



Natchez Trace Parkway

Fire Management Plan

December, 2008



SIGNATURE PAGE

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ANNUAL FIRE MANAGEMENT PLAN REVIEWS

2009

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I. INTRODUCTION

A. Reasons for Plan Development

National Park Service (NPS) policy states that all national park units that contain burnable vegetation must have a fire management plan (FMP) approved by the superintendent. The fire management program, carefully guided by resource management objectives should protect cultural resources and perpetuate the natural resources and their associated natural processes. The general management plan (GMP) for the Parkway emphasizes the role of fire as a natural ecological process, and these priorities serve as the basis for this document. As the FMP is implemented, collaboration among several disciplines is critical in order to adaptively manage Parkway lands.

B. Compliance

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.

The FMP serves as a detailed and comprehensive program of action to implement federal fire management policy principles and goals. 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 Parkway 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 Natchez Trace Parkway (NATR) must be safeguarded.

Selected Alternative: Under the preferred alternative, the NATR 2005 Fire Management Plan would be updated and implemented. 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 Parkway's resource management objectives and for managing hazard fuels. Prescribed fire would be used where appropriate to protect life, property, and Parkway 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 1200 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 (i.e. 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 Parkway 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, precommercial 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, if needed.

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 Parkway, Maximum Allowable Areas would be too small to afford effective resource management or fuel reduction benefits.

Other Alternatives: A No Action alternative was also considered in detail in the Environmental Assessment. 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.

Scoping: During January 15-February 5, 2008, Natchez Trace Parkway announced to the public its intentions to revise and implement the 2005 Draft Fire Management Plan. No comments were received. On August 11, 2008, the draft version of the Environmental Assessment for the Fire Management Plan was available for public comment. The announcement of availability was made through the NPS Planning, Environment, and Public Comment (PEPC) website, a press release sent via email to approximately 250 organizations, individuals, and newspapers, and in hard copy in 3 Natchez Trace Parkway Visitor Centers. 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 Parkway via e-mail or written correspondence. The public was also welcomed to visit the Parkway office and speak personally with the appropriate staff members about the plan. The public scoping period ended on September 11, 2008. No comments were received during the public scoping period.

Summary of Impacts and Conclusions: The selected alternative, as described above, would have the following impacts on the human environment:

1. There would be minor, localized soil erosion and compaction from fuels reduction and wildland fire suppression activities. The small scale of these activities would ensure that soil erosion would be minimal (see page 3-3 of the EA).
2. There would be minor impacts to water quality from soil erosion due to fuels reduction activities and use of fire retardants and foams (see page 3-6 of the EA).

3. Suppression and maintenance activities resulting in ground disturbance may impact plant species and could result in the spread of non-native species (see page 3-10 of the EA).
4. Temporary displacement and minor adverse impacts to some wildlife species may occur as a result of fire suppression, debris burns, and other fuels treatments (see page 3-15 of the EA).
5. Prescribed fire and use of heavy equipment may lead to minor impacts on surrounding air quality (see page 3-18 of the EA).
6. Minor, short-term impacts on visual resources and visitor experience may occur during fuels treatments and prescribed burning activities (see page 3-19 of the EA).
7. There would be very minor risks to human health and safety during suppression, fuels reduction, and prescribed burning activities (see page 3-22 of the EA).

C. Authorities for Implementation

The authorities for implementing this plan are contained in the Organic Act of the National Park Service (August 25, 1916, Section 102), the National Parks and Recreation Act of 1978, the National Park Service's Director's Orders #18 (DO-18, 2005), and associated Reference Manual #18 (2006). DO-18 cites Part 910 of the Departmental Manual, which authorizes the prevention, preparedness, control, and suppression of fire on or threatening lands under the jurisdiction of the Department of the Interior.

This plan will implement fire management policies and help achieve resource management and fire management goals as defined in (1) Federal Wildland Fire Management Policy and Program Review; (1995) (2) Managing Impacts of Wildfires on Fire Adapted Ecosystems – A Cohesive Strategy; and (3) A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan.

II. RELATIONSHIP TO LAND MANAGEMENT PLANNING AND FIRE POLICY

A. History and Significance of the Natchez Trace Parkway

The Natchez Trace was one of the most ancient and important Indian roads leading from the 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. Many travelers of the Natchez Trace were farmers and boatmen from the Ohio River regions of Pennsylvania, Ohio, and Kentucky floating supplies down to ports in Natchez and New Orleans at the beginning of the 1800s. The Natchez Trace ran through the heart of Choctaw and Chickasaw country, through a series of mounds that had been built by people over the previous 2000 years, and through a diverse terrain of swamps, rivers, and rolling hills.

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. It was furthermore made famous because General Jackson returned with his army over the Natchez Trace to Nashville after the Battle of New Orleans.

The Natchez Trace is located on highlands between watersheds throughout almost its entire length. This served as the most suitable route over which to establish the national Parkway through a section of the country greatly in need of such road facilities. From a national standpoint, such a road was needed to connect the North and East directly with the Natchez, New Orleans, and the southwest section of the country. The Natchez Trace is known as one of the Nation's most famous old roads.

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 nine districts: Leipers Fork and Meriwether Lewis in Tennessee; Cherokee in Tennessee and Alabama; Tupelo, Dancy, Kosciusko, Ridgeland, Port Gibson, and Natchez in Mississippi. The Parkway is 444 miles in length and averages 825' in width. Elevation ranges from 70' at Natchez to 1080' at Nashville. The Parkway transcends 8 major watersheds. Precipitation averages 56 inches per year with most of the rainfall occurring in the spring and summer months. The Tennessee, Alabama, and north Mississippi portions historically receive light to moderate snow from November through March.

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. The oak/pine type is best represented by post and blackjack oaks interspersed with stands of loblolly and shortleaf pine. The oak/hickory type is made up of the white, southern red, and black oaks along with shagbark hickory, yellow poplar, white ash, sweetgum, blackgum, and red maple. Refer to the Natchez Trace Parkway Fire Monitoring Plan (Appendix K) for more information.

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 1310 species of flora and fauna. Threatened and endangered species, such as the red-cockaded woodpecker, Indiana gray bat, Tennessee yellow-eyed grass, the slackwater darter, bayou darter, and ringed sawback turtle have been found associated with the Parkway. Critical habitat for the slack water darter, Tennessee yellow-eyed grass, and the Indiana gray bat occur on Parkway land. Refer to Appendix C for a complete list of threatened and endangered species occurring along the Parkway.

The Parkway contains 45,748.98 acres in fee-simple title and scenic easements that contain restrictive covenants on 5,906.63 additional acres. There is no Parkway acreage designated as wilderness. The Parkway has an irregular boundary of approximately 1,000 miles, arranged in a long thin configuration. This translates into a ratio of one mile of boundary for every 49 acres, and is indicative of the significant urban interface issues. 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.

There are 441 separate cultural/historical structures or sites and 29 cemeteries, 3 commemorative sites and one National Scenic Trail on Parkway lands. These include 115 segments of Old Trace, 314 archeological sites, 3 historic houses, 9 historic sites and structures, 2 battlefields, 1 monument, and 1 National Scenic Trail.

B. Natural Resource Goals and Fire Management

The enabling legislation for the Natchez Trace Parkway states:

~~Be~~ it enacted by the Senate and the House of Representatives of the United States of America in Congress assembled, That, all lands and easements heretofore and hereafter conveyed to the United States by the States of Mississippi, Alabama, and Tennessee for the right-of-way for the projected Parkway between Natchez, Mississippi, and Nashville, Tennessee, together with sites acquired or to be acquired for recreational areas in connection therewith...shall be known as the Natchez Trace Parkway.” (52 Stat. 407).

This legislation was the foundation for the administration and maintenance of the Parkway and associated land. The Parkway’s Resource Management Plan and Statement for Management further describe management objectives. The Parkway’s primary resource management goal is:

---to preserve, protect, and manage the park’s [sic] cultural and natural resources within naturally functioning ecosystems, consistent with cultural resource preservation” (NPS 1995).

Fire management at the Parkway is directly related to this resource management goal, and is supported by the Parkway's fire management objectives. This plan will help meet this broad management goal by outlining the specific strategies and objectives needed for successful implementation of fire management on Parkway lands. In addition, this fire management plan identifies actions necessary to implement Servicewide fire management policies (DO-18, 2005) and RM-18 (2006) and to achieve Parkway resource management objectives.

III. WILDLAND FIRE MANAGEMENT STRATEGIES

A. General Management Considerations

Whereas fire on the landscape is recognized as a natural ecosystem process, the narrow geography and urban interface associated with Parkway lands prevent the possibility of wildland fire use. Therefore, all wildfire at the Natchez Trace Parkway will be suppressed, but prescribed fire is used to achieve management objectives. Agencies cooperating with the Parkway include federal, state, and local entities such as the U. S. Fish and Wildlife Service, U.S. Forest Service, Mississippi Forestry Commission, Alabama Forestry Commission, Tennessee Department of Forestry, Tishomingo State Park, and more than 60 volunteer and paid fire departments. Such interagency partnerships and collaborations are a vital component of fire management at the Parkway. This plan seeks to incorporate the management needs of the Parkway and local agencies while recognizing regional and national strategies designed to reduce the damaging effects of wildland fires. As with wildland fire suppression and prevention, the same sort of cooperation is needed for the use of prescribed fire in ecosystems adapted to and dependent upon fire.

B. Wildland Fire Management 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. Specifically, the Parkway’s primary resource management goal is:

—..to preserve, protect, and manage the park's [sic] cultural and natural resources within naturally functioning ecosystems, consistent with cultural resource preservation” (NPS 1995)

General fire management goals for the Parkway, adapted from DO-18, are listed below.

1. Achieve maximum overall benefits and minimize damages of wildland fire suppression within the framework of land use objectives and resource management plans, while giving primary consideration to firefighter and public safety.
2. Raise employee and public awareness about fire management program goals, objectives, and fire’s role in ecosystem management.
3. Maintain the highest standards of professional and technical expertise in planning and safely implementing an effective wildland fire management program.
4. Integrate fire management with all other aspects of Parkway management.
5. 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.

6. 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.

7. Protect life and property and accomplish resource management objectives, including restoration of the natural role of fire in fire-dependent ecosystems.

C. Wildland Fire Management Options

1. Wildland Fire Suppression

All wildland fires will 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).

2. Prescribed Fire

Prescribed fire is one of the preferred strategies for achieving the Parkway's resource management objectives and for managing hazard fuels. Prescribed fire will be used where appropriate to protect life, property, and Parkway resources from the effects of unwanted fire and to manage ecosystems and associated fuels to meet management objectives. 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
- Historic scene restoration/maintenance (pine stands, fields, and prairies).
- Manage and/or restore native ecosystems and control non- native species.
- Integrated pest management (southern pine bark beetle).
- Replicate the effects of natural fires.

3. 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 Parkway results in burns 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 are prohibiting 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.

4. Wildland Fire Use

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

D. Wildland Fire Management Strategies by Fire Planning Unit

The Natchez Trace Parkway is unique in that it belongs to two broad Fire Planning Units (FPUs), 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 1). For the purposes of this plan, management will be discussed generally at the Fire Planning Unit level.

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.

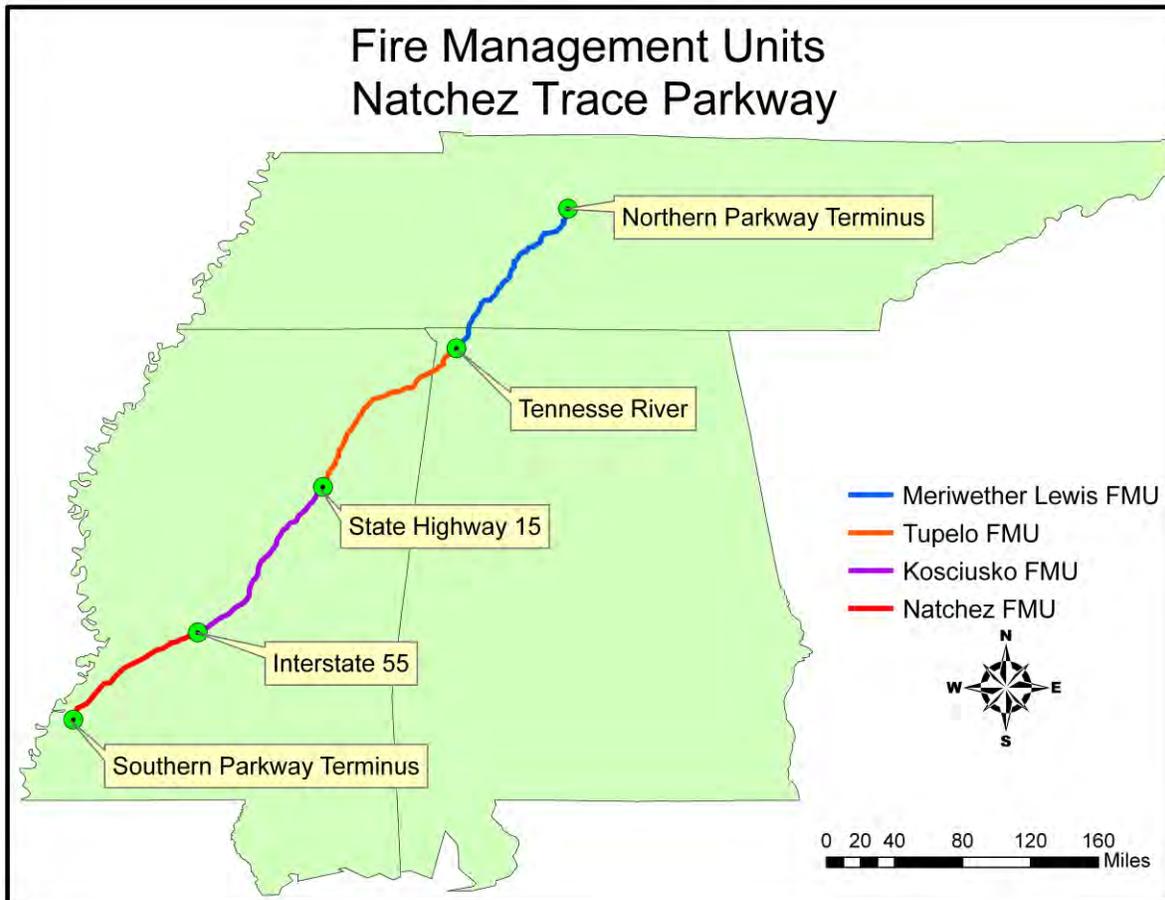


Figure 1. Geographic divisions between Fire Management Units (FMU) along the Natchez Trace Parkway. Natchez, Kosciusko, and Tupelo FMUs belong to the North Mississippi Fire Planning Unit (FPU). The Meriwether Lewis FMU belongs to the Tennessee/Green River FPU. The Tennessee River is the boundary between the two Fire Planning Units.

1. North Mississippi Fire Planning Unit

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

a. 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 the 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 K) and Parkway 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) 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.

b. Fire Management Objectives and Strategies

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

- Provide for the safety of Parkway visitors, neighbors, and employees during all phases of fire management activities
- Conduct all fire management activities commensurate with applicable laws, policies, and regulations.
- Suppress all unwanted fires (declared wildfires) in the Parkway and within the Parkway protection zone with minimum cost, and environmental and cultural resource impacts
- Cooperate extensively with adjacent land management owners and local fire suppression agencies through Memoranda of Understanding to facilitate safe and prompt suppression of wildfires.

- Prescribed burn and/or mechanically/manually and/or chemically treat the Parkway developed zones to reduce the threat of unwanted fire.
- Reduce unplanned human-caused ignitions through cooperative fire prevention program.
- Provide opportunities for public understanding of the wildland urban interface problem.

Objective 2: Manage fuels to meet management objectives.

- Create and maintain defensible areas for fire suppression.
- Where applicable, restore fuel loads and plant community structure, composition, and associated wildlife species to ranges of natural variability comparable to pre-Anglo settlement using a predetermined regimen of prescribed burns, mechanical, manual, or chemical treatments.
- Eliminate unnaturally intense fires through reduction of hazard fuels by periodic prescribed burns, mechanical, manual, or chemical treatments.
- Avoid prescribed burns which would reduce air quality in densely populated areas for more than two days.
- Train Parkway staff and cooperators to conduct safe, objective-oriented prescribed burns consistent with DO-18 and RM-18 requirements.
- Provide opportunities for the public understanding of fire ecology; smoke management and fuels management objectives and operations.
- Monitor and evaluate the effectiveness of the fuels management program.

Objective 3: Prevent adverse impacts from fire suppression.

- Use minimum impact fire suppression techniques and rehabilitate disturbed areas to protect natural, cultural, and scenic resources from adverse impacts attributable to fire suppression activities.
- Suppress unwanted fires commensurate with values at risk.
- Ensure that a resource advisor is present on all major suppression actions.
- Engender understanding among firefighters about the impacts of fire suppression on sensitive Parkway resources.
- Prevent use of tractor plows to suppress fires on Parkway lands, unless there is an imminent threat to life or property and the superintendent or designee has given permission for tractor plow use.
- Avoid use of non-native seed to rehabilitate sites disturbed by wildfires or their suppression.

The following strategies will be employed to meet Parkway fire management objectives:

- Suppress all wildfires threatening life, property, or resources using the appropriate management response. The appropriate response is 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

individually. Every reasonable effort will be made to prevent wildfires from crossing Parkway boundaries. Minimum impact tactics will be used whenever possible.

- Maintain an Initial Attack organization capable of suppressing Class A, B, and C wildfires. Initial Attack equipment and personnel will be distributed to maintain a minimum response time of 1.5 hours to Class A and B fires, and 2.5 hours to Class C or larger fires.
- Maintain Cooperative Agreements with adjacent fire agencies to promote cooperative prevention, suppression, and fuels management activities.
- Implement a long-range training and position management program to meet identified fire management staffing and qualification requirements. Integrate qualification requirements into position descriptions.

c. Wildland Fire Management in the Northern MS FPU

Suppression is as per Parkway policy (see section I). Interagency operations are directed by the Interagency Agreements with the National Forests of Mississippi, the Mississippi Forestry Commission (MFC), Alabama Forestry Commission (AFC), and the Noxubee and Mississippi Sandhill Crane National Wildlife Refuges. The Parkway also maintains Memorandums of Understanding or General Agreements with 50 local fire departments.

The MFC is the primary provider of detection services for the Mississippi, while the AFC provides detection services for Alabama utilizing aerial detection flights. The USFS also occasionally contracts detection flights. The Parkway depends on these cooperator-provided detection services, as well as ground detection by patrol rangers and other staff. The Parkway may also initiate additional detection flights and prevention patrols under extreme conditions.

The Parkway's primary suppression resources are four type 6X engines distributed throughout the unit. The USFS, AFC, and MFC use tractor-plows almost exclusively. These resources are extremely effective, but are only used to prevent wildfires from crossing Parkway boundaries, or when other resources prove ineffective. Some USFS, AFC, and MFC districts do have type 6X engines available. Local fire cooperators generally lack training and experience in wildland firefighting, and are best suited for structure protection duties.

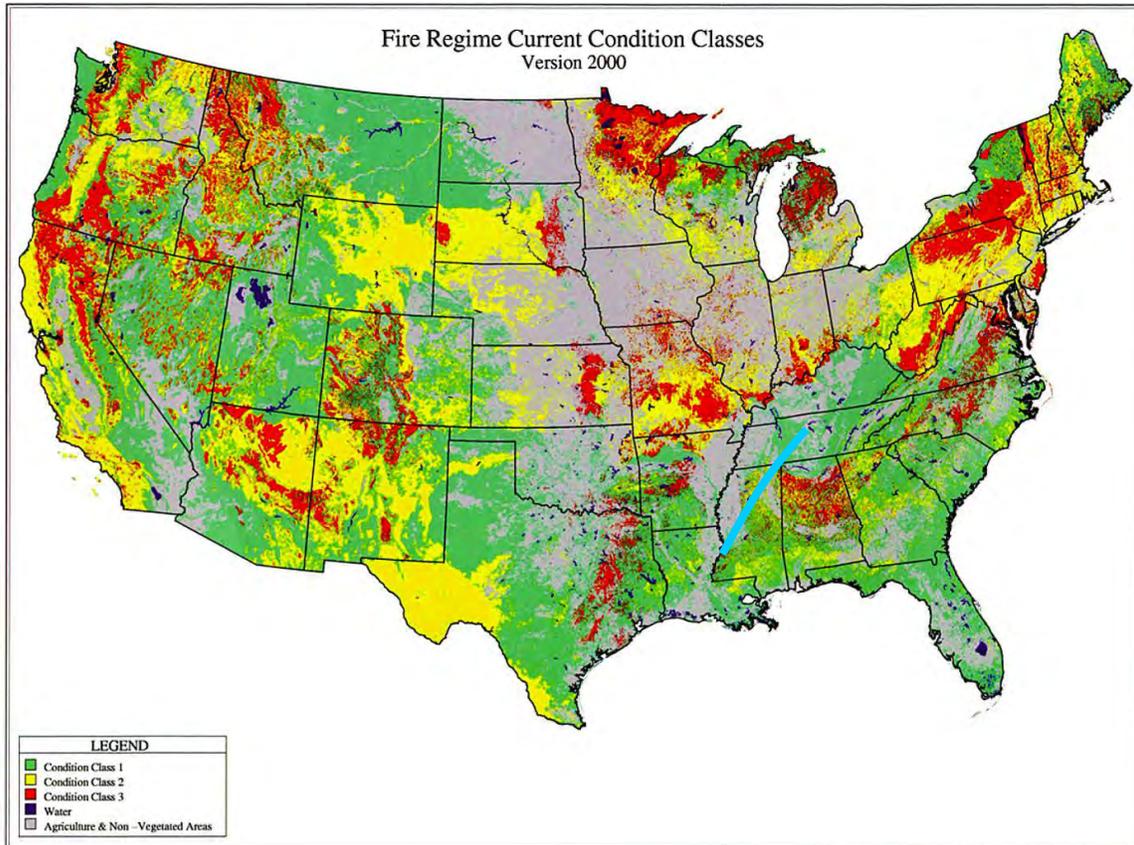


Figure 2. Current fire regime condition class for the United States. Note the presence of all condition classes along the approximate location of the Natchez Trace Parkway (blue line). From Schmidt, *et al.* 2002.

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.

a. 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 is the primary fire cause. Fires in this unit have the potential to be more damaging to Parkway resources due to steep slopes and the presence of species that are less fire-tolerant. Refer to the Fire Monitoring Plan (Appendix K) and Parkway 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 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. Indigenous 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 K).

b. Fire Management Objectives and Strategies

The objectives for fire management in the TN FPU are largely equivalent to those of the MS FPU. Refer to the Northern MS FPU section above (III.D.1.b) for objectives and strategies.

c. Wildland Fire Management in the TN FPU

Suppression is as per Parkway policy (see section I). Interagency operations are directed by the Memorandums of Understanding and General Agreements with the Tennessee Department of Conservation, Division of Forestry (TDF), Alabama Forestry Commission (AFC), and 15 local fire departments.

The TDF is the primary provider of detection services for the Tennessee portion of while the AFC provides detection services for the Alabama portion utilizing aerial detection flights. The Parkway depends on these cooperators provided detection services, as well as ground detection by patrol rangers and other staff. The Parkway may also initiate additional detection flights and prevention patrols under extreme conditions.

The Parkway's primary suppression resource is one type 6X engine stationed at the Meriwether Lewis Ranger Station. The TDF utilizes tractor-plows almost exclusively. These resources are extremely effective, but are only used to prevent wildfires from crossing Parkway boundaries, or when other resources prove ineffective. Some TDF and AFC districts do have type 6X engines available. Most local fire cooperators lack training and experience in wildland firefighting, and are best suited for structure protection duties.

3. Fire History and Occurrence for all FMUs

Fires from lightning strikes have occurred for eons, but little data exists to provide a clue to their frequency and intensity prior to post-settlement times. Indians and European settlers, however, used fire as a means of manipulating the natural environment to their benefit.

Prior to European settlement the Chickasaw and Choctaw Indians were the primary inhabitants of the Coastal Plain. These Indians maintained a hunting-gathering-farming economy, with hunting being the primary method of subsistence. 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.

A written account of Indians using fire was documented by Captain Thomas Nairne in 1708 in the Captain Thomas Nairne's Journals To The Chickasaws and Talapoosies:

"Of all hunting deversons, I took most pleasure in firing rings for in that we neer missed 7 or 10 Dear. Three or 4 hours after the ring is fired, of 4 or 5 miles circumference, the hunters post themselves within as

nigh the flame and smook as they can endure. . . .the hunters who drawing nigher together, as the circle grows less, find an easy pray of the impounded dear . . ."

Other references support this use of fire, such as written by Charles Hudson in "The Southeastern Indians".

"The fire surround was a communal hunting technique used in fall and early winter . . . a group of hunters, often as many as two or three hundred, would go into the woods and set the leaves on fire in a circle of up to five miles in circumference. . . . Not all burning by the Indians was directly connected with fire surround hunting. Some evidence suggests that they intentionally burned portions of the woods in winter . . . not only did it reduce the threat of serious forest fires, . . . it kept the forest open by cleaning out underbrush, tree seedlings, and saplings. ...In view of this practice of regular light burning, it is not so difficult to explain why early Europeans ...reported seeing large parklike meadows with widely separated large trees..."

With the advent of European settlement, fire played an increasing role in the development of the agrarian economy. Fire was used to clear farmland, renew pastures, encourage wildlife habitat and reduce tick and chigger populations. Today, the landholders along the Parkway still use fire for the same reasons. This traditional use of fire is reflected in the fire history data collected at Natchez Trace Parkway.

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 Parkway 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. The sources of fires and corresponding percentages are given in Figure 3.

¹ Note that this figure includes off-park acres.

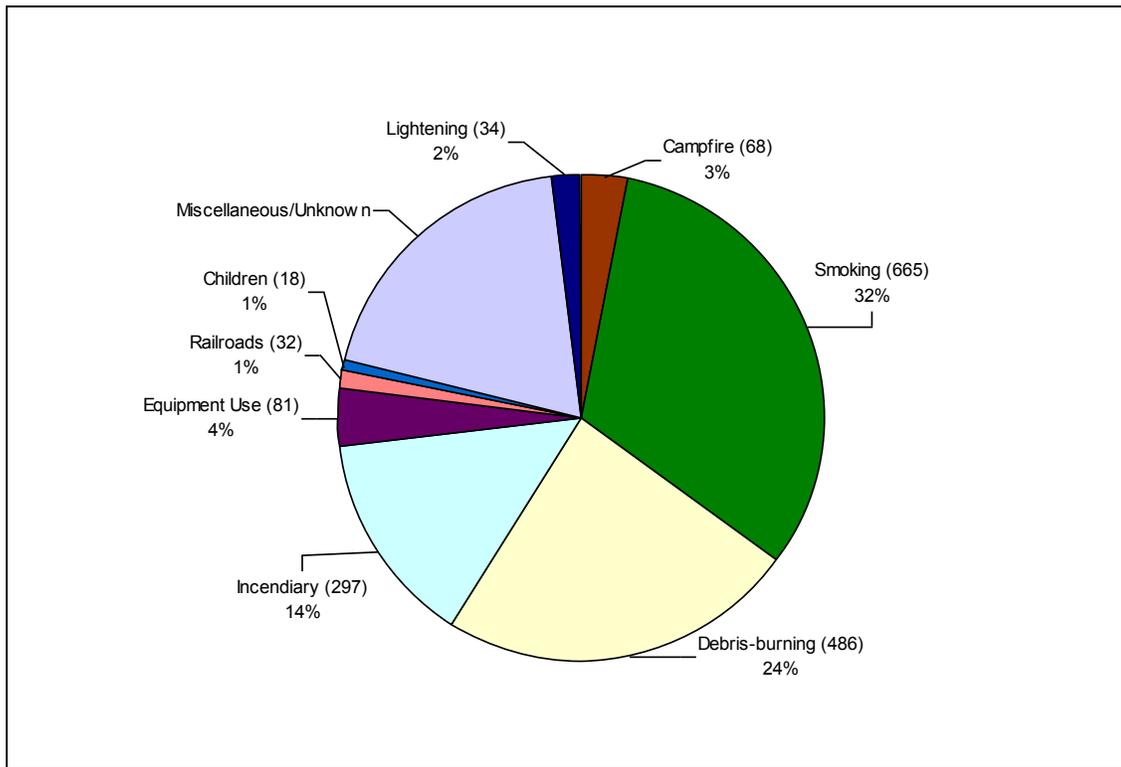


Figure 3. Sources of fires along the Natchez Trace from 1938-2006. Number in parentheses indicates number of fires. Note: For ease of reporting, the cause of most fires in the 1900's was recorded as smoking. This number is likely inflated, and many fires should have been recorded as incendiary.

The percentage of fire size classes are: Class A (24%), Class B (52%), Class C (21%), Class D (2%) and Class E and F combined (1%). These figures are based on total acreage burned combining Parkway acreage and off Parkway acreage. Approximately 76% of all the wildfires are less than 10 acres, and 97% are less than 100 acres. Wildfires have occurred during every month of the year; however, 82% occur within the following six months:

<u>Month</u>	<u>Percent Fire Frequency</u>
October	6%
November	9%
December	10%
January	9%
February	15%
March	20%
April	12%

The wildfire season at Natchez Trace Parkway occurs during the months of October through April each year. These are the months after autumn leaf fall and prior to the major spring green-up .

4. FMU Fire Management Zones

Within each Fire Management unit there are several Fire management zones. The management objectives for each zone are identified below and are applicable throughout the Parkway. The actual zone boundaries within the zones will be established as fire management objectives are implemented.

a. Natural Zone

Description: The natural zone encompasses approximately 22,039 acres, which is to be managed as a natural environment. Any area not identified as development, cultural or special use is within this zone. The natural zone is comprised of six separate vegetative associations. They are oak/hickory, oak/pine, loblolly/shortleaf pine, oak/gum/cypress, mixed hardwood and beech/magnolia.

Objectives: Fuels treatments will be used to simulate the natural role of fire in this zone. Treatments will be conducted to perpetuate fire-dependent plant communities, promote scenic diversity, eradicate exotic species and reduce fuel loadings to presuppression levels.

Zone Management: The following fire management actions may be taken to accomplish Parkwide objectives.

Wildfire:

- All lightning and man-caused fires at Natchez Trace Parkway will be considered wildfires and will be suppressed.

Fuels Treatments:

- May be used to maintain the Parkway's scenic diversity by stimulating the regeneration of oaks within the mixed hardwood oak/hickory associations and the pines and grasses within the oak/pine/cedar/glade associations.
- May be used to reduce fuel accumulations to mitigate the impacts from wildfires.
- May be used to assist in the eradication of exotic species.
- May be used to conduct research burns to further our knowledge on the effects of fire upon Parkway ecosystems.
- May be used in habitat enhancement for endangered and threatened species.
- May be used in the management and control of disease and insect infestations.

b. Development Zone

Description: The development zone contains approximately 12,495 acres and includes the lands necessary to provide and maintain areas for Parkway maintenance and visitor use. This zone includes in part: offices, maintenance areas, residences, restrooms, picnic areas, interpretive exhibits, roadways and lands included in the agricultural leasing program.

Objectives: Fuels treatments will be used as a tool in the management of vegetation within the development zone. Fire may be used in place of mechanical mowing to save money and to protect Parkway structures and visitors.

Zone Management: The following actions may be taken to accomplish Parkwide objectives.

Wildfire:

- All lightning and man-caused fires at Natchez Trace Parkway will be considered wildfires and will be suppressed.

Fuels Treatments:

- May be used to maintain the Parkway's scenic diversity by stimulating the regeneration of oaks within the mixed hardwood oak/hickory associations and the pine and grasses within the oak/pine/cedar/glade associations.
- May be used to reduce fuel accumulations to mitigate the impacts from wildfires, especially around structures.
- May be used to assist in the eradication of exotic species.
- May be used to conduct research burns to further our knowledge on the effects of fire upon Parkway ecosystems.
- May be used in pastoral scene maintenance by perpetuating the growth of forbs and grasses along the Parkway.
- May be implemented on scenic easement or special use lands by trained Parkway employees upon request of reservation holder and approval from the Parkway Superintendent. Burning uses might include debris, open field management, or vegetative manipulation in accordance with Parkway objectives. State and Federal air quality standards must be met.
- May be used in the management and control of disease and insect infestations.

c. Historic Zone

Description: The historic zone includes approximately 647 acres having historical and cultural significance. These lands include vestiges of the Old Trace, historic structures, and historic and archaeological sites. The boundaries of this zone in most cases are the same as shown on the National Register Property or Nomination.

Objectives: Fuels treatments will be used to protect historic structures, archaeological sites and maintain the historic scene.

Zone Management: The following actions may be taken to accomplish Parkwide objectives.

Wildfire:

- All lightning and man-caused fires at Natchez Trace Parkway will be considered wildfires and will be suppressed.

Fuels Treatments:

- May be used to perpetuate the historic scene.
- May be used to assist in the eradication of exotic species.
- May be used to maintain scenic diversity within the plant associations found within this zone.
- May be used to reduce fuel loadings around historic structures to secure them from wildfire.
- May be used in the management and control of disease and insect infestations.

- May be used to conduct research burns to further our knowledge of the effects of fire upon Parkway ecosystems.

d. Special Use Zone

Description: The special use zone encompasses approximately 1000 acres. These lands are transportation and utility corridors for uses by other agencies and private interests. These uses include accesses for electrical power, gas and oil pipelines, water lines, railroads and road rights-of-way.

Objectives: Fuels treatments will be used to protect utility corridors from wildfire and hardwood encroachment.

Zone Management: The following actions may be taken to accomplish Parkwide objectives:

Wildfire:

- All lightning and man-caused fires at Natchez Trace Parkway will be considered wildfires and will be suppressed.

Fuels Treatments:

- May be used to reduce fuel loadings to mitigate the impacts from wildfire.
- May be used to maintain the corridors in the early stages of succession in lieu of spraying or mowing.
- May be used to assist in the elimination of exotic species.
- May be used to conduct research burns to further our knowledge of the effects of fire upon Parkway ecosystems.

IV. WILDLAND FIRE MANAGEMENT PROGRAM COMPONENTS

A. General Implementation Procedures

Because of the narrow geometry of the Parkway and the associated urban interface, all wildland fires will be suppressed. Therefore, the appropriate management response will be fire suppression. Common sense must be used in suppression actions considering values to be protected, least cost, resource damage caused by the suppression action, and the first priority at all times, firefighter and public safety. If the initial action is unsuccessful, a Wildland Fire Situation Analysis (WFSA) will be prepared to determine the next set of management responses (Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide, 1998).

Appropriate Management Response

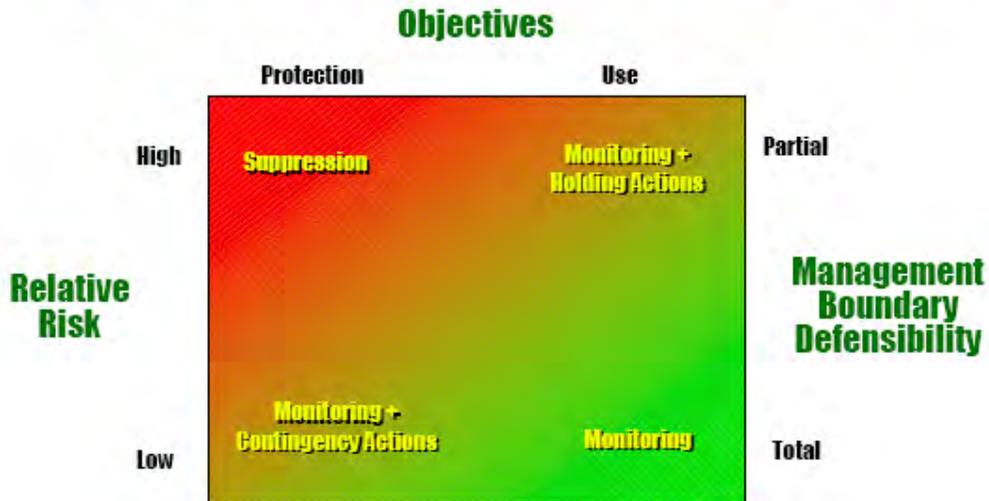


Figure 3. Ranges of appropriate management responses based on objectives, relative risk, complexity, and defensibility of management boundaries (from Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide, 1998. Because of the high relative risk and proximity of fires to management boundaries, the appropriate management response for the Parkway is fire suppression.

Wildland Fire Management RM-18 states that a Wildland Fire Implementation Plan (WFIP) will be initiated for all wildland fires. The Incident Commander will be responsible for completing the Stage 1: Initial Fire Assessment portion of the WFIP. This Stage 1 analysis documents the current and predicted situation, and appropriate administrative information. Because fire suppression is the only appropriate response, the requirement for a WFIP at the Parkway is satisfied at the programmatic level, as described in this FMP. Exceptions to this may occur in cases where suppression extends beyond initial attack.

B. Wildland Fire Suppression

1. Prevention

The Parkway has completed a Wildfire Prevention Analysis and Plan (Appendix E). The purpose of the document is to outline the plan for wildfire prevention and to identify personnel responsible for its implementation. Plan components include fire prevention objectives, responsibilities, fire prevention assessment (risk, hazard, and value assessments), fire prevention compartments, plan evaluation, fire prevention tasks, and compartment summary. This plan will be utilized with the Fire Prevention Workload Analysis to determine personnel and materials costs for the wildfire prevention program.

Ninety-nine percent of Parkway fires are human-caused. The prevention plan identifies the need to improve wildfire investigation and prosecution. All wildfires will be investigated (Exhibit 2 - NATR Fire Investigation SOP). Violators will be held responsible for civil costs and criminal actions.

Due to the width of the Parkway, all vegetation within the Parkway is hazard fuel unless there is some type of natural or man-made barrier to prevent it from crossing the Parkway boundary. To complicate matters further, residential, commercial, and industrial development is continuing at a rapid rate along many of the thousand miles of Parkway boundary. To deal with this problem, the Parkway has initiated the development of a Hazard Fuel Management Plan to identify and prioritize hazard fuel blocks, and to identify long term strategies for responsibly managing the risks associated with these fuels.

2. Prevention Strategies

Prescribed fire is the preferred means of fuel reduction because of its low cost and consistency with natural zone management. However, the size of the areas to be treated, recommended burning rotations (3-5 years), staffing and cost requirements, and smoke management concerns necessitate shifting to alternative strategies for some areas. Manual and mechanical fuel reduction projects have proven to be successful, though more labor intensive and costly than prescribed fire.

A public information program in conjunction with cooperators is an additional strategy. Adjacent landowners can significantly lower the risks to values, especially structures, by following guidelines, such as those outlined in the Firewise educational campaign. In addition, education through public awareness activities such as Fire Prevention Week and educational presentations occur annually.

Establishing a system of fuel breaks on the Parkway boundary is the most attractive strategy from a fire management perspective. Some areas have had fuel breaks constructed around areas of heavy fuel loading to provide defensible space from which to aggressively fight fire. The presence of fuel breaks also reduces the cost of any prescribed fire (resource management or hazard fuel) projects that the Parkway might initiate in these areas. These strategies will be considered based upon the hazard fuel identification and prioritization. A combination of strategies will most likely be chosen.

3. Preparedness

As directed, District Rangers are responsible for all preparedness actions within their districts. The FMO is responsible for coordinating Parkwide preparedness actions. Specific duties are assigned in the Parkway step-up plan (Appendix D).

a. Staffing Levels

District Rangers will maintain the following **minimum** fire qualification levels for each engine within their districts. The FMO will ensure that the following Parkway-wide staffing minimums are met:

Parkway Level	District Level
1 Incident Commander/Multiple Resources 1 Strike Team/Task Force Leader 2 Type 4 Incident Commanders 2 Single Resource Engine Bosses 1 Single Resource Crew Boss	Advanced Firefighter/IC Type 4 Single Resource Engine Boss 2 Firefighters

The FMO is responsible for the required training needs of firefighters. This is necessary to maintain minimum staffing levels. Fire Management will locate available courses, and arrange for any funding that might be needed. In the past, the Parkway has had great difficulty in retaining or recruiting qualified Single Resource Leaders. Training Single Resource Leaders for each of the Parkway's 5 engines is the highest training priority, and is improving as the experience levels and qualifications of the firefighters increase.

Parkway training may be coordinated with fire cooperators, and instructors meeting agency instructor requirements are used whenever available. All instructors are approved by the FMO. In addition to formal training, the Parkway will offer annual firefighter refreshers to each district. The training may be specific to each district, and may be instructed by district staff with the assistance of the FMO.

The linear nature of the Parkway necessitates that a decentralized suppression organization, integrating cooperator resources as appropriate, exists for the safe and effective management of wildfires on or threatening Parkway lands and resources. Because of this decentralization, copies of DO-18 and RM-18 are located at each duty station and are available for reference use by park personnel. It is suggested that all personnel involved in wildfire suppression activities become familiar with these guidelines and the fire management plan.

b. Engines and Caches

Due to the distribution of firefighters and the incompatibility of cooperator suppression tactics (tractor-plovs), the Parkway has maintained a fleet of small engines since the 1940’s. These engines serve as the primary fire suppression resource.

Each district with an engine will maintain 1 re-supply cache and 1 main supply cache will be located at Parkway headquarters. Fire management will maintain the main cache and 2 engines. District Rangers are responsible for ensuring the assigned District Fire Coordinator maintain the year round fire readiness of the assigned caches and engines. Subject-to-furlough forestry technicians assist in keeping caches ready during the fire season.

Parkway caches are located as follows:

Station	Cache Type	Description
Natchez, Kosciusko, Meriwether Lewis (Out-district locations with engines)	A	Engine Resupply Cache
Ridgeland, Cherokee, Leipers Fork	B	Initial Attack Cache (pump kit, hose, handtools)
Tupelo	C	Main Fire Cache

Standard configuration and inventory for engines and caches is contained in Appendix F, Exhibit 10. Needed inventory for engines follows the standards set forth in the Interagency Standards for Fire and Fire Aviation Operations (“Red Book”). District Rangers, as assigned, are responsible for maintaining all assigned equipment and caches in a ready state, and meeting minimum inventory requirements.

The Equipment Specialist is responsible for maintaining the headquarters fire cache, inventorying re-supply caches, and filling District Ranger resource orders in a timely manner. The FMO may direct the reassignment of resources to another district as conditions warrant.

c. Fire Weather and Fire Danger

Fire weather monitoring is necessary to determine daily fire danger and staffing levels. Fire weather will be observed daily at 1300 hours at the Tupelo, Meriwether Lewis, Highway 41, and Ridgeland RAWS stations. This data will be input into the Weather Information Management System (WIMS) to receive the daily fire danger from the National Fire Danger Rating System (NFDRS). This data will also be archived into the National Interagency Fire Management Integrated Database (NIFMID) which contains historical fire and weather record information.

The fire management office will monitor current and predicted fire weather, and calculate manning classes and fire danger ratings for each district. The Communications Center will broadcast fire danger ratings, manning classes, and fire weather forecasts daily during fire season and whenever a district is in MC-III or higher. The manning class report will determine step-up actions to be taken by that district during the next 24 hours (Appendix D).

The Parkway relies on cooperators, Parkway staff, and visitors to detect fires before they grow beyond the Parkway's control capabilities. Cooperators provide aircraft detection. This is supplemented by patrol and observation by Parkway employees. A number of fires are also reported by visitors or adjacent landowners. The step-up plan provides increased patrols as well as the use of aircraft if deemed necessary by the FMO. This system has worked extremely well in the past. At the present time, it is uncertain whether state cooperators will be able to maintain the current level of fire detection. Adjustments to this plan may be needed if state detection services decline significantly.

Because fuels on the Parkway mostly fall into Fire Behavior Fuel Models 8 and 9 and National Fire Danger Rating Fuel Models E, R, and C, the Parkway will utilize fuel models E and R to determine Fire Danger Rating Indices. Fuel model C will be monitored to compare Fire Danger Rating generated by the U.S. Forest Service. The Parkway will utilize the Burning Index (BI) as the primary fire danger indicator. During periods of drought the Parkway will make provisions for severity utilizing the Keetch-Byrum Drought Index in conjunction with the National Fire Danger Rating System. Refer to the Natchez Trace Parkway Wildfire Suppression District Action Guidelines (Appendix D) for fire danger rating thresholds and associated step-up actions and protocols.

4. Pre-Attack Plan

Due to the Parkway's linear geometry and wildland-urban interface, all wildfires will be suppressed using the appropriate management response. The appropriate response is 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 individually. Refer to Appendix H for more detail.

Although formal pre-attack plans are not in use for each district along the Parkway, pre-attack planning data continues to be compiled by the Fire Management Office. Pre-attack planning data that may be collected includes:

- Response map (roads, fire stations/caches, fire towers, airports, helispots, water sources (type and flow), mutual aid zones/fire cooperator districts)
- Hazard/Risk map (potential fire occurrence zones (high, medium, low), potential values at risk zones (high, medium, low), hazard potential zones (high, medium, low))
- Natural and Cultural Resources map (sensitive zones, non-sensitive zones), as available
- Directories/Inventories (engines, caches, maintenance equipment, employees, cooperators)
- Parkway structure assessments

- Closure/Evacuation procedures

The National Inter-Agency Incident Management System (NIIMS) is a system that fire protection agencies can utilize at local, state and federal levels and is integrated with Incident Command System (ICS) and The Wildland Fire Qualification System Guide (PMS 310-1). Experience and training is entered into the Incident Qualification Certification System (IQCS) where fire qualifications are certified. ICS will be utilized within the current fire organization at the Natchez Trace Parkway (Refer to fire suppression SOP, Exhibit 5).

All fires occurring within the Parkway will be reported to the Fire Dispatcher, who will dispatch the closest initial attack forces per the preplanned dispatch plan (Appendix F, Exhibit 2). FMO, District Ranger, and Cooperators will be notified.

The Incident Commander (IC) will be responsible for all aspects of the management of the incident. The IC will ensure that all suppression actions are implemented with the highest regards for firefighter safety. The IC will provide a size-up of the fire to the dispatcher as soon as possible, and determine the resource needs for the fire. After the size-up, the IC may cancel preplanned resource orders or may place additional resource orders through the FMO. The IC will select the appropriate fire suppression strategies and tactics necessary to effectively suppress the fire with the minimum impact on Parkway resources. Bulldozers and tractor-plows will not be used inside Parkway boundaries unless approved by the Parkway Superintendent or his/her designee.

The District Ranger and the FMO will be notified whenever it appears that a fire will escape initial attack efforts. The FMO will be responsible for coordinating all extended attack actions including:

- Completion of WFSA (Exhibit 6) for Superintendent.
- Assignment or ordering of appropriate suppression resources.
- Completion of Delegation of Authority if needed.

The IC will be responsible for all mop-up and rehabilitation actions. Parkway fires will be patrolled until declared out.

Each firefighter is responsible for his/her own as well as his/her co-workers' safety at all times. All NWCG safety guidelines will be followed.

All wildfire sites will be rehabilitated as soon as practical. The FMO may dispatch resource specialists to fires to guide suppression and rehabilitation within sensitive zones. All trash will be removed. Fire lines (hand or bulldozed) will be refilled, and waterbars added if needed, hazard trees and snags cut, and stumps cut flush. Re-seeding needs will be determined in accordance with NPS policy and regulations (See Appendix F).

The FMO and Fire Management Program Assistant will complete all situation reports as soon as practical. The IC will complete and submit the Field DI 1202 Fire Report and Crew Time Report (Exhibit 7) to the FMO. The FMO will ensure that the fire report is entered into the BLM Fire Reporting System, that timekeepers are informed of premium pay and/or backfill and the appropriate accounts, and that expended supplies are replaced.

C. Prescribed Fire

1. Planning and Documentation

All prescribed fires will have objectives consistent with the Parkway's Resources Management Plan, will be approved by the Superintendent, and will comply with current national, regional, and Parkway policies/standards concerning planning and implementation.

Once a burn plan has been reviewed by the FMO, it will be presented to the Division Chiefs who will advise and request approval from the Superintendent. On the burn itself, regular fireline procedures will be mandatory. On the more complex fires, an Information Officer may be assigned. All appropriate cooperators and neighbors will be notified in advance of a prescribed fire (refer to the individual Burn Plan for the specific notification list).

a. Annual Implementation Activities:

The Fuels Management Planning Committee will be responsible for an annual review and update of a Five-Year Prescribed Fire Schedule. This will be a dynamic document that will integrate the biological, hazard fuel, and research needs of the Parkway and will project, by year, those areas to be burned over the next 5 years. The updating of this document will set in motion the following important actions: preburn inventories/monitoring; budget requests; assignment of Burn Bosses; and the writing, review, and approval of burn plans.

Burn plans will address the air quality regulations for the state in which the burn unit is located, including any annual deadlines for submitting plans for state approval.

b. Prescribed Fire Strategy for FMUs:

At NATR, prescribed fire may be used in all four units to achieve resource management objectives. Specifics are noted under FMU objectives.

c. Prescribed Fire Qualifications Needs:

For the operational program, it is estimated that the following will be needed depending on the burn complexity:

	<u>Fully Qualified</u>	<u>Trainees</u>
Burn Boss I	1	1
Burn Boss II	1	1
Holding Boss	1	1
Firing Boss	1	1
Holding Crew Member	5	1
Ignition Crew Member	3	1
Fire Effects Monitor	1	1
Information Officer	1	1
Incident Commander Type 3	1	1

d. Prescribed Fire/Fire Effects Monitoring:

The monitoring of prescribed fire behavior and effects will comply with the NPS National Fire Monitoring Handbook protocols. This handbook identifies the following four levels of monitoring.

- Level 1- Environmental Monitoring
- Level 2- Fire Observation Monitoring
- Level 3-Short-term Change Monitoring
- Level 4- Long-term Change 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 of 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 K) for further information regarding monitoring.

e. Critiques:

Prescribed fires, as well as wildland fires, will be critiqued. The critique will document any changes in the management, operation, prescriptions, training, or procedures that might be needed to improve the effectiveness or efficiency of the program. The use of After Action Reviews (AAR) facilitates this process.

In addition, before releasing personnel from a fire, the Burn Boss will hold a brief critique/After Action Review. Important points brought forth during these critiques will be included in the final burn report. Individuals working on prescribed burns may receive a written evaluation by their supervisors, if requested. The FMO may evaluate the Burn Boss, if requested.

The Fuels Management Planning Committee can review any fire that it deems necessary and, at least annually, the Committee will review the entire prescribed fire program.

f. Documentation and Reporting:

As prescribed fires are being conducted, they will be reported on the NPS Wildland Fire Management Computer System. Minimum documentation requirements will be those found in RM-18, Chapter 10. In addition, all prescribed fires will be reported to the state coordination centers in Mississippi, Alabama and Tennessee.

The Burn Boss is responsible for completing the Department of Interior Fire Report Form, DI-1202, and for those parts of the burn plan requiring post-ignition completion. The Fire Effects Monitor will complete the specified forms in the Monitoring Handbook. Additional documentation pertaining to fuel consumption and biological responses will be required on most burns; the nature and scope of the requirements will be dependent on the burn objectives.

g. Historic Fuel Treatment maps:

Areas treated by prescribed fire are mapped and on file in the Parkway Fire Management Office.

h. Local Prescribed Burn Plan Requirements:

Burn plans will be completed using a format consistent with the direction found in RM-18, Chapter 10. The Prescribed Burn Plan will be completed before any prescribed fire is ignited. This plan will not be considered complete until it is signed by the preparer, reviewed by the FMO, the Division Chiefs, and approved by the Superintendent.

The Burn Boss is responsible for obtaining the necessary prescribed burning permit from the state and county where the burn is scheduled. The Burn Boss will also implement each burn plan.

2. Exceeding Existing Prescribed Fire Burn Plan

Prescribed fires exceeding the parameters of the plan will be declared an unwanted wildland fire and suppressed. A WFSA will be initiated under the provisions found in RM-18, Chapter 9.

Fire suppression actions will be the same as described in the fire Suppression section of this FMP. Refer to the Contingency Plan section of the Prescribed Fire Burn Plan if further information is needed to complete the WFSA.

3. Air Quality and Smoke Management

a. Pertinent Air Quality Issues

Visibility and clean air are primary natural resource values in all NPS units. protection of these resources must be given full consideration in fire management planning and operations. In addition, smoke management can have serious health and safety effects, which must be considered during the planning and approval process.

b. Program Actions to Manage Smoke

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

Traffic impeded by the smoke from wildfires will be stopped on either side of the affected area. At this time, a well-marked pilot vehicle will move traffic in a caravan formation through the smoke.

All prescribed burns will mitigate, through planning, the effects of smoke upon traffic flow, visitors, local neighbors and on other sensitive areas. Smoke management prescriptions will be written into all prescribed burn plans. All local, state, and federal air quality regulations and permitting procedures will be followed. Any smoke situation that arises and threatens any sensitive areas will be immediately **suppressed**.

Prescribed burns will 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 will be followed.

D. Non-Fire Fuel Treatment Applications

As stated above, the primary tool to accomplish hazard fuels reduction and resource management objectives will be the use of prescribed fire. In addition, various non-fire treatments utilizing mechanical, manual and/or chemical treatments will be used in areas not suited for prescribed fire such as around Parkway improvements or other areas where prescribed fire is not feasible.

a. Preparedness activities

For all activities, (i.e. mechanical/manual activities such as chainsaw operation) personnel will be properly trained to ensure that they are qualified for the associated work.

b. Equipment use restrictions

Equipment use for non-fire applications will adhere to the same guidelines found in the section on Minimum Impact Suppression Techniques. Resource specialists will work with Fire Management section on project plans where tracked or wheeled power equipment will be used to ensure that resource damage does not occur.

c. Effects monitoring

Due to the low-impact nature of the mechanical treatments to be utilized at Natchez Trace Parkway, monitoring effects will be primarily visual assessment of the success of the project in reducing the fuel hazard. Before and after photographs and dead-and-downed fuels transects (Brown's Transects) may be used to document the effects and measure success.

d. Critiques

Critiques of the mechanical treatment projects will occur as part of the annual fire management review process.

e. Cost Accounting

The FMO will maintain cost records for all mechanical treatment projects. In many cases, treatment costs will be cost shared by the use of in-house preparedness resources during lower staffing level days.

f. Documentation

All mechanical treatment projects will be documented using requirements found in RM-18, Chapter 10.C.

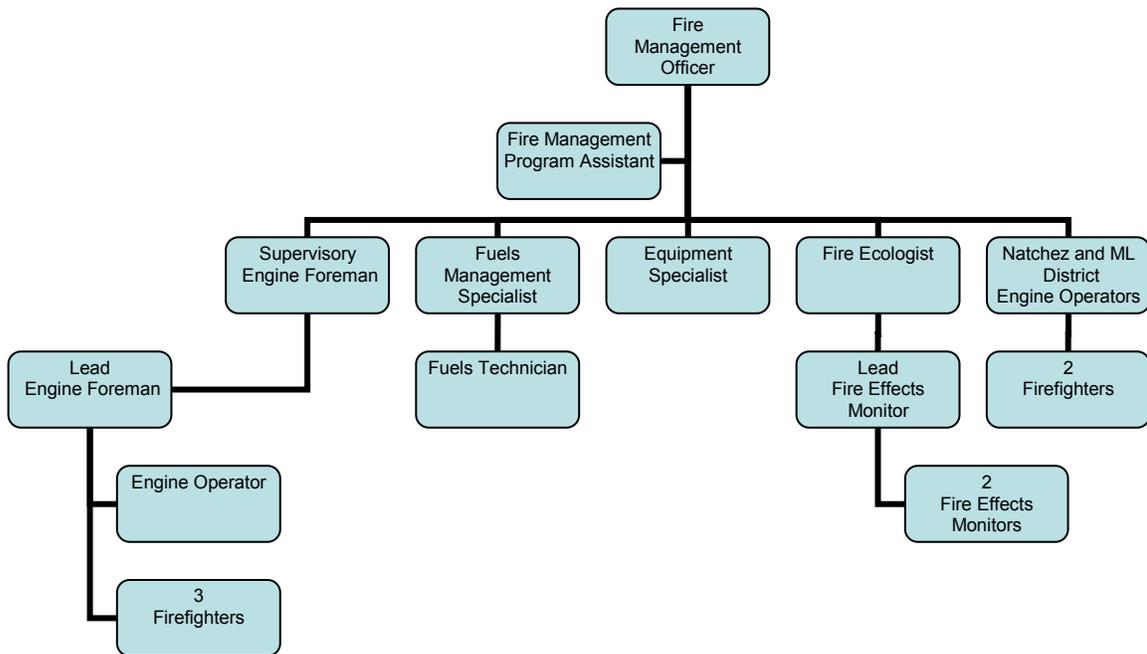
g. Annual planned project list

Fuels reduction is planned around all Parkway improvements or other areas where prescribed fire is not feasible.

V. ORGANIZATIONAL AND BUDGETARY PARAMETERS

A. Organizational Structure

Fire Management is located within the Division of Ranger Activities. There are 19 Fire positions within the organization, as summarized below:



B. Staff Responsibilities

1. Responsibilities of the Superintendent:

- Responsible for the overall management of the fire suppression program.
- Responsible for certifying that employees meet identified qualification standards.
- Ensures that trained and certified employees are made available to participate in wildland fire activities, as the situation demands, and that employees with operational, administrative, or other skills support the wildland fire program as needed.
- Final approval of all prescribed fire plans.
- Final approval of all fuels treatment projects and verification of project acreage.
- Ensures effective cooperative relations within the Parkway, cooperating fire organizations, and adjoining landowners.
- Approves any use of mechanized equipment (i.e. Tractor-plows) within the Parkway.

2. Responsibilities of the Assistant Superintendent

- Assumes Superintendent duties when the Superintendent is unavailable.
- Serves as a member of the Fuels Management Planning Committee (see below).
- Reviews prescribed fire burn plans.

3. Responsibilities of the Fuels Management Planning Committee

- Provide consistent and coordinated management of prescribed fire and non-fire operations, including annual review of prescribed fire program projects.
- The Committee will consist of the Assistant Superintendent, Chief Ranger, Chief of Resource Management, Fire Management Officer, Natural Resource Specialist, Cultural Resource Specialist, Fuels Management Specialist, and Fire Ecologist. The committee may request technical expertise from other individuals at any time.

4. Responsibilities of the Division Chiefs

- Makes qualified personnel (if any) available for training and pack testing to maintain a minimum Parkway fire roster.
- Adjusts schedules during fire seasons, so that overhead and fire fighters (as qualified) are available for fire duty.
- Provides equipment and personnel for special fire related projects, i.e., media relations, fire suppression, logistical support, overhead teams, etc.

5. Responsibilities of the Chief Park Ranger

- Delegated the responsibility for coordination and supervision of the Parkway's fire management program by the Superintendent.
- Advises Superintendent and Division Chiefs of emergency fire situations and potential.
- Monitors events during suppression activities, and is authorized to intercede, to insure the safety of fireline personnel.
- Serves as a member of the Fuels Management Planning Committee.
- Reviews prescribed fire burn plans.
- Assists FMO during completion of Wildland Fire Situation Analysis (WSFA).
- During periods when the Chief Ranger is absent from the Parkway or is otherwise unavailable, the designated Deputy Chief Ranger assumes the above responsibilities.

6. Responsibilities of the Chief of Natural Resources

- Serves as a member of the Fuels Management Planning Committee.
- Reviews prescribed fire burn plans.
- Assists FMO during completion of Wildland Fire Situation Analysis (WSFA).

7. Responsibilities of the Natural Resource Specialist

- Reviews environmental compliance needs for fuels reduction projects.
- Identifies and prioritizes resource management prescribed fire needs.
- Works with fire ecologist to prepare fire research proposals, and participates in the completion of fire research.
- Inspects suppression sites upon request, and assists with the development of rehabilitation plans.
- Serves as a member of the Fuels Management Planning Committee.
- Reviews prescribed fire burn plans.
- Assists FMO during completion of WSFA.
- May serve as a resource advisor.

8. Responsibilities of the Cultural Resource Specialist

- Reviews cultural compliance needs for fuels reduction projects.
- Identifies and prioritizes cultural resource management prescribed fire needs.
- Inspects suppression sites upon request, and assists with the development of rehabilitation plans.
- May serve as a member of the Fuels Management Planning Committee.
- Assists FMO during completion of WSFA.
- May serve as a resource advisor.

9. Responsibilities of the District Ranger

- As needed, is responsible for field implementation of wildfire suppression program and accountability within their respective districts. This responsibility is tiered through successive delegation to the operational/implementation of wildfire suppression authority and accountability to the District Ranger (DR). District Rangers may assign specific duties and tasks to their field staffs in implementing their responsibilities, however, accountability for program readiness and effectiveness may not be further delegated.
- Ensures that district fire caches and equipment are maintained to standards and in a state of readiness.
- Ensures all district minimum training standards/targets are met. Coordinates fire training needs for district employees with the FMO.
- Initiates requests for supplies and materials needed for district fire equipment and cache to the FMO.
- Ensures safe and effective response to fire reports, initial attack, and overall suppression action by Parkway personnel assigned to district fires.
- Coordinates the dispatch of Parkway and cooperator resources through the Parkway's Communication Center.
- Monitors events during suppression activities, and is authorized to intercede, to insure the safety of fireline personnel.
- Assures that the Communication Center dispatcher is provided with a size up of the fire situation within 15 minutes of arrival on scene. Information is to include fire location, estimated acreage, fuel type, weather conditions, topography, resources at risk, suppression resources needed, and resources on scene (see Wildfire Incident Report Appendix F, Exhibit 8).
- Schedules red carded personnel during periods of severity in coordination with the FMO.
- Coordinates the involvement of cooperator resources in suppression actions.
- Monitors all wildfires within their district until declared out (24 hours after last evident smoke).
- Facilitates fire cause determination for all wildfires.
- Ensures preparation and review of individual fire reports for receipt by the Parkway FMO within 1 working day after a fire.
- May assist FMO during completion of WSFA.
- Prepare and submit overtime & premium pay, and vehicle mileage charge requests relating to wildfire incidents, prescribed burning, and fire training using the standard Crew Time Report form.
- Provides the FMO and Fuels Specialist with proposals for prescribed fire projects.
- Facilitates the development of fireline experience for red carded Parkway employees in their district.
- Assures district personnel participate in annual physical fitness/work capacity testing and refresher training.
- During periods when a DR is absent from the Parkway or is otherwise unavailable, the designated Acting District Ranger assumes the above responsibilities. DRs are responsible for insuring that acting designees are familiar with these fire program responsibilities.

10. Responsibilities of the Parkway Communications Center

- Receives initial reports of wildfires from field personnel, fire cooperators, and citizen calls.
- Facilitates dispatch of Parkway and/or cooperator suppression resources.
- Serves as the communication link for wildfire incidents and with Incident Commanders in the field.
- Maintains a current list of available qualified personnel and associated contact numbers.
- Notifies and updates FMO (or Acting FMO) and appropriate DR of any reported fires.
- Communicates fire reports and updates to local fire cooperator dispatcher(s).
- Notifies the FMO (or Acting FMO) promptly of updates on fire activity, weather conditions, and suppression-related developments.
- Maintains an incident log and assembles regular situation updates on uncontrolled fires.
- On-duty dispatcher will request additional dispatch assistance if fire and non-fire radio traffic workload becomes excessive.
- Requests fire program support assistance through the FMO, if needed.
- During high fire danger (Manning class III or higher), broadcasts daily Fire Weather Reports and Fire Danger Indices as provided by fire management.

11. Responsibilities of the Fire Management Officer

- The FMO is the staff specialist for the Parkway's fire suppression, prescribed fire, and fire prevention programs with the attendant fire management responsibilities and accountability assigned to the position.
- Responsible for oversight of the fire management elements and specialist support of the Parkway wildfire suppression program. The operation of this program is a key applied resource management operation with significant, direct effects on the preservation of Parkway natural and cultural resources.
- Reviews all Parkway fire suppression actions to provide recommendations for the safe and effective suppression of Parkway fires by red carded personnel.
- Certifies all Parkway wildland fire resource qualifications and taskbooks.
- Completes WFSAs for superintendent when fire escapes initial attack or a prescribed fire escapes the burn unit.
- Designated as the collateral duty safety officer during wildfire suppression actions.
- Monitors fire suppression actions, either on scene or by radio, to provide additional safety oversight. Specific actions may be recommended or required to be performed by the designated IC, as directed by the FMO, to insure the safety of fireline personnel.
- Develops a staffing plan to reflect Parkway suppression staffing needs.
- Supervises fire management permanent and subject-to-furlough employees.
- Recruit and recommend selections for all fire management funded personnel through supervisory channels to the Superintendent.
- Coordinates fire training needs identified for Parkway employees with district/subdistrict supervisors.
- Develops Parkway fire training courses to meet Parkway fire program needs.
- Oversees agreements and leads in Parkway management liaison with fire service/land management agency cooperators
- Oversees the Rural Fire Assistance Program.
- Serves as primary liaison with the state coordination centers in Mississippi, Alabama, and Tennessee and as mobilization coordinator during out-of- Parkway interagency mobilizations.
- Reviews and approves individual fire reports received from the districts within two working days after each incident.
- Reviews and authorizes all procurement action and travel expenditure charges against all fire management accounts.
- Reviews and authorizes/certifies personal services charges against all fire management accounts.

- Coordinates with applicable DRs the staffing and funding of red carded personnel during periods of severity.
- Coordinates the release of Parkway resources for mutual assistance or other support to neighboring fire jurisdictions outside of Parkway lands or beyond the Parkway protection zone.
- Assigns fire management staff assistance during wildfire incidents in response to DR or IC requests, as appropriate.
- Oversees fire weather station operation and data entry.
- Verifies fire danger calculations utilizing the National Fire Danger Rating System (NFDRS) and Weather Information Management System (WIMS).
- Presents all proposed prescribed fire projects to the Fuels Management Planning Committee for approval.
- Serves as a member of the Fuels Management Planning Committee.
- Oversees fuel reduction contracts as a certified Contracting Officers Technical Representative (COTR).
- Prepares or approves individual prescribed fire plans.
- Serves as or designates Prescribed Burn Boss.
- Assures fire effects monitoring is conducted.
- Responsible for all capitalized equipment purchased with fire management funds.
- Oversees the preparation and coordination of fire prevention activities.
- Responsible, with the Interpretation Staff, for planning programs to educate the public regarding the role of fire in the Parkway and fire prevention.
- Annually updates the Fire Management Plan.
- Administers the After Action Review on Class C and larger wildfires.

12. Responsibilities of the Fire Management Program Assistant

- Provides clerical support to the FMO and Fire Management Program.
- Enters information into the Incident Qualification Certification System (IQCS), Bureau of Land Management Fire Reporting System, and FIRECODE as required by DO-18 and RM-18.
- Records wildfire incidents on the incident log, assigning individual fire and obtaining account numbers for each fire incident.
- Prepares fire training announcements to communicate fire training opportunities applicable to Parkway /Service needs that are available from in- Parkway and outside sources.
- Processes resource orders from Parkway or cooperators
- Maintains a listing of available fire resources in the Resource Ordering and Status System (ROSS) and updates availability weekly.
- Routes incoming fire report, overtime & premium pay requests, fire equipment lists and requisitions to the FMO through normal channels.
- Types reports and correspondence concerning fire management and wildfires from draft materials.
- Maintains personnel qualification, procurement, correspondence, and equipment inventory files.
- Facilitate training and provide administrative assistance in incident business management to other Divisions and other parks.

13. Responsibilities of the Fuels Management Specialist

- Administers the Parkway fuels management program.
- Coordinates with Parkway staff to propose new fuels management projects.
- Oversees fuels inventory program and works with Fire Ecologist to ensure fuels projects meet required monitoring guidelines.
- Develops strategies for fuel reduction projects
- Develops and implements burn plans, mechanical fuel reduction plans, statements of work for contracts, and chemical treatment plans.

- Oversees fuel reduction contracts as a certified Contracting Officers Technical Representative (COTR).
- Presents all proposed fuels management projects to the Fuels Management Planning Committee for approval.
- Serves as a member of the Fuels Management Planning Committee.
- Prepares or approves individual prescribed fire plans.
- Serves as or designates Prescribed Burn Boss.
- Assures fire effects monitoring is conducted.
- Assures compliance issues have been mitigated or addressed.

14. Responsibilities of the Fire Ecologist

- Develops and directs Parkway's fire effects monitoring program.
- Oversees fuel reduction contracts as a certified Contracting Officers Technical Representative (COTR).
- Serves as a member of the Fuels Management Planning Committee.
- Reviews prescribed fire burn plans.
- Assists FMO during completion of Wildland Fire Situation Analysis (WSFA).
- Assures compliance issues have been mitigated or addressed.

15. Responsibilities of the Equipment Specialist

- Provides supplies and materials needed for district fire equipment and caches.
- Responsible for obtaining and inputting fire weather data into WIMS.
- Responsible for obtaining NFDRS Indices and relaying them to Communications Center for daily broadcast.
- Maintains and oversees all fire caches.
- Maintains current inventory of all cache supplies.
- Oversees fuel reduction contracts as a certified Contracting Officers Technical Representative (COTR).
- Works with the Interpretation Staff to develop and plan programs to educate the public regarding the role of fire in the Parkway and fire prevention.

16. Responsibilities of the Fuels Technician

- Responsible for installing fuel loading monitoring plots.
- Assists Fuels Specialist during initial installation of project boundaries.
- Prepares project maps and acreage determinations.
- Responsible for tracking and documenting live fuel moisture content in various fuel types.
- May assist fire effects crew with installation and inventory of fire effects plots.

17. Responsibilities of the Fire Effects Crew

- Installs and inventories fire effects plots at host and satellite parks.
- Records, enters, and manages fire effects data.
- Act as Fire Effects Monitor on prescribed burns at the Parkway and in satellite parks, as qualified.

18. Responsibilities of the Engine Module Leader

- Maintains assigned engine in a state of readiness.
- Ensures physical training for assigned engine crews.
- Supervises engine crews on a daily basis.
- Trains engine crews.
- Oversees fuel reduction contracts as a certified Contracting Officers Technical Representative (COTR).

19. Responsibilities of the Engine Foreman

- Maintain assigned engine in a state of readiness.
- Responsible for ensuring physical training for assigned engine crew.
- Leads engine crews during periods of severity or during suppression operations.
- Trains engine crews.

20. Responsibilities of the Engine Operator

- Maintains assigned engine in a state of readiness.
- Trains engine crews.
- Leads engine crews during periods of severity or during suppression operations.
- Responsible for ensuring physical training for assigned engine crew.

21. Responsibilities of Parkway Fire Personnel

- Responsible for individual fire records, equipment and physical conditioning.
- Qualifies annually for physical fitness/work capacity standards required for their appropriate incident management position no later than January 31.
- Maintains assigned fire equipment in ready state and using all safety gear assigned.
- Assists the Fire Management Program Assistant (FMPA) in maintaining accurate personal fire training and experience records.

22. Responsibilities of the Wildfire Incident Commander:

- The Incident Commander (IC) will be responsible for the safe and efficient suppression of the assigned wildfire.
- Fulfills the duties described for the IC in the Field Operations Guidelines (IC-420-1).
- Notifies Communications Center of all resource needs and situation updates, including the need for an extended attack.
- Ensures wildfire behavior is monitored and required data is collected.
- Ensures that personnel are qualified for the job they are performing.
- Identifies and protects endangered and threatened species, historic structures, and archaeological sites according to the Fire Management Plan.
- Utilizes minimum impact tactics.
- Ensures fire is manned until declared out.
- Ensures that the fire site is fully rehabilitated.
- Submits completed Field Wildfire report and Crew Time to FMO within 1 day of fire being declared out.

23. Responsibilities of the Prescribed Burn Boss:

- Ensures that all prescribed fire operations are conducted with the utmost regard for safety.
- Writes prescribed burn prescriptions and plans for assigned projects.
- Implements prescribed burn plans.
- Assists with the administration, monitoring, and evaluation of prescribed burns.
- Notifies FMO of any fire escape from burn unit.

24. Fire Cooperators (see listing of cooperators Appendix F, Exhibit 5)

- Provide assistance in detection and suppression of wildfires.
- Assist, as needed, in the investigation of suspicious fires.
- Assist in training.
- Assist in the collection of fire weather.

C. Funding and Budgetary Parameters

Funding authority for the fire management program is found in Section 102 of the General Provisions of the Department of the Interior's annual Appropriations Bill. The funding mechanism for normal year expenditures of funds for fire management purposes was established in P.L. 1010121, Department of the Interior and Related Agencies Appropriation Act (1990). Authority to exceed appropriations due to wildland fire management activities involving the safety of life and protection of property is provided in 31 U.S. Code 665 (E) (1) (B). Related statutory authorities are the Clean Air Act, the Clean Water Act, the Endangered Species Act, and the Antiquities Act. Air operations during wildland fire incidents will comply with the provisions of Directors Order #60 (Aviation Management) and Parts 350-354 of the Department Manual.

VI. MONITORING AND EVALUATION

Monitoring and evaluating the effects of fire upon the 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 Parkway 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.

Long term monitoring of prescribed fire activities is done in accordance with the NPS Fire Monitoring Handbook protocols. The fire effects monitoring program established at NATR follows the guidelines and recommendations described in the *NPS Fire Monitoring Handbook* with some modification (see page 2-20 of the EA).

Refer to the Natchez Trace Parkway Fire Monitoring Plan for more information regarding monitoring (Appendix K).

VII. FIRE RESEARCH

The following fire research needs for the Natchez Trace Parkway have been identified:

- Development of fire related maps to be incorporated into the Parkway GIS for planning purposes. Such maps include vegetation, fuel types and loadings, hydrology, barriers, historic/native vegetation, and smoke management (critical/sensitive targets). Vegetation maps and classifications are underway by NatureServe in association with the USGS National Wetlands Research Center (Lafayette, LA).
- Comprehensive assessment of the Parkway's hazard fuels, and the identification and prioritization of hazard fuel units.

- Assessment of hazard fuel management options, and their effects upon the Parkway.
- Further investigation of historic fire return intervals and desired future conditions
- Determination of the effects of fire on animal populations.
- Delineation and determination of appropriate restoration techniques for degraded blackbelt prairie habitat.
- Prepare and implement a fire prevention plan including a long-term hazard fuel management plan for the entire Parkway. Prepare treatment alternatives, prescriptions and rotations based on existing and future research.
- Investigate the use of mechanical and chemical treatments (i.e. fuel breaks along boundaries) to increase plan cost effectiveness.
- Integrate fire ecology, management, and prevention themes into existing Parkway interpretive programs.
- Conduct research burns to further our knowledge of the effects of fire upon Parkway ecosystems.

Research funding is requested through the normal budget process. Organizations such as Cooperative Ecosystem Studies Units (CESU) Networks provide opportunities to work with local universities for research.

VIII. PUBLIC SAFETY

Firefighter and public safety will 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 Parkway boundary can threaten residential, commercial, or industrial areas. Fires may affect Parkway 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.

IX. PUBLIC INFORMATION AND EDUCATION

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 Parkway 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 Parkway. 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 Parkway'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 Parkway 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 Parkway bulletin boards. Questions from the media will be referred to the appropriate subject matter expert, but may include the Chief Ranger, Fire Management Officer, Fuels Management Specialist, or Fire Ecologist.

X. PROTECTION OF SENSITIVE RESOURCES

A. Sensitive Archeological/Cultural/ Historic Resources

Archaeological, cultural, and historic resources found within NATR are irreplaceable. The Natchez Trace Parkway has over 140 archaeological sites scattered throughout the Parkway. The heat generated from a fire can cause the fracturing of lithic materials lying close to the surface. Therefore, these sites and structures must receive special attention. Guidelines from DO-28, in addition to those listed below, will be followed to protect these resources from fire.

- 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 Parkway 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 with 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.

In addition to archeological sites, the Natchez Trace Parkway has a multitude of historic sites and structures. These sites include Burial Mounds, Indian Villages, Roadside Inns, Civil War Campsites, Battlefields, Monuments, Mines, Cemeteries and portions of the Old Trace. A list of Classified Structures (LCS) is on file in the Parkway library and a map of archeological sites is available in the office of the Parkway Cultural Resource Specialist.

B. Sensitive Natural Resources

The GMP repeatedly acknowledges the role of fire within the vegetative communities along the motor road. The Parkway's fire management objectives are clearly described and that prescribed burning will be applied as a means to meet those objectives.

Two critical habitats have been identified along the Parkway. Mile posts 328-376 are designated critical habitat for the slackwater darter (*Etheostoma boschungii*) and the gray bat (*Myotis grisescens*).

C. Developments/Infrastructure

The Natchez Trace Parkway includes 180 buildings. The primary action taken to prevent or mitigate negative impacts to these resources is suppression using minimum impact techniques.

XI. FIRE CRITIQUES AND ANNUAL PLAN REVIEW

It will be the responsibility of the Incident Commanders of all fire management operations to ensure that an After Action Review of the relevant fire management operation is carried out. For Class A fires and for all Class B fires up to 5 acres this review can be informal and limited to the completion of a DI-1202 unless there was an injury on the fire or the Incident Commander feels that some sort of documentation is necessary. For all Class B fires over 5 acres in size and for all Class C and above fires this review will be conducted in a formal manner and will be documented.

In addition to the Incident Commander and relevant fire personnel, the Fire Management Officer will participate in all formal reviews. In addition, the Parkway's Safety Officer will participate in any review of an operation where fire management personnel were injured.

The Fire Management Plan will be reviewed annually by the Fire Management Officer in cooperation with the Fuels Management Planning Committee and the Superintendent. Any alterations to the Plan will be approved by the Superintendent prior to their implementation.

XII. CONSULTATION AND COORDINATION

It will be the responsibility of the Fire Management Officer to review and/or to revise the existing memorandums of understanding with cooperating agencies. The Fire Management Officer will also ensure that the applicable cooperating agency is notified and consulted whenever fire management activities could affect the agency's operations. It will be the responsibility of all Incident Commanders to ensure that any fire management operations are coordinated with the cooperating agencies involved.

Refer to the Parkway's Environmental Assessment (EA) for this fire management plan for a list of agencies and organizations that were solicited to review and comment on the EA. Formal consultation was accomplished through the U. S. Fish and Wildlife Service under Section 7 of the Endangered Species Act.

APPENDIX A
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APPENDIX B DEFINITIONS

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

Burning Index (BI) - A number related to the contribution of fire behavior to the effort of containing a fire.

Daily revalidation – A process named the periodic fire assessment, which evaluates the continued capability of the local unit to manage the fire for resource benefits, and to determine if the fire is escalating in complexity and operational needs. This process is completed as frequently as specified by the local unit.

Decision criteria checklist (Initial Go/No-Go Decision) – A set of standard evaluation criteria to determine if the current wildland fire meets criteria to be managed for resource benefits. The completion of these criteria will lead to a decision to “Go/No-Go” with management of the fire for resource benefits.

Expected weather conditions - those weather conditions indicated as common, likely, or highly probable based on current and expected trends and their comparison to historical weather records. These are the most probable weather conditions for this location and time. These conditions are used in making fire behavior forecasts for different scenarios (one necessary scenario involves fire behavior prediction under "expected weather conditions").

Disturbance – any relatively discrete event, either natural or human induced, that causes a change in the existing condition of an ecological system.

Confine - the strategy employed in appropriate management responses where a fire perimeter is managed by a combination of direct and indirect actions and use of natural topographic features, fuel, and weather factors.

Ecological process – the actions or events that link organisms and their environment, such as predation, mutualism, successional development, nutrient cycling, carbon sequestration, primary productivity, and decay.

Ecosystem management – the careful and skillful use of ecological, economic, social, and managerial principles in managing ecosystems to produce, restore, or sustain ecosystem integrity and desired condition over the long term.

Ecosystem sustainability – the ability to sustain diversity, productivity, resilience to stress, health, renewability, and/or yields of desired values, and resource uses from an ecosystem while maintaining the integrity of the ecosystem over time.

Escaped fire – a fire which has exceeded or is expected to exceed initial attack capabilities or prescription.

Fire complexity analysis – A process for assessing wildland fire organizational needs and relative complexity in terms of ICS types (I, II, III etc.).

Fire Management Unit - any land management area definable by objectives, topographic features, access, values-to-be-protected, political boundaries, fuel types, or major fire regimes, etc., that sets it apart from management characteristics of an adjacent unit. FMUs are delineated in Fire Management Plans (FMP). These units may have dominant management objectives and pre-selected strategies assigned to accomplish these objectives.

Fire dependent or fire maintained ecosystems - an ecosystem can be called fire dependent or fire maintained if periodic perturbations by fire are essential to the functioning of the system.

Fire exclusion – the disruption of a characteristic pattern of fire intensity and occurrence (primarily through fire suppression).

Fire evaluation - the process of examining and appraising fire monitoring information.

Fire monitoring - the act of observing a fire to obtain information about its environment, behavior, and effects for the purpose of evaluating the fire and its prescription.

Fire prescription - a written statement defining the objectives to be attained, and the conditions of temperature, humidity, wind direction and speed, and fuel moisture, under which a fire will be allowed to burn. Generally expressed as an acceptable range of the various indices, and the limit of the geographic area to be covered.

Fire regime – the fire pattern across the landscape, characterized by occurrence interval and relative intensity. Fire regimes result from a unique combination of climate and vegetation. Fire regimes exist on a continuum from short-interval, low-intensity (stand maintenance) fires to long interval, high-intensity (stand replacement) fires.

Fire return interval – the number of years between two successive fires occurring in a designated area.

Fire use – the combination of wildland fire use and prescribed fire application to meet resource objectives.

Fuel - All material (whether in the ground, on the surface, or in the air) that may be burned, including duff, logs, branches, needles and twigs. Fuel is divided into four size classes:

- 1-hour time lag - < 1/4 inch (grass, litter, duff)
- 10-hour time lag - 1/4 inch - 1 inch (twigs and small stems)
- 100-hour time lag - 1 inch - 3 inches (branches)
- 1000-hour time lag - > 3 inches (large branches and stems)

Hazard fuels – excessive live and/or dead wildland fuel accumulations (either natural or created) having the potential for the occurrence of uncharacteristically intense wildland fires.

Holding actions - planned actions required to achieve wildland and prescribed fire management objectives. These actions have specific implementation timeframes for fire use actions but can have less sensitive implementation demands for suppression actions. For wildland fires managed for resource benefits, an MMA may not be totally naturally defensible. Specific holding actions are developed to preclude fire from exceeding the MMA. For prescribed fires, these actions are developed to restrict the fire inside the planned burn unit. For suppression actions, holding actions may be implemented to prohibit the fire from crossing containment boundaries. These actions may be implemented as firelines are established to limit the spread of fire.

Incident Commander Type 3 (ICT3) - The Incident Commander Type 3 is responsible for incident activities of multiple resources including the development and implementation of strategic decisions, and for approving ordering and releasing resources. Depending on the size of the incident, jobs such as operations and logistics may be delegated to other personnel.

Incident Commander Type 4 (ICT4) - The Incident Commander Type 4 is responsible for incident activities of single resources during the initial attack stage of an incident, including the development and implementation of strategic decisions, and for approving, ordering and releasing resources.

Initial attack – an aggressive suppression action consistent with fire fighter and public safety, and with values to be protected.

Management action points - also called "trigger points." Either geographic points on the ground or specific points in time where an escalation or alteration of management actions is warranted. These points are defined and the management actions to be taken are clearly described in an approved Wildland Fire Implementation Plan (WFIP) or Prescribed Fire Plan. Timely implementation of the actions when the fire reaches the action point is generally critical to successful accomplishment of the objectives.

Maximum Manageable Area (MMA) - MMA defines the firm limits of management capability to accommodate the social, political, and resource impacts of a wildland fire. Once established as part of an approved plan, the general impact area is fixed and not subject to change. MMAs can be developed as part of the FMP and described as a Fire management area or FMA. They can also be developed as part of the planning and implementation of management actions after a fire has ignited. If they are developed after the ignition, their definition will occur during the Wildland Fire Implementation Plan Stage III process. In the event a fire occurs in a pre-planned MMA or FMA and the local unit determines that this MMA is not the best-suited alternative for the present conditions, a new MMA can be developed as part of the Stage III process. Once this occurs, the Stage III MMA becomes the firm limits of the fire and is fixed.

Mitigation actions - Mitigation actions are considered to be those on-the-ground activities that will serve to increase the defensibility of the MMA; check, direct, or delay the spread of fire; and minimize threats to life, property, and resources. Mitigation actions may include mechanical and physical non-fire tasks, specific fire applications, and limited suppression actions. These actions will be used to construct firelines, reduce excessive fuel concentrations, reduce vertical fuel continuity, create fuel breaks or barriers around critical or sensitive sites or resources, create "blacklines" through controlled burnouts, and to limit fire spread and behavior.

Normal fire year – The normal fire year for suppressed wildland fires is the year with the third highest number of wildland fires in the past ten years of record. The normal wildland fire managed for resource benefits year is the year with the third highest number of acres burned by wildland fire managed for resource benefits in the past ten years of record.

Preparedness - Activities that lead to a safe, efficient and cost effective fire management program in support of land and resource management objectives through appropriate planning and coordination. This term replaces presuppression.

National Fire Danger Rating System (NFDRS) - A system that uses weather, fuel, lightning and human-caused fire occurrence to formulate several indices. It relates only to the potential of the initiating fire. Fire danger is rated from a worst-case approach. It provides guidance for short-range planning.

Natural ignition – a wildland fire ignited by a natural event such as lightning or volcanoes.

Prescription – a set of measurable criteria that guides the selection of appropriate management strategies and actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social, or legal considerations.

Prescribed fire – any fire ignited by management actions to meet specific objectives. Prescribed fires are conducted in accordance with prescribed fire plans.

Prescribed fire plan – a plan required for each prescribed fire. Plans are documents prepared by qualified personnel, approved by the agency administrator, and include criteria for the conditions under which the fire will be conducted (a prescription).

Timelag (TL) - The time necessary for a fuel particle to lose approximately 63 percent of the difference between its initial moisture content and its equilibrium moisture content.

Value - In terms of fire prevention, it is defined as natural or developed areas where loss or destruction by wildfire would be unacceptable.

Wildfire – an unwanted wildland fire.

Wildland fire – any non structure fire that occurs on wild land.

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

Wildland Fire Use – the management of naturally ignited wildland fires to accomplish specific pre-stated resource management objectives in predefined geographic areas outlined in fire management plans.

Wildland fire management - all activities related to the prevention, control or use of fire burning through vegetation under specific prescriptions for the purpose of achieving fire management objectives.

Wildland fire situation analysis (WFSA) – a decision making process that evaluates alternative management strategies against selected safety, environmental, social, political, and economic criteria.

APPENDIX C
THREATENED & ENDANGERED SPECIES LIST
2007

Threatened

Louisiana Black Bear- *Ursus americanus luteolus* (mammal)
Ringed Sawback Turtle- *Graptemys oculifera* (reptile)
Spotfin Chub- *Cyprinella monacha* (fish)
Slackwater Darter- *Etheostoma boschungii* (fish)
Bayou Darter- *Etheostoma rubrum* (fish)
Orange Nacre Mucket- *Lampsilis perovalis* (invertebrate-mussel)
Prices Potato Bean- *Apios priceana* (plant)
Rock Cress- *Arabis perstellata* (plant)

Endangered

Gray Bat- *Myotis grisescens* (mammal)
Indiana Bat- *Myotis sodalists* (mammal)
Red-cockaded Woodpecker- *Picoides borealis* (bird)
Bald Eagle- *Haliaeetus leucocephalus* (bird)
Cumberland Monkeyface Pearlymussel- *Quadrula intermedia* (invert-mussel)
Cumberlandian Combshell- *Epioblasma brevidens* (mussel)
Shiny Pigtoe- *Fusconaia cor* (mussel)
Orange-footed Pearlymussel- *Plethobasus cooperianus* (mussel)
Birdwing Pearlymussel- *Conradilla caelata* (mussel)
Tan Riffle Shell Mussel- *Epioblasma florentina walkeri* (mussel)
Pale Liliput Pearlymussel- *Toxolasma cylindrellus* (mussel)
Tennessee Yellow-eyed Grass- *Xyris tennesseensis* (plant)
Leafy Prairie Clover- *Dalea foliosa* (plant)
Tennessee Purple Coneflower- *Echinacea tennesseensis* (plant)

Critical Habitat

Mile Posts 328-376 for the Gray Bat and the Slackwater Darter

Refer to the Fire Monitoring Plan for a complete listing of plant species along the Parkway.

APPENDIX D

**Wildfire Suppression District Action Guidelines
Step-up Plan**

District Preparedness Step-up Actions	District Preparedness Step-up Action	Basic District Wildfire Response Initial Attack Protocol ^A
LOW & MODERATE BI 0-11 (E) BI 0-7(R)	Basic preparedness in place: • All firefighters issued PPE ¹ • Ranger PPE and fire tools in patrol vehicles • Engines and equipment ready for immediate use	• Dispatch closest engine ^B and two Firefighters ^C to fire • Place next closest engine on standby • Notify through Dispatch: 1. District Ranger 2. Fire Management Officer 3. State Forestry Agency 4. Local Fire Service (if non-volunteer)
HIGH BI 12-23 (E) BI 7-13 (R)	Basic preparedness in place, plus additional actions: • High fire danger signs posted on bulletin boards at key visitor use facilities ² • Report district conditions after daily fire report to FMO through dispatch ³ . • Implement campfire/open fire restrictions consistent with neighboring fire management agencies.	• Dispatch closest engine and two Firefighters to fire • Place next closest engine and four more Firefighters on standby • Notify through Dispatch: 1. District Ranger 2. Fire Management Officer 3. State Forestry Agency 4. Local Fire Service (if non-volunteer)
BI 24+ (E) BI 20+ (R)	IE Basic preparedness in place, additional actions from above, plus: • Provide engine driver and/or Firefighter response coverage during primary burn period (1300 hours until dark) ⁴ • Increase patrols in areas known to experience field burning or debris fire escapes originating on adjacent lands	• Dispatch 2 closest engines, one Initial Attack IC ^D , and four Firefighters to fire. • Notify through Dispatch: 1. District Ranger 2. Fire Management Officer 3. State Forestry Agency 4. Local Fire Service (if non-volunteer)

2. Posting fire danger information will normally only be done in coordination with similar postings by neighboring Federal, state or local fire management agencies. See below for key sites.

3. District conditions include estimated or actual fuel moisture and wind conditions which may affect local fire danger level.

4. Emergency pre-suppression funding should be available to support overtime necessary for staffing coverage; contact FMO prior to incurring such costs to insure account has been secured.

A. Initial attack protocols are a guide for district responses. District Rangers may modify them to meet local needs to provide effective suppression.

B. Closest engine regardless of district boundaries. Only Engine Driver necessary to drive engine to fire scene; does not have to be a Firefighter.

C. Closest Firefighters available to respond regardless of district boundaries. Notify District Ranger/Maintenance Supervisor in sending district(s) when their personnel are dispatched to a fire in an adjacent district.

D. Qualified Initial Attack ICS are listed on the initial fire report clipboard maintained in Dispatch.

Key visitor use facility bulletin boards which may be posted include:
 TN segment National Scenic Trail trailheads
 Gordon House Restroom
 Meriwether Lewis (Grinders Inn and Campground)
 Colbert Ferry Picnic Area/Boat Launch
 Cherokee Ranger Station
 Tupelo Visitor Center and Tupelo segment NATR National Scenic Trail trailheads
 Witch Dance Restroom/USFS trailhead
 Jeff Busby Concession Area and Campground/Overlook
 Kosciusko Welcome Center
 Ridgeland NATR National Scenic Trail trailheads
 River Bend Picnic Area/Restroom
 Mississippi Craft Center Concession Area
 Coles Creek Picnic Area/Restroom
 Natchez segment NATR National Scenic Trail trailheads
 Mt. Locust Visitor Contact Station/Restroom

Wildfire Prevention Analysis & Plan

The Fire Prevention Component of the Fire Management Plan

Natchez Trace Parkway

**United States Department of the Interior
National Park Service**

Prepared By:

Fire Management Officer

Date

Approved By:

Park Superintendent

Date

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

Preface

- This Natchez Trace Parkway wildfire Prevention Plan was developed by the Park Fire Management Officer and approved by the Superintendent. It is a two-fold document: an analysis of the Park's RISKS, HAZARDS and VALUES, and an operational plan that outlines protection of the Park's resources from wildfire.
- The plan attempts to identify wildfire prevention priority areas, actions and responsibilities consistent with the Natchez Trace Parkway's land management planning goals.
- Implementation of this plan needs to consider: first, the use of appropriate fire personnel and resources; secondly, the education and application of Park personnel and resources; thirdly, the documentation for additional resources through the Park Fire Management Planning process.
- It is an adaptable document, lending itself to review and update as necessary.
- It is also a dynamic document, whose shortfalls can be addressed through the review of Park priorities, available resources, personnel performance and budget constraints.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

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APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued



Introduction

The Natchez Trace Parkway will implement this Wildfire Prevention Plan (WPP), as an integrated element of the Park's fire management program through their Fire Management Plan. Wildfire prevention programs will be directed toward ignitions which pose the greatest potential to cause unacceptable damage or losses.

To properly direct wildfire prevention efforts it is important to accurately identify problems or potential problems. To identify priority wildfire prevention programs one must assess the following components:

1. Risks - Risks are defined as those uses or human activities which have the potential to result in a wildfire ignition. When assessing the risk of a given area, only the risk should be examined. Wherever there are concentrations of people or activity, the potential for a human-caused ignition exists. After assessing the risks within an area, it is helpful to look at historical fires to validate the risk assessment. Historical fires alone, however, are not an accurate reflection of the risks within a given area. The objective of this effort is to determine the degree of risk within areas of an administrative unit.

2. Hazards - Hazards are defined as the fuels and topography of an area. The objective in examining hazards is to determine the potential for a "large" fire to result from a human-caused ignition. This can be more simply put as determining the degree of difficulty in suppressing a fire once it is ignited. It is important to examine hazards without regard for anything else.

3. Values - Values are defined as natural or developed areas where loss or destruction by wildfire would be unacceptable.

Once Risks, Hazards, and Values are evaluated, it is possible to determine when, where, and how to implement effective fire prevention programs. By comparing an area's potential for ignition (risks), its potential to burn after ignited (hazard), and the values which are threatened by a wildfire (values), the fire prevention plan can be prepared. This plan will concentrate on the highest priority wildfire prevention problems within the area. It may not be necessary to have an extensive fire prevention effort in an area with a number of risks where the hazard is minimal and there are no real values threatened. In contrast, it will be important to have a comprehensive effort in an area where there is substantial RISK, a HIGH hazard, and HIGH values threatened.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

The WPP addresses what needs to be done in each compartment based on the types of activities and uses. It defines what actions will take place, when, and who is responsible. Wildfire prevention activities generally fall within one of four broad categories. These categories include:

1. Education - Education is aimed at changing people's behavior by awareness and knowledge. This can be done through printed materials, mass media (radio, T.V., etc.), one-on-one contacts or group presentations. Information can also be delivered through signs, displays, fairs, parades, etc.
2. Engineering - Engineering is an activity designed to reduce or eliminate fire risks (e.g. spark arrester) and hazards (e.g. clearance around a home).
3. Enforcement - Enforcement is used to gain compliance with fire regulations and ordinances.
4. Administration- Those activities such as Planning, Budgeting, Training.

This Wildfire Prevention Plan selects the most cost effective mix of activities to mitigate potential fire problems within each fire prevention area. It identifies implementation levels which can be incorporated into the Fire Management Plan.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

wildfire.

The Park Fire Management Officer is responsible to integrate this operational plan into the Fire Management Plan and ensure that the actions called for are implemented. The Superintendent has the authority to assign individual responsibilities within the compartments.

The positions listed in the Tasks Section, under responsibility, are those identified as the individual/position that will be accountable for completion of the activity.

C onducting The Assessment

The first phase, and perhaps the most important, is to assess the Risks, Hazards and Values. The assessment consists of three distinctly different steps. It is important that each step be conducted independently with no attempt to blend or combine any of them.

For each component, a relative rating of HIGH, MEDIUM, or LOW is assigned within each wildfire prevention area. These ratings are relative and not absolute.

Existing resources were also used in the assessment evaluation. On the Natchez Trace Parkway, these included:

1. History of person-caused fire occurrence.
2. Current and anticipated staffing.
3. Previous Park Fire Prevention Plans.
4. Park and Fire Management personnel expertise.
5. Previous Fire Management Plans.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

Risk Assessment

Assessing the risk consists of evaluating the potential for wildfire ignition. Consideration, at this time, is NOT given to how or if a fire would spread or burn once ignited. Concentrations of human activities that could start fires are identified.

For the purpose of the Natchez Trace Parkway Wildfire Prevention Plan, the following Risks were identified:

- | | |
|---------------------------------|-------------------------------|
| 1 . Wildland Urban Interface | 21 . Party Areas |
| 2 . Wildland Urban Intermix | 22 . Sightseeing |
| 3 . Wildland Rural Intermix | 23 . Campground Undeveloped |
| 4 . Power Equipment | 24 . Picnicing |
| 5 . Service Contracts | 25 . Businesses |
| 6 . Maintenance Projects | 26 . Transportation Corridors |
| 7 . Construction Projects | 27 . Fireworks |
| 8 . Powerlines | 28 . Shooting Areas |
| 9 . Gas Pipelines | 29 . Children With Matches |
| 10 . Agricultural | 30 . Incendiary |
| 11 . Railroads | 31 . Slash Burning |
| 12 . Storm Damage Removal | 32 . Debris Burning |
| 13 . Beetle Killed Tree Removal | 33 . Dumps |
| 14 . Fuel Reduction Contracts | 34 . Lightning |
| 15 . Campground Developed | 35 . Electronic Sites |
| 16 . Hunting | 36 . Cultural Activities |
| 17 . Water-Based Recreation | 37 . Drug Labs/Cultivation |
| 18 . Trail/Hikers/Equestrian | 38 . Military Training/Aerial |
| 19 . OHV/Non-Motorized | |
| 20 . OHV/Motorized | |

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

Hazard Assessment

In fire prevention terminology, the word "Hazard" is used to describe the relationship between fuels and topography and must not be confused with how hazard is defined in other disciplines.

The Hazard assessment deals with identifying areas of like fire behavior based on fuels and topography. Given a normal fire season, how intense, and at what rate of spread would a wildfire burn? What is the resistance to control? Under average fire season conditions, fire intensity is largely a product of fuels and topography.

Hazard criteria used by the Natchez Trace Parkway are:

<u>Hazard Criteria</u>	<u>Low</u>	<u>Medium</u>	<u>High</u>
Mixed Hardwoods - 0 - 20% Slope	X		
Mixed Hardwoods - 20 - 50% Slope		X	
Mixed Hardwoods - 50 - 100% Slope			X
Pine - Hardwood Mix		X	
Eastern Red Cedar - Tall Grass			X
Intermediate Brush - Hardwood Regeneration	X		
Short Grass	X		
Tall Grass			X
Pine Overstory - Grass/Shrub Understory		X	
Southern Long Needle Pine		X	
Southern Pine Beetle Kill		X	
Storm Damage			X

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

V

Value Assessment

Assessing values is a subjective process. During this process, an interdisciplinary approach was used. Specialists from the Park participated in developing the value component.

A Value component is determined and assigned to each fire prevention area.

Areas of obvious value are labeled HIGH. Other areas which have some value, but are less in relative comparison, are labeled as MEDIUM. Everything else is considered LOW.

These values were viewed as areas where wildfire would be unacceptable.

Value considerations for the Natchez Trace Parkway are:

- 1 . Timber
- 2 . Forage/Grazing
- 3 . Water Storage
- 4 . Watershed
- 5 . Scenic Byways
- 6 . Visual Resources
- 7 . Developed Recreation Sites
- 8 . Fish Habitat
- 9 . Threatened & Endangered Species
- 10 . Wildlife Habitat
- 11 . Cultural/Historical
- 12 . Soils
- 13 . Forest Products - Other
- 14 . Riparian
- 15 . Political/Social
- 16 . Commercial Development
- 17 . Cash Crops
- 18 . Improvements
- 19 . Viewshed
- 20 . Airshed

D eveloping Compartments

The information necessary to establish final compartments is now complete.

In order to establish final boundaries, the RISK areas are the primary consideration. Fire Prevention programs usually treat risks, so it is logical that the final compartment boundaries be determined primarily by risk.

A new overlay was placed on the original risk overlay. They were re-traced in green and labeled high, medium or low.

The risk areas are now assigned. The risk overlay was then placed on the hazard overlay. The hazard rating was then assigned to the risk overlay. These were also identified as high, medium or low.

The same process was completed with the value overlay. The value judgement required some interpolation*, by assigning the value that best represented the total compartment.

This new overlay represents the final compartment map.

Each compartment was then analyzed by a compartment matrix that displays the individual compartment risk, hazard and values. Additional valuable compartment information is provided, such as historical fire cause and specific fire prevention actions.

*Interpolation - using the risk boundary as the final compartment boundary presents some difficulty when assigning subsequent hazard and value ratings. Usually, some interpolation is required. It is important to assign the value and hazard ratings that best represent the overall compartment.

Evaluating The Plan

The Wildfire Prevention Plan should be evaluated annually to ensure effective implementation of the planned actions. (Effectiveness of the overall Wildfire prevention Program will involve different evaluation techniques over a longer period of time.)

The following questions are provided to assist in the evaluation process:

A. Have the priority areas or actions changed? If so, the WPP must be amended to address changes in priority areas and/or the redefinition of the Fire Prevention Tasks.

B. Are the task actions funded? If so, was the action completed? If not, the responsibilities and completion dates must be reevaluated and redefined.

C. Have the task actions been successful? If not, the actions, responsibilities and completion dates must be reevaluated and redefined as appropriate.

This evaluation holds management and the plan accountable for the effectiveness of the Wildfire Prevention program.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

Fire Prevention - Tasks

The following Tasks have been identified as elements for this Fire Prevention Program. These items require annual coordination to ensure a balanced, cost-effective Fire Management Program. These tasks are designed to mitigate the highest potential losses due to wildfire.

Implementation of these tasks is dependent on the level of funding available. Each item has the budget level indicated to identify when the action would be taken. The following describes the different funding levels:

MINIMUM LEVEL (Level 1) = The prevention program necessary to accomplish the mandated and awareness activities. This level consists of all the prevention activities that a unit identifies as "must be done".

HISTORICAL LEVEL (Level 2) = The prevention program that best represents the average prevention output for the period of years that the fire occurrence data is being considered.

PLAN LEVEL (Level 3) = This is the level of prevention activities that has been described in the prevention planning process which focuses on preventing large and damaging fires and reducing cost + net value change.

RESPONSIBILITY DEFINITIONS:

SUPT	Park Superintendent
FMO	Fire Management Officer
CR	Chief of Ranger Activities
CM	Chief of Maintenance
DR	District Ranger
FMPA	Fire Management Program Assistant
ES	Equipment Specialist
FS	Fuels Specialist
FMS	Fire Management Staff
CO	Contracting Officer
INTERP	Interpretation Division

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

E

EDUCATION Tasks

#	M=Min	Responsibility	Due Date	Task
1	H	FMO, ES	As Needed	Provide Fire Safe Videos to other agencies/associations.
2	PHM	FMO, ES	On-going	Provide Homeowner Fire Safety Material as requested.
3				Conduct Fire Safety Programs with Homeowner's Assoc.
4				Conduct/participate in local Town Meetings.
5				Conduct Fire Prevention Public Education Programs with local service clubs.
6				Participate with local County Planning Commissions.
7	PHM	FMO, ES	On-going	Provide training for Volunteer Fire Departments in Wildfire Prevention Public Education.
14	PHM	FMO	On-going	Continue involvement with Interagency/Corporate Fire Prevention campaigns.
16	HM	FMO	As Needed	Utilize effective Fire Information procedures/systems during incidents while stressing the importance of increased fire prevention efforts.
20	PHM	FMO	On-going	Provide local written media with timely news releases.
34	PHM	DR	As Needed	Install Fire Prevention Signing at points of significant interest.
36	HM	INTERP	As Needed	Implement a Highway Rest Area/Visitor Information Center Fire Prevention Display Program.
39	HM	FMO	As Needed	Establish engine patrol routes and implement on a needed basis, i.e. holidays, high use periods and weekends.
41	HM	FMO	On-going	Implement high visibility fire prevention efforts in the following area: Fire Prevention Patrol.
42	HM	INTERP	On-going	Implement high visibility fire prevention efforts in the following area: Visitor Center Fire prevention.
44	HM	FMO	On-going	Evaluate agency printed materials (brochures, flyers, etc.) to determine if adequate fire prevention considerations are being displayed.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

E

EDUCATION Tasks

#	P=Plan H=Hist		Responsibility	Due Date	Task
	M=Min				
46	P	M	FMO	As Needed	Determine if new material is needed to deal with specific Fire Management issues and arrange for production.
48		HM	FMO	As Needed	Review existing publications (evaluate, update, and re-publish) as needed.
55		HM	FMO, ES	On-going	Utilize Fire Prevention materials, such as Defensible Space, Home Fire Protection Guide, Fire Awareness Guide for Homeowners, and Fire Risk Rating for Homeowners in the Wildland Urban Interface.
57		HM	ES, FMS	On-going	Participate in career day activities at local intermediate schools.
58		PHM	FMO	As Needed	Develop an organized effort, and provide 'co-op' coordination for activities associated with Fire Prevention characters.
60		PHM	FMO	As Needed	Conduct the following prevention programs/contacts with local schools in/or adjacent to priority areas (w/cooperator): Conduct Outdoor Fire Safety programs.
62		PHM	ES, FMS	On-going	Continue the use of Smokey as a prevention tool.
63		PHM	ES, FMS	On-going	Participate in interagency FIREWISE workshop program.
66		PHM	ES, FMS	On-going	Participate in educational programs to maintain high visibility of the Fire Prevention effort. These are programs such as: Smokey Bear (CFFP) and FIREWISE.
67		PHM	ES, FMS	On-going	Participate in educational programs to maintain high visibility of the Fire Prevention effort. These are programs such as: Parades.
68		PHM	ES, FMS	On-going	Participate in educational programs to maintain high visibility of the Fire Prevention effort. These are programs such as: Fairs.
69		HM	ES	On-going	Participate in educational programs to maintain high visibility of the Fire Prevention effort. These are programs such as: Exhibits.
70		PHM	ES, FMS	As Needed	Consider other Fire Prevention activities, such as: Fire Prevention Week-Mall Display, Oil & Gas Show, Recreation & Boat Show, Children's Festivals, and Hunter Safety Booth.
71		PHM	DR	On-going	Consider other Fire Prevention activities, such as: Utilize Campground Hosts in Fire Prevention.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

E

EDUCATION Tasks

#	P=Plan H=Hist		Responsibility	Due Date	Task
	M=Min				
72	P	M	FMS	As Needed	Consider other Fire Prevention activities, such as: provide group tours of the Fire Facility.
75	P	H	ES	On-going	Consider additional school/youth educational activities with the following: Environmental Education, Day Care Centers, Intermediate Schools, Fishing Clinics, Indian Reservations, and Boy/Girl Scouts.
76	P	H	FMO	On-going	Implement an agency internal communication system to ensure that employees know existing and predicted conditions such as protection strength, fire weather, fire activity and planned activities.
87	P	H	ES, FMS	On-going	Conduct Smokey Bear appearances, programs and other uses as per the National Smokey Bear Standard Guidelines.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued



ENGINEERING Tasks

P=Plan H=Hist				
#	M=Min	Responsibility	Due Date	Task
93	HM	FMO	As Needed	Monitor/enforce all construction activities Fire Criteria.
96	HM	FMO	As Needed	Complete physical inspections of all powerlines in hazardous fire areas.
97	HM	CM	As Needed	Install and maintain campground fire pits/grates.
98	PHM	FS	On-going	Establish fuelbreaks in the high risk/hazard areas.
99	PHM	FS	On-going	Complete prescribed burning of piles, debris and slash.
100	PHM	FMO	On-going	Develop an Area Hazard Reduction program to address dispersed and developed recreation sites, hunter camps, turn-outs and places of concentrated public use and population zones.
102	PHM	FMO	On-going	Inspect agency facilities for fire hazards and hazard reduction needs.
103	M	FMO, FS	On-going	Inventory undeveloped sites and hazard areas, and complete necessary hazard reduction.
104	PHM	FMO, FS	On-going	Evaluate the use of Prescribed Fire to reduce hazards in high use/value areas.
106	PHM	CM	On-going	Ensure agency owned/maintained roads/facilities are inspected and maintained.
109	PHM	FMO, ES	On-going	Formalize a residential firesafe evaluation plan with the Fire Prevention Co-op's.
110	P M	FMO	As Needed	Participate in fire safe evaluations as requested.
112	PHM	FMO	On-going	Provide fire safe inspections to residential sites.
115	PHM	DR	On-going	Implement a Campfire Safety program, such as: Campfire Safety Handouts.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued



ENFORCEMENT Tasks

P=Plan H=Hist				
#	M=Min	Responsibility	Due Date	Task
117	HM	CR	On-going	Continue the Park Investigation program to provide adequate Fire Cause Determination.
118	PHM	FMO	On-going	All initial attack personnel will receive observation/point of origin/cause determination training (Introduction to Fire Investigation).
119	PHM	FMO	On-going	Provide Basic Fire Investigation training to all Initial Attack Incident Commanders.
120	HM	DR	On-going	Investigate all human caused fires and process trespass actions when appropriate.
121	P M	CR	As Needed	Evaluate the Park Fire Investigation program to develop recommendations/plan to cover the following: Roles and Responsibilities, Staffing Levels, Training Requirements, and Trespass Effectiveness.
122	PHM	FMO	On-going	Provide advanced Fire Investigation training to law enforcement officers.
133	M	SUPT	As Needed	Coordinate all fire restrictions and closures with cooperating agencies.
134	PHM	SUPT	As Needed	Establish fire restriction orders by District Manager (i.e. campfires, fireworks.)
148	PHM	CO	As Needed	Implement standards and guidelines for all industrial operations.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

A

ADMINISTRATION Tasks

#	M=Min	Responsibility	Due Date	Task
150	HM	FMO	On-going	High fire danger or above normal conditions which include, but are not limited to, the following, will require additional planning: Spring/Fall Seasons, Low Fuel Moisture, Extreme Burning Index, Dry Lightning, Depleted Initial Attack capabilities (Resource Drawdown), Going Fires, and Red Flag Weather Conditions. The above indicators will require consideration of the following measures: Additional staffing, Pre-positioning of resources, Increased detection, Patrols, and Media Applications.
152	P M	FMO	As Needed	The Park will provide 'Introduction to Fire Prevention' training (P-101) for selected employees.
154	P M	FMO	As Needed	Provide an 'Intro to Fire Investigation' course for all fire management personnel.
157	PHM	FMO	On-going	Prepare a Fire Prevention Action Plan/Expectations, to be included in all operating plans with cooperating agencies. This will provide direction as to the Fire Prevention Objectives on agency land protected by others.
158	HM	FMO	On-going	Participate with Interagency Fire Prevention Committees.
162	PHM	FMO	On-going	Maintain an updated Wildfire Prevention Plan for the entire planning unit.
164	HM	FMPA	On-going	Maintain appropriate Fire Cause Information and Atlas.
165	P M	FMO	On-going	Complete the Fire Prevention Workload Analysis.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued



orkload Analysis Tasks

P=Plan
H=Hist
M=Min Responsibility Due Date Task

GENERAL ACTION (Education) Fire Danger Rating: Adjectives To Field

76	PHM	FMO	On-going	Implement an agency internal communication system to ensure that employees know existing and predicted conditions such as protection strength, fire weather, fire activity and planned activities.
GENERAL ACTION (Education) Mass Media: Prepare News Release				
16	HM	FMO	As Needed	Utilize effective Fire Information procedures/systems during incidents while stressing the importance of increased fire prevention efforts.
20	PHM	FMO	On-going	Provide local written media with timely news releases.
GENERAL ACTION (Education) Public Education: Participate in Wildfire Prev Pgms				
42	HM	INTERP	On-going	Implement high visibility fire prevention efforts in the following area: Visitor Center Fire prevention.
44	HM	FMO	On-going	Evaluate agency printed materials (brochures, flyers, etc.) to determine if adequate fire prevention considerations are being displayed.
46	P M	FMO	As Needed	Determine if new material is needed to deal with specific Fire Management issues and arrange for production.
48	HM	FMO	As Needed	Review existing publications (evaluate, update, and re-publish) as needed.
115	PHM	DR	On-going	Implement a Campfire Safety program, such as: Campfire Safety Handouts.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued



orkload Analysis Tasks

P=Plan
H=Hist
M=Min

#	M=Min	Responsibility	Due Date	Task
GENERAL ACTION (Education) Educational Programs: Coordinate Interagency Programs				
1	H	FMO, ES	As Needed	Provide Fire Safe Videos to other agencies/associations.
7	PHM	FMO, ES	On-going	Provide training for Volunteer Fire Departments in Wildfire Prevention Public Education.
14	PHM	FMO	On-going	Continue involvement with Interagency/Corporate Fire Prevention campaigns.
55	HM	FMO, ES	On-going	Utilize Fire Prevention materials, such as Defensible Space, Home Fire Protection Guide, Fire Awareness Guide for Homeowners, and Fire Risk Rating for Homeowners in the Wildland Urban Interface.
58	PHM	FMO	As Needed	Develop an organized effort, and provide 'co-op' coordination for activities associated with Fire Prevention characters.
63	PHM	ES, FMS	On-going	Participate in interagency FIREWISE workshop program.
109	PHM	FMO, ES	On-going	Formalize a residential firesafe evaluation plan with the Fire Prevention Co-op's.
133	M	SUPT	As Needed	Coordinate all fire restrictions and closures with cooperating agencies.
GENERAL ACTION (Education) School Program: Lvl 1 Team Teaching				
57	HM	ES, FMS	On-going	Participate in career day activities at local intermediate schools.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued



orkload Analysis Tasks

P=Plan
H=Hist

#	M=Min	Responsibility	Due Date	Task
GENERAL ACTION (Education) School Program: Lvl 2 Team Teaching				
75	PHM	ES	On-going	Consider additional school/youth educational activities with the following: Environmental Education, Day Care Centers, Intermediate Schools, Fishing Clinics, Indian Reservations, and Boy/Girl Scouts.
GENERAL ACTION (Education) Parade: Prep Time & Parade				
67	PHM	ES, FMS	On-going	Participate in educational programs to maintain high visibility of the Fire Prevention effort. These are programs such as: Parades.
GENERAL ACTION (Education) Fair: Days of Booth Time				
68	PHM	ES, FMS	On-going	Participate in educational programs to maintain high visibility of the Fire Prevention effort. These are programs such as: Fairs.
GENERAL ACTION (Education) CFFP: Purchase Materials				
62	PHM	ES, FMS	On-going	Continue the use of Smokey as a prevention tool.
66	PHM	ES, FMS	On-going	Participate in educational programs to maintain high visibility of the Fire Prevention effort. These are programs such as: Smokey Bear (CFFP) and FIREWISE.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued



orkload Analysis Tasks

P=Plan
H=Hist
M=Min

#	M=Min	Responsibility	Due Date	Task
GENERAL ACTION (Education) Exhibits: # of Exhibits				
69	HM	ES	On-going	Participate in educational programs to maintain high visibility of the Fire Prevention effort. These are programs such as: Exhibits.
70	PHM	ES, FMS	As Needed	Consider other Fire Prevention activities, such as: Fire Prevention Week-Mall Display, Oil & Gas Show, Recreation & Boat Show, Children's Festivals, and Hunter Safety Booth.
GENERAL ACTION (Education) Smokey Bear: # of Appearance				
87	PHM	ES, FMS	On-going	Conduct Smokey Bear appearances, programs and other uses as per the National Smokey Bear Standard Guidelines.
GENERAL ACTION (Law Enforcement) Restriction/Closure: Develop Fire Restrict. Plan & Procedures				
134	PHM	SUPT	As Needed	Establish fire restriction orders by District Manager (i.e. campfires, fireworks.)
GENERAL ACTION (Law Enforcement) Industrial Ops Inspection: Ensure Fire Precaution Criteria in Contract				
148	PHM	CO	As Needed	Implement standards and guidelines for all industrial operations.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued



orkload Analysis Tasks

#	M=Min	Responsibility	Due Date	Task
P=Plan H=Hist				
GENERAL ACTION (Administration) Prevention Plan: Prepare Unit Plan				
121	P M CR		As Needed	Evaluate the Park Fire Investigation program to develop recommendations/plan to cover the following: Roles and Responsibilities, Staffing Levels, Training Requirements, and Trespass Effectiveness.
162	PHM FMO		On-going	Maintain an updated Wildfire Prevention Plan for the entire planning unit.
GENERAL ACTION (Administration) Prev. Committee: Participate in Mtgs.				
158	HM FMO		On-going	Participate with Interagency Fire Prevention Committees.
GENERAL ACTION (Administration) Training: Provide Intro. Trng.				
118	PHM FMO		On-going	All initial attack personnel will receive observation/point of origin/cause determination training (Introduction to Fire Investigation).
119	PHM FMO		On-going	Provide Basic Fire Investigation training to all Initial Attack Incident Commanders.
122	PHM FMO		On-going	Provide advanced Fire Investigation training to law enforcement officers.
152	P M FMO		As Needed	The Park will provide 'Introduction to Fire Prevention' training (P-101) for selected employees.
154	P M FMO		As Needed	Provide an 'Intro to Fire Investigation' course for all fire management personnel.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued



orkload Analysis Tasks

P=Plan
H=Hist

#	M=Min	Responsibility	Due Date	Task
SPECIFIC ACTION (Patrol) Patrol: Sole Function when fire Danger or Risk dictates				
39	HM	FMO	As Needed	Establish engine patrol routes and implement on a needed basis, i.e. holidays, high use periods and weekends.
41	HM	FMO	On-going	Implement high visibility fire prevention efforts in the following area: Fire Prevention Patrol.
SPECIFIC ACTION (Public Contact) Individual: 15 Min Per contact				
2	PHM	FMO, ES	On-going	Provide Homeowner Fire Safety Material as requested.
SPECIFIC ACTION (Public Contact) Group: 3 Hr Per Contact				
3				Conduct Fire Safety Programs with Homeowner's Assoc.
4				Conduct/participate in local Town Meetings.
5				Conduct Fire Prevention Public Education Programs with local service clubs.
60	PHM	FMO	As Needed	Conduct the following prevention programs/contacts with local schools in/or adjacent to priority areas (w/cooperator): Conduct Outdoor Fire Safety programs.
72	P M	FMS	As Needed	Consider other Fire Prevention activities, such as: provide group tours of the Fire Facility.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued



orkload Analysis Tasks

P=Plan
H=Hist

M=Min Responsibility Due Date Task

SPECIFIC ACTION (Public Contact) Key People: 3 Hr Per Contact

6			Participate with local County Planning Commissions.
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SPECIFIC ACTION (Signs) Construction: Build Additional Signs

34	PHM DR	As Needed	Install Fire Prevention Signing at points of significant interest.
36	HM INTERP	As Needed	Implement a Highway Rest Area/Visitor Information Center Fire Prevention Display Program.

SPECIFIC ACTION (Inspections) Residence: 1 Hr Initial

110	P M FMO	As Needed	Participate in fire safe evaluations as requested.
112	PHM FMO	On-going	Provide fire safe inspections to residential sites.

SPECIFIC ACTION (Inspections) Powerline: 1 Mi/Hr

96	HM FMO	As Needed	Complete physical inspections of all powerlines in hazardous fire areas.
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APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued



orkload Analysis Tasks

P=Plan
H=Hist

#	M=Min	Responsibility	Due Date	Task
SPECIFIC ACTION (Inspections) Lg Construction: 4 Hrs Initial				
93	HM	FMO	As Needed	Monitor/enforce all construction activities Fire Criteria.
SPECIFIC ACTION (Law Enforcement) Fire Invest. Unknown Suspect: 2 Hrs/Investigation				
117	HM	CR	On-going	Continue the Park Investigation program to provide adequate Fire Cause Determination.
SPECIFIC ACTION (Law Enforcement) Known Suspect: 3 Days/Case				
120	HM	DR	On-going	Investigate all human caused fires and process trespass actions when appropriate.
SPECIFIC ACTION (Administration) Recruit. Train Equip/Supervise: 101-1000 Hrs				
71	PHM	DR	On-going	Consider other Fire Prevention activities, such as: Utilize Campground Hosts in Fire Prevention.
SPECIFIC ACTION (Administration) Planning: Develop Compartment-Specific Plan				
150	HM	FMO	On-going	High fire danger or above normal conditions which include, but are not limited to, the following, will require additional planning: Spring/Fall Seasons, Low Fuel Moisture, Extreme Burning Index, Dry Lightning, Depleted Initial Attack capabilities (Resource Drawdown), Going Fires, and Red Flag Weather Conditions. The above indicators will require consideration of the following measures: Additional staffing, Pre-positioning of resources, Increased detection, Patrols, and Media Applications.
157	PHM	FMO	On-going	Prepare a Fire Prevention Action Plan/Expectations, to be included in all operating plans with cooperating agencies. This will provide direction as to the Fire Prevention Objectives on agency land protected by others.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued



orkload Analysis Tasks

P=Plan
H=Hist

#	M=Min	Responsibility	Due Date	Task
164	HM	FMPA	On-going	Maintain appropriate Fire Cause Information and Atlas.
165	P M	FMO	On-going	Complete the Fire Prevention Workload Analysis.
SPECIFIC ACTION (Hazards) Recurring Proj: 10 Days/FPT/Year				
98	PHM	FS	On-going	Establish fuelbreaks in the high risk/hazard areas.
100	PHM	FMO	On-going	Develop an Area Hazard Reduction program to address dispersed and developed recreation sites, hunter camps, turn-outs and places of concentrated public use and population zones.
106	PHM	CM	On-going	Ensure agency owned/maintained roads/facilities are inspected and maintained.
SPECIFIC ACTION (Hazards) Special Proj.: # of Hrs				
97	HM	CM	As Needed	Install and maintain campground fire pits/grates.
99	PHM	FS	On-going	Complete prescribed burning of piles, debris and slash.
102	PHM	FMO	On-going	Inspect agency facilities for fire hazards and hazard reduction needs.
103	M	FMO, FS	On-going	Inventory undeveloped sites and hazard areas, and complete necessary hazard reduction.
104	PHM	FMO, FS	On-going	Evaluate the use of Prescribed Fire to reduce hazards in high use/value areas.

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

C

Compartment Master Index

<u>Comp #</u>	<u>Name</u>	<u>Risk</u>	<u>Hazard</u>	<u>Value</u>	<u>Zone</u>
001	Natchez FMU	H		H	01
002	Kosciusko FMU	H		H	01
003	Tupelo FMU	H		H	01
004	Tennessee	H		H	02

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

Natchez Trace Parkway

Compartment Matrix For Wildfire Prevention Area:

Risk Hazard Value

001: Natchez FMU

H	M	H
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RISK COMPONENT: H

Urban Development

- ==> Wildland Urban Interface
- ==> Wildland Urban Intermix
- ==> Wildland Rural Intermix

Industrial Operations

- ==> Power Equipment
- ==> Service Contracts
- ==> Maintenance Projects
- ==> Construction Projects
- ==> Powerlines
- ==> Gas Pipelines
- ==> Agricultural Railroads
- ==> Storm Damage Removal
- ==> Beetle Killed Tree Removal
- ==> Fuel Reduction Contracts

Recreation

- ==> Campground Developed
- ==> Hunting
- ==> Water-Based Recreation
- ==> Trail/Hikers/Equestrian
- ==> OHV/Non-Motorized
- ==> OHV/Motorized
- ==> Party Areas
- ==> Sightseeing
- ==> Campground Undeveloped
- ==> Picnicing

Commercial Development

- Businesses

Other

- ==> Transportation Corridors
- ==> Fireworks
- ==> Shooting Areas
- ==> Children With Matches
- ==> Incendiary
- ==> Slash Burning
- ==> Debris Burning
- ==> Dumps
- ==> Lightning
- ==> Electronic Sites
- ==> Cultural Activities
- ==> Drug Labs/Cultivation
- ==> Military Training/Aerial

Number of Fires By Statistical Cause And Size Class (Rounded)

Cause	A	B	C	D	E	F+
Lightning	2	1				
Equipment	3	3				
Campfire	2	2				
Debris Burning	3	29	17	1		
Smoking	12	39	22	1		
Railroad		2	1			
Incendiary	3	7	3			
Children			1	1		
Other	7	30	3			

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

Natchez Trace Parkway

Compartment Matrix For Wildfire Prevention Area:

001: Natchez FMU

(Part 2)

HAZARD COMPONENT: M

<u>Criteria</u>	<u>Low</u>	<u>Medium</u>	<u>High</u>
Mixed Hardwoods - 0 - 20% Slope	X		
Mixed Hardwoods - 20 - 50% Slope		X	
Mixed Hardwoods - 50 - 100% Slope			X
Pine - Hardwood Mix		X	
Eastern Red Cedar - Tall Grass			X
Intermediate Brush - Hardwood Regeneration	X		
Short Grass	X		
Tall Grass			X
Pine Overstory - Grass/Shrub Understory		X	
Southern Long Needle Pine		X	
Southern Pine Beetle Kill		X	
Storm Damage			X

VALUE COMPONENT: H

- | | |
|-------------------------------------|----------------------------|
| ==> Timber | ==> Forage/Grazing |
| ==> Water Storage | ==> Watershed |
| ==> Scenic Byways | ==> Visual Resources |
| ==> Developed Recreation Sites | ==> Fish Habitat |
| ==> Threatened & Endangered Species | ==> Wildlife Habitat |
| ==> Cultural/Historical | ==> Soils |
| ==> Forest Products - Other | ==> Riparian |
| ==> Political/Social | ==> Commercial Development |
| ==> Cash Crops | ==> Improvements |
| ==> Viewshed | ==> Airshed |

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

Natchez Trace Parkway

Compartment Matrix For Wildfire Prevention Area:

002: Kosciusko FMU

Risk Hazard Value

H M H

RISK COMPONENT: H

Urban Development

- ==> Wildland Urban Interface
- ==> Wildland Urban Intermix
- ==> Wildland Rural Intermix

Industrial Operations

- ==> Power Equipment
- ==> Service Contracts
- ==> Maintenance Projects
- ==> Construction Projects
- ==> Powerlines
- ==> Gas Pipelines
- ==> Agricultural
- ==> Railroads
- ==> Storm Damage Removal
- ==> Beetle Killed Tree Removal
- ==> Fuel Reduction Contracts

Recreation

- ==> Campground Developed
- ==> Hunting
- ==> Water-Based Recreation
- ==> Trail/Hikers/Equestrian
- ==> OHV/Non-Motorized
- ==> OHV/Motorized
- ==> Party Areas
- ==> Sightseeing
- ==> Campground Undeveloped
- ==> Picnicing

Commercial Development

- ==> Businesses

Other

- ==> Transportation Corridors
- ==> Fireworks
- ==> Shooting Areas
- ==> Children With Matches Incendiary
- ==> Slash Burning
- ==> Debris Burning
- ==> Dumps
- ==> Lightning
- ==> Electronic Sites
- ==> Cultural Activities
- ==> Drug Labs/Cultivation
- ==> Military Training/Aerial

Number of Fires By Statistical Cause And Size Class (Rounded)

Cause	A	B	C	D	E	F+
Lightning	10	6	1			
Equipment	19	14	1			
Campfire	8	15	7	1		
Debris Burning	19	99	51	8	3	
Smoking	72	148	99	13	2	1
Railroad	2	10	11			
Incendiary	15	72	28	2	1	
Children		2	1			
Other	27	57	23	4	1	

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

Natchez Trace Parkway

Compartment Matrix For Wildfire Prevention Area:

002: Kosciusko FMU

(Part 2)

HAZARD COMPONENT: M

<u>Criteria</u>	<u>Low</u>	<u>Medium</u>	<u>High</u>
Mixed Hardwoods - 0 - 20% Slope	X		
Mixed Hardwoods - 20 - 50% Slope		X	
Mixed Hardwoods - 50 - 100% Slope			X
Pine - Hardwood Mix		X	
Eastern Red Cedar - Tall Grass			X
Intermediate Brush - Hardwood Regeneration	X		
Short Grass	X		
Tall Grass			X
Pine Overstory - Grass/Shrub Understory		X	
Southern Long Needle Pine		X	
Southern Pine Beetle Kill		X	
Storm Damage			X

VALUE COMPONENT: H

- | | |
|-------------------------------------|----------------------------|
| ==> Timber | ==> Forage/Grazing |
| ==> Water Storage | ==> Watershed |
| ==> Scenic Byways | ==> Visual Resources |
| ==> Developed Recreation Sites | ==> Fish Habitat |
| ==> Threatened & Endangered Species | ==> Wildlife Habitat |
| ==> Cultural/Historical | ==> Soils |
| ==> Forest Products - Other | ==> Riparian |
| ==> Political/Social | ==> Commercial Development |
| ==> Cash Crops | ==> Improvements |
| ==> Viewshed | ==> Airshed |

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

Natchez Trace Parkway

Compartment Matrix For Wildfire Prevention Area:

Risk Hazard Value

003: Tupelo FMU

H M H

RISK COMPONENT: H

Urban Development

- ==> Wildland Urban Interface
- ==> Wildland Urban Intermix
- ==> Wildland Rural Intermix

Industrial Operations

- ==> Power Equipment
- ==> Service Contracts
- ==> Maintenance Projects
- ==> Construction Projects
- ==> Powerlines
- ==> Gas Pipelines
- ==> Agricultural
- ==> Railroads
- ==> Storm Damage Removal
- ==> Beetle Killed Tree Removal
- ==> Fuel Reduction Contracts

Recreation

- ==> Campground Developed
- ==> Hunting
- ==> Water-Based Recreation
- ==> Trail/Hikers/Equestrian
- ==> OHV/Non-Motorized
- ==> OHV/Motorized
- ==> Party Areas
- ==> Sightseeing
- ==> Campground Undeveloped
- ==> Picnicing

Commercial Development

- Businesses

Other

- ==> Transportation Corridors
- ==> Fireworks
- ==> Shooting Areas
- ==> Children With Matches
- ==> Incendiary
- ==> Slash Burning
- ==> Debris Burning
- ==> Dumps
- ==> Lightning
- ==> Electronic Sites
- ==> Cultural Activities
- ==> Drug Labs/Cultivation
- ==> Military Training/Aerial

Number of Fires By Statistical Cause And Size Class (Rounded)

Cause	A	B	C	D	E	F+
Lightning	2	6				
Equipment	22	6	1			
Campfire	3	6	2	1		
Debris Burning	32	100	38	5	1	
Smoking	52	68	27	2		
Railroad	1	2	2			
Incendiary	23	58	10			
Children	7					
Other	36	108	16			

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

Natchez Trace Parkway

Compartment Matrix For Wildfire Prevention Area:

003: Tupelo FMU

(Part 2)

HAZARD COMPONENT: M

<u>Criteria</u>	<u>Low</u>	<u>Medium</u>	<u>High</u>
Mixed Hardwoods - 0 - 20% Slope	X		
Mixed Hardwoods - 20 - 50% Slope		X	
Mixed Hardwoods - 50 - 100% Slope			X
Pine - Hardwood Mix		X	
Eastern Red Cedar - Tall Grass			X
Intermediate Brush - Hardwood Regeneration	X		
Short Grass	X		
Tall Grass			X
Pine Overstory - Grass/Shrub Understory		X	
Southern Long Needle Pine		X	
Southern Pine Beetle Kill		X	
Storm Damage			X

VALUE COMPONENT: H

- | | |
|-------------------------------------|----------------------------|
| ==> Timber | ==> Forage/Grazing |
| ==> Water Storage | ==> Watershed |
| ==> Scenic Byways | ==> Visual Resources |
| ==> Developed Recreation Sites | ==> Fish Habitat |
| ==> Threatened & Endangered Species | ==> Wildlife Habitat |
| ==> Cultural/Historical | ==> Soils |
| ==> Forest Products - Other | ==> Riparian |
| ==> Political/Social | ==> Commercial Development |
| ==> Cash Crops | ==> Improvements |
| ==> Viewshed | ==> Airshed |

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

Natchez Trace Parkway

Compartment Matrix For Wildfire Prevention Area:

Risk Hazard Value

004: Tennessee

H M H

RISK COMPONENT: H

Urban Development

- ==> Wildland Urban Interface
- ==> Wildland Urban Intermix
- ==> Wildland Rural Intermix

Industrial Operations

- ==> Power Equipment
- ==> Service Contracts
- ==> Maintenance Projects
- ==> Construction Projects
- ==> Powerlines
- ==> Gas Pipelines
- ==> Agricultural
- ==> Railroads
- ==> Storm Damage Removal
- ==> Beetle Killed Tree Removal
- ==> Fuel Reduction Contracts

Recreation

- ==> Campground Developed
- ==> Hunting
- ==> Water-Based Recreation
- ==> Trail/Hikers/Equestrian
- ==> OHV/Non-Motorized
- ==> OHV/Motorized
- ==> Party Areas
- ==> Sightseeing
- ==> Campground Undeveloped
- ==> Picnicing

Commercial Development

- Businesses

Other

- ==> Transportation Corridors
- ==> Fireworks
- ==> Shooting Areas
- ==> Children With Matches
- ==> Incendiary
- ==> Slash Burning
- ==> Debris Burning
- ==> Dumps
- ==> Lightning
- ==> Electronic Sites
- ==> Cultural Activities
- ==> Drug Labs/Cultivation
- ==> Military Training/Aerial

Number of Fires By Statistical Cause And Size Class (Rounded)

Cause	A	B	C	D	E	F+
Lightning	2	3	2			
Equipment	11	3	1			
Campfire	6	5	1			
Debris Burning	11	43	20	7	1	1
Smoking	36	53	17		1	
Railroad		1				
Incendiary	20	46	11	4	1	
Children	11	2	2			
Other	18	53	7	1		

APPENDIX E
WILDLAND PREVENTION PLAN AND ANALYSIS, continued

Natchez Trace Parkway

Compartment Matrix For Wildfire Prevention Area:

004: Tennessee

(Part 2)

HAZARD COMPONENT: M

<u>Criteria</u>	<u>Low</u>	<u>Medium</u>	<u>High</u>
Mixed Hardwoods - 0 - 20% Slope	X		
Mixed Hardwoods - 20 - 50% Slope		X	
Mixed Hardwoods - 50 - 100% Slope			X
Pine - Hardwood Mix		X	
Eastern Red Cedar - Tall Grass			X
Intermediate Brush - Hardwood Regeneration	X		
Short Grass	X		
Tall Grass			X
Pine Overstory - Grass/Shrub Understory		X	
Southern Long Needle Pine		X	
Southern Pine Beetle Kill		X	
Storm Damage			X

VALUE COMPONENT: H

- | | |
|-------------------------------------|----------------------------|
| ==> Timber | ==> Forage/Grazing |
| ==> Water Storage | ==> Watershed |
| ==> Scenic Byways | ==> Visual Resources |
| ==> Developed Recreation Sites | ==> Fish Habitat |
| ==> Threatened & Endangered Species | ==> Wildlife Habitat |
| ==> Cultural/Historical | ==> Soils |
| ==> Forest Products - Other | ==> Riparian |
| ==> Political/Social | ==> Commercial Development |
| ==> Cash Crops | ==> Improvements |
| ==> Viewshed | ==> Airshed |

APPENDIX F
UNIT-SPECIFIC SUPPLEMENTAL INFORMATION
Exhibits 1-12

APPENDIX F
EXHIBIT 1
NATR Fire Crew/Overhead Mobilization Plan

Firefighting personnel will be obtained from the Districts, Sub-districts, and Headquarters. The appropriate District Rangers, Maintenance Foremen, and/or Division Chiefs will maintain a prioritized listing of their personnel who hold Red Cards. When a mobilization request is received, the mobilization coordinator, after receiving approval from the Chief Ranger and/or the Chief of Maintenance for the mobilization, will contact the appropriate supervisor(s). It will then be the supervisor's responsibility to contact the personnel needed to fill the resource needs as per their prioritized listing, and considering local operational needs. Once they have contacted the personnel on their lists and confirmed the names of the persons who will be filling the resource needs, the supervisors will then provide the mobilization coordinator with the names of the individuals.

NOTE: Crew Bosses and/or Squad Bosses should take a portable radio with them when they are dispatched. These are available from the Fire office as needed.

To enable us to fill resource orders on a timely basis, we would ideally like to have personnel mobilized within two hours. To help us to do this, particularly during the primary fire season in the west (i.e. April through mid-September), supervisors are requested to update their resource lists, as needed, to ensure that the individuals on their listings are, in fact, available for callout.

MOBILIZATION PROCEDURES

Upon receiving a request for an Interagency Crew an/or Overhead mobilization, the mobilization coordinator will activate the mobilization process via the following procedures:

Obtain the following **required information** from the individual or agency making the request and enter this information on a Resource Order Form:

- Fire (Incident) Name and Number, and Fire (Incident) Order (Request) Number.
- A Regional Account Number.
- Location of Incident (if known).
- Ordering Office (e.g. State Interagency Coordination Center, Southern Interagency Coordination Center, NIFC)
- Delivery Location (i.e. reporting location)
- Desired delivery (reporting) date/time.
- Resources (Items) requested.

Once the information in "I" has been obtained, the mobilization coordinator will initiate mobilization procedures as follows:

Notify the Chief Ranger, Chief of Maintenance, and the Fire Program Assistant that a mobilization request has been received. **The Chief Ranger and Chief of Maintenance will then make the initial "go" or "no go" decision** based on the current Parkway situation with regards to staffing needs and ongoing priorities. If the Chief Ranger and Chief of Maintenance approve the mobilization, the requested resources will be mobilized (unless the requesting office has specified the desired method of delivery, dependant upon the requested delivery date and/or time). Whenever possible, common carrier transportation will be utilized. Arrangements will be made through Northrup Grumman for travel from Alabama, Tennessee, and Mississippi. You will need to utilize someone who is authorized to make reservations through Northrup Grumman utilizing GovTrip to purchase tickets. (Division Secretary, Budget Analyst, or Fire Program Assistant).

The travel agencies require an identification number for the Parkway prior to processing any requests. Once they have verified the ID#, you will need to give them Travel Authorization Numbers **for each individual being dispatched**, along with the Account Number that was received from the Regional office. Contact the Fire Program Assistant or the Chief Ranger Secretary if there is a problem with either the Travel Agency or with Travel Authorization Numbers.

APPENDIX F
EXHIBIT 1
NATR Fire Crew/Overhead Mobilization Plan, continued

If the requested delivery date and/or time are such that a common carrier cannot meet the need (e.g. ASAP, late night request for early next day delivery) then a charter aircraft may be utilized. **The aircraft utilized must be on the current OAS Contract and Rental Aircraft Listing.**

ADMINISTRATIVE REQUIREMENTS

For all mobilizations, the following reports will be completed before the requested resources are dispatched unless otherwise noted:

1. **Resource Order Form:** To be completed by the Fire Program Assistant. The Fire Management office will retain one copy of this form, with copies being given to the personnel being dispatched.
2. **Passenger and Cargo Manifest:** To be completed by the Fire Program Assistant if a manifest is requested from the Coordination Center. The Fire Management office will keep one copy of this form, with the original **plus six copies** being given to the personnel being dispatched. NOTE: When completing the column labeled "cargo weight", enter 65# for each passenger. Each "Passenger's" Social Security Number will be listed directly above their name in the appropriate column.
3. **Emergency Firefighter Time Sheet:** To be completed by the personnel being dispatched. One time sheet will be completed for each individual dispatched. The completed time sheets will be given to the Crew Boss once the crew has assembled. In the case of a single resource, the assigned individual will retain it.
4. **Travel Authorization:** To be completed by the Fire Program Assistant or appropriate designated Division Secretary. **If the mobilization occurs during working hours, the TA's are to be done within 24 hours of the mobilization**. If the mobilization occurs after hours or on weekends/or holidays, the TA's are to be done during the next business day.
5. When a charter aircraft is being utilized, the "Chief of Party" should carry two blank OAS-23 manifold copy forms (Aircraft Use Report) with them in case the pilot does not have any. **User Code "9p" should be used for point-to-point transport of firefighters, with the Regional Fire Account Number assigned to that particular incident being entered into the column labeled "Organization and Charge Code Symbols".**

NATR FIRE MOBILIZATION PLAN - KEY POINTS

The following are the **key points** of NATR's Fire Mobilization Plan, listed according to their "normal" order of occurrence after reception of a mobilization request. **See plan itself for detailed information.**

Obtain Required Information Regarding Mobilization

- **Fire (Incident) Name and Number**
- **Fire (Incident) Order (Request) Number**
- **Account Number**
- **Ordering Office**
- **Delivery (Reporting) Location**
- **Date/Time Needed**
- **Resource(s) Requested**

APPENDIX F
EXHIBIT 1
NATR Fire Crew/Overhead Mobilization Plan, continued

Preliminary Notification Prior To Resource Mobilization

- Contact Chief Ranger and Chief Of Maintenance to get "Go-or-No Go" decision.
- Notify Fire Program Assistant that a request has been received.

Resource Mobilization

- If "Go" decision, contact applicable supervisor(s) and obtain name(s) of assigned resource(s).
- Notify assigned resource(s) of mobilization.
- Make the necessary travel arrangements, and arrange for ground transportation to the airport, if necessary.
- Notify assigned resource(s) where and what time to report for transportation to airport if transportation is being provided.

Administrative Requirements

- Resource Order Form: (Interagency Dispatch Center responsibility)

NOTE: IF MOBILIZATION DID NOT OCCUR ON WEEKDAY DURING NORMAL WORKING HOURS, A COPY WILL BE FAXED TO THE FIRE MGMT. OFFICE PRIOR TO THE NEXT WORKING DAY.

- Passenger/Cargo Manifest (Interagency Dispatch Center responsibility)

NOTE: IF MOBILIZATION DID NOT OCCUR ON WEEKDAY DURING NORMAL WORKING HOURS, A COPY WILL BE FAXED TO THE FIRE MGMT. OFFICE PRIOR TO THE NEXT WORKING DAY.

- Emergency Firefighter Time Sheet (Dispatched persons' responsibility)
- Travel Authorization (Fire Program Assistant, Division Secretary, or Budget Analyst assigns TA Numbers).

APPENDIX F

EXHIBIT 2

Standard Operating Procedure for Fire Dispatch and Suppression Along the Natchez Trace Parkway

The Superintendent is responsible for coordinating aggressive suppression action on all reports of fire per Parkway and NPS policies. In addition, the Parkway provides mutual aid to local fire departments and forestry agencies when requested. Wildfire suppression operations will be considered as emergencies, and take precedence over any other non-emergency Parkway operations. Fire suppression is a collateral duty for all employees (except FMO, engine module staff). All employees, regardless of Division, are strongly encouraged to participate.

The following Standard Operating Procedures will apply to all Parkway fire suppression operations.

Fire Dispatch and Travel to Fire

The Superintendent's fire coordination responsibilities have been delegated to the FMO. The Communications Center will serve as the primary fire dispatch.

All fires and smokes on or off the Parkway will be immediately reported to the Communication Center (radio call sign - 700). The following information should be reported:

LOCATION	(MP, side of road, adjacent to...)
ACCESS	(Best road to get to fire)
SIZE	(Rough acreage estimate)
FUELS	(Fuel/vegetation types and loading)
BEHAVIOR	(Smoldering, creeping, running...)
POTENTIAL	(Structures, property threatened)
PARKWAY VISIBILITY	(Amount of smoke on Parkway)

Initial Attack resources will be dispatched to all reports of fires based upon the preplanned dispatch matrix (attached). Mutual Aid responses beyond 1/4 mile of Parkway boundary (PROTECTION ZONE) must be approved by FMO. Resources may also be repositioned to provide coverage behind dispatched resources. Dispatch will notify cooperators of fire and Parkway response. Refer to Communication Center Responsibilities (Section V.B) for more information.

An Incident Commander will be designated and dispatched to every fire; an unqualified Incident Commander will only be designated if approved by the FMO. Dispatch will provide the IC with all the information it has on the fire.

All additional forces dispatched to the fire will be advised of the IC and fire location. All fire related communications should be through the IC.

Non red-carded maintenance or Ranger personnel will be dispatched to the fire for traffic control or other support functions if requested by the IC.

Engines will only be driven by employees completing the Parkway engine operators training course, and drivers will adhere to all traffic regulations at all times. Emergency warning lighting will be activated anytime the engine is parked on the side of a road.

Backfill will be available for any employee dispatched to a fire. Base eight hours may be paid for by the wildfire account if Parkway management chooses not to utilize the backfill option.

APPENDIX F

EXHIBIT 2

Standard Operating Procedure for Fire Dispatch and Suppression Along the Natchez Trace Parkway, continued

Fire Size-Up, Planning, and Ordering

The designated IC will be responsible for the management and supervision of the fire suppression operation. Upon arrival, the IC will perform a quick size-up, and report the following information to FIRE:

SPECIFIC LOCATION	(MP, side of road, adjacent to...)
ACCESS	(Best road to get to fire)
SIZE	(Rough acreage estimate)
FUELS	(Fuel/vegetation types and loading)
BEHAVIOR	(Smoldering, creeping, running...)
POTENTIAL	(Values at risk, expected time/size of containment)
PARKWAY VISIBILITY	(Amount of smoke on Parkway, traffic control needed?)
FIRE CAUSE	(Cause if known, investigator needed?)
RESOURCES NEEDED/RELEASED	

The IC may order additional resources, supplies, or equipment from dispatch. Orders will be filled promptly whenever possible. Dispatch may order non-red carded personnel to provide traffic control, fire investigation, or support services when needed. The IC will ensure that fire suppression tactics minimize impacts upon natural or cultural resources. The Superintendent must approve use of cooperators tractor-plows within the Parkway.

The IC will keep dispatch informed on the status of the fire and suppression efforts. Dispatch will keep cooperators, DRs, the FMO, and the Chief Ranger informed.

Deployment and Containment

All personnel dispatched to the fire will check in (by radio or person) with the IC to receive instructions prior to deployment. Firefighters will wear all personal protective equipment while on the fire. Synthetic materials will not be worn inside protective clothing. Required protective clothing includes:

- Nomex shirt and trousers
- Helmet
- Leather boots w/ 8" top with non-skid soles
- Leather gloves
- Fire shelter

Incidental firefighters (personnel who are not red carded, but do have 8 hours of wildland firefighting training) can participate in initial attack operations as engine drivers but are **NOT** to take any suppression actions. Red carded personnel will replace these individuals as soon as possible.

The IC will notify dispatch if it appears that it will take more than 8 hours for containment.

Control, Mop-Up, and Management

The IC will ensure that the fire is manned until it is declared out, and that all equipment is returned to a state of readiness before releasing personnel. The IC will ensure that the fire scene is rehabilitated within 3 days of the fire being declared out. Rehabilitation will include, but is not limited to, covering firelines and vehicle tracks, flush cutting stumps, and installation of water bars (if needed).

The Resource Management Specialist or Cultural Resource Specialist will be dispatched to inspect and/or plan the rehabilitation of any fire where tractor-plows were used or where there was significant resource damage. An archeologist from the Southeast Archeological Center may be requested to inventory all sites disturbed by tractor-plow operations.

APPENDIX F

EXHIBIT 2

Standard Operating Procedure for Fire Dispatch and Suppression Along the Natchez Trace Parkway

Administrative Requirements

The IC will ensure that the Field Fire Report (DI 1201) and the Time and Cost Report is completed and routed to headquarters within 5 days. The Time and Cost Report should include all PPE or equipment needing replacement after the fire as well as all fire time (including backfill time and time for completing rehab and administration). The Fire Management Program Assistant will assist with both reports upon request.

The District Ranger will route the initial Case Incident Report of the fire investigation to the FMO within 5 days of the fire. Supplemental Fire Investigation Case Incident Reports will be routed to the FMO as they are completed.

APPENDIX F
EXHIBIT 3
STANDARD OPERATING PROCEDURE FOR DEBRIS BURNING
ALONG THE NATCHEZ TRACE PARKWAY

General

Burning has been used in the past to dispose of debris within the Parkway. Burning may be a legitimate disposal method for certain types of debris by Parkway staff, contractors, or lessees. DO-18 and RM-18 recognize this as a legitimate use of fire, but also establishes requirements for its use. This SOP establishes Parkway procedures that comply with DO-18 and RM-18, and will allow necessary burning to proceed safely.

Requirements (NPS, Lessees, Contractors)

All debris burning projects will be reviewed and approved by the FMO. Anybody interested in initiating a burn project will call the FMO and describe the project. The FMO will determine if the project meets Debris Burning requirements. Staffing for debris burns will consist of one engine and two Red Carded firefighters. Parkway staff will be made available to meet these requirements provided funding is available.

The burning of hazardous or dangerous materials will not be approved. These materials include, but are not limited to:

1. Hazardous chemical residues
2. Petroleum residues
3. Treated lumber
4. Plastic or synthetic materials

All unapproved debris burning within the Parkway will be immediately suppressed as a wildfire. The responsible party will be charged with the violation of 36 CFR 2.13 a. 1. - Fire in Undesignated Area, and may be charged for suppression costs.

All future agricultural leases will state "No burning will occur on leased property without approval by the Parkway Fire Management Officer. Violators will be charged with the violation of 36 CFR 2.13 a. 1. Fire in Undesignated Area, and may be charged for suppression costs."

All future construction contracts will be developed and conducted in coordination with the Fire Management Officer. All construction contracts/projects that produce vegetative debris will specify when and how the material will be disposed. If fire is a potential disposal method, the Fire Management Officer must review and approve the contract stipulations related to debris burning. The project/contract must include funding for planning and conducting the debris burning and identify the responsible individual(s).

APPENDIX F
EXHIBIT 4
STANDARD OPERATING PROCEDURE FOR WILDFIRE INVESTIGATION
ALONG THE NATCHEZ TRACE PARKWAY

Fire cause investigation and prosecution of violators is an essential facet of the Parkway fire prevention program. **ALL** wildfires occurring on the Parkway will be investigated. The IC of every fire will be responsible for protecting the point of origin, and for determining the cause of the fire if possible. The IC will notify the responsible District Ranger of the location of the point of origin and any other applicable information.

The District Ranger will be responsible for ensuring that all human-caused fires are thoroughly investigated, and documented on a Case Incident Report. Investigative assistance on arson or complex cases may be obtained through the Chief Ranger. Arson investigation costs may be charged to the fire account with the concurrence of the FMO. All violators will be held liable for civil costs and for appropriate criminal action when laws or regulations have been violated. Cash rewards from appropriated funds are authorized to be paid upon arrest and conviction of known arsonists from suppression funds. The option to offer these rewards must be coordinated through the Southeast Field Area Fire and All-Risk Coordinator and local law enforcement agencies.

APPENDIX F
EXHIBIT 5
MEMORANDA OF UNDERSTANDING

Fire Department	General Agreement Number
Alpine Fire Department	G5570-06-0002
Attala County Fire Department	G5570-03-0007
Belden Volunteer Fire Dept	G5570-99-0006
Bench Volunteer Fire Dept	G5570-03-0008
Birmingham Ridge V.F.D.	G5570-06-0003
Bywy Volunteer Fire Dept	G5570-04-0003
Carter's Branch V.F.D.	G5570-03-0005
Cedar Hill Fire Department	G5570-03-0041
Central Volunteer Fire Deptment	G5570-06-0021
Cherokee Volunteer Fire Dept	G5570-08-0060
Chester Volunteer Fire Dept.	G5570-08-0009
Claiborne Co. Vol. Fire Dept	G5570-08-0010
Cloverdale Vol. Fire Department	G5570-06-0013
Collinwood Vol. Fire Department	G5570-03-0012
Cumberland Vol Fire Department	G5570-06-0018
Dennis Volunteer Fire Dept	G5570-03-0001
Ethel Volunteer Fire Department	G5570-08-0014
French Camp Vol. Fire Dept	G5570-08-0024
Gluckstadt Vol. Fire Department	G5570-08-0019
Guntown Fire Department	G5570-03-0003
Hickman Co. Rescue Squad	G5570-08-0015
Hobo Big V Vol. Fire Dept	G5570-08-0016
Houston Community V.F.D.	G5570-02-0013
Houston Volunteer Fire Dept	G5570-08-0017
Leake County Fire Department	G5570-08-0019
Lewis County Vol Fire Dept	G5570-08-0020
Maben Fire Department	G5570-08-0059
Madison Fire Department	G5570-03-0021
Mantee Volunteer Fire Dept	G5570-03-0022
Marietta Volunteer Fire Dept.	G5570-05-0008
Mathiston Volunteer Fire Dept.	G5570-05-0058
Maury County Fire & Rescue	G5570-08-0023
McCool Fire Department	G5570-03-0032
New Site Volunteer Fire Dept	G5570-06-0002
Oakland Volunteer Fire Dept	G5570-08-0025
Ofahoma Volunteer Department	G5570-01-0017
Palmetto-Old Union V.F.D.	G5570-05-0005
Pratts-Friendship Vol. Fire Dept	G5570-06-0011
Raymond Volunteer Fire Dept.	G5570-03-0026
Saltillo Fire Department	G5570-03-0004
Shady Grove Vol Fire Dept	G5570-05-0010

APPENDIX F
EXHIBIT 5
MEMORANDA OF UNDERSTANDING

Fire Department	General Agreement Number
Simpson Volunteer Fire Dept	G5570-08-0027
South Lee Vol Fire Dept.	G5570-03-0014
South Tishomingo Vol Fire Dept	G5570-03-0003
Thomastown Vol Fire Dept.	G5570-01-0016
Tishomingo Volunteer Fire Dept	G5570-03-0002
Troy-Woodland Vol Fire Dept.	G5570-08-0061
Unity Fire Department	G5570-03-0001
Van Vleet Volunteer Fire Dept.	G5570-06-0015
Waterloo Volunteer Fire Dept.	G5570-04-0002
Wayne County Emergency Mgt	G5570-02-0022
Weir Volunteer Fire Department	G5570-01-0057
West End Volunteer Fire Dept	G5570-04-0004
Williamson Co. Rescue Squad	G5570-08-0029
Woodland/Sparta VFD	G5570-08-0030

APPENDIX F
EXHIBIT 6
WILDFIRE INCIDENT REPORT
and
INCIDENT TIME REPORT (Green Sheet)

14. CAUSE: (UNDERLINE CHOICE) CAMPFIRE - COOKING/WARMING, CAMPFIRE - UNKNOWN, CAMPFIRE - KNOWN, SMOKING - SMOKING, FIRE USE - TRASH BURNING, FIRE USE - BURNING DUMP, FIRE USE - FIELD BURNING, FIRE USE - LAND CLEARING, FIRE USE - SLASH BURNING, FIRE USE - RIGHT-OF-WAY, FIRE USE - RESOURCE MANAGEMENT, FIRE USE - OTHER, UNKNOWN, FIRE USE- OTHER KNOWN, INCENDIARY - TRASH BURNING, INCENDIARY - FIELD BURNING, INCENDIARY - SLASH BURNING, INCENDIARY - GRUDGE FIRE, INCENDIARY - RECURRENT, INCENDIARY - EMPLOYMENT, INCENDIARY - BLASTING, INCENDIARY - FIREWORKS, INCENDIARY - OTHR, UNKNOWN, INCENDIARY - OTHER KNOWN, EQUIPMENT - AIRCRAFT, EQUIPMENT - VEHICLE, EQUIPMENT - EXHAUST, EQUIPMENT - BRAKES, EQUIPMENT - BLASTING, EQUIPMENT - POWEWRLINE, EQUIPMENT - OTHER, UNKNOWN, EQUIPMENT - OTHER KNOWN, RAILROADS - EXHAUST, RAILROADS - BRAKES, RAILROADS - OTHER, UNKNOWN, RAILROADS - OTHER KNOWN, JUVENILES - RECURRENT, JUVENILES - FIREWORKS, JUVENILES - IGNITION DEVICES, JUVENILES - OTHER, UNKNOWN, JUVENILES - OTHER, KNOWN, MISCELLANEOUS - FIREWORKS, ADULTS, MISCELLANEOUS - OTHER, UNKNOWN, MISCELLANEOUS - OTHER, KNOWN

DETAILED REMARKS IN NARRATIVE SECTION IS REQUIRED TO FURTHER SPECIFY THE CAUSE WHEN MISCELLANEOUS - OTHER, KNOWN IS UTILIZED.

15. SUSPECT CLASSIFICATION: (UNDERLINE CHOICE) INDIVIDUALS WHO OWN LAND OR BUSINESSES WITHIN THE PROTECTION BOUNDARIES, SPECIAL-USE PERMITEES OPERATING WITHIN THE PROTECTION BOUNDARIES, CONTRACTORS, THEIR AGENTS OR EMPLOYEES ENGAGED IN THE PURCHASE OF PRODUCTS OR CONSTRUCTION OF FACILITIES WITHIN THE PROTECTION BOUNDARIES, FEDERAL, STATE, COUNTY, MUNICIPAL, TRIBAL, OR OTHER PUBLIC EMPLOYEES WORKING WITHIN THE PROTECTION BOUNDARIES, PERMANENT RESIDENTS LIVING WITHIN ONE MILE OUTSIDE THE PROTECTION BOUNDARY, SEASONAL RESIDENTS OR WORKERS RESIDING INSIDE OR WITHIN ONE MILE OF THE PROTECTION BOUONDARY, TOURISTS, MOTORISTS, CAMPERS, ETC. IN TRANSIT THROUGH PROTECTED AREA, PEOPLE NOT INCLUDED ABOVE (DESCRIBE IN REMARKS SECTION), UNKNOWN
16. INVESTIGATED: (UNDERLINE CHOICE) YES OR NO
17. FIRE CAUSE SUSPECT IDENTITY: (UNDERLINE CHOICE) KNOWN OR UNKNOWN
18. FIRE CAUSE SUSPECT TYPE: (UNDERLINE CHOICE) RESIDENT, TRANSIENT, UNKNOWN
19. REMARKS (REMARKS PERTAINING TO TRESPASS INVESTIGATION, CIRS REPORT WILL SUFFICE):
20. NARRATIVE: (SIGNIFICANT EVENTS, ACTIONS TAKEN)

INCIDENT COMMANDER

DATE

APPENDIX F
EXHIBIT 7
PRESCRIBED FIRE INCIDENT REPORT

PRESCRIBED FIRE INCIDENT REPORT

1. **DATE:** _____
2. **NAME OF PROJECT:** (TEN LETTERS OR LESS) _____.
3. **LOCATION:** MILEPOST _____ E OR W, T____, R____, SEC____, LATITUDE _____, LONGITUDE _____
4. **FISCAL DATA:** _____
5. **ACRES INVOLVED:** _____ ACRES ON PARK, _____ ACRES OFF PARK
6. **TIME OF IGNITION:** _____ HOURS. (NOTIFY DISPATCH)
7. **TIME OF CONTROL:** IGNITION ENDED, NO THREAT OF ESCAPE OVER CONTROL LINES ACHIEVED AT _____ HOURS. (NOTIFY DISPATCH)

DATE DECLARED OUT: _____

TOPOGRAPHY: (CIRCLE CHOICE) RIDGETOP 1, SADDLE 2, UPPER 1/3 OF SLOPE 3, MIDDLE 1/3 OF SLOPE 4, LOWER 1/3 OF SLOPE 5, CANYON BOTTOM 6, VALLEY BOTTOM 7, MESA OR PLATEAU 8, FLAT OR ROLLING 9.

7. **ASPECT:** (CIRCLE CHOICE) N, NE, NW, E, SE, S, SW, W

8. **PLOT OBJECTIVE:** (CIRCLE CHOICE) **CULTURAL SCENE MAINTENANCE** : HISTORICAL SITE 01, OTHER CULTURAL SITE 02, **NATURAL SYSTEMS:** EXOTIC/UNDESIRABLE SPECIES CONTROL 10, HABITAT MAINTENANCE 11, RESEARCH 12, FIRE DEPENDENT ECOSYSTEM 13, **HAZARD REDUCTION:** FUEL REDUCTION - ACTIVITY FUELS 20, FUEL REDUCTION - NATURAL FUELS 21, REAL PROPERTY PROTECTION 22, BOUNDARY PROTECTION 23, FUEL BREAK MAINTENANCE 24, **MAINTENANCE:** DEBRIS REMOVAL 30, VISTA MAINTENANCE 31, HEALTH (INSECT CONTROL) 32, RIGHT-OF-WAY MAINTENANCE 33.

9. **FIRING TYPE: FIRING STRATEGY:** HEAD FIRE 1, BACK FIRE 2, SPOT FIRE 3, CONCENTRIC FIRE 4, **FIRING METHOD:** HAND IGNITION 1, AERIAL IGNITION 2, REMOTE IGNITION 3.

10. **COST PER ACRE:** \$ _____

11. **FUEL MODEL(s):** (CIRCLE PRIMARY, UNDERLINE SECONDARY CHOICE) 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

12. **PROJECT NUMBER:** _____

13. FUEL LOADING	PREBURN	CONSUMPTION
SHRUB/HERB		
0 - 1	_____	_____
1.1 - 3.0	_____	_____
3.1 - 9.0	_____	_____
9 +	_____	_____
LITTER/DUFF	_____	_____

14. **POTENTIAL FOR ESCAPE:** (CIRCLE CHOICE) 0, 1, 3, 5, 7, 9

15. **VALUES AT RISK:** (CIRCLE CHOICE) 0, 1, 3, 5, 7, 9

16. **FUELS/FIRE BEHAVIOR:** (CIRCLE CHOICE) 0, 1, 3, 5, 7, 9

17. **FIRE DURATION:** (CIRCLE CHOICE) 0, 1, 3, 5, 7, 9

18. **AIR QUALITY:** (CIRCLE CHOICE) 0, 1, 3, 5, 7, 9

19. **EQUIPMENT ON SCENE** (LICENSE #):

20. **PERSONNEL ON SCENE** (POSITION HELD):

21. **NARRATIVE:** (SIGNIFICANT EVENTS, ACTIONS TAKEN, ESCAPE)

BURN BOSS

DATE

APPENDIX F
EXHIBIT 8
WILDFIRE/PRESCRIBED FIRE SUPPORT INCIDENT REPORT

WILDFIRE/PRESCRIBED FIRE SUPPORT INCIDENT REPORT

1. DATE: _____ DISPATCH TIME: _____
2. NAME OF INCIDENT: (TEN LETTERS OR LESS) _____
3. LOCATION: (FOUND ON RESOURCE ORDER) _____
IF LOCAL GIVE LOCATION BY MILEPOST _____, E OR W SIDE,
OR LOCATION OFF PARKWAY _____
4. NAME OF AGENCY BEING ASSISTED: _____
5. ACRES INVOLVED: _____
6. TYPE OF FIRE: (UNDERLINE CHOICE) WILDFIRE OR PRESCRIBED FIRE
7. EQUIPMENT DISPATCHED

8. PERSONNEL DISPATCHED AND POSITIONS HELD

NARRATIVE: (SIGNIFICANT EVENTS, ACTIONS TAKEN)

NAME

DATE

**APPENDIX F
EXHIBIT 9**

**NATR FIRE QUALIFICATIONS NEEDS/STATUS for INITIAL ATTACK
by FMU**

Fire Planning Unit	Fire Management Unit/Engine Location	IC Type IV	IC Type V	Engine Operator	Firefighter	Current Needs (as of 10/2008)
Tennessee-Green River	Meriwether Lewis	1	2	1	2	1 ICT4 1 ICT5 1ENOP 1 FFT2
North Mississippi	Tupelo	1	2	2	4	Fully Staffed
North Mississippi	Kosciusko	1	2	1	2	1 ICT4 1 ICT5 1 ENOP 1 FFT2
North Mississippi	Natchez	1	2	1	2	1 ICT4 1 ICT5 1ENOP 1 FFT2

Note: One person may have more than one needed qualification; ideally there would be at least 5 individuals to meet the staffing needs .

APPENDIX F
EXHIBIT 10
INVENTORY FOR ENGINE RESUPPLY CACHES

Each engine on the Natchez Trace Parkway will carry a predetermined amount of equipment. The District Ranger will be responsible to ensure that these specifications are met. Engines are to be equipped to follow the Interagency Standards for Fire and Fire Aviation Operations (Red Book).

Type A Engine Resupply Cache (Natchez, Kosciusko, Meriwether Lewis)

- 100 feet 3/4" or 1" hard line live reel hose
- 3 - 100 feet 1" hose
- 3 - 100 feet 1 1/2" hose
- 4 - 1" nozzle (Forester, KK adjustable)
- 1 - 1 1/2" nozzle
- 1 - flapper
- 1 - council tool (fire rake)
- 1 - shovel
- 1 - pulaski
- 2 - 8 foot hard line draft hose
- 1 - foot valve
- 1 - 10 foot 1 1/2" filler hose
- 1 - hydrant wrench
- 1 - 1" double female
- 1 - 1 1/2" double female
- 1 - 1" double male
- 1 - 1 1/2" double male
- 1 - 3/4" - 1" increaser
- 1 - 1" - 1 1/2" increaser
- 3 - 1 1/2" - 1" reducer
- 1 - 2 1/2" - 1 1/2" reducer
- 1 - 1" double gated wye
- 2 - 1 1/2" double gated wye
- 2 - hose clamp
- 2 - spanner wrench
- 1 - box AA batteries
- 6 - MRE meal
- 2 - backpack pumps
- 1 - 3/4" aspirating foam nozzle
- 1 - 1" aspirating foam nozzle

Note: These are minimum requirements; additional items may be carried on the engine as deemed necessary. Caution should be taken not to overload the vehicle so much as to raise the gross vehicle weight to a level over legal limits. Engines should be weighed prior to the start of fire season to prevent this type of overloading.

APPENDIX F
EXHIBIT 10
INVENTORY FOR INITIAL ATTACK AND MAIN CACHES

Type B Initial Attack Cache (Ridgeland, Cherokee, Leipers Fork)

- 1-portable pump
- 1-pump kit- check and bleeder valve, foot valve, 1 1/2" - 1" reducers, gated wye, nozzles, gas line, gas can, 2 lengths draft hose, ear plugs, goggles, tool kit, sheet plastic, spanner wrenches, and rope.
- 2 - shovel
- 2 - pulaski
- 2 - council tool (fire rake)
- 2 - flapper
- 3 - 100 feet 1" hose
- 3 - 100 feet 1 1/2" hose

Type C Main Cache Inventory (Tupelo)

- 30 - 100 feet 1" hose
- 30 - 100 feet 1 1/2" hose
- 2 - 100 feet 3/4" hard line hose
- 6 - 8 feet draft hose
- 20 - 50 feet 3/4" hose
- 5 - 1" adjustable flow nozzle (KK)
- 5 - 1 1/2" adjustable flow nozzle (KK)
- 5 - Forester nozzle
- 4 - 1" aspirating foam nozzle
- 4 - 1 1/2" aspirating foam nozzle
- 1-portable pump with pump kit
- 1-pump kit- check and bleeder valve, foot valve, 1 1/2" - 1" reducers, gated wye, nozzles, gas line, gas can, 2 lengths draft hose, ear plugs, goggles, tool kit, sheet plastic, spanner wrenches, and
- 6 - driptorch
- 20 - shovel
- 20 - pulaski
- 20 - council tool (fire rake)
- 20 - flapper
- 2 - combi-tool
- 6 - 1" double gated wye
- 6 - 1 1/2" double gated wye
- 2 - pressure relief valve
- 2 - check and bleeder valve
- 10 - 1 1/2" to 1" reducer
- 2 - 2 1/2" to 1 1/2" reducer
- 4 - 2" to 1 1/2" reducer
- 6 - 1" to 3/4" reducer
- 4 - 1" to 1 1/2" increaser
- 4 - 1 1/2" NP to 1 1/2" NH adapter
- 4 - 1" NP to 1" NH adapter
- 12 - hose clamp
- 12 - spanner wrench
- 2 - hydrant wrench
- 1 - mop up kit
- 20 - personal gear pack (red pack)
- 20 - initial attack pack with fire shelter (yellow pack)
- 20 - fire shelter with case
- 20 - headlamp
- 20 - individual first aid kit

Type C Main Cache Inventory, continued

- 20 - dust/sand/wind goggles
- 100 - pair ear plugs
- 6 - saw chaps
- 20 - brush jacket
- 20 - 2 person tent
- 20 - sleeping bag
- 40 - nomex trousers
- 40 - nomex shirt
- 20 - hardhat
- 50 - pair of gloves
- 10 - 5-gallon pail foam concentrate
- 3 - case of fusees
- 5 - case Meals-Ready-to-Eat (MREs)
- 4 - case AA battery
- 1 - electric grinder with grinding disks
- 1 - portable Flow Mix foam proportioner
- 1 - driptorch repair kit
- 2 - box flagging
- 1 - package hose washers
- 4 - belt weather kits

In addition to the Type C Main Fire cache the FMO will maintain a communications cache including:

- 10 - portable programmable radio with carrying case
- 3 - hand held Global Positioning System (GPS) units
- 10 - rechargeable battery
- 20 - clam shell battery holder

APPENDIX F
EXHIBIT 10
INVENTORY FOR FUELS TRAILER

In addition to the caches, an inventory prescribed fire tools will be located in a box trailer, and maintained by fuels management.

Number	Item
4	Rx Burn Ahead Signs
10	Sign Stands
6	Smoke Ahead Signs
4	Sign Frames
6	Sign Frames
7	Old Signs
1	Pump w/ pump pack
3	Blowers
1	Project Chain Saw
6	Shovels
6	Flappers
5	Rakes
5	Pulaskis
2	Combis
2	1-1/2" hose
3	1" hose
4	3/4" hose
1	Saw Pack
1	Draft Hose
1	50:1 oil mix
10	Drip Torches
7	3:1 Jerry
1	50:1 Jerry
1	Gas Jerry
2	Bar Oil

APPENDIX F
EXHIBIT 11
FIRE LINE REHABILITATION

The DO-18 and RM-18 guidelines for the rehabilitation of impacted areas due to the application of suppression techniques is will be followed. Further direction for rehabilitation for Natchez Trace Parkway is described below.

The actual construction of a fire line to control or contain a wildfire, if improperly applied, can impose a greater impact to the environment than the fire itself. Natural and cultural resources can be permanently damaged during the actual line construction or from the effects of soil erosion. Endangered species, sensitive plant communities, and archaeological sites must be considered as part of the decision making process in selecting the appropriate suppression methods.

The fire suppression techniques at Natchez Trace Parkway will be those that provide the least impact to the resources and at the same time control the wildfire. Fire lines requiring a depth that exposes bare mineral soil to the effects of wind and erosion will be rehabilitated.

Fire plows will only be used when absolutely necessary, such as to protect structures that are immediately threatened by a wildfire or during environmental conditions being classed with very high and extreme fire danger. The use of a plow should be restricted, when possible, to being placed along our boundary. When a plow is used the lines must be rehabilitated to as near the original land profile as practical. With Fire Management Officer approval, the wildfire account may be used to cover the additional costs of rehabilitation. An assessment must be made by the Resource Management Specialist, Fire Management Officer, Cultural Resource Specialist, District Ranger, and/or an archeologist from SEAC before any rehabilitation is to be undertaken on fireline that may have impacted a sensitive area.

Rehabilitation Guidelines

- Trees that were cut during suppression efforts will be made to look like natural blow downs when practical.
- Stumps will be flush cut at soil level and covered with soil to provide a natural appearance.
- Brush and berms will be scattered to provide a natural appearance.
- Native species will be used for reseeding.
- Water bars will be used in areas where there is a slope of 10% or greater as needed.
- Tractor-plow line will be filled in and covered with brush and leaves to provide a more natural appearance (See attached review of rehabilitation of the Old Highway 8 fire).
- Any boundary fence that was damaged due to suppression activities will be repaired.
- In the case of vehicles becoming stuck in soft or wet soil, the damaged area will be filled in and leveled (when conditions warrant) to provide for a more natural appearance. Seeding of native grass or herbs may be needed to complete restoration.

APPENDIX F
EXHIBIT 11
FIRE LINE REHABILITATION, continued

Case Study: Review of Rehabilitation of the Old Highway 8 Fire

On March 16, 1996 a fire was reported at milepost 231.4 on the west side of the Parkway just south of Old Highway 8. The Parkway responded with two type 6 engines and two firefighters, and one patrol car with one ranger. Chickasaw County responded with a tractor plow and an operator. The tractor plow was first on scene followed by the patrol ranger. The county plow was given permission to proceed with line construction. Approximately 250 feet of plow line was constructed. The line began at the edge of the woods on a small knoll and proceeded in a southwesterly direction to a swampy area inside the burn area.

The Fire Management Officer was called to make an assessment of the damages two days later. Upon investigation, it was determined that the SEAC archeologist should survey the area as there was a possibility that the area might have some cultural significance. The archeologist deemed that this was a minor site and that no damage had been done. He recommended that rehabilitation begin as soon as conditions warranted that the work could be done.

The fire management seasonal working out of the Dancy District office spent two hours raking the plow berm back into the trench. Slash was then scattered over the rehabilitated line to give it a more natural appearance. Monitoring of the rehabilitation has shown that the restoration was successful.

APPENDIX F
EXHIBIT 12
INTERAGENCY PRESCRIBED FIRE PLAN

Project Name: Campgrounds and Motor Drive

Unit Name: See ELEMENT 4

ADMINISTRATIVE UNIT(S): Natchez Trace Parkway-National Park Service

PRESCRIBED FIRE NAME: Campgrounds and Motor Drive

PREPARED BY: _____

DATE: _____

Dan Mapstone, RXB2

Fire Management Officer, Natchez Trace Parkway

CO-PREPARED BY: _____

DATE: _____

Shawn K. Nagle, RXB2(T)

Fuels Management Specialist, Natchez Trace Parkway

TECHNICAL REVIEW BY: _____

(See Appendix B)

DATE: _____

Travis Nepl, RXB2

Ass't Module Lead, Great Smoky Mountains Fire Use Module

COMPLEXITY RATING: MODERATE

APPROVED BY: _____

DATE: _____

Stennis R. Young

Acting Superintendent, Natchez Trace Parkway

Delegation of Authority:

The approved prescribed fire plan constitutes a delegation of authority to burn. No one has the authority to burn without an approved plan or in a manner not in compliance with the approved plan. Actions taken in compliance with the approved prescribed fire plan will be fully supported. Personnel will be held accountable for actions taken that are not in compliance with elements of the approved plan regarding execution in a safe and cost-effective manner.

ELEMENT 2: AGENCY ADMINISTRATOR PRE-IGNITION APPROVAL CHECKLIST

Instructions: The Agency Administrator's Pre-Ignition Approval is the intermediate planning review process (i.e. between the Prescribed Fire Complexity Rating System Guide and Go/No-Go Checklist) that should be completed before a prescribed fire can be implemented. The Agency Administrator's Pre-Ignition Approval evaluates whether compliance requirements, Prescribed Fire Plan elements, and internal and external notifications have been or will be completed and expresses the Agency Administrator's intent to implement the Prescribed Fire Plan. If ignition of the prescribed fire is not initiated prior to expiration date determined by the Agency Administrator, a new approval will be required.

Project Name: Campgrounds and Motor Drive

Unit Name: See ELEMENT 4

YES	NO	KEY ELEMENT QUESTIONS
		Is the Prescribed Fire Plan up to date? <i>Hints: amendments, seasonality.</i>
		Will all compliance requirements be completed? <i>Hints: cultural, threatened and endangered species, smoke management, NEPA.</i>
		Is risk management in place and the residual risk acceptable? <i>Hints: Prescribed Fire Complexity Rating Guide completed with rational and mitigation measures identified and documented?</i>
		Will all elements of the Prescribed Fire Plan be met? <i>Hints: Preparation work, mitigation, weather, organization, prescription, contingency resources</i>
		Will all internal and external notifications and media releases be completed? <i>Hints: Preparedness level restrictions</i>
		Will key agency staff be fully briefed and understand prescribed fire implementation?
		Are there any other extenuating circumstances that would preclude the successful implementation of the plan?
		Have you determined if and when you are to be notified that contingency actions are being taken? Will this be communicated to the Burn Boss?
		Other:

Recommended by: _____ Date: _____

Dan Mapstone, RXB2

Fire Management Officer, Natchez Trace Parkway

Approved by: _____ Date: _____

Stennis R. Young

Acting Superintendent, Natchez Trace Parkway

Approval expires (date): _____

Project Name: Campgrounds and Motor Drive

Unit Name: See ELEMENT 4

ELEMENT 2: PRESCRIBED FIRE GO/NO-GO CHECKLIST

<p>A. Has the burn unit experienced unusual drought conditions or contain above normal fuel loadings which were not considered in the prescription development? If <u>NO</u> proceed with checklist., if <u>YES</u> go to item B.</p>	YES	NO
<p>B. If <u>YES</u> have appropriate changes been made to the Ignition and Holding plan and the Mop Up and Patrol Plans? If <u>YES</u> proceed with checklist below, if <u>NO</u> STOP.</p>		

YES	NO	QUESTIONS
		Are ALL fire prescription elements met?
		Are ALL smoke management specifications met?
		Has ALL required current and projected fire weather forecast been obtained and are they favorable?
		Are ALL planned operations personnel and equipment on-site, available, and operational?
		Has the availability of ALL contingency resources been checked, and are they available?
		Have ALL personnel been briefed on the project objectives, their assignment, safety hazards, escape routes, and safety zones?
		Have all the pre-burn considerations identified in the Prescribed Fire Plan been completed or addressed?
		Have ALL the required notifications been made?
		Are ALL permits and clearances obtained?
		In your opinion, can the burn be carried out according to the Prescribed Fire Plan and will it meet the planned objective?

If all the questions were answered "YES" proceed with a test fire. Document the current conditions, location, and results

Burn Boss

Date

ELEMENT 3: COMPLEXITY ANALYSIS SUMMARY

PRESCRIBED FIRE NAME			
ELEMENT	RISK	POTENTIAL CONSEQUENCE	TECHNICAL DIFFICULTY
1. Potential for escape	L	M	M
2. The number and dependence of activities	M	M	M
3. Off-site Values	M	M	M
4. On-Site Values	M	M	M
5. Fire Behavior	M	M	M
6. Management organization	M	M	M
7. Public and political interest	M	M	L
8. Fire Treatment objectives	M	M	M
9. Constraints	M	M	M
10. Safety	M	L	M
11. Ignition procedures/ methods	M	M	M
12. Interagency coordination	M	M	M
13. Project logistics	L	M	M
14. Smoke management	M	M	M

COMPLEXITY RATING SUMMARY	
	OVERALL RATING
RISK	M
CONSEQUENCES	M
TECHNICAL DIFFICULTY	M
SUMMARY COMPLEXITY DETERMINATION	M
<p>RATIONALE: This project rates a moderate complexity due to the interagency resource sharing nature as well as the Natchez Trace Parkway motorist/public activity. The rapport between the Natchez Trace Parkway, Tombigbee National Forest, Holly Springs National Forest, and the Noxubee National Wildlife Refuge continues to be an effective operation with cognizance of safety and professionalism. The traffic on the Natchez Trace Parkway continues to be a safety concern. The mitigation measures stated in Element 13 and Element 19 explain the signage procedures to alert motorists/public.</p>	

ELEMENT 4: DESCRIPTION OF PRESCRIBED FIRE AREA

A. Physical Description

This burn plan will consist of the following units:

1. **Location:**

- Campgrounds

Unit Name	Section, Township, Range	Latitude	Longitude	Side, Milepost	County
Meriwether Lewis Hiking Trails North	N/A in Tennessee	N35°31'13"	W87°27'16"	West, 386.0-386.9	Lewis
Meriwether Lewis Hiking Trails South	N/A in Tennessee	N35°30'46"	W87°27'05"	West, 385.8-386.9	Lewis
Jeff Busby Campground	Sec17, T18N, R10E	N33°24'51"	W89°15'56"	East, 192.9-193.3	Choctaw
Rocky Springs Campground	Sec44, T13N, R4E	N32°05'10"	W90°47'54"	West, 54.0-55.0	Claiborne

- Motor Drive

Unit Name	Section, Township, Range	Latitude	Longitude	Side, Milepost	County
Old Trace Drive	N/A in Tennessee	N35°24'08"	W87°31'13"	East, 375.8-377.6	Lawrence/Lewis

2. **Size:**

Unit Name	Total Acres
Meriwether Lewis Hiking Trails North	271
Meriwether Lewis Hiking Trails South	187
Jeff Busby Campground	330
Rocky Springs Campground	104
Old Trace Drive	232
<i>Total</i>	<i>1124</i>

3. **Topography:**

Unit Name	Elevation	Slope	Aspect
Meriwether Lewis Hiking Trails North	720-938	0-40, Avg. 20	All
Meriwether Lewis Hiking Trails South	745-940	0-50, Avg. 20	All
Jeff Busby Campground	385-590	0-50, Avg. 20	All
Rocky Springs Campground	160-250	0-20, Avg. 5	All
Old Trace Drive	750-1050	0-80, Avg. 30	All

4. **Project Boundary:**

Unit Name	North Boundary	East Boundary	South Boundary	West Boundary
Meriwether Lewis Hiking Trails North	Campground Rd. and Little Swan Creek	Little Swan Creek	ML Loop Trail and Campground Rd.	Campground Rd.
Meriwether Lewis Hiking Trails South	ML Loop Trail and Little Swan Creek	Natchez Trace Parkway mowline	HWY 20	Campground Rd.
Jeff Busby Campground	Fireline and Hiking Trail	Hiking Trail	Powerline and dirt road	Little Mtn. Rd.
Rocky Springs Campground	Old Trace Trail	Little Sand Creek	Natchez Trace Parkway mowline	Fireline and Campground Rd.
Old Trace Drive	Old Trace Drive	Old Trace Drive	Old Trace Drive	Natchez Trace Parkway mowline

B. Vegetation/Fuels Description:

1. On-site fuels data

Unit Name	Percent Composition (%)	Fuel Model	Total Fuel Load <3-inch, dead and live (tons/acre)	Dead Fuel Load, 0-1/4-inch (tons/acre)	Live Fuel Load (tons/acre)	Fuel Bed Depth (ft.)	Total Dead Fuel Load (Litter/duff, 1, 10,100 and 1000-hour fuels) (tons/acre)
Meriwether Lewis Hiking Trails North	100	9	4	3	0	0.5	25.23
Meriwether Lewis Hiking Trails South	100	9	4	3	0	0.5	25.23
Jeff Busby Campground	100	9	4	3	0	0.5	N/A
Rocky Springs Campground	100	10	12.0	3.0	2.0	1.0	28.4
Old Trace Drive	100	9	4	3	0	0.5	14.5

2. Adjacent fuels data

Adjacent vegetation is similar to the on-site vegetation listed above.

C. Description of Unique Features:

As per National Park Service guidelines, any ground disturbing equipment such as dozers/tractor plows will not be used on NPS owned lands. No known cultural resource sites are located within the subunits. No known rare or threatened and endangered species are located within the units.

D. Maps:

- Please refer to Vicinity and Project Maps (Appendix A)

ELEMENT 5: GOALS AND OBJECTIVES

A. Goals:

Direction to utilize prescribed fire to achieve goals and objectives further stated in this burn plan comes from the Parkway's Resource Management and Fire Management Plan. The Federal Wildland Fire Policy of 2001 reaffirms the 1995 policy and recommends that federal land management agencies within fire dependent communities continue to reintroduce and maintain fire as part of the ecosystem. The policy of using fire as a tool will help decrease risks to life, property and resources and help perpetuate the natural and cultural resource values for which the Natchez Trace Parkway was established.

- Reduce fuel loading in order to protect Natchez Trace Parkway resources and adjacent communities from wildfire
- Restore and perpetuate natural communities dependent on fire
- Increase native species diversity

B. Objectives:

1. Resource Objectives:

- Reduce total fuel loadings by >30% as measured immediately post-burn
- In conifer-dominated areas, reduce conifer poles (2.5-15.0 cm dbh) >25% as measured one year post burn
- In oak-dominated areas, reduce mean density of pole-size trees (2.5-15cm dbh) by 20-30% after 3 burns

2. Fire Management Objectives:

- Provide for firefighter and public safety
- Provide training and developmental opportunities for park staff
- Provide public with an opportunity to learn about fire

ELEMENT 6: FUNDING:

A. Cost:

Task	Estimated Costs(per unit)
Unit Planning	200.00
Unit Preparation	1500.00
Burning	2950.00
Holding/Mop-up	250.00
Misc. Equipment	100.00
Total	\$5000.00

B. Funding source:

The planned project costs associated with the planning and implementation of the prescribed burns covered by this prescribed fire plan total \$5,000 per unit. This project will be funded through respective fiscal year wildland urban interface hazard fuel reduction funding sources. Once approved and funded, account numbers will be established by the Southeast Regional Office and be made available to Park Staff and assigned burn personnel for the implementation of these projects.

ELEMENT 7: PRESCRIPTION

A. Environmental Prescription:

Weather		Acceptable Range	Optimal
1	Temperature (°F)	30-85	55
2	Relative Humidity (%)	25-60	40
3	Wind Direction	SEE BELOW	SEE BELOW
4	Fuel Moisture (%)		
	1 hour	6-10	8
	10 hour	8-30	10
	100 hour	10-30	12
	Woody-live	0-200	100
4	Mid-flame Wind Speed (mph)	0-6	3
5	Mixing Height (feet)	≥1650	>1650
6	Transport Wind Speed (m/s)	≥3.5	5
7	Stagnation Index	0-3	0
8	Drought Indicator – KBDI	200-400	<400

Specific Wind Directions for Units		
Unit Name	Acceptable Wind Range	Optimal Wind
Meriwether Lewis Hiking Trails North	SE, S, SW	S
Meriwether Lewis Hiking Trails South	SE, S, SW	S
Jeff Busby Campground	SW, W, NW, N	W
Rocky Springs Campground	NE, SE, S, SW	S
Old Trace Drive	N, SW, W, NW	W

- Each individual unit contains interior roads, trails, fireline, mowline and/or creeks. The fragmented nature of each unit will serve as holding points should any control/smoke management concerns occur.

B. Fire Behavior Prescription:

- Fuel Model 9

	Fuel Characteristics	Acceptable Range	Optimal
1	Rate of Spread (Chains/hour)	2-13	5
2	Flame Length (feet)	1-4	2
3	Fireline Intensity (btu/ft/sec)	10-87	29
4	Spotting Distances (mile)	0-0.2	N/A
5	Probability of Ignition (%)	30-60	40

- Fuel Model 10

	Fuel Characteristics	Acceptable Range	Optimal
1	Rate of Spread (Chains/hour)	1-11	4
2	Flame Length (feet)	2-6	4
3	Fireline Intensity (btu/ft/sec)	17-254	95
4	Spotting Distances (mile)	0-0.3	N/A
5	Probability of Ignition (%)	30-60	40

ELEMENT 8: SCHEDULING

A. Ignition Time Frames/Season(s):

- Anytime of year as determined by Burn Boss

B. Projected Duration:

- 1-2 days per unit
- Smoke and flames may be visible for several days

C. Constraints:

- Smoke management constraints dictate burning under neutral to slightly unstable atmospheric stability generally associated with the passage of weak cold fronts. There are no other scheduling constraints apart from the attached prescription.
- At National Preparedness Levels Four and Five, prescribed fire implementation is restricted and regional guidance should be sought.

ELEMENT 9: PRE-BURN CONSIDERATIONS

A. Considerations:

1. On Site:

- Burn Boss or designee will determine needs such as fireline to be built, preparation of critical holding points, snags to be felled or protected, equipment to be pre-positioned, special features to be protected, warning signs to be placed, weather recording, fuels condition sampling and monitoring needs.
- Burn boss or designee will conduct structural triage on all buildings and coordinate the prep prior to ignition. The park buildings are as follows:

Unit Name Locations	Building Name	Use	Unit Name Location	Building Name	Use
Meriwether Lewis Hiking Trails North	Campground Rest Area	Rest Area	Rocky Springs Campground	Rest Areas (3)	Rest Area
Meriwether Lewis Hiking Trails South	Maintenance Building	Office and workshop	Rocky Springs Campground	Information Station and Rest Area	Visitor contact
Jeff Busby Campground	Rest Areas (3)	Rest Area	Rocky Springs Campground	Maintenance Building	Office and workshop
Jeff Busby Campground	Maintenace Building	Office and workshop			

- Fire effects plots will be established within some units, prior to ignition, and will be re-evaluated in compliance with NPS fire effects monitoring standards.
 - Burn Boss or designee will visit site and make necessary operational and logistical changes.
2. Off Site
- Smoke warning signs will be placed on the Natchez Trace Parkway as a precaution. The major smoke concern is that wind will carry smoke onto the Parkway before it can be dispersed. The smoke will be monitored and fire personnel will request assistance to temporarily close the Parkway if vehicle visibility falls below 500 feet (as estimated by Burn Boss or designee). 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 or designee.

- Ensure a Delegation of Authority has been prepared and signed by the Agency Administrator or acting for off-Park Burn Bosses.
- Burn Boss or designee will coordinate with District personnel regarding campground and/or trail closures. A press release will be issued prior to prescribed fire season.
- Prepare maps and IAPs in accordance with RM-18. Required elements include the following:
 1. A) Organizational Assignment (ICS-203)
 2. B) Medical Plan (ICS-206)
 3. C) Safety Message (or ICS-215A)
 4. D) Division Assignment List (ICS-204)
 5. E) Communication Plan (ICS205)
 6. F) Project Map
 7. G) Weather Forecast
 8. H) Aviation Operations Summary if applicable (ICS – 220)

B. Method and Frequency for Obtaining Weather and Smoke Management Forecast(s):

- Burn Boss or designee will contact the Mississippi or Tennessee Forestry Commission office for required permit and submit a Spot Weather Forecast request from the National Weather Service (See contact numbers below).
- Spot weather forecasts will be requested prior to ignition, on all ignition days and any days the fire is actively spreading.
- Burn Boss or designee in charge of mop-up and patrol will also obtain and review the spot weather forecast to determine if mop up and patrol resources are adequate.
- During the burn, on-site monitoring will be coordinated by a Fire Monitor (FEMO). The FEMO is responsible for collecting data on weather, smoke, and fire behavior observations according to NPS protocols. The FEMO will be in communication with overhead personnel to ensure safe and productive operations. Burn Boss will determine frequency for obtaining weather, smoke and fire behavior observations as conditions warrant. FEMO will broadcast current weather observations to burn personnel at intervals determined by Burn Boss or designee.

C. Notifications:

- Burn Boss will determine the need to notify adjacent landowners and/or media.
- Additionally, Burn Boss or designee will notify Natchez Trace Parkway Dispatch (By radio or call 662-680-4000) and respective District Ranger before and after ignition. If unit is still smoking at end of burn day, the Burn Boss or designee will contact NATR Dispatch so they can notify adjacent 911 dispatch centers.

Unit Name	District Ranger Contact	National Weather Service Office/Number	Burn Permit Contact
Meriwether Lewis Hiking Trails North	Leipers Fork (931) 626-1034 cell (931) 796-2675 office	Nashville, TN (615) 754-4633	Tennessee Forestry Commission (931) 796-2721
Meriwether Lewis Hiking Trails South	Leipers Fork (931) 626-1034 cell (931) 796-2675 office	Nashville, TN (615) 754-4633	Tennessee Forestry Commission (931) 796-2721
Jeff Busby Campground	Kosciusko (601) 668-2976 cell (662) 289-3671 office	Jackson, MS (601) 936-2189	Mississippi Forestry Commission (662) 840-0948
Rocky Springs Campground	Natchez (601) 953-4308 cell (601) 445-4211 office	Jackson, MS (601) 936-2189	Mississippi Forestry Commission 1-888-823-3473
Old Trace Drive	Leipers Fork (931) 626-1034 cell (931) 796-2675 office	Nashville, TN (615) 754-4633	Tennessee Forestry Commission Lewis County (931) 796-2721 Lawrence County (931) 766-1413

ELEMENT 10: BRIEFING

At a minimum, assigned personnel must be briefed at the beginning of each operational period to ensure personnel safety considerations (including the JHA) and prescribed fire objectives and operations are clearly defined and understood. The following briefing checklist will serve as a guide while conducting briefings:

Briefing Checklist:

- Burn Organization
- Burn Objectives
- Description of Burn Area
- Expected Weather & Fire Behavior
- Communications
- Ignition plan
- Holding Plan
- Contingency Plan
- Wildfire Conversion
- Safety

ELEMENT 11: ORGANIZATION AND EQUIPMENT

A. Positions:

Position	Red Card Qualification	No. of Personnel
Burn Boss*	RXB2	1
Firing Boss	FIRB	1
Holding Boss*	CRWB or ENGB	1
Fire Effects Monitor**	FEMO	1
Ignition Personnel	FFT2	2
Type 6 Engine	ENOP/ENGB	2
Type 6 Engine	ENOP/ENGB	2
Gator with water	FFT2	2
Public Information	N/A if not on line, FFT2 on line	As Needed
Road Patrol	N/A	As Needed
Minimum Required Total		10

**Burn Boss may also serve as Holding Boss (Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide, September 2006).*

***Fire Effects Monitor may be assigned as a collateral position.*

Trainees are acceptable in all positions as long as a qualified facilitator is identified.

Duty hours may be staggered to allow for evening patrols without exceeding work/rest guidelines.

B. Equipment and Supplies

- The above table represents the *minimum* personnel and equipment determined to be adequate for the anticipated conditions (See Appendix F for Holding Resources Worksheet). The burn boss is ultimately responsible for evaluating each specific burn unit on burn day and determining the required number, type, and kind of resources required to safely implement the burn. Thus additional resources may be added or resource configurations/assignments altered for each operational period so long as the above minimums are met. Specific daily organization and assignments will be documented in the Incident Action Plan for each operational period.

ELEMENT 12: COMMUNICATION

A. Radio Frequencies

1. Command Frequency(s):

Channel Name	Function	RX	TX
OPS A (Digital)	Repeater (NATR Dispatch will monitor)	165.6000/293	172.6750/29 3
OPS B (Digital)	Repeater (NATR Dispatch will monitor)	166.2375/293	172.6750/29 3

2. Tactical Frequency(s):

Channel Name	Function	RX	TX
NATR Tac (Digital)	Scene of Action/ Tactical	168.6125/293	168.6125/29 3

B. Telephone Numbers:

Contact	Phone Number
Natchez Trace Parkway Dispatch	662-680-4000
Samuel Larry, SER NPS Fire Management Officer	404-562-3108 x684 (office)
Mississippi Interagency Coordination Center	601-928-1778

ELEMENT 13: PUBLIC AND PERSONNEL SAFETY, MEDICAL

A. Safety Hazards:

- An IAP will be completed by the burn boss or designee prior to each operational period. The IAP will address objectives, fire weather/behavior, assignments, communications, and safety. A daily safety and project briefing will be conducted prior to work on the project during each phase of the project by the designated work leader or burn boss.
- Please refer to Job Hazard Analysis (Appendix D)

B. Measures Taken to Reduce the Hazards:

- Smoke warning signs will be placed on the Natchez Trace Parkway as a precaution. The major smoke concern is that wind will carry smoke onto the Parkway before it can be dispersed. The smoke will be monitored and fire personnel will request assistance to temporarily close the Parkway if vehicle visibility falls below 500 feet (as estimated by Burn Boss or designee). 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.
- Please refer to Job Hazard Analysis (Appendix D)

C. Emergency Medical Procedures:

- Please refer to Medical Plan (Appendix G)

D. Emergency Evacuation Methods:

- Please refer to Medical Plan (Appendix G)

E. Emergency facilities:

- Please refer to Medical Plan (Appendix G)

ELEMENT 14 TEST FIRE

A. Planned location:

- A test fire will be conducted on each burn unit as part of the go / no-go burn decision process. The test fire will be ignited in an area with fuels that are representative of fuels being targeted within the treatment unit and that is easily controlled. The purpose of the test fire is to verify that observed fire behavior will meet management objectives for the burn and to verify predicted smoke dispersion. Results of the test fire will be documented by the burn boss and firing boss and retained as part of the Prescribed Fire Record (Fire Report).

B. Test Fire Documentation:

- Please refer to Element 2. Prescribed Fire Go/No-Go Checklist.

ELEMENT 15: IGNITION PLAN

A. Firing Methods:

- Ignition duties will be assigned to a FIRB; the FIRB may also be tasked with ignition and holding responsibilities along an individual flank. The Burn Boss will decide this after consultation with the individuals filling the positions.

B. Devices:

- Drip torches and fusees

C. Techniques, Sequences and Patterns:

- The ignition patterns will be adjusted according to burn day weather conditions. Ignition will occur firstly along containment lines and secondly in the interior of the unit, as needed, after a blackline has been established. Firefighter safety and the safety of the public will be the foremost consideration during ignition. Ignition may produce heading, backing, or flanking fire as long as burn objectives are being met and the fire behavior is within prescription parameters. The Burn Boss and FIRB will develop a firing plan and all personnel will be briefed on this plan.

D. Ignition Staffing:

- Burn Boss and FIRB will determine other ignition staffing.

ELEMENT 16: HOLDING PLAN

A. General Procedures for Holding:

- If prescription parameters are exceeded or control problems occur, ignition operations should be terminated by the Burn Boss at a safe and appropriate location. Holding personnel will control the fire until a decision is made to continue, postpone, or extinguish the fire.
- Each individual unit contains interior roads, trails, fireline, mowline and/or creeks. The fragmented nature of each unit will serve as holding points should any control/smoke management concerns occur.

B. Critical Holding Points and Actions:

- Critical holding areas include the Parkway structures and infrastructure. Burn Boss will evaluate critical holding areas and the associated actions prior to ignition.

C. Minimum Organization or Capabilities Needed:

- Please refer to Holding Resources Worksheet (Appendix F).

D. Mop-Up Operations:

- Mop-up of all or part of the unit will occur if the Burn Boss or Fire Management Officer determines there is potential risk of escape or if smoke impacts warrant. Personnel will remain on the fire until the burn boss deems it safe to leave, after which, regular patrols will be instituted until the burn is declared out.

ELEMENT 17: CONTINGENCY PLAN

- If the objectives are not being met, the Contingency Plan is implemented. If the Contingency Plan is successful at bringing the project back within the scope of the Prescribed Fire Burn Plan the project continues. If contingency objectives are not met, the prescribed fire is converted to a wildfire and Extended Attack is undertaken.
- Contingency planning is intended for more than just a response to an escaped fire. The contingency plan is the portion of the Prescribed Fire Plan that considers possible but unlikely events and the contingency resources and actions needed to mitigate those events.

- Contingency planning is the determination of initial actions and additional resources needed if the prescribed fire is not meeting, exceeds, or threatens to exceed:
 - Project or unit boundary
 - Objectives
 - Prescription parameters
 - Minimum implementation organization
 - Smoke impacts

A. Trigger Points:

- The following conditions or triggers warrant activation of the contingency plan:
 1. Objectives not be met during the burn operation
 2. Prescription parameters exceeded during the operation
 3. Spotting or slopovers occur
 4. Smoke impacting the Natchez Trace Parkway
- If spot fires or slopovers occur, Holding Specialist will supervise suppression activities. Aggressive, direct attack actions will be made to control spot fires and slopovers, where possible. Firing Boss will manage the remaining prescribed burn unit and choose the appropriate management action.
- If prescription parameters are exceeded or control problems occur, ignition operations should be terminated by the Burn Boss at a safe and appropriate location.
- Burn Boss will evaluate topographic and operational trigger points prior to ignition.

B. Actions Needed:

- Holding Specialist will supervise suppression activities. Aggressive, direct attack actions will be made to control fire, where possible. Ignition personnel will manage the remaining prescribed burn unit and choose the appropriate management action.

C. Additional Resources and Maximum Response Time(s):

- The following resources are typically available as contingency resources. The availability of contingency resources shall be identified prior to initiation of operations and be identified in the Incident Action Plan for that operational period.

Unit Name	Contingency Resource	Response Time
Meriwether Lewis Hiking Trails North	Hohenwald City FD	1 hour
	Lewis County VFD	1 hour
Meriwether Lewis Hiking Trails South	Hohenwald City FD	1 hour
	Lewis County VFD	1 hour
Jeff Busby Campground	Bywy VFD	1 hour
Rocky Springs Campground	Claiborne County VFD	1 hours
Old Trace Drive	Hohenwald City FD	1 hour
	Lewis County VFD	1 hour

D. Regional Office Notification

- Parks are required to notify the Regional Fire Management Officer within 24 hours of any of the following actions taken on a prescribed fire that has escaped or is a threat to escape:
 1. Any prescribed fire converted to a wildfire
 2. Any prescribed fire requiring activation of the contingency resources or operational time not accounted for in the Prescribed Fire Burn Plan
 3. Any prescribed fire that requires additional resources or operational time not accounted for in the Prescribed Burn Plan

ELEMENT 18: WILDFIRE CONVERSION

A. Wildfire Declared By:

- If contingency actions are not successful by the end of the next burning period, then the Burn Boss will convert the prescribed fire to wildland fire status (escaped fire). Once declared a wildland fire, the fire may not be returned to prescribed fire status. A Wildland Fire Situation Analysis will be completed.

B. IC Assignment:

- Burn Boss will assume the role of Incident Commander until relieved by an Incident Commander Type 3 (ICT3), if deemed necessary.

C. Notifications:

- Burn Boss will notify Parkway dispatch and Parkway Superintendent of the change in status.
- Additional resources needed will be ordered through the Mississippi or Tennessee Interagency Coordination Center.

D. Extended Attack Actions and Opportunities to Aid in Fire Suppression:

- Burn Boss will consult with the incoming ICT3 to determine extended attack actions and opportunities to aid in suppressing fire.

ELEMENT 19: SMOKE MANAGEMENT AND AIR QUALITY

A. Compliance and Permits to be Obtained:

- A Burn Permit will be obtained from the Mississippi or Tennessee Forestry Commission as per state air quality regulations.
- State air quality regulations dictate that a minimum mixing height of 1260 feet and a transport wind of at least 3.5 meters per second are forecasted in order to receive a burn permit.

B. Smoke Sensitive Areas/Receptors:

- No smoke sensitive areas/receptors are located adjacent to the units.

Unit Name	Smoke Sensitive Area/Receptor	Direction of the Burn Unit	Distance (miles)
N/A	N/A	N/A	N/A

C. Impacted Areas:

- The Parkway and local county roads may be impacted by smoke. Burn Boss will make necessary operational changes to mitigate smoke concerns.

D. Mitigation Strategies and Techniques to Reduce Smoke Impacts:

- Smoke warning signs will be placed on the Natchez Trace Parkway as a precaution. The major smoke concern is that wind will carry smoke onto the Parkway way before it can be dispersed. The smoke will be monitored and fire personnel will request assistance to temporarily close the Parkway if vehicle visibility falls 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 will serve as holding points should any control/smoke management concerns occur.

ELEMENT 20: MONITORING

Monitoring associated with prescribed fire operations ensures prescription elements are valid for meeting stated objectives, documents pre- and post-fire conditions, ensures progress toward desired future conditions is being made, and short and long term objectives are being realized. Monitoring on this project may occur pre-burn, during operations, and post-burn.

A. Pre-Burn Monitoring

- NPS FMH fire effects plots are established and maintained by the NATR Fire Effects Monitoring Crew. Pre-fire treatment data will be collected on these plots according to the Fire Monitoring Plan for these monitoring types. NATR staff shall monitor environmental conditions to determine when a particular burn unit may come into prescription.

B. Burn Operations

- A qualified Fire Effects Monitor (FEMO) will be assigned for each treatment. During the burn, on site monitoring will be conducted by the FEMO. The FEMO will be responsible for the collection and documentation of weather, smoke, and fire behavior observations according to National Park Service monitoring protocols. The FEMO will also maintain constant communication with the Burn Boss, Firing Boss, and holding forces to ensure safe operations when working within the burn. FEMO will broadcast current weather observations to burn personnel at intervals determined by Burn Boss or designee. Following the burn, the FEMO will complete a fire monitoring report that summarizes weather and fire behavior observations in relation to ignition operations and any initial observations of first order fire effects.

C. Post-Fire

- Long-term evaluation of the burn may be conducted by NATR fire effects staff to document fire related changes over time and to ensure long-term objectives are being met. This monitoring will comply with current NPS standards for the monitoring type.

ELEMENT 21: POST-BURN ACTIVITIES

Post-burn Activities That Must be Completed:

- After the burn, the FEMO will complete a fire monitoring report summarizing fire behavior, smoke, and weather observations along with first order fire effects. Burn Boss will input reporting information into the BLM Fire Reporting System, NFPORS and the DI-1202.
- NATR Fire Management Staff will maintain a project file that includes:
 - A. Original signed prescribed fire burn plan
 - B. Agency Administrator Go/No-go Pre-Ignition Approval
 - C. Operational Go/No-Go Checklist
 - D. All reviewer comments
 - E. All maps
 - F. Monitoring data including weather, fire behavior and fire effects observations
 - G. Weather forecasts
 - H. Notifications, if deemed necessary
 - I. Documented prescribed fire organizational charts
 - J. Job Hazard Analysis signature forms
 - K. Cost summary sheet
 - L. Any agreements related to implementation
 - M. Post-burn fire report

Interagency Burn Plan Template APPENDICES

- A. Maps: Vicinity and Project**
- B. Technical Review Checklist**
- C. Complexity Analysis**
- D. Job Hazard Analysis**
- E. Fire Behavior Modeling Documentation or Empirical Documentation**
- F. Holding Resources Worksheet**
- G. Medical Plan**

APPENDIX G
WILDLAND FIRE SITUATION ANALYSIS

Wildland Fire Situation Analysis

WFSA Information

WFSA Number:

Jurisdiction(s):

Fire Name:

Geographic Area:

Incident Number:

Unit:

Date/Time Prepared:

Accounting or Management Code:

Fire Situation

Start Date/Time:

Current Fire Size: ____ acres

Fuel Conditions

Topography

Jurisdiction and Land Ownership in the Fire Area

Fire Behavior - Current and Forecast

Forecast Weather (3 and 10 day) and Current Seasonal Conditions

National and Regional Fire Preparedness, and Suppression Resource Availability

Decision Summary

Selected Alternative

Most Cost Effective Alternative:

Selected Alternative Description

Rationale for selecting this alternative

WFSA revision or amendment thresholds and protocol

Critical fire management resources

Special considerations

Analysis prepared by:

Agency Administrator Approval

Date/Time

Daily Review

National Preparedness Level	Regional Preparedness Level	Suppression cost to date	Size to date	Selected alternative remains valid (Y or N)	By	Date	Time

Final Review

The elements of the selected alternative were met on:

Date: _____ Time: _____

By: _____
Agency Administrator

Objectives

Objective

Economic

Environmental

Social

Other

Safety Issues

Safety Issues

Alternatives

Alternative A.

Target Outcome

Probability: _____ %
Final Fire Size: _____ acres
Time to Contain: _____ days
Time to Control: _____ days

Extreme Outcome

Probability: _____ %
Final Fire Size: _____ acres
Time to Contain: _____ days
Time to Control: _____ days

Estimated Suppression Costs

Alternative A.

Target Outcome

Estimated suppression cost: \$0

Basis for cost estimate:

Historic average cost per acre

Extreme Outcome

Estimated suppression cost: \$0

Basis for cost estimate:

Historic average cost per acre

Resource Value Losses

Note: Outcome values, including totals, are rounded to 3 significant digits counting from the left.
Expected Impact is rounded to 2 significant digits.

Item	Alternative A.			Expected Impact
	Target Outcome	Fallback Outcome	Extreme Case Outcome	
Total (rounded)	\$ ____		n/a	\$ ____

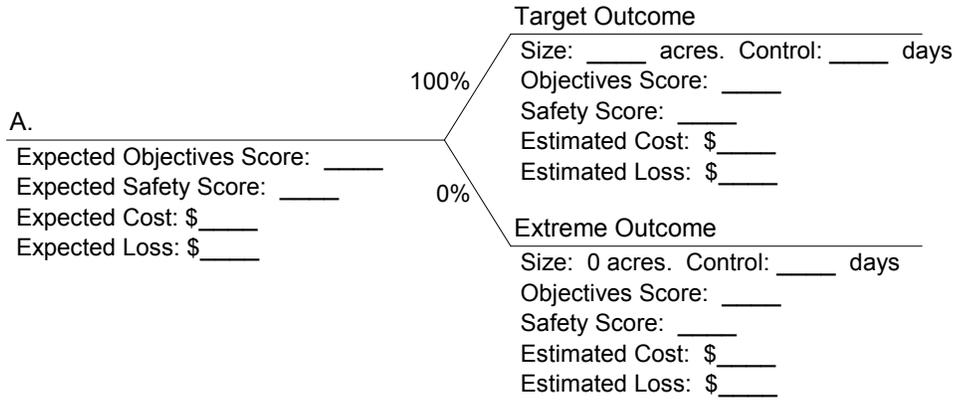
Safety Assessment

Target Outcome

Alternative A.
Fallback Outcome

Extreme Outcome

Decision Tree



APPENDIX H

PRE-ATTACK PLAN

Due to the Parkway's linear geometry and wildland-urban interface, all wildfires will be suppressed using the appropriate management response. The appropriate response is 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 individually. Every reasonable effort will be made to prevent wildfires from crossing Parkway boundaries. Minimum impact tactics will be used whenever possible.

The Pre-Attack Plan for the Parkway is outlined in the Wildfire Suppression District Action Guidelines (Step-Up Plan) located in Appendix D. Staffing needs for increasing fire danger are described in this document, and thereby serves as the general Pre-Attack Plan for the Parkway.

In addition to the Step-Up plan, the ability for pre-attack planning is dependent upon the assistance of 69 volunteer fire departments/local cooperators located along the length of the Parkway. Agreements and Memoranda of Understanding with each department are updated regularly and maintained in the Fire Management Office.

APPENDIX I
Five-Year Prescribed Fire Implementation Plan
(Fiscal Years 2007-2011)

Fiscal Year	Prescribed Fire Unit Name	Objective	Size (Acres)²	Comment
2007	Rocky Springs Campground	Forest structure, fuel reduction, habitat management	50	
	Witchdance East	Forest structure, fuel reduction, habitat management	177	USFS joint burn on 2 year rotation
	Trace West	Forest structure, fuel reduction, habitat management	150	USFS joint burn on 2 year rotation
	Needs Center	Fuel reduction	100	
	Cherokee Lease Tracts	Maintain open grassfields, reduce thatch for wildlife benefit	80	
	Old Trace Drive	Fuel reduction	300	
	Management Inspection burns	Maintain scenic vistas and slopes	5	
	Day Use Areas	Fuel reduction	10	
		Total	872	
2008				
	Meriwether Lewis	Fuel reduction	300	
	Witchdance West	Forest structure, fuel reduction, habitat management	310	
	Trace East	Forest structure, fuel reduction, habitat management	69	
	Milepost 17	Forest structure, fuel reduction, habitat management	34	
	Tishomingo State Park	Forest structure, fuel reduction, habitat management	195	
	Management Inspection burns	Maintain scenic vistas and slopes	3	
	Chickasaw Village	Prairie restoration/cedar encroachment reduction	80	
		Total	991	

² Acreages are estimates. Actual acreages to be determined.

APPENDIX I
Five-Year Prescribed Fire Implementation Plan, continued
(Fiscal Years 2007-2011)

Fiscal Year	Prescribed Fire Unit Name	Objective	Size (Acres)³	Comment
2009	Kudzu Patch	Reduce exotic cover	40	Burn every 2 years; spray in June and October
	Witchdance East	Forest structure, fuel reduction, habitat management	177	USFS joint burn on 2 year rotation
	Ag Lease (TBD)	Maintain open grassfields, reduce thatch for wildlife benefit	20	
	Trace West	Forest structure, fuel reduction, habitat management	150	USFS joint burn on 2 year rotation
	Bailey Farm	Maintain open grassfields, reduce thatch for wildlife benefit	360	
		Total	747	
2010	Chickasaw Village	Prairie restoration/cedar encroachment reduction	85 (? , not sure with new VC)	
	Dyestone Creek	Woody encroachment reduction	30	
	Access Islands	Fuel reduction, visibility improvement	20	
	Ag Lease (TBD)	Maintain open grassfields, reduce thatch for wildlife benefit	20	
	Kudzu Patch	Exotics reduction	30	
		Total	165	
2011	Colbert Ferry	Forest structure, fuel reduction, habitat management	100	
	Lauderdale Park	Forest structure, fuel reduction, habitat management	5	
	Witchdance East	Forest structure, fuel reduction, habitat management	177	USFS joint burn on 2 year rotation
	Trace West	Forest structure, fuel reduction, habitat management	150	USFS joint burn on 2 year rotation
		Total	432	

³ Acreages are estimates. Actual acreages to be determined.

APPENDIX J

FEDERAL INTERAGENCY MEDICAL QUALIFICATION STANDARDS PROGRAM AND FITNESS TESTING FORMS

Medical Exams and Forms

In FY 2007, the Department of Interior implemented the Federal Interagency Wildland Firefighter Medical Qualification Standards program in order to address concerns that existing firefighter physical examination processes were inadequate. As a result, medical examinations of wildland firefighter applicants and incumbents are to be conducted as a *pre-placement* exam for all permanently-employed individuals who are to be assigned to roles that involve the arduous level of wildland firefighting, and then every five years thereafter until age 45, at which time the frequency of exams changes to every three years. Please refer to “National Interagency Incident Management System Wildland and Prescribed Fire Qualification

System Guide, PMS 310-1, April 2006”, for information on specific firefighting positions that have been determined to require arduous exertion. On intervening years, when a physical examination is not conducted, an interim year medical history will be completed by each firefighter and reviewed prior to the firefighter’s performance test. In addition, a specified medical screening is to be performed and recorded by a health care professional. The Medical Review Officer (MRO) may determine that, due to health and safety risks, interval changes in health status, and possible medically related performance concerns, the medical evaluation of individual firefighters must be conducted more frequently. The Agency pays for medical examinations or screenings. Full information about the program and answers to frequently asked questions can be found at http://www.nifc.gov/medical_standards/. Refer to Figure 4 for a summary of the evaluation process.

The Federal Interagency Wildland Firefighter Medical Qualification Standards program provides a consistent set of medical examination criteria, a medical examination form, and an annual medical history and clearance form. These forms provide uniform tools for agencies to use in the administration of the medical program. The exams include:

1. Baseline Exam- The baseline (initial) exam is focused on the medical requirements to perform arduous firefighter duties and is more comprehensive than periodic exams.
2. Periodic Exam- conducted every 5 years (if < 45 years of age) or 3 years (> age 45) on incumbent firefighters. Temporary seasonal hire firefighters will receive a Periodic exam after age 45, then every 3 years.
3. Exit Exam- The exit exam is performed when an incumbent terminates federal service as an arduous duty wildland firefighter.

Work Capacity Testing and Fitness

Wildland firefighters must meet the minimum physical fitness/work capacity standards for their assigned incident management position, as defined in NWCG 310-1 “Wildland Fire Qualifications System Guide”. Physical fitness/work capacity tests for wildland firefighters and other fire-qualified employees will consist of the “pack test” work capacity testing (see Figure 5). Each District has a designated physical fitness workout room that is available for firefighter use to maintain or achieve fitness levels.

Managers should provide wildland firefighters 3 hours per week of duty time to assist qualified employees in meeting fitness goals. Those firefighters whose full time duties are 100% arduous duty-related (such as engine and prescribed fire/suppression crews) are normally provided one hour per day for fitness training.

APPENDIX J

The FireFit Program (sponsored by the Federal Fire and Aviation Safety Team, or FFAST) is one program aimed at providing the interagency wildland fire community with a comprehensive, easy-to-follow, fitness program with the ultimate goal of improving firefighter safety and health and reducing injuries. This program provides a basic format for a well balanced fitness program that can be augmented as local units see fit. Program success will rely on management support at every level as well as individual's motivation and participation. More information can be found at <http://www.nifc.gov/FireFit/index.htm>.

APPENDIX J

MEDICAL STANDARDS EVALUATION PROCESS

QUICK REFERENCE CHART

MEDICAL STANDARDS EVALUATION PROCESS The following chart is presented to summarize the requirements for firefighters who perform in arduous firefighter situations.	Incumbent/ Applicant (permanent positions) < 45 years of age	Incumbent/ Applicant (permanent positions) ≥ 45 years of age	Temporary Seasonal Hires < 45 years of age	Temporary Seasonal Hires ≥ 45 years of age	AD/EFF positions < 45 years of age	AD/EFF positions ≥ 45 years of age
Medical Clearance/Surveillance Examination (<i>Baseline</i>)	Yes - initial	Yes - initial	No	No	No	No
Medical Clearance/Surveillance Examination (<i>Periodic</i>)	Every 5 yrs	Every 3 yrs	No	Every 3 yrs	No	No
Annual Medical History and Screening (given on years that no examination is scheduled)	Yes	Yes	Yes	Yes	Yes, when indicated by the HSQ	Yes
Medical Clearance/Surveillance Examination (<i>Exit</i>)	Yes - for incumbents only	Yes for incumbents only	No	No	No	No

Figure 4. Quick reference to medical evaluation process. From Federal Interagency Wildland Firefighter Medical Qualification Standards.

APPENDIX J

Work Capacity Test Forms and Information

WORK CAPACITY TEST RECORD

Units will document the administration of the Work Capacity Test (WCT) to all employees and job applicants. This documentation must be retained until the next WCT is administered. Units may also be requested to provide data from these records to assist in the evaluation of the WCT process.

Privacy Act - No employee may disclose records subject to the Privacy Act unless the disclosure is permitted under 43 CFR 2.56 or to the individual to whom the record pertains. The Privacy Act contains a criminal penalty for unauthorized disclosure of records. (5 U.S.C. 552a)

To be completed by employee:

Name (Last, First): _____ Where employed: _____

Date test taken: _____ Test administered by: (Print Name) _____

ICS position for which test is required (highest needed) _____

Performance level needed (circle one): Arduous Moderate Light

Type of test taken (circle one): Pack Test Field Test Walk Test

Work Capacity Test Descriptions:

	Pack Test	Field Test	Walk Test
Pack weight	45 lbs.	25 lbs	None
Distance	3 miles	2 miles	1 mile
Time	45 minutes	30 minutes	16 minutes

To be completed by test administrator:

Test result time: _____

Employee passed test (circle one): Yes / No

I certify that the work capacity test was administered according to agency guidelines.

(Signature of Test Administrator)

(Title)

(Date)

“The Pack Test” Work Capacity Testing for Wildland Firefighters: Ensuring Wildland Firefighter Safety

What is the Pack Test?

The Pack Test refers to work capacity tests used to qualify individuals for the three levels of wildland firefighting duty:

- Arduous
- Moderate
- Light

The Pack Test measures:

- Aerobic capacity
- Muscular strength
- Muscular endurance

All wildland firefighters must meet minimum levels of fitness requirements for the type of duties they are assigned:

Arduous: involves field work calling for above-average endurance and superior conditioning. All firefighters are required to perform arduous duty.

Moderate: involves field work requiring complete control of physical facilities and may include considerable walking, standing and lifting 25-50 lbs. Safety officers and fire behavior analysts are examples of moderate duty positions.

Light: involves mainly office-type work with occasional field activity. Examples include: staging area and helibase managers.

Testing wildland firefighters for work capacity is important for several reasons:

- Personal safety and health
- Coworker safety
- Improved operations

About Arduous Work

Wildland firefighting demands a high level of fitness to safely perform physically demanding work in difficult environments.

Firefighters, strike team leaders, line scouts, and others assigned arduous duty must be prepared to work in steep

terrain, and in extreme temperatures, altitude, and smoke-while maintaining reserve work capacity to meet unforeseen emergencies.

Prior to reporting for work, applicants are **strongly encouraged** to train for arduous-level work capacity.

“Pack Test” Training

Training for the Pack-Field-Walk test is important. Start training at least 4-8 weeks before you are scheduled to take the test. To be in shape for work duty, you may want to train in the footwear or boots you will wear on the job. Footwear should be ankle high and protect the ankles.

Begin training before you report for work. Start by walking. Train for the test level you will need to pass for the duties you will be required to perform.

Start training for arduous and moderate duty without a pack. Gradually increase distance and begin carrying appropriate weight. Increase the weight until you can meet the requirement for arduous or moderate duty.

The chart below provides test criteria for arduous, moderate, and light duty performance:

Fitness Requirement	Test	Description
Arduous	Pack Test	3-mile hike with 45-pound pack in 45 min.
Moderate	Field Test	2-mile hike with 25-pound pack in 30 min.
Light	Walk Test	1-mile hike in 16 min.

More on Training

Before you begin to train for testing or substantially increase your level of activity, consult your physician. This is especially important if you are over 40 and have been inactive; have a history of a heart condition, chest pain, loss of balance; or have a joint or bone problem that could be made worse by a change in physical activity.

Once you are cleared to begin training, here's what you'll need:

- Adequate footwear that will cover and protect feet and ankles while testing.
- Comfortable clothing.
- A pack. The type of pack is personal choice, but it must weigh either 45 or 25 lbs, depending on whether you are testing for arduous or moderate duty.
- An accurately measured, safe, and level course.

Taking the Test

- Testing will be monitored and any problems should be brought to the attention of the test monitor.
- No jogging or running is permitted.
- The test is Pass/Fail only.
- Choose your own pack or a standard firefighter backpack pump will be provided.
- Packs will be weighed before and after testing.

For More Information:

Personal health, physical fitness, and work capacity all work towards making conditions safer for firefighters and the people they protect. Ask your local fire management office for more information.

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To file a complaint, write the Secretary of Agriculture, U.S. Department of Agriculture, Washington, D.C. 20250, or call (800) 245-6340 (voice) or (202) 720-1127 (TDD). USDA is an equal employment opportunity employer.

March 2002

PAR-Q & YOU

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

YES	NO	
<input type="checkbox"/>	<input type="checkbox"/>	1. Has your doctor ever said that you have a heart condition <u>and</u> that you should only do physical activity recommended by a doctor?
<input type="checkbox"/>	<input type="checkbox"/>	2. Do you feel pain in your chest when you do physical activity?
<input type="checkbox"/>	<input type="checkbox"/>	3. In the past month, have you had chest pain when you were not doing physical activity?
<input type="checkbox"/>	<input type="checkbox"/>	4. Do you lose your balance because of dizziness or do you ever lose consciousness?
<input type="checkbox"/>	<input type="checkbox"/>	5. Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?
<input type="checkbox"/>	<input type="checkbox"/>	6. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?
<input type="checkbox"/>	<input type="checkbox"/>	7. Do you know of <u>any other reason</u> why you should not do physical activity?

If
you
answered

YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active — begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal — this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. It is also highly recommended that you have your blood pressure evaluated. If your reading is over 144/94, talk with your doctor before you start becoming much more physically active.

DELAY BECOMING MUCH MORE ACTIVE:

- if you are not feeling well because of a temporary illness such as a cold or a fever — wait until you feel better; or
- if you are or may be pregnant — talk to your doctor before you start becoming more active.

PLEASE NOTE: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed Use of the PAR-Q: The Canadian Society for Exercise Physiology, Health Canada, and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

No changes permitted. You are encouraged to photocopy the PAR-Q but only if you use the entire form.

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

"I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction."

NAME _____

SIGNATURE _____

SIGNATURE OF PARENT
or GUARDIAN (for participants under the age of majority) _____

DATE _____

WITNESS _____

Work Capacity Test: Informed Consent

- **Pack Test- Arduous** The 3-mile test with a 45 pound pack in 45 minutes is strenuous, but no more so than the duties of wildland firefighting.
- **Field Test-Moderate** The 2-mile test with a 25 pound pack in 30 minutes is fairly strenuous, but no more so than the field duties.
- **Walk Test-Light** The 1-mile walk in 16 minutes is moderately strenuous, but no more so than the duties assign.

Risks

- There is a slight risk of injury (blisters, sore legs, sprained ankles) especially for those who have not practiced the test. If you have been inactive and have not practiced or trained for the test, you should engage in several weeks of specific training before you take the test. Be certain to warm up and stretch before taking the test, and to cool down after the test. The risk of more serious consequences (such as respiratory or heart problems) is diminished by completing the (HSQ) physical activity readiness questionnaire.

I have read the information on this form, the brochure "Work Capacity Test" and understand the purpose, instructions, and risks of the job related to work capacity test.

I have read the information, understood, and truthfully answered the HSQ.

Test to be Taken (check one) Pack test Field Test Walk Test

Signature _____ Date _____

Printed Name _____

Privacy Statement

The information obtained in the completion of this form is used to help determine whether an individual being considered for wildland firefighting can carry out those duties in a manner that will not place the candidate unduly at risk due to inadequate physical fitness and health. Its collection and use are covered under Privacy Act System of Records OPM/Govt-10 and are consistent with the provisions of 5 USC 552a (Privacy Act of 1974).

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



Natchez Trace Parkway
Tupelo, MS 38804

Natchez Trace Parkway
Fire Monitoring Plan
March, 2007

Natchez Trace Parkway
Fire Monitoring Plan

Natchez Trace Parkway
Fire Monitoring Plan

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I. INTRODUCTION and BACKGROUND

Fire has historically played a significant role in shaping the structure and composition of ecological communities in the southern United States, and continues to be a pervasive force affecting many different ecosystems. Before European-American settlement, the fire regime in the southern pine and oak-hickory vegetation types was heavily influenced by the activity of Native Americans. In general, southern forests were thought to burn at intervals of 13 years or less (Frost 1998). Currently, fire is once again being used as a tool for ecosystem management and restoration along the Natchez Trace Parkway and many NPS lands.

Because information about the effects of fire on park resources is critical to the ability of the NPS to make ecosystem-level management decisions about fire use, a plan of action for fire effects monitoring is essential. The fire effects monitoring program used by the NPS was established to ensure that parks meet their respective fire and resource management objectives. More specifically, the NPS fire effects monitoring program was developed to document basic information about wildland fires, determine short- and long-term effects of fire on vegetation, detect trends in plant communities, and to determine if additional research is necessary. The NPS has established monitoring protocols and recommended standards that are valuable to the development of a monitoring program. These standardized protocols are outlined in the Fire Monitoring Handbook (USDI 2003).

In accordance with the National Park Service (NPS) policies outlined in Director's Order 18 (DO-18): *Wildland Fire Management* (NPS, 1998), a Fire Management Plan (FMP) was originally prepared for NATR in 2000, and is under revision in 2006. The FMP identifies management goals and objectives for the park which indicate the need for continuance of fire management activities that include prescribed burning. Prescribed fires are defined in DO-18 as "...fires ignited by park managers to achieve resource objectives and will include monitoring programs that record fire behavior, smoke behavior, fire decisions and fire effects, to provide information on whether specified objectives are met." Monitoring is further addressed in Section 5.2 .b.10., which states that all approved FMPs will "Include procedures for short and long term monitoring to document that overall programmatic objectives are being met and undesired effects are not occurring."

This fire monitoring plan is an appendix to the Fire Management Plan, which is in turn tiered to the Resource Management and to the General Management Plans. The purpose of this monitoring plan is to outline the management objectives and monitoring design as it relates to fire effects and other fuels treatment monitoring at the Natchez Trace Parkway (NATR). Time-sensitive sections of this plan, such as monitoring schedules, will be updated annually with full revisions every 3 years.

The Natchez Trace Parkway (hereafter referred to as the parkway) encompasses approximately 21,000 ha (52000 ac), extending from Natchez,

Mississippi to Nashville, Tennessee. The parkway averages 250 meters (825 ft) in width and extends 716 km (444 mi) through portions of MS, AL, and TN (Figure 1, Appendix A). The narrow geometry of the parkway, with much of its boundary adjoining urban areas, presents significant challenges for fire management.

Although fuel load monitoring began along the parkway in 1995, formal fire effects monitoring at NATR began 2001 with the establishment of a four-person fire effects monitoring crew. Currently, the fire effects program consists of a fire ecologist and three fire effects monitors that work along the parkway and in 6 other parks in the southeast region¹.

This monitoring plan is written to function as an Appendix to the NATR Fire Management Plan.

II. ECOLOGY AND LANDSCAPE MANAGEMENT

A. Fire Regimes and Fire History

Because one of the primary goals of fire management within the NPS is to restore fire as an ecosystem process across the landscape, it is necessary to examine the historic fire regime that occurred in a given area. The frequency, season, intensity, extent, and type of fire are all factors of a given fire regime (Whelan 1995). Wade, *et al.* (2000) discuss the three different fire regimes in eastern forests- understory, mixed, and stand-replacement regimes. These regimes are categorized based on the survival of the overstory species. Within the understory fire regime, the southern pine and oak-hickory forests comprise the major vegetation types that historically support fire along the parkway. These vegetation types are characterized by the understory fire regime (i.e. 80 % canopy survival) and will be discussed individually with respect to other vegetation classifications schemes such as the International Ecological Classification Standard, Kuchler, and the United States Forest Service ecoregional classification system (NatureServe 2004, Kuchler 1964, McNab and Avers 1994). Figure 1a (Appendix A) depicts the three Kuchler vegetation types that the Natchez Trace Parkway crosses: oak-hickory, oak-hickory-pine, and blackbelt.

Each Kuchler type will be discussed in terms of its respective fire regime. Fire regime types classify the landscape according to the role fire would play in the absence of modern human mechanical intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995). Coarse scale definitions for natural (historical) fire regimes have been developed by Hardy *et al.* (2001) and Schmidt *et al.* (2002) and interpreted for fire and fuels management by Hann and Bunnell (2001). The five natural (historical) fire regimes are classified based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the

¹ Other parks in which the Natchez Trace Fire Effects Monitoring crew works include: Mammoth Cave National Park, Little River Canyon National Preserve, Gulf Islands National Seashore, Vicksburg National Military Park, Stones River National Battlefield, and Horseshoe Bend National Military Park.

dominant overstory vegetation. These five regimes include:

I – 0-35 year frequency and low (surface fires most common) to mixed severity (less than 75% of the dominant overstory vegetation replaced);

II – 0-35 year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced);

III – 35-100+ year frequency and mixed severity (less than 75% of the dominant overstory vegetation replaced);

IV – 35-100+ year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced);

V – 200+ year frequency and high (stand replacement) severity.

Each of the Kuchler ecosystem types along the parkway will also eventually be classified by its departure from historic fire regime using the Fire Regime Condition Class (FRCC) classification. FRCC is a classification of the amount of departure from the natural regime (Hann and Bunnell 2001). This will be possible once the vegetation map for the parkway is complete (estimated by fiscal year 2008). Once this map is complete, it will be possible to classify the park with regard to FRCC via map in the Appendix of this plan. In the meantime, each Kuchler type will be described using the FRCC language of Fire Regimes I-V.

Once the vegetation mapping is complete, some modification of the vegetation grouping described in this plan may be in order. Although there are many vegetative alliances along the parkway, this discussion is generally limited to broad vegetative classifications that will receive treatment with prescribed fire.

1. Southern Pine

Landfire Potential Natural Vegetation Group: West Gulf Coastal Plain Pine-Hardwood Woodland/Forest Upland

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). Refer to West Gulf Coastal Plain Pine-Hardwood Forest Upland reference condition model for a description of successional pathways (see <O://fire effects/Monitoring Plan/reference conditions or http://www.landfire.gov/ModelsPage2.html>).

2. 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.). Refer to the Interior Highlands Dry-Mesic Forest reference condition model for a description of successional pathways (see O://fire effects/Monitoring Plan/reference conditions or <http://www.landfire.gov/ModelsPage2.html>).

3. 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- indiagrass- 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*). Refer to Appendix G for a complete listing of plant species encountered in this vegetation type.

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. Refer to Blackland Prairie reference condition model for a description of successional pathways (see <O://fire effects/Monitoring Plan/reference conditions> or <http://www.landfire.gov/ModelsPage2.html>).

III. MANAGEMENT OBJECTIVES

A. Resource Management Goal for Prescribed Fire

The primary resource management goal of the parkway is to preserve, protect, and manage the park's cultural and natural resources within naturally functioning ecosystems, consistent with cultural resource preservation (USDI 1995). This broad resource management goal is supported by the fire management program. Specific fire management objectives are outlined in the NATR Fire Management Plan (2006), and summarized below.

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:

B. Rationale for Choice Attributes and Desired Future Conditions

The fire management objectives for the parkway center on reducing fuel loading and restoring plant communities to historic composition. Therefore, the attributes to be measured as indicators of the success of the fire management program include fuel load, tree density, and native herbaceous plant cover. Associated fire management objectives include the reduction of exotic plant species cover.

Current fuel load and tree density estimates for forested areas of the parkway are significantly greater than historic estimates (see Section 2, Ecology and Landscape Management). Desired future conditions for such areas include reduction of fuel load and tree density (for trees 2.5-15 cm in diameter at breast height) by approximately 20-50% (Whitehead and Sheehan 1985), as well as a decrease in exotic species cover of 5%.

Kuchler Type	Fire Regime	Fire Return Interval (yrs)	Goals
Southern Pine	I	< 35	Restoration of historic fuel loading, pole density, cover of herbaceous species; exotics species reduction
Oak Hickory	III	35-100	Restoration of historic fuel loading, pole density; exotics species reduction
Blackbelt Prairie	II	< 35	Restoration of native prairie via woody encroachment and exotic species reduction.

IV. MONITORING DESIGN

Fire effects monitoring at the parkway will follow the design outlined by the NPS Fire Monitoring Handbook (FMH) (USDI 2003). The handbook describes four levels of monitoring. Descriptions of these levels, as well as the data to be collected at each level, are given below.

A. Monitoring Levels

Level 1- Environmental Monitoring. This level of monitoring includes the compilation of baseline data before a burn event, such as weather, socio-political factors, and terrain.

Level 2- Fire Observation Monitoring. Monitoring at this level consists of documentation of the ambient conditions during a fire, such as smoke and fire characteristics. Fire observation monitoring data is used in conjunction with

environmental monitoring to predict fire behavior, and to aid in the understanding of short- and long-term monitoring results.

Refer to the NATR Fire Management Plan for descriptions of Environmental and Fire Observation monitoring performed at the parkway.

Level 3-Short-term Change Monitoring. Level 3 monitoring provides information concerning fuel reduction and vegetative change as defined by the management objectives. Short-term change monitoring allows managers to determine whether management objectives were achieved.

Level 4- Long-term Change Monitoring. Level 4 monitoring generally involves monitoring the same variables as in short-term monitoring but over a longer postburn period. By monitoring over longer periods of time, it is possible to observe trends that might guide management decisions.

Level 3 and Level 4 monitoring are the focus of this monitoring plan.

B. Short- and Long-term Monitoring

The Fire Monitoring Handbook defines a monitoring type as a major fuel-vegetation association that is treated with a specific burn prescription (USDI 2003). Two monitoring types have been identified along the parkway. Initial monitoring objectives for each monitoring type are presented below. As monitoring data is analyzed, objectives may evolve based on information acquired about treatment effects.

1. Monitoring Types and Objectives

***Pinus taeda* Monitoring Type (FPITAI09)**

This monitoring type is characterized by an overstory consisting of 20-40% cover of loblolly pine (*P. taeda*) and relates to Kuchler's southern pine type. Overstory may be interspersed with longleaf (*P. palustris*), shortleaf (*P. echinata*) and Virginia (*P. virginiana*) pines, as well as various hardwoods primarily represented by oaks and hickories (*Quercus spp.* and *Carya spp.*) and sweetgum (*Liquidambar styraciflua*). Subcanopy cover may consist of 20- 80% cover of dogwood (*Cornus florida*), redbud (*Cercis canadensis*), eastern red cedar (*Juniperus virginiana*), and red maple (*Acer rubrum*). Shrub understory includes < 80% cover of blackberry (*Rubus sp.*), greenbrier (*Smilax sp.*), poison ivy (*Toxicodendron radicans*), Chinese privet (*Ligustrum sinense*), and Japanese honeysuckle (*Lonicera japonica*). Grass and forbs represent < 10% cover and can include various grasses, sedges, and asteraceous species. Refer to Appendix B for the complete monitoring type description (FMH-4).

Restoration (initial) management objectives:

- Reduce total fuel (woody, litter, and duff) load by >50% immediate postburn as compared with preburn levels.
- Reduce conifer pole (2.5-15.0 cm dbh) density by at least 25% one year post burn as compared with preburn levels.
- Reduce the percent cover of exotic plants (e.g. kudzu (*Pueraria montana*), Chinese privet (*Ligustrum sinense*), Japanese honeysuckle (*Lonicera japonica*) from 0- 5% after 5 fires.

Restoration sampling objectives:

- Monitor total fuel load in order to be 80% confident of detecting a 50% decrease in woody fuel load, accepting a 20% chance of concluding that a change took place when it did not (Type I error).
- Monitor conifer pole (2.5-15.0 cm dbh) density in order to be 80% confident of detecting a 20% decrease, accepting a 25% chance of concluding that a change took place when it did not (Type I error).
- Monitor percent cover of exotic species (kudzu, Chinese privet, and Japanese honeysuckle) to be 80% confident of detecting a 0-5% decrease, accepting a

20% chance of concluding that a change took place when it did not (Type I error).

Maintenance management objectives:

- Maintain woody fuel loading at ≤ 15 tons/acre.
- Maintain pole density at 100-140 trees/acre (current density approx 160 tr/ac).
- Cause no net increase in percent cover of exotics.

Maintenance sampling objectives:

- Measure woody fuel load with an 80% probability of being within 25% of the true mean total fuel load.
- Measure pole density with an 80% probability of being within 25% of the true mean pole density.
- Measure percent cover of exotics with an 80% probability of being within 25% of the true mean percent cover of exotics.

***Juniperus virginiana* Monitoring Type (BJUVI1D06)**

Restoration (initial) management objectives:

- Decrease woody species (*Juniperus virginiana*, *Ligustrum sinense*) density by $\geq 50\%$ after 5 consecutive years of annual burning.

Restoration sampling objectives:

- Monitor woody species with an 80% probability of detecting a 50% density reduction after 5 years of annual burning, accepting a 25% chance of concluding that a change took place when it did not (Type I error).

Maintenance management objectives:

- Maintain $< 25\%$ cover of woody species.
- Cause no net increase in percent cover of exotics.

Maintenance sampling objectives:

- Measure percent cover of woody species with an 80% probability of being within 25% of the true mean percent cover of woody species.
- Measure percent cover of exotics with an 80% probability of being within 25% of the true mean percent cover of exotics.

Table 2 lists monitoring types, objectives, and results summaries for fire effects data at NATR.

Potential Monitoring Types

The creation of new monitoring types may occur based on the 5-year burn plan. In particular, an oak-hickory monitoring type may be developed based on the hazard fuel reduction burns that may occur in these areas within the near future. Other potential monitoring may include the use of photomonitoring to document changes in cover of kudzu (*Pueraria montana*) or reduction in slash/brush.

2. Sampling Design

Plots are randomly located within areas scheduled for burning within the near future and stratified by monitoring type. Random plot location points are generated using a GIS², according to the methodology of the Fire Monitoring Handbook. A diagram of current plot locations can be found in Figure 3, Appendix A.

Sampling unit shape and size follows NPS National Fire Monitoring Handbook protocol, with some modification to accommodate for narrow Parkway lands. The population of interest is the specified monitoring type (FPITA1D09 or BJUV11D06). Macroplots, defined as the sampling area in which subsampling will occur, will serve as the sampling units, and are 25 m by 30 m in size (Figure 2, Appendix A).

As described in the Fire Monitoring Handbook, pilot sampling will be performed for the first 10 plots in each monitoring type. Minimum sample sizes will be calculated for all objective variables, and the largest sample size will be used for plot installation. Minimum sample size will be then be recalculated postburn to determine final sample size. After collecting data from 10 plots, optimal size/arrangement of subsamples (overstory, poles, seedlings, and number of herbaceous transects) will be determined by comparison of the variability in the respective subsamples.

² Until 2002, the random grid map method was used for random selection of monitoring plots. Random locations for plots installed after 2002 were generated using GIS. Random points can be generated using the Alaskapak software for ArcGIS 9.x, downloadable from <http://www.nps.gov/akso/gis>. Other methods of random point generation include using a script in ArcGIS. A script (entitled 'random sample/points in a polygon') was downloaded from <http://arcscripts.esri.com/> and used to generate random points prior to use of the Alaskapak software. This usage of this script or Alaskapak will be replaced by sample site generation in the new Fire Ecology Assessment Tool program (FEAT).

To date, 13 monitoring plots have been installed in the FPITA (loblolly pine) monitoring type. Minimum sample size calculations indicated that the variability was higher in the fuel load data (as compared to the pole density or herbaceous cover data) and analysis specified a 20-plot minimum. However, herbaceous preburn data has been recorded for only 6 of the 13 plots. Seven additional plots will be installed, bringing the total to 20 plots with 13 plots having herbaceous data (Table 1). Once herbaceous data from at least 10 plots has been collected, minimum sample size will be redetermined.

As of February, 2007, 3 monitoring standard FMH plots have been installed in the oak-hickory monitoring type (Meriwether Lewis and Old Trace Units). For this new monitoring type, the intent is to install 4-5 plots in this type and to examine the data for minimum plot estimates.

Four monitoring plots have been installed in the BJUVI (eastern red cedar) monitoring type. Based on shrub density, minimum sample size calculations indicate 12 plots are needed. As additional areas in this brush monitoring type are identified for burning, additional FMH plots will be installed. Four additional non-standard monitoring plots have been installed in the BJUVI monitoring type, in the Blackbelt Overlook site. This site is a restoration demonstration area for mechanical thinning before use of fire. As the effects of the thinning are observed, additional areas may be treated, and additional monitoring will occur as needed.

Additional research in the grassland of the Chickasaw Village site has been done most recently under contract with Dr. Randy Warren of Mississippi State University³. It is anticipated that the fire effects monitoring will continue with consultants from TrueSearch Environmental, using the same methodology utilized by Warren (see Section 4, Part E., Additional Projects).

³ Early research and inventory of the Chickasaw Village site was conducted pre-1994 in conjunction with the National Heritage program. Copies of that research is available in the fire ecologist's and natural resource management specialist's office.

Table 1. Fire effects monitoring plot installation plan.

Monitoring Type	Management Objective	Number of Existing Plots*	Minimum # of Plots	# Plot Installs Planned	Total # Planned Plots
FPITA					
<i>Pinus taeda</i>					
	Fuel load (woody)	13	20	7	20
	Pole density	13	15	7	20
	Cover of exotics	6	100 ⁴	7	13
FOAHI					
Oak-Hickory					
	Fuel load (woody)	3	Not determined	2	10
	Pole density	3	Not determined	2	10
	Cover of exotics	3	Not determined	2	10
BJUVI					
<i>Juniperus virginiana</i>					
	Woody species density	4	12	0	None planned
	Cover of exotics	4	--	--	None planned

* This number of plots refers to those plots with applicable data. For example, 7 of the 13 FPITA plots do not have preburn herbaceous data. Therefore, for the variable of herbaceous cover, there are 6 plots installed.
 --Cannot be determined until data is recorded.

⁴ High minimum sample estimation for this variable is based on data from 4 plots; this will be re-evaluated after examining data from additional plots.

Table 2. All results shown are 80% confidence intervals of the mean unless otherwise noted; means are reported in brackets. Fuel reduction objectives/results are mean percent reduction from preburn to immediate postburn, unless otherwise stated. An underlined number of plots denote that minimum sample sizes have been achieved.

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (80% confidence interval)	Objective Achieved? (minimum plots achieved/needed)
NATR FPITA1D09 Loblolly pine forest <i>Pinus taeda</i>	Reduce total fuel load by 20-50% immediately postburn	Fuel load reduction = 46% by Year 1. (n= <u>7</u> , 1 fire).	Yes Plots analyzed are located in the Trace East, Witchdance SE, Witchdance E, and Witchdance West units.
	Reduce poles (2.5-15.0 cm dbh) >25% one year post burn	Density reduction = 9% by Year 1.	No Plots analyzed are located in the Trace East, Witchdance SE, Witchdance East, and Witchdance West units.
	Cause no net gain in percent cover of exotic plants (e.g. kudzu, Chinese privet, Japanese honeysuckle, etc.) after 5 years of burning	To be determined; currently no available data- (7 plots with no preburn data, and 6 plots that have not burned).	Not Determined
NATR BJUVI1D06 Blackbelt prairie <i>Juniperus virginiana</i>	25-50% reduction of <i>Juniperus virginiana</i> density after 5 years of burning	Density of <i>Juniperus virginiana</i> reduced by 67% after 4 th burn	Yes, but minimum sample size not met (4/14). ⁵
	20-40% reduction in cover of exotic vegetation by 4 th burn	Density of exotic species reduced by 50% after 4 th burn	Yes, but minimum sample size not met (4/14).

3. Field Measurements

⁵ Additional plots will not likely be installed in this monitoring type, as monitoring is occurring using other methods in conjunction with local botanists.

Measurement protocols for forest plots follow the Fire Monitoring Handbook, except that the plot size is reduced to 30 m by 25 m to account for the narrow parkway geometry. The following variables are measured in the macroplots (Figure 2, Appendix A). See Appendix D for a complete list of all FMH datasheets utilized for monitoring along the parkway.

- **Overstory trees** (trees ≥ 15.1 cm) are measured and mapped in the entire macroplot. Datasheet used to record overstory data is the FMH-8. Form entitled 'Tree Map Overstory' (located at O:\fire\fire effects\NATR info\pilot sampling) is used to map overstory trees.
- **Pole trees** (2.5 cm-15 cm) are measured and mapped in subplots C, D, G, H, K, and L. Datasheet used to record pole data is the FMH-9. Form entitled 'Tree Map Pole' (located at O:\fire\fire effects\NATR info\pilot sampling) is used to map pole trees.
- **Seedling tree density** is measured in each of one randomly chosen 10 m x 5 m and one 5 m by 5 m subsections labeled 1-4 in Q4. Seedling data is recorded using the FMH-10 datasheet.
- **Herbaceous cover** is measured along the Q4-Q1 and Q3-Q2 transects. Herbaceous data is recorded using the FMH-16 datasheet.
- **Fuel load** is measured along four Brown's transects originating at points 1A-4A. Fuel load is recorded using the FMH-19 datasheet.
- **Photographs** are taken using both a 35 mm camera (for color slides) and a digital camera. Slides are scanned and organized on the fire effects server (O:\fire\fire effects\Images\specific park) and stored in archival binders in the fire effects office. As a backup to film/camera failure, digital photos of the plots are also taken. Photographic information is recorded on the form entitled 'NATR Pilot Plot Coversheet' located at O:\fire\fire effects\NATR info\pilot sampling.

As with forest plots, standard FMH protocol is followed for brush plots. The variables of herbaceous cover and brush density are measured along 30-m transects. In addition, photographs are taken at each end of the transect.

Monitoring plots are permanently marked using painted/flagged ½" diameter rebar, and labeled with brass tags according to FMH protocol. All plots have written directions and have been georeferenced using a GPS. Approximate plot locations are given in Table 2, and plot location maps can be found in Figures 4-12, Appendix A.

Plots at the parkway follow the monitoring frequency recommended by the FMH protocol. Preburn monitoring is done no more than two years before burning. The plots are monitored immediately postburn, and at 1, 2, 5, and 10 years postburn. Because

Year 1 postburn reads must be done in the same phenological stage as the preread, Year 1 postburn reads may be done from 8-20 months after the fire (see monitoring schedule)⁶. If the plot is burned again, the monitoring cycle is reset and plots are read with the same frequency. Table 3 lists the current monitoring and install schedule for the Parkway. Most monitoring will occur during the summer. The five-year burn plan for the Natchez Trace Parkway can be found in Appendix E.

Table 2. Location of fire effects monitoring plots along the Natchez Trace Parkway.

Plot #	Burn Unit	NATR Milepost	Side of Parkway
Loblolly Pine			
1	Trace East	245.8	East
2	Witchdance SE	235.2	East
3	Witchdance E	235.4	East
4	Tishomingo	304.2	West
5	Tishomingo SP	304.2	West
6	Witchdance W	233.6	West
7	Witchdance W	235.8	West
8	Witchdance W	236	West
9	Witchdance W	235.6	West
10	Colbert Ferry	327	East
11	Rocky Springs	54.6	West
12	Rocky Springs	54.6	West
13	Natchez	18.5	East
Eastern Red Cedar			
30-33	Chickasaw Village	262	East
N, S, E, and W	Blackbelt Overlook	250	East

⁶ For some plots, year 1 reads were not done during the correct phenological stage. These plots will therefore be read during the next correct season, and the schedule will be reset after the second burn. See Table 3.

C. Monitoring of Non-Fire Treatment

Non-fire fuel reduction along the parkway mainly consists of the mechanical removal of downed woody debris in wildland urban interface areas. Monitoring in such areas will be done in conjunction with the Fuels Management Specialist. At this time, pre- and post-removal monitoring consists of photomonitoring and fuel load determination in project units. The current protocol involves locating monitoring treatment plots within areas of representative woody debris accumulation. However, this protocol may be refined to include random placement of monitoring plots within the project unit boundaries. Additional clarification about monitoring of non-fire treatments will be forthcoming. A plan template for non-fire treatments is located in Appendix H.

E. Additional Projects

In addition to the FMH monitoring in the blackbelt site (BJUVI monitoring type), extensive prairie restoration research was initiated in 1997 through a contract with Randy Warren and John MacDonald of TrueSearch Environmental Consulting company.⁷ At the conclusion of the contract, the fire effects monitoring crew will continue monitoring plots using the established design. A report describing methods and preliminary results can be found at O://fire effects/Chickasaw Village. Plots located within the Chickasaw Village site are scheduled for reading in May, 2006. Results of this analysis can be found at O://fire effects/Chickasaw Village/2006 analysis.

V. DATA MANAGEMENT AND ANALYSIS

The following datasets will be available (FPITA monitoring type) as a result of monitoring along the parkway with the established change/trend management objectives

1. total fuel load by woody size class, litter, and duff
2. overstory tree density and characteristics (species, DBH, crown class)
3. pole tree density and characteristics (species, DBH, height class)
4. herbaceous species cover, composition, and height
5. seedling density
6. postburn severity
7. bark char, scorch height, percent crown scorch
8. non-native species cover

For the BJUVI monitoring type, the following datasets will be available:

1. woody species density
2. herbaceous percent cover
3. postburn severity

⁷ John MacDonald is the contact for this project, and can be reached via email at arcasimperialis@aol.com.

Results for all objective variables are analyzed annually and presented in the program annual report. Changes in the objective variables of fuel load, pole density, exotic species cover, and cover of native grasses/forbs will be examined graphically to determine if the assumption of normality is valid⁸. The data will be analyzed inferentially by first calculating the confidence interval around the mean of differences between each pair of resampled plots (preburn versus postburn) using the standard error of the mean difference. If the confidence interval does not contain 0, then the samples will be interpreted as different for the given level of significance (80%). Hypothesis testing using a t-test will be performed to determine if objectives have been met.

As of September, 2005, all fire effects data is managed using the Fire Ecology Assessment Tool (FEAT) software. FEAT has the capability to export data into Microsoft Excel. Data is statistically analyzed using Minitab Software. The license for Minitab is updated annually. For more information, contact the Southeast Region Fire Ecologist.

Statistics consultation is available through contracts arranged at the national level. As of May, 2006, Ken Gerow of the University of Wyoming is the NPS Fire Ecology statistics consultant. Ken has taught statistics at many of the annual Fire Ecology FEAT/Statistics workshops, and has written an interactive statistics ebook. See Ken's website at <http://uwadmnweb.uwyo.edu/stats/gerow.asp> for more information.

A. Data Management

All fire effects data is managed by FEAT software. The FEAT program, instruction manual, and user forum is available at the Spatial Dynamics forum website <http://forum.spatialdynamics.com/>. This forum is the single most useful location for acquiring any sort of information relating to FEAT. The FEAT program is downloaded to each necessary PC, and one PC is designated as the master server. While running FEAT, all non-master PCs must navigate to this computer as the server. Currently, the master PC is in the front office of the Fire Effects house 17, and is the one located farthest from the door (INPNATR76963H17). This computer must be on in order for all other PCs to access the FEAT database.

Data will be entered, checked for errors, and managed by the fire effects monitoring crew at the parkway. Original copies of all data are kept in brown multi-divided file folders in the fire effects office. Copies of original data for use in the field are kept in green multi-divided folders and are stored with the original files. All datasheets are scanned and stored on the fire effects server at O:\fire\fire effects\Images\NATR\specific burn unit\specific read. Electronic copies of all data will be filed in the regional fire ecologist's office.

⁸ If the data is non-normal, the decision of whether to transform the data or to analyze nonparametrically will be made after further consultation with the research community

General program operation guidelines, such as equipment reordering information, equipment checklists, camera usage guidelines and scanner guidelines can be found on the server at O://Program operation documents.

B. Quality Control

Quality control is a crew-wide responsibility applicable through all phases of data collection, storage, and analysis. Proper data collection begins with insuring that all crewmembers collect data in a consistent manner according to FMH or adapted protocols. In order to verify the precision of field measurements, data will be collected independently by two different observers from a random sample of monitoring plots (~ 10% of the plots within the monitoring type) and compared. Such periodic in-field comparisons will allow for additional training in areas where data measurement error is greatest. Every effort will be made to eliminate non-sampling “field effect” errors, such as the effects of trampling. The lead monitor ensures that all datasheets are completed before leaving the field.

In order to minimize data entry/transcription errors, each datasheet will be checked by a crewmember that did not enter the data. Data will be processed further only after data checking is completed.

Ensuring the correct identification of species is ultimately the responsibility of the Lead Monitor, in consultation with the Fire Ecologist, other staff, and local experts. Voucher specimens will be collected as necessary, and specimen books are located in the fire ecology library (in the fire effects office). Unknown species will be named according to the conventions given in Appendix C.

VI. ROLES AND RESPONSIBILITIES

The Fire Ecologist, in conjunction with the Fire Management Officer and the Division of Resource Management, is responsible for developing monitoring and management objectives. Other responsibilities of the Fire Ecologist include supervising the monitoring crew, determining the appropriate sampling design, managing the database, analyzing the data, and disseminating the results appropriately.

The Lead Fire Effects Monitor is responsible for training Fire Effects Monitors, and for the accurate collection/storage of monitoring and spatial data. A detailed description of duties and responsibilities of the Fire Ecologist and Fire Effects Monitors at the parkway can be found in the NATR Fire Management Plan (2000).

Refer to RM-18 Chapter 11 for additional information on roles and responsibilities.

VII. REPORTING AND ADAPTIVE MANAGEMENT

Fire effects monitoring data will be examined annually by the Fire Ecologist and reported to the Fire Management Officer, Fuels Management Specialist, Division of

Resource Management, and Regional Fire Ecologist. Results will be reported via written report and/or an annual meeting. Consultation regarding whether results are acceptable and if monitoring objectives have been met will take place with these parties. Results will be disseminated appropriately and presentations at scientific meetings will occur as possible. Depending on the monitoring results, changes in current objectives, burn prescriptions or burn season may be in order. Additionally, if applicable, the need for further research will be recognized.

Future direction of Fire Effects Monitoring at the Parkway

As the fire effects program has become more established, it is now possible to expand boundaries concerning monitoring at the Parkway. The first expansion relates to monitoring in hardwood-dominated ecosystems. The first monitoring plots in this system were installed in the Meriwether Lewis and Old Trace Drive units (FY 2006). Information from these monitoring plots will add to the knowledge base about the effects of fire in hardwood areas.

Another area of expansion relates to the restoration of chalky prairie remnants that have been identified near the Blackbelt Overlook. Mechanical thinning and prescribed fire were initiated in this rare community in fiscal years 2006 and 2007. As more of the community is located, additional treatments and monitoring will be planned.

Lastly, it is becoming clear that managers need information about the effects of fire in a timeframe that is shorter than the landscape-level timeframe defined by the Fire Monitoring Handbook (FMH) protocols. For this reason, it may be more useful for monitoring to occur at the project level in addition to the landscape level. In fiscal year 2007, it is hoped that simplified plots be installed in individual burn units would provide specific information, such as fuel load estimates. This would require project-level monitoring planning, with special attention to the sample sizes needed for statistical validity. Discussion about the feasibility of project-level monitoring is needed.

VIII. CONSULTATION AND COORDINATION

This monitoring plan was done in consultation with Dan Mapstone, Shawn Nagle, Andrew Ruth (Fire Management Officer, Fuels Management Specialist, and former Lead Fire Effects Monitor, respectively, Natchez Trace Parkway). The document was reviewed by Caroline Noble (Southeast Region Fire Ecologist) Kurt Foote, and Amanda Callis (Natural Resource Management Specialist, and Lead Fire Effects Monitor, respectively, Natchez Trace Parkway). In addition to those listed above, review of this document will be requested from Cody Wienk (Fire Ecologist, Northern Great Plains Fire Management Office).

IX. REFERENCES

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X. Appendices

APPENDIX A

Figures



Figure 1. Park brochure map showing Natchez Trace Parkway coverage over Mississippi, Alabama, and Tennessee.

natrmap1%2Epdf.pdf

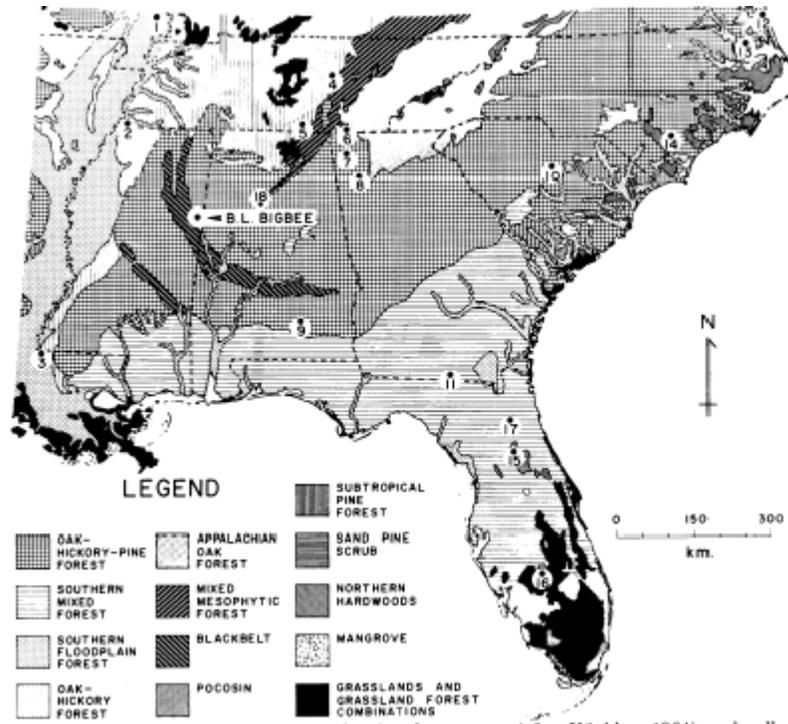


Figure 1a. Southeastern United States showing the Kuchler potential natural vegetation types. Numbers represent sites in which pollen cores were taken. (Kuchler 1964; reproduced from Whitehead and Sheehan 1985).

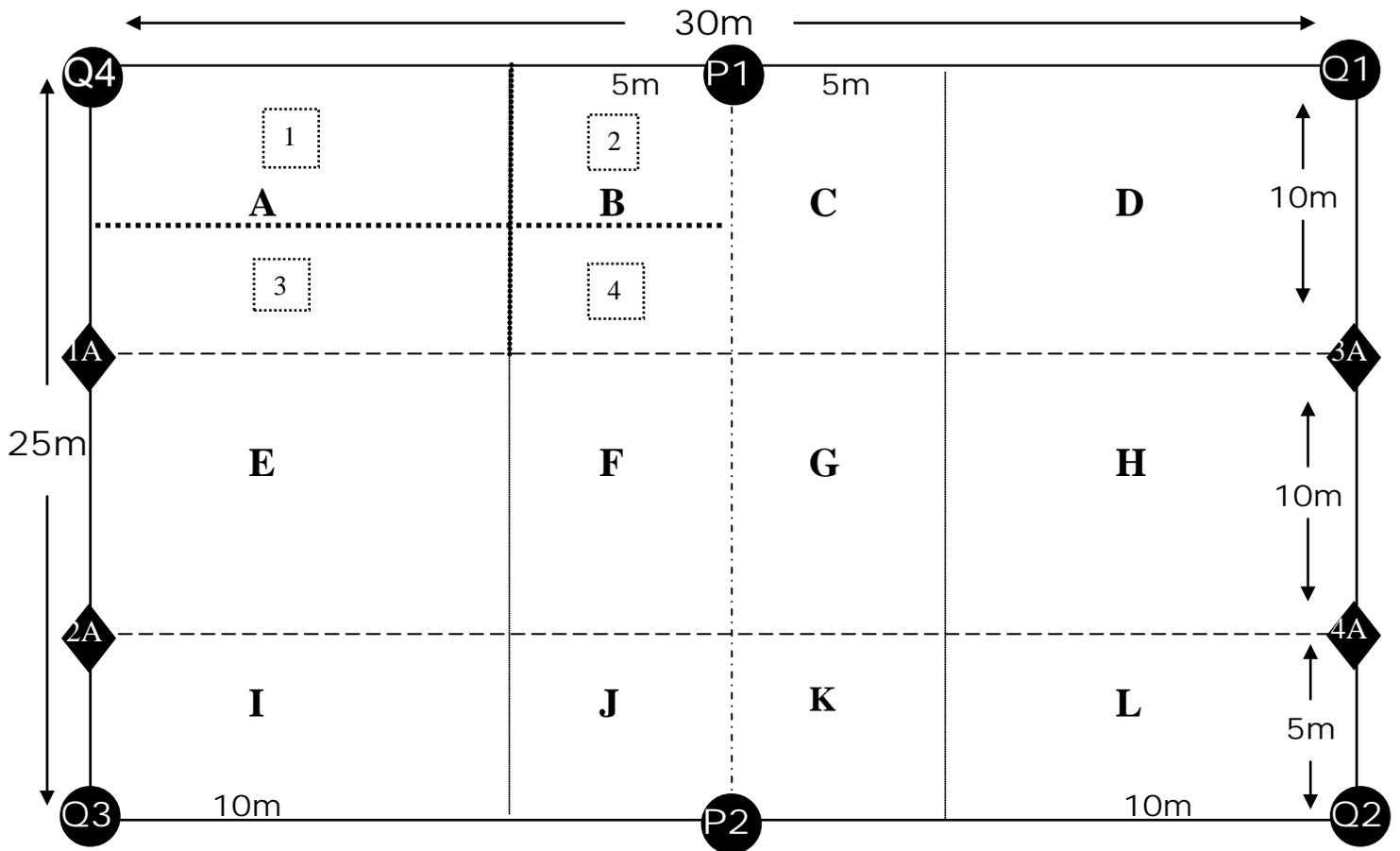


Figure 2. Pilot sampling plot layout for NATR. Seedling measurements performed in each of one randomly chosen 10 m x 5 m and one 5 m by 5 m subsections labeled 1-4 in Q4. Herbaceous transects are measured along Q4-Q1 and Q3-Q2. Overstory trees are measured in the entire plot, and pole trees are measured in subplots C, D, G, H, K, and L. Brown's transects are measured from points 1A-4A to randomly chosen points 1B-4B.



Figure 3. General location of fire effects monitoring plots along the Natchez Trace Parkway

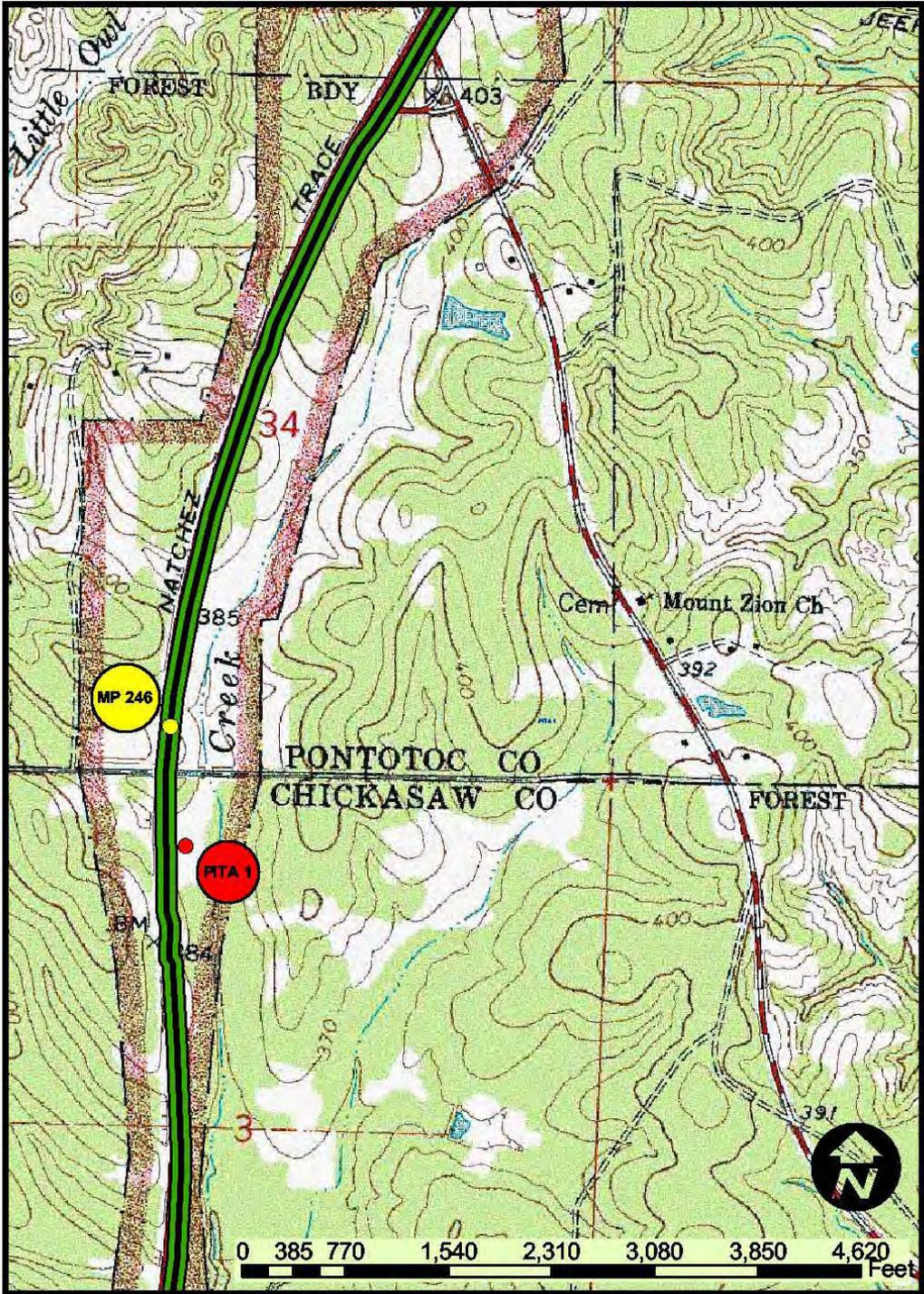


Figure 4. Location of *Pinus taeda* fire effects monitoring plot 1 along the Natchez Trace Parkway (Chickasaw County, MS).

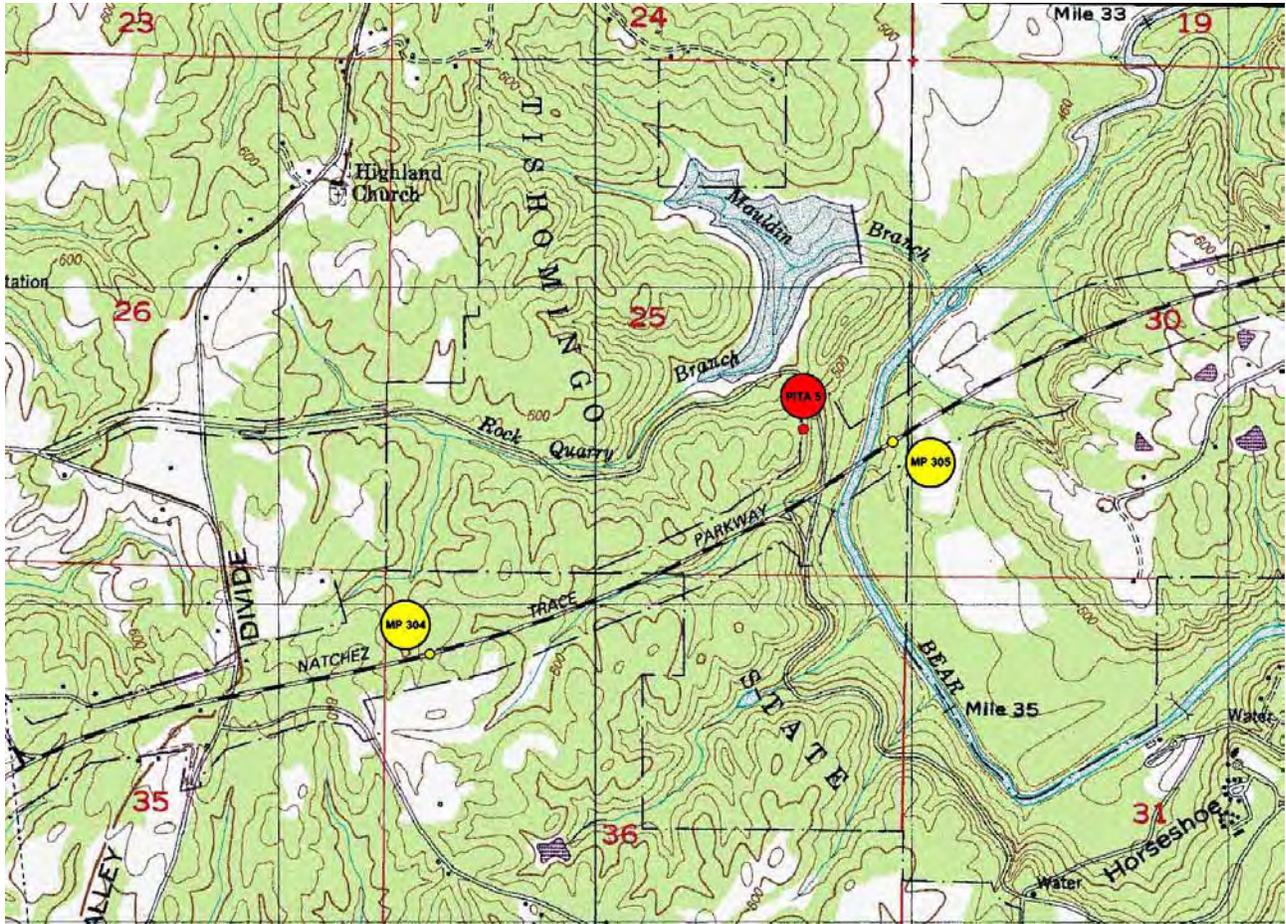


Figure 5. Location of *Pinus taeda* fire effects monitoring plot 5 along the Natchez Trace Parkway, (Tishomingo County, MS).

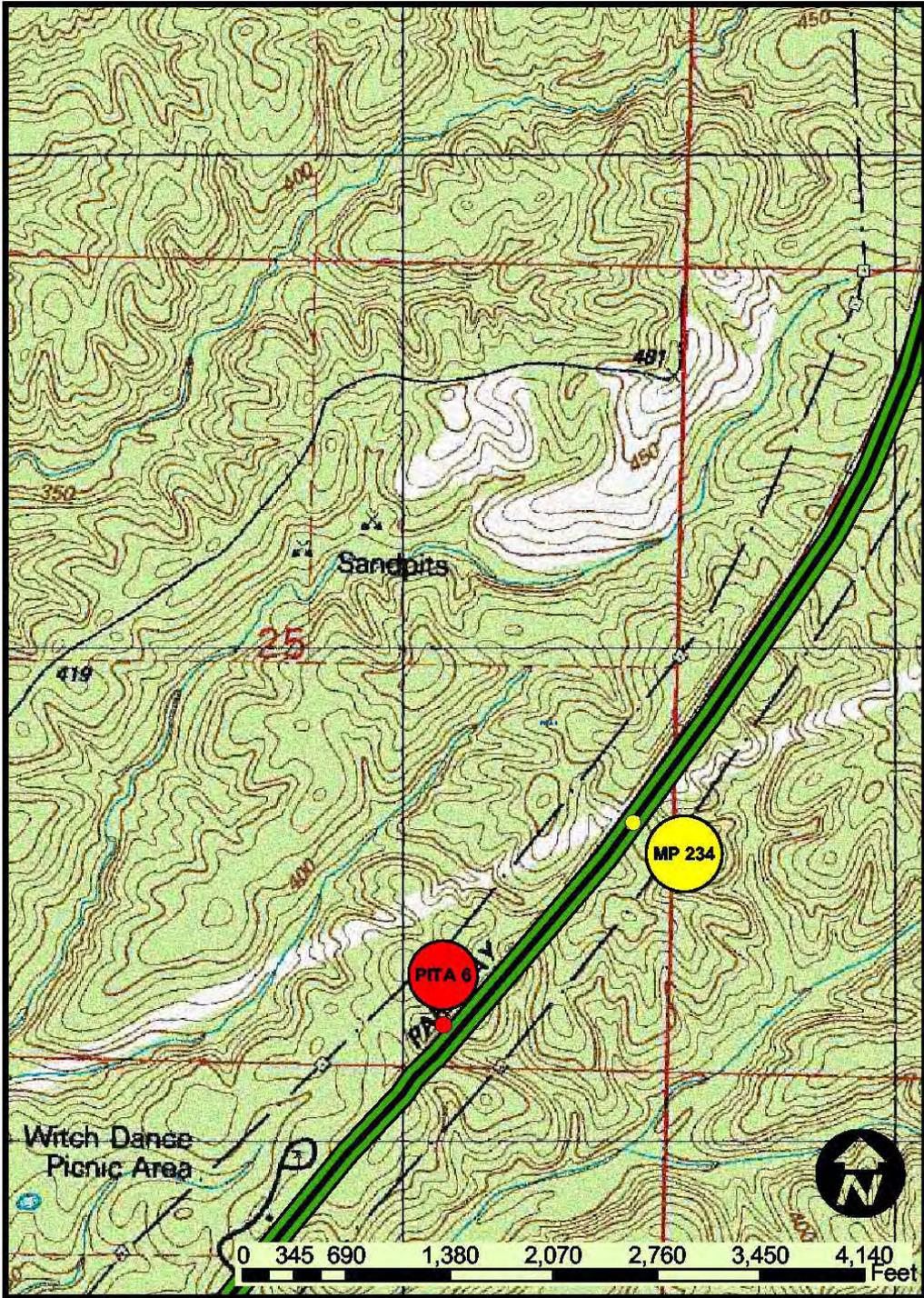


Figure 6. Location of *Pinus taeda* fire effects monitoring plot 6 along the Natchez Trace Parkway (Chickasaw County, MS). Parkway is denoted by double green line.

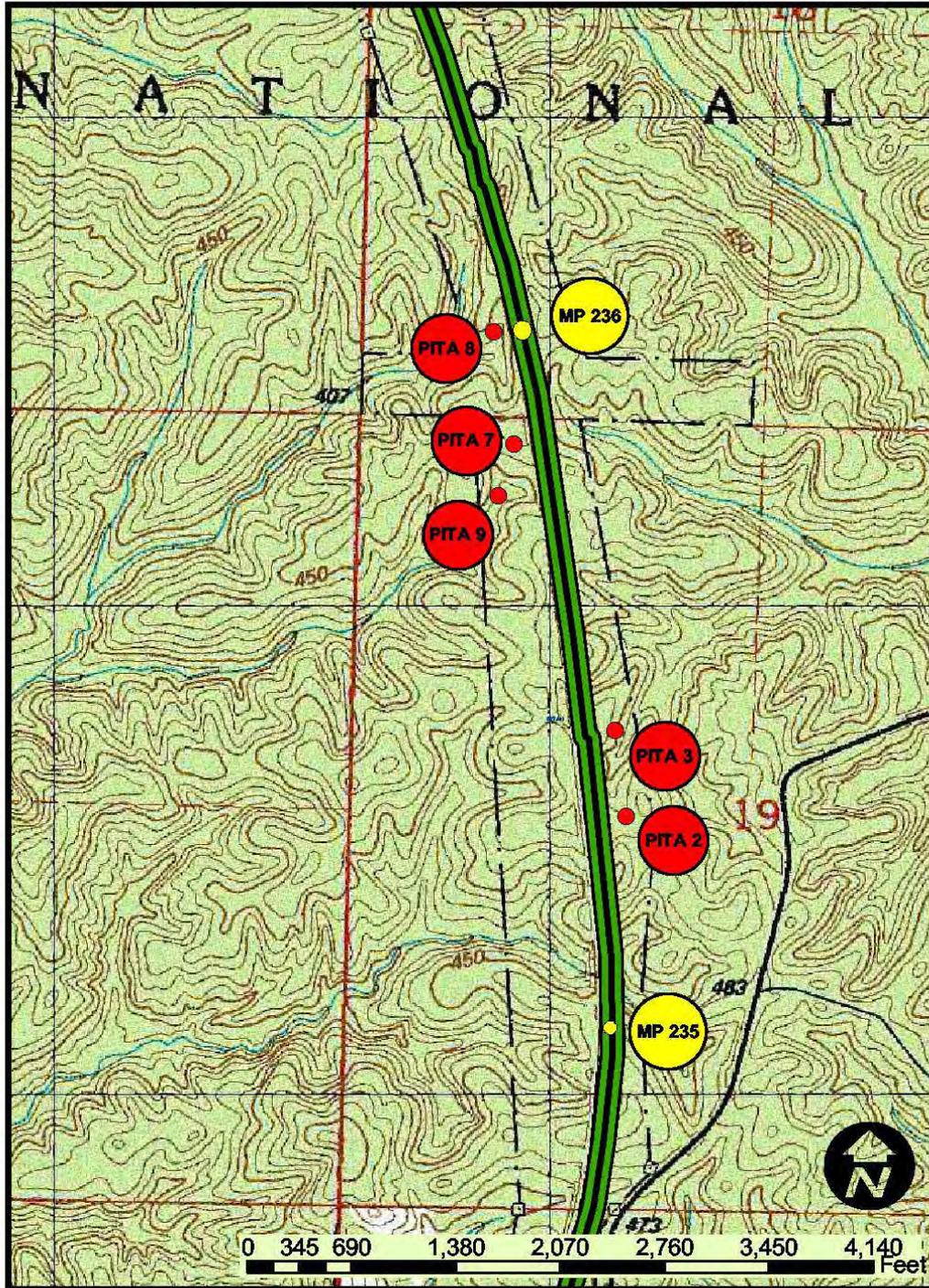


Figure 7. Location of *Pinus taeda* fire effects monitoring plots 2, 3, and 7-9 along the Natchez Trace Parkway, (Chickasaw County, MS). Parkway is denoted by double green line.

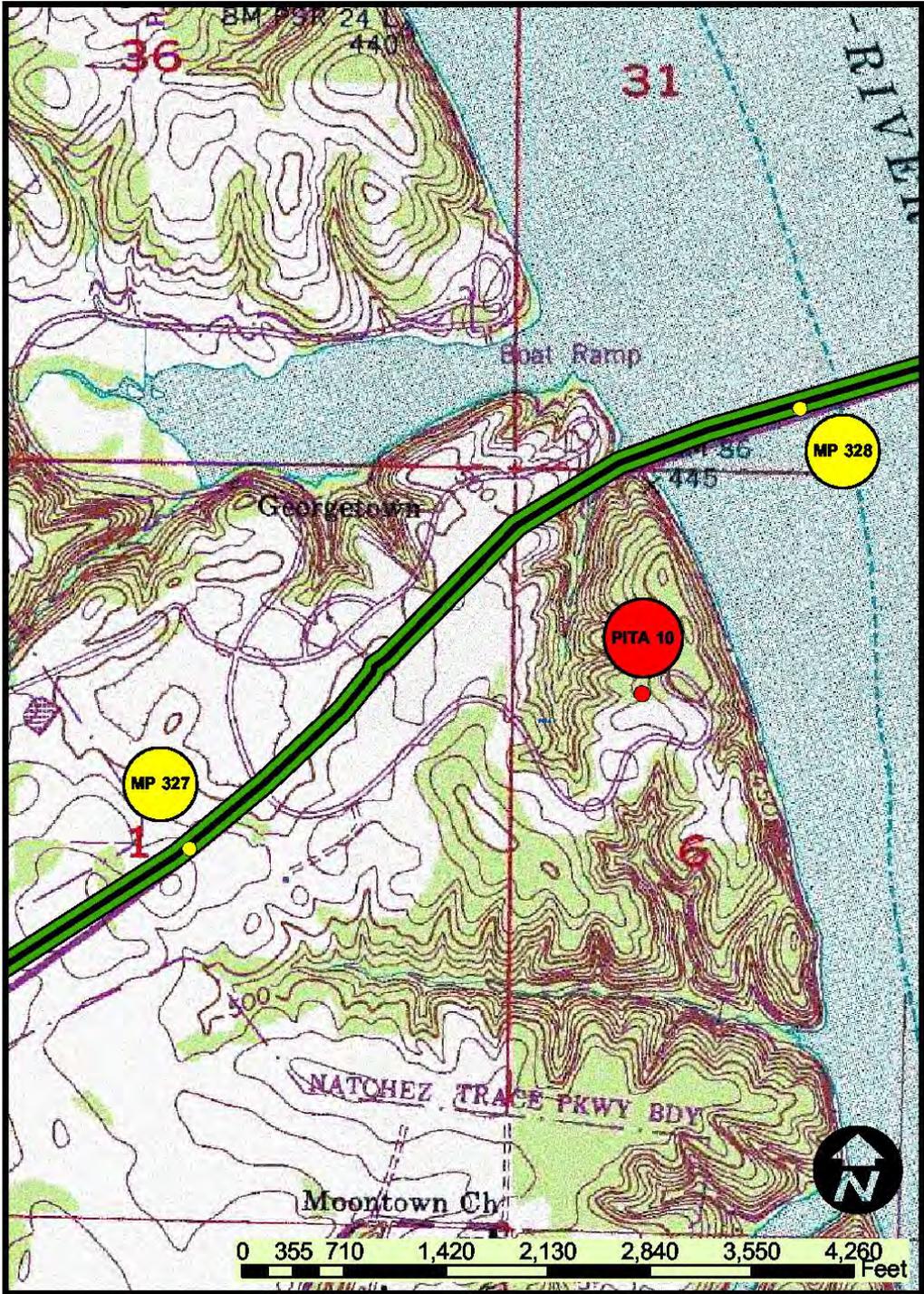


Figure 9. Location of *Pinus taeda* fire effects monitoring plot 10 along the Natchez Trace Parkway (Colbert County, AL). Parkway is denoted by double green line.

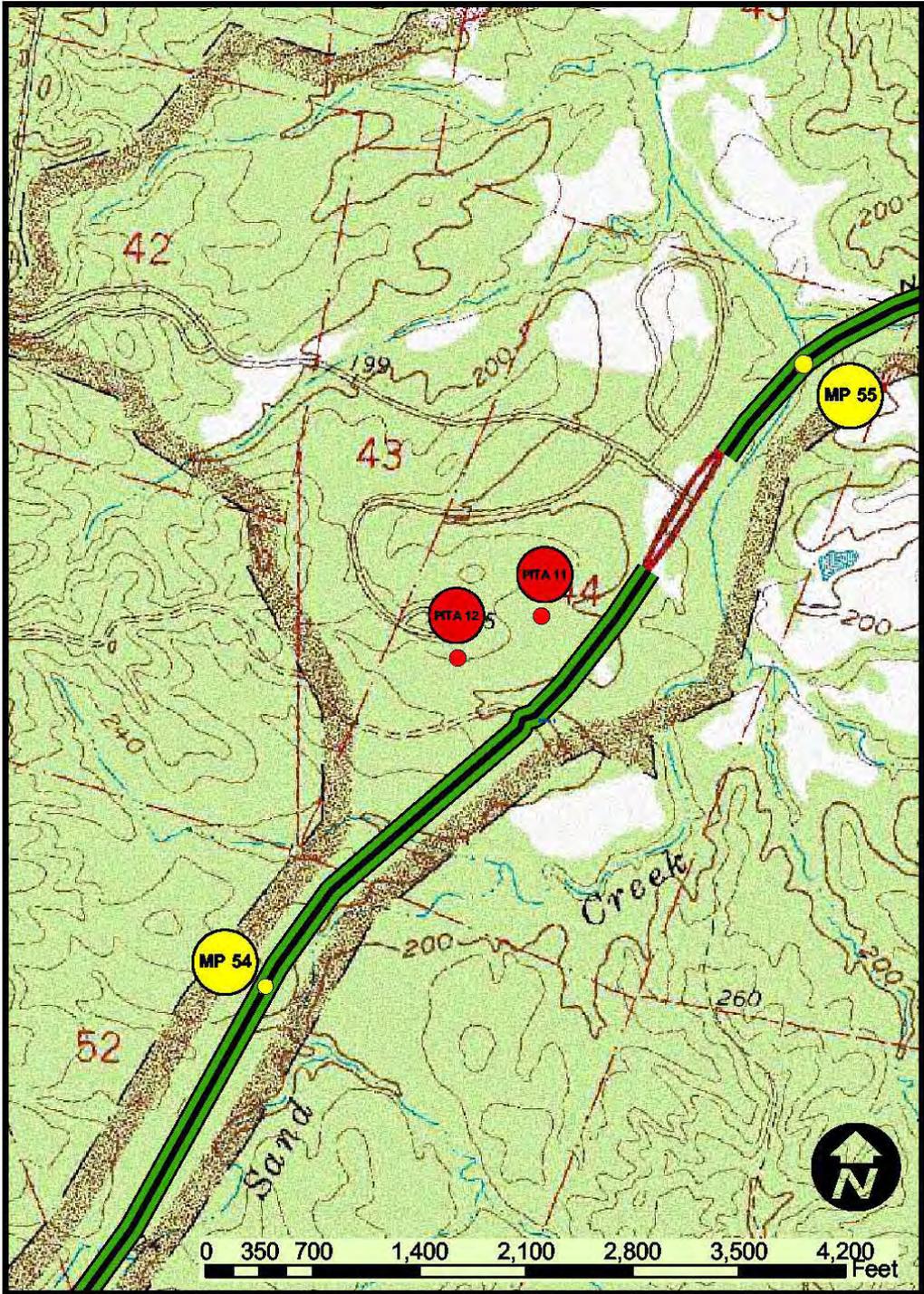


Figure 10. Location of *Pinus taeda* fire effects monitoring plots 11-12 along the Natchez Trace Parkway (Claiborne County, MS).

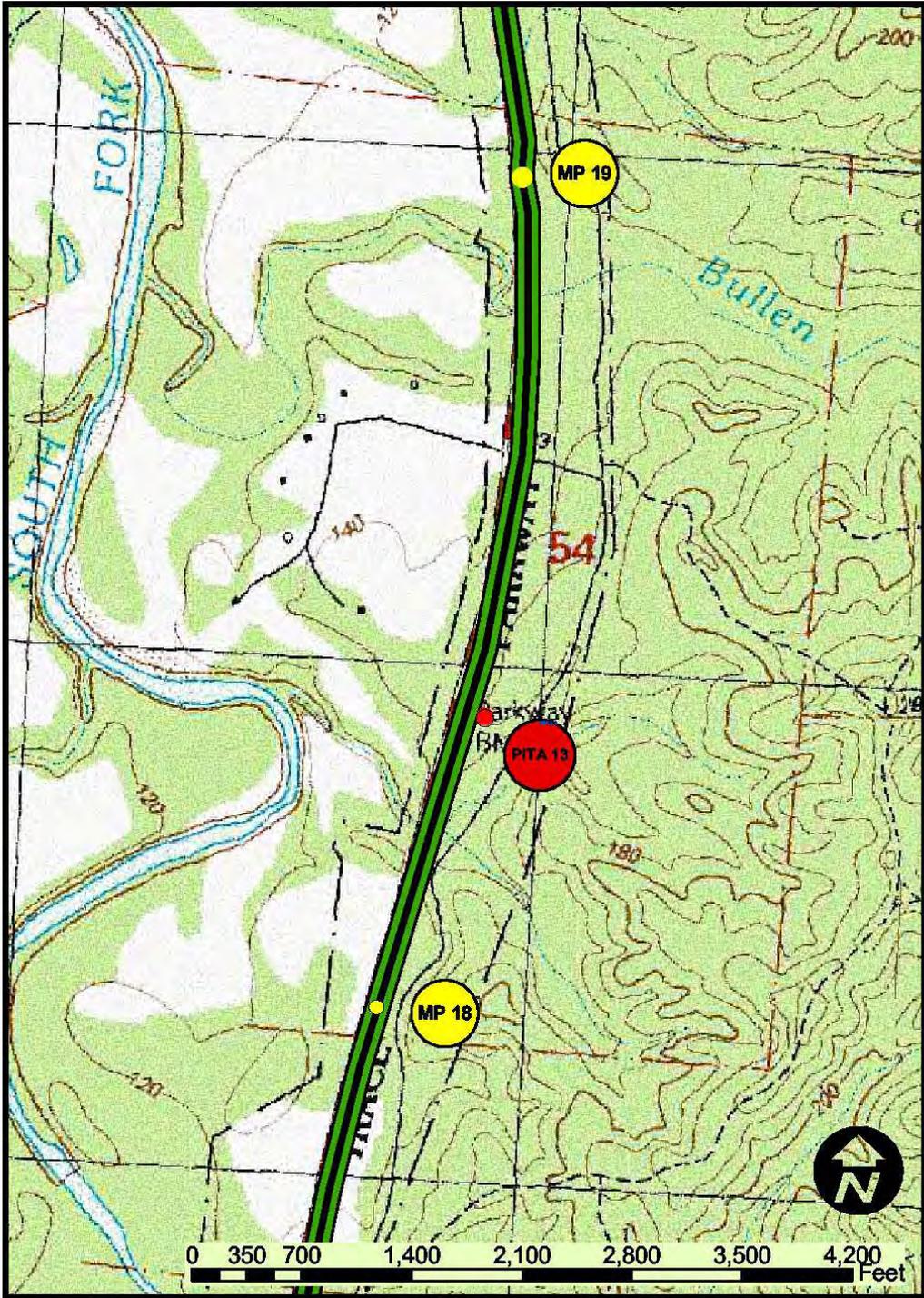


Figure 11. Location of *Pinus taeda* fire effects monitoring plot 13 along the Natchez Trace Parkway (Jefferson County, MS).

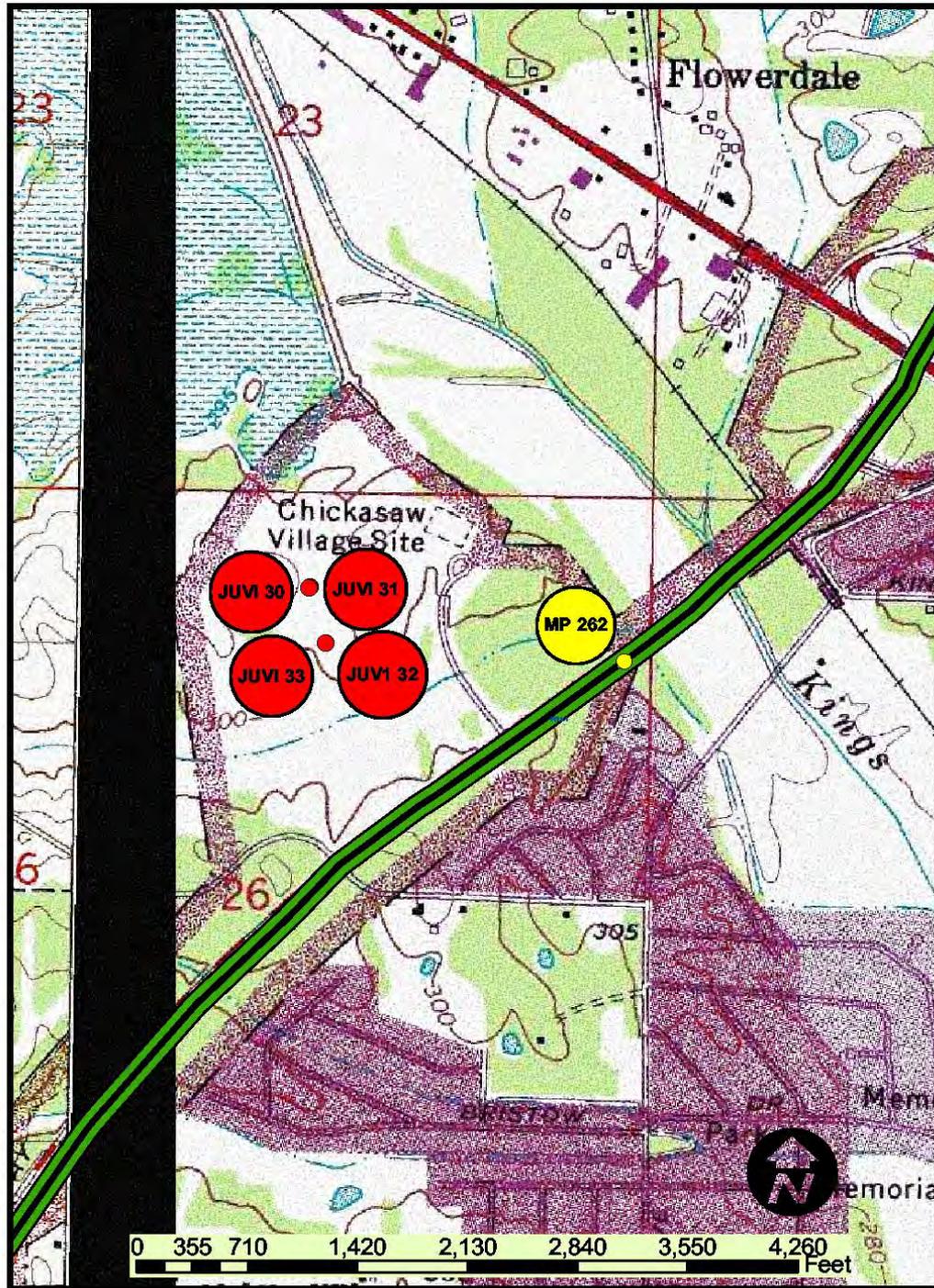


Figure 12. Location of the four *Juniperus virginiana* fire effects monitoring plots 30-33 along the Natchez Trace Parkway (Lee County, MS). Parkway is denoted by double green line.

APPENDIX B

Loblolly Pine Monitoring Type Description Sheet

FMH-4

Park: NATR

Monitoring Type Code: F P I T A 1 D 09
6/04

Date Described: 12/ 99; revised: 8/01,

Monitoring Type Name: Loblolly Pine Forest

Preparer(s): Dan Mapstone, Doug Wallner, Bill Whitworth, and Paul Reeberg . Revisors:
Caroline Noble, Dana Cohen, Lisa McInnis

Burn Prescription: Burning may occur November through May, with temperatures ranging from 20—85° F. Relative humidity 25—60%, wind direction: 0—359 ° and midflame wind speed 0-6 mph. Fuel moisture: 1-hour: 6—11%, 10-hour 8—30%; rate of spread: 2—7 chains/hour; flame length 0.5—3 ft. (Prescriptions and outputs are for head fire only, but will also include flanking and backing fire).

Management Objectives (Restoration): Reduce total dead and downed fuel load by >50% immediate postburn from preburn levels. Reduce poles (2.5-15.0 cm dbh) >25% one year post burn. Cause no net gain in percent cover of exotic plants (e.g. kudzu, Chinese privet, Japanese honeysuckle, etc.) after 5 years of burning.

Management Objectives (Maintenance): Maintain 1,000 hour fuel loading at <5 tons/acre, pole density at approximately 100 trees/hectare.

Sampling Objectives: Monitor all objective variables in order to be 80% confident of detecting the following amounts of change, with acceptance of a 20% chance of saying a change took place when it did not: fuel load- initial reduction 50%, main: percent cover of exotic plants—20%,—40%.

Objective Variables: Total fuel loading, 1,000 hour fuel loading, pole-sized tree density, and total % cover of exotic species.

Physical Description: Upland sites on all aspects and slopes less than 50% at elevations less than 1,000 feet.

Biological Description: Overstory consists of 20-40% cover of loblolly pine (*Pinus taeda*). May be interspersed with longleaf (*P. palustris*), shortleaf (*P. echinata*) and Virginia pines (*P. virginiana*), as well as various hardwoods primarily represented by oaks and hickories (*Quercus spp.* and *Carya spp.*) and sweetgum (*Liquidambar styraciflua*). Subcanopy cover may consist of 20 to 80% cover of dogwood (*Cornus florida*), redbud (*Cercis canadensis*), eastern red cedar (*Juniperus virginiana*), and red maple (*Acer rubrum*). Shrub understory includes < 80% cover of blackberry (*Rubus sp.*), greenbrier (*Smilax sp.*), poison ivy (*Toxicodendron radicans*), Chinese privet, and Japanese honeysuckle (*Lonicera japonica*). Grass and forbs represent < 10% cover and can include various grasses, sedges, and asteraceous species.

APPENDIX B

Loblolly Pine Monitoring Type Description Sheet, continued

Rejection Criteria: Exclude areas within 5 meters of canopy edge along mowed lines, roads, or park boundary and within 2 meters of canopy edge of trails and other physical barriers such as sloughs, ditches, drainages, creeks, cliffs, powerlines, rights-of-way, and developed areas.

Notes: Pilot sampling will be done for the first ten plots in this monitoring type. PITA plots are likely to be split to include an oak-hickory monitoring type.

APPENDIX B

Loblolly Pine Monitoring Type Description Sheet, continued

GENERAL PROTOCOLS		Yes/No	
Preburn			
	Control Plots	No	
	OP/Origin Buried	No	
	Voucher Specimens	Yes	
	Abbreviated Tags	Yes	
	Herb Fuel Load	No	
	Brush Fuel Load	No	
	Stakes (REBAR) Installed:	14	
Burn			
	Duff Moisture	Yes	
	Flame Depth	No	
FOREST PLOT PROTOCOLS			
Preburn Read (00 Pre)			See pilot sampling plot layout, Figure 2.
Overstory			
	Trees Tagged	Yes	Area Sampled: 30 x 20 m
	Trees Mapped	Yes	Quarter(s) Sampled: Q1-Q4, subplots A-L
	DBH	Yes	
	Dead Recorded	Yes	
	Live Crown Position	Yes	
	Coded		
	Live Damage Coded	Yes	
	Dead Crown Position	Yes	
	Coded		
	Dead Damage Coded	No	
Pole-Size			
	Trees Tagged	Yes	Area Sampled: 15 x 20 m
	Trees Mapped	Yes	Quarter(s) Sampled: Q1 and Q2 (subplots C, D, G, H, K, L)
	DBH	Yes	
	Dead Recorded	Yes	
	Height Code Recorded	Yes	
Seedling			
	Seedlings Mapped	No	Area Sampled: Pilot sampling done in Q4; two of four areas in subplots A and B sampled. See Figure 1.
	Dead Recorded	Yes	
	Height Code Recorded	Yes	
	Tally Count	Yes	

APPENDIX B

Loblolly Pine Monitoring Type Description Sheet, continued

FOREST PLOT PROTOCOLS	Yes/ No [continued]
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Preburn Read (00 Pre) [continued]

Herbaceous

Point Intercept Method	Yes
Tallest Species Height Recorded	Yes
All Species Intercepted Recorded	Yes
Dead recorded	Yes

Point Intercept Recorded for full length of Q4-Q1 and Q3-Q2 until pilot sampling completed.
 Clonal shrubs to eliminate from belt transect: *Rhus spp.*, *Gaylussacia spp.*, *Ilex glabra*, *I. vomitoria*, *Vaccinium stamineum* (list not all inclusive of all clonal species).

Fuel

Loadings

Sampling Plane Lengths along Brown's Transects:

- 1 hour fuels: 0-6 feet
- 10 hour fuels: 0-6 feet
- 100 hour fuels: 0-12 feet
- 1,000 hour fuels (rotten and solid): 0-100 feet
- Litter and Duff Measurements: 1,5,10,15,20,25,30,35,40, and 45 feet

Immediate Postburn Read (01 Post, 02 Post, 03 Post, etc...)

Overstory

Record Tag #	Yes	Area Sampled: 30 x 25 m
Record Tree Status (alive, dead, resprout, consumed)	Yes	Quarter(s) Sampled: Q1-Q4
DBH	No	
Maximum Scorch Height	Yes	
% Crown Scorched	Yes	
Char Height	Yes	

Pole-Size

Record Tag #	Yes	Area Sampled: 15 x 25 m
Live and Dead Recorded	Yes	Quarter(s) Sampled: Q1 and Q2
DBH	No	
Height	No	
Maximum Scorch Height	Yes	
% Crown Scorched	Yes	
Char Height	Yes	

**Fuel
Loadings**

Sampling Plane Lengths along Brown's Transects:

1 hour fuels: 0-6 feet

10 hour fuels: 0-6 feet

100 hour fuels: 0-12 feet

1,000 hour fuels (rotten and solid): 0-100 feet

Litter/Duff Measurements along Brown's Transects: 1,5,10,15,20,25,30,35,40, and 45 feet

Burn

Severity Burn severity recorded along all 4 Brown's Transects: 1,5,10,15,20,25,30,35,40, and 45 feet

Post Burn Reads (01 yr 01, 01 yr 2, etc...)

***Same as 00 Pre-Read**

APPENDIX B

Eastern Red Cedar Monitoring Type Description Sheet

FMH-4

Park: NATR

Monitoring Type Code: BJUVI1D06 **Date Described:** 12/99, Revised 8/04
Monitoring Type Name: Cedar-encroached Broomsedge Grassland

Preparer(s): Dan Mapstone, Doug Wallner, Bill Whitworth and Paul Reeberg. Revised by Lisa McInnis

Burn Prescription: Date: November through May, Temperature: 20—85° F; relative humidity 25—60%; wind direction: 0—359 °; midflame wind speed 0-6 mph; fuel moisture: 1-hour: 6—11%, rate of spread: 2—7 ch/hr; flame length 0.5—3 ft. (Prescriptions and outputs are for head fire only, but will also include flanking and backing fire).

Restoration (initial) management objectives: Decrease woody species (*Juniperus virginiana*, *Ligustrum sinense*) density by $\geq 50\%$ after 5 years of annual burning.

Restoration sampling objectives: Monitor woody species with an 80% probability of detecting a 50% density reduction after 5 years of annual burning, accepting a 25% chance of concluding that a change took place when it did not (Type I error).

Maintenance management objectives: Maintain < 25% cover of woody species. Cause no net increase in percent cover of exotics within 5 year burn rotation.

Maintenance sampling objectives: Measure percent cover of woody species with an 80% probability of being within 25% of the true mean percent cover of woody species. Measure percent cover of exotics with an 80% probability of being within 25% of the true mean percent cover of exotics.

Physical Description: Upland sites on all aspects and slopes at elevations less than 1,000 feet. Soils may be of the Oktibehha-Smithdale-Providence or Leeper-Catalpa-Marietta soil series; moderately deep over soft limestone or chalk.

Biological Description: Grassland with encroaching eastern red cedar and pricket. Dominant herbaceous cover consists broomsedge bluestem (*Andropogon virginicus*), big bluestem (*Andropogon gerardii*), bermudagrass (*Cynodn dactylon*), little bluestem (*Schizachyrium scoparium*), johnsongrass (*Sorghum halepense*), and Indiangrass (*Sorghastrum nutans*). Forbs include many asteraceous species, thistles (*Cirsium* spp.), clover (*Dalea* spp.), goldenrods (*Solidago* spp.) and lespedezas (*Lespedeza* spp.). Woody vines and shrubs (0 to 30 % cover) may include poison ivy (*Toxicodendron radicans*) and blackberry (*Rubus* spp.).

Rejection Criteria: Exclude areas within 15 meters of motor road mowline, roads, trails, or park boundary and other physical barriers such as sloughs, drainages, and powerline rights-of-way.

APPENDIX B

Eastern Red Cedar Monitoring Type Description Sheet, continued

BRUSH PLOT PROTOCOLS	Yes/No
Preburn Read (00 Pre)	
Control Plots	No
0P/Origin Buried	No
Voucher Specimens	Yes
Abbreviated Tags	Yes
Herb Fuel Load	No
Brush Fuel Load	No
Stakes (REBAR) Installed:	2
<hr/>	
Burn	
Duff Moisture	No
Flame Depth	No
<hr/>	
Herbaceous	
Point Intercept Method	Yes
Tallest Species Height	Yes
Recorded	
All Species Intercepted	Yes
Recorded	
Dead recorded	Yes
<hr/>	
Brush	
Density	Yes
<hr/>	
<p>Record all woody species (including trees) that are $\geq 50\%$ rooted in the belt. Belt is in 0-1m and 1-3m widths along the right side of the 0P-30P transect. Clonal shrubs to eliminate from belt transect: <i>Rhus spp.</i>, <i>Gaylussacia spp.</i>, <i>Ilex glabra</i>, <i>I. vomitoria</i>, <i>Vaccinium stamineum</i> (list not inclusive of all clonal species).</p>	
<hr/>	
Immediate Postburn Read (01 Post, 02 Post, 03 Post, etc...)	
Brush Density	Yes (using FMH-17)
Burn Severity	Yes (collected along transect using FMH-22)
<hr/>	
Post Burn Reads (01 yr 01, 01 yr 2, etc...)	
*Same as 00 Pre-Read	

FMH-4 MONITORING TYPE DESCRIPTION SHEET**Park: NATR****Monitoring Type Code: FOAHIID 0 9****Date Described: 1-17-06****Monitoring Type Name:** Oak-Hickory Woodland/Forest**Preparers:** L. McInnis**Fuel Model(s):** 9

Burn Prescription: Units containing this type will initially be burned between January-April (into green-up). Future burns (following the initial burn) may be conducted in the spring or fall. Units should be burned 3-4 times within 10-12 years of the first burn, after which time burn frequency should be re-evaluated based on management objectives. Temperatures typically range from 55-80° F; Relative humidities 25-45%; Midflame windspeed 2-10 mph; 1-hour fuel moisture 5-10%; 10-hour fuel moisture 8-20%.

Management Goal(s): Restore/maintain open oak woodlands that are both ecologically sustainable and structurally historically. Encourage native plant and animal diversity to the greatest extent possible.

Management Objectives: Reduce litter and duff load by 30-40% and mean density of pole-size trees (2.5-15cm dbh) by 20-30% after 3 burns.

Monitoring Objectives: In the oak-hickory woodland/forest monitoring type, we want to be 80% confident of detecting a 30% reduction in litter and duff load 20% reduction in the mean density of pole-sized trees and following the application of 3 prescribed burns. We are willing to accept a 20% chance of saying these changes took place when they really did not ($\alpha=.20$).

Objective Variable(s): Mean litter and duff load, mean density of pole-size trees.

Physical Description: Any aspect, elevation 400-500 feet. Applies to areas of northern Natchez Trace Parkway (AL and TN).

Soil series- to be researched.

Biological Description: Open to closed woodlands and forests with 60-90% overstory cover. Dominants are *Quercus alba* (white oak), *Q. velutina* (black oak), *Q. stellata* (post oak), and hickory species (*Carya* spp.). The subcanopy is typically well-developed and dominated by *Cornus florida* (flowering dogwood), *Sassafras albidum* (sassafras), and others. Shrub understory consists of < 40% cover of blackberry (*Rubus* sp.), greenbriar (*Smilax* sp.), poison ivy (*Rhus toxicodendron*), privet (*Ligustrum* spp.), and japanese honeysuckle (*Lonicera japonica*). The ground flora is usually sparse (<25% cover), but cover values can be higher (60%). Dominant species include hog-peanut (*Amphicarpaea bracteata*), naked tick-trefoil (*Desmodium nudiflorum*), and Christmas fern (*Polystichum acrostichoides*). Grass and forbs represent < 10% cover and can include *Andropogon* spp., and *Dicanthelium* spp.

Rejection Criteria: Exclude anomalous vegetation patches, monitoring type boundaries, and barren areas (>20% cover by rock). Also reject areas within 20 meters of any physical barriers such as roads, trails, or streams. Reject plots situated on slopes greater than 45%.

GENERAL PROTOCOLS		Y	N	Y	N
Preburn	Control Plots		X	Herb Height	X
	Herbaceous Density		X	Abbreviated Tags	X
	OP/Origin Buried		X	Herb Fuel Load	X
	Voucher Specimens	X		Brush Fuel Load	X
	Belt Transect Width:			Stakes Installed: 14	
	*Herbaceous Cover Data Collected at: Q4-Q1 Fuel Load Sampling Plane Lengths: 6, 6, 12, 50 (75), 50 (75) (see below).				
Burn	Duff Moisture		X	Flame Depth	X
Post Burn	Char Height		Y		
	Herbaceous Data: Do not collect Collect Severity: Fuel transects Fuel Load Sampling Plane Lengths: 6, 6, 12, 50, 50				

FOREST PLOT PROTOCOLS		Y	N	Y	N
Overstory	Tree Damage	X		Crown Position	X
	Dead Tree Damage		X	Dead Crown Position	X
	Record DBH year 1		X		
	Area Sampled: 50 x 20 m			Quarter(s) Sampled: Q1-Q4	
Pole-size	Height	X		Poles Tagged	X
	Record DBH year 1		X		
	Area Sampled: 25 m x 20 m			Quarter(s) Sampled: Q1 and Q2	
Seedling	Height	X			
	Record Dead Seedlings		X		
	Area Sampled: 10 x 5 m belt along P1-P2 line			Quarter Sampled: Q1	

FOREST PLOT PROTOCOLS		Yes/ No	[continued]
Preburn Read (00 Pre) [continued]			
Herbaceous			
	Point Intercept Method	Yes	
	Tallest Species Height Recorded	Yes	
	All Species Intercepted Recorded	Yes	
	Dead recorded	Yes	
	Point Intercept Recorded for full length of Q4-Q1.		

Fuel Loadings

Sampling Plane Lengths along Brown's Transects:

1 hour fuels: 0-6 feet

10 hour fuels: 0-6 feet

100 hour fuels: 0-12 feet

1,000 hour fuels (rotten and solid): 0-50 feet

Litter and Duff Measurements: 1,5,10,15,20,25,30,35,40, and 45 feet

Immediate Postburn Read (01 Post, 02 Post, 03 Post, etc...)

Overstory

Record Tag #	Yes	Area Sampled: 50 x 20 m
Record Tree Status (alive, dead, resprout, consumed)	Yes	Quarter(s) Sampled: All 4 quarters (Q1-Q4)
DBH	No	
Maximum Scorch Height	Yes	
% Crown Scorched	Yes	
Char Height	Yes	

Pole-Size

Record Tag #	Yes	Area Sampled: 25 m 20 m
Live and Dead Recorded	Yes	
DBH	No	Quarter(s) Sampled: 2 quarters (Q1 and Q2)
Height	No	
Maximum Scorch Height	Yes	
% Crown Scorched	Yes	
Char Height	Yes	

Fuel

Loadings

Sampling Plane Lengths along Brown's Transects:

1 hour fuels: 0-6 feet

10 hour fuels: 0-6 feet

100 hour fuels: 0-12 feet

1,000 hour fuels (rotten and solid): 0-50 feet

Litter/Duff Measurements along Brown's Transects: 1,5,10,15,20,25,30,35,40, and 45 feet

Burn

Severity

Burn severity recorded along all 4 Brown's Transects: 1,5,10,15,20,25,30,35,40, and 45 feet

Post Burn Reads (01 yr 01, 01 yr 2, etc...)

*Same as 00 Pre-Read

APPENDIX C

Unknown Species Naming Standards

The standardized methods for naming unknown plant species at the parkway are given below. *Please see addendum on last page.

Scenario One: Positive ID of Genus and Species

- **Assign a four letter code with the first two letters of the code representing the first two letters of the genus. The last two letters of the code will represent the first two letters of the species. Numbers at the end of the 4-letter code designate it is as a specific species when other species could potentially have the same acronym (see next black bullet).**
 - *Pinus palustris*=PIPA 1
- **If one identifies a plant species whose code is already accounted for, append the next sequential number at the end of the code. (An updated FMH-6 list will contain all the species codes for a specific park.)**
 - E.g., if DIVI 1 is already claimed by *Diospyros virginiana*, *Dioscorea villosa* would be DIVI 2.
- **Until one is confident with the acronyms from a park's updated FMH-6, be sure to refer the updated FMH-6 often in the field to insure that the correct acronyms are assigned to the correct plant species and to insure that species codes already assigned to a plant are not duplicated.**

Scenario Two: Positive ID of Genus only (specie might be identified later)

- **Assign a four letter code with the first two letters of the code representing the first two letters of the genus. The last two letters of the code should be descriptive of some of the plants characteristics. Be sure to note this code on an unknown tracking list and update the FMH-6 upon return from the field.**
 - E.g., a Solidago specie with Hairy Stems could be classified as SOHS 1.
- **If plant is eventually identified positively to species, refer to Scenario One.**

APPENDIX C

Unknown Species Naming Standards, Continued

- If plant is never to be identified to species, refer to Scenario Three.

Scenario Three: Positive ID of Genus only (specie cannot be identified)

- Assign a four letter code with the first two letters of the code representing the first two letters of the genus. The last two letters of the code will be “SP” which stands for species.
 - E.g., a Solidago specie would be SOSP 1.
- If one identifies a plant genus whose code is already accounted for, append the next sequential number at the end of the code. (An updated FMH-6 list will contain all the species codes for a specific park.)
 - E.g., if CASP 1 is already claimed by *Carya* species, *Carex* species would be CASP 2.

Scenario Four: Positive ID of Family only (specie might be identified later)

- Assign a four letter code with the first two letters of the code represented by the first two letters of the family. The last two letters of the code should be descriptive of some of the plants characteristics. Be sure to note this code on an unknown tracking list and update the FMH-6 upon return from the field.
 - E.g., a Poaceae specie with Round Stems could be classified as PORS 1.
- If plant is eventually identified to genus, refer to Scenario Three.
- If plant cannot be identified to genus or species, refer to Scenario Five.

Scenario Five: Positive ID of Family only (specie will not be identified)

- Assign a four letter code with the first two letters of the code representing the first two letters of the family. The last two letters of the code will be “SP” which stands for species.
 - E.g., a Poaceae specie would be POSP 1.

APPENDIX C

Unknown Species Naming Standards, Continued

- If one identifies a plant family whose code is already accounted for, append the next sequential number to the end of the code. (An updated FMH-6 list will contain all the species codes for a specific park.)
 - E.g., if POSP 1 is already claimed by *Potentilla* species, *Poaceae* species would be POSP 2.

Scenario Six: Cannot identify to family (might be identified to family, genus, or species)

- Assign a four-letter code based on the characteristics of the plant
 - E.g., a **W**oody, **P**almately-Leaved Shrub with **R**oot **S**uckers might be classified as WPRS 1.
- If plant can only be identified to family, refer to Scenario Four.
- If plant cannot be identified to family, consult with fire ecologist.

APPENDIX C

Unknown Species Naming Standards, Continued

Addendum

- For uncommon codes, write out the full family, genus, or species name (or the characteristics of the acronym describing the plant) next to the code on the field data sheet.

- For any codes not on the updated FMH-6 which you carry in the field, either add these to the tracking list (formerly known as the unknown tracking list) as an unknown or as a known species which needs to be added to the FMH-6. When recording species codes during a monitoring trip, be sure to check both the FMH-6 and the unknown tracking to insure no duplication of species codes.

- Upon return from the field, update the FMH-6 with any new codes (known and unknown) from the tracking list. (This will insure that the next trip to this park will have an updated FMH-6.)

- Until one is confident with the acronyms from a park's updated FMH-6, be sure to refer the updated FMH-6 often in the field to insure that the correct acronyms are assigned to the correct plant species and to insure that species codes already assigned to a plant are not duplicated.

- Once a specie is positively identified, update specie code in the FMH-6 and change all occurrences in FMH from the old code to the new identified code.

APPENDIX C

Species Code List

SP_Code	SP_CommonName	Genus	SP_LatinName	LifeForm	LifeCycle
ACBA1	southern sugar maple	Acer	barbatum	Tree	Perennial
ACNE1	boxelder	Acer	negundo	Tree	Perennial
ACRU1	red maple	Acer	rubrum	Tree	Perennial
ACSP1		Acer	species	Not Defined	Not Defined
ALSP1	Unknown Allium Species	Allium	species	Forb	Perennial
AMBR1	Hog Peanut	Amphicarpaea	bracteata	Vine	Perennial
ANSP1		Andropogon	species	Grass	Perennial
ANVI1	broomsedge	Andropogon	virginicus	Grass	Perennial
ARGI1		Arundinaria	gigantea	Grass	Perennial
ASPL1	spleenwort fern	Asplenium	platyneurom	Fern	Perennial
ASSP1		Aster	species	Forb	Not Defined
BARE1		Bare		Substrate	Not Defined
BESC1	alabama supplejack	Berchemia	scandens	Vine	Perennial
BICA1	Cross Vine	Bignonia	capreolata	Vine	Perennial
BOLE1		Tree bole		Substrate	Not Defined
CAAL1	mockernut (formerly CATO)	Carya	alba	Tree	Perennial
CAAM1		Callicarpa	americana	Shrub	Perennial
CACA1	ironwood	Carpinus	caroliniana	Tree	Perennial

SP_Code	SP_CommonName	Genus	SP_LatinName	LifeForm	LifeCycle
CACO1		Carya	cordiformis	Tree	Perennial
CAGL1		Carya	glabra	Tree	Perennial
CAOV1	shagbark hickory	Carya	ovata	Tree	Perennial
CAPA1		Carya	pallida	Tree	Perennial
CARA1		Campsis	radicans	Vine	Perennial
CASP1		Carya	species	Tree	Perennial
CASP2		Carex	species	Grass_Like	Perennial
CATO1		Carya	tomentosa	Tree	Perennial
CECA1	red bud	Cercis	canadensis	Tree	Perennial
CEOC1	common hackberry	Celtis	occidentalis	Tree	Perennial
CHFA1		Chamaecrista	fasciculata	Forb	Annual
CHLA1		Chasmanthium	latifolium	Grass	Not Defined
CHSE1	longleaf woodoats	Chasmanthium	sessiliflorum	Grass	Perennial
CLMA1		Clitoria	mariana	Forb	Perennial
COFL1		Cornus	florida	Tree	Perennial
CYSP1	Unknown Species: Cyperaceae Family	Unknown	cyperaceae family	Grass_Like	Not Defined
DENU1		Desmodium	nudiflorum	Forb	Perennial
DESP1		Desmodium	species	Not Defined	Not Defined
DEUN1		Dead wood	unknown	Substrate	Not Defined

SP_Code	SP_CommonName	Genus	SP_LatinName	LifeForm	LifeCycle
DISP1		Dichantherium	species	Grass	Not Defined
DIVI1	common persimmon	Diospyros	virginiana	Tree	Perennial
ELSP1		Elymus	species	Grass	Perennial
ELTO1		Elephantopus	timentosum	Forb	Not Defined
ELVI1	Virginia Wildrye	Elymus	virginicus	Grass	Perennial
ERHI1		Erechtities	hieracifolia	Forb	Perennial
ERQU1		Erigeron	quercifolius	Forb	Perennial
EURO1		Eupatorium	rotundifolia	Forb	Perennial
FAGR1		Fagus	grandifolia	Tree	Perennial
FESP1		Festuca	species	Not Defined	Not Defined
FRAM1	white ash	Fraxinus	americana	Tree	Perennial
FRCA1	Carolina Buckthorn	Frangula	caroliniana	Tree	Perennial
FRPE1	green ash	Fraxinus	pennsylvanica	Tree	Perennial
FRSP1	Ash	Fraxinus	species	Tree	Perennial
GASP1		Unknown	galium ?	Forb	Not Defined
GECA1		Geum	canadense	Forb	Not Defined
GESE1	evening trumpet flower	Gelsemium	sempervirens	Forb	Perennial
GESP1	Unknown Geum Species	Geum	species unknown	Forb	Perennial
GROUND				Substrate	Not Defined

SP_Code	SP_CommonName	Genus	SP_LatinName	LifeForm	LifeCycle
ILAM1	Carolina Holly	Ilex	ambigua	Not Defined	Not Defined
ILOP1		Ilex	opaca	Tree	Perennial
JUCO1	Leathery Rush	Juncus	coriaceus	Grass_Like	Perennial
JUSP1		Juncus	species	Grass_Like	Perennial
JUVI1	eastern red cedar	Juniperus	virginiana	Tree	Perennial
JUVI2	eastern red cedar	Juniperus	virginiana shrub	Tree	Perennial
KRBI1		Krigia	biflora	Forb	Not Defined
LESP1		Lespedeza	species	Forb	Not Defined
LISI1	Chinese Privet	Ligustrum	sinese	Shrub	Perennial
LIST1	sweetgum	Liquidambar	styraciflua	Tree	Perennial
LITT1		Litter		Substrate	Not Defined
LITU1	yellow poplar	Liriodendron	tulipifera	Tree	Perennial
LOEL1		Lobelia	elongata	Forb	Perennial
LOJA1	honeysuckle	Lonicera	japonica	Vine	Perennial
MAGR1	southern magnolia	Magnolia	grandiflora	Tree	Perennial
MIRE1	partridge berry	Mitchella	repens	Vine	Perennial
MIVI1	Nepalese Brown Top	Microstegium	vimineum	Grass	Perennial
MORU1	red mulberry	Morus	rubra	Tree	Perennial
MOSS1		Moss		Non_Vascular	Not Defined

SP_Code	SP_CommonName	Genus	SP_LatinName	LifeForm	LifeCycle
NYSY1	black gum, tupelo gum	Nyssa	sylvatica	Tree	Perennial
OSVI1		Ostrya	virginiana	Tree	Perennial
OXDI1		Oxalis	dillenii	Forb	Perennial
PAQU1	virginia creeper	Parthenocissus	quinquefolia	Vine	Perennial
PHAM1		Phytolacca	americana	Forb	Perennial
PIEC1	shortleaf pine	Pinus	echinata	Tree	Perennial
PIPO1		Pinus	ponderosa	Tree	Perennial
PISP1		Pinus	species	Tree	Perennial
PITA1	loblolly	Pinus	taeda	Tree	Perennial
PIUD1		Pinus	unknown dead	Tree	Not Defined
PIVI1		Pinus	virginiana	Tree	Perennial
POAC1	christmas fern	Polystichum	acrostichoides	Fern	Perennial
POSI1	Common Cinquefoil	Potentilla	simplex	Forb	Perennial
POSP1		Potentilla	species	Forb	Not Defined
POSP2	Unknown specie: Poaceae Family	Unknown	poaceae species	Grass	Perennial
PRSE1	black cherry	Prunus	serotina	Tree	Perennial
PRSP1		Prunus	species	Tree	Perennial
QUAL1	white oak	Quercus	alba	Tree	Perennial
QUCO1	scarlet oak	Quercus	coccinea	Tree	Perennial

SP_Code	SP_CommonName	Genus	SP_LatinName	LifeForm	LifeCycle
QUFA1	southern red oak	Quercus	falcata	Tree	Perennial
QUMA1	blackjack oak	Quercus	marlandica	Tree	Perennial
QUMO1		Quercus	montana	Tree	Perennial
QUMU1		Quercus	muehlenbergii	Tree	Perennial
QUNI1	water oak	Quercus	nigra	Tree	Perennial
QUPH1	willow oak	Quercus	phellos	Tree	Perennial
QUPR1	chestnut oak	Quercus	prinus	Tree	Perennial
QURU1	northern red oak	Quercus	rubura	Tree	Perennial
QUSP1		Quercus	species	Tree	Perennial
QUST1	post oak	Quercus	stellata	Tree	Perennial
QUVE1	black oak	Quercus	velutina	Tree	Perennial
RHCO1	winged sumac	Rhus	copallinum	Shrub	Perennial
ROCK1		Rock	rock	Substrate	Not Defined
ROMU1	multiflora rose	Rosa	multiflora	Shrub	Perennial
ROSP1	Rose	Rosa	species	Shrub	Perennial
RUSP1		Rubus	species	Forb	Not Defined
RUUN1		Rubus unk		Not Defined	Not Defined
SAAL1	sassafras	Sassafras	albidum	Tree	Perennial

SP_Code	SP_CommonName	Genus	SP_LatinName	LifeForm	LifeCycle
SACA1		Sanicula	canadensis	Forb	Not Defined
SALY1		Salvia	lyrata	Not Defined	Not Defined
SASP1		Sanicula	species	Forb	Perennial
SMBO1		Smilax	bona-nox	Vine	Perennial
SMGL1		Smilax	glauca	Vine	Perennial
SMRO1		Smilax	rotundifolia	Vine	Perennial
SMSP1		Smilax	species	Vine	Not Defined
SOGL1		Solidago	gigantea	Forb	Perennial
SOSP1		Solidago	species	Forb	Perennial
TORA1	posion ivy	Toxicodendron	radicans	Vine	Perennial
TRIN1		Trifolium	incarnatum	Forb	Annual
TRLA1		Trillium	lanceolatum	Forb	Perennial
ULAL1	winged elm	Ulmus	alata	Tree	Perennial
ULAM1		Ulmus	americana	Tree	Perennial
ULRU1	slippery elm	Ulmus	rubra	Tree	Perennial
ULSP1		Ulmus	species	Tree	Perennial
ULXX2		Ulmus	unknown	Tree	Not Defined
UNAN1		Unk andropogon		Not Defined	Not Defined

SP_Code	SP_CommonName	Genus	SP_LatinName	LifeForm	LifeCycle
UNAS1		Unknown	asteraceae	Forb	Not Defined
UNDE1		Unknown dead		Tree	Not Defined
UNFA1	Unknown Species in Fabaceae	Unknown	fabaceae family	Forb	Not Defined
UNFO1		Unknown	forb	Forb	Not Defined
UNFU1		Unknown fungus		Non_Vascular	Perennial
UNHE1		Unknown	herb	Forb	Not Defined
UNLI1		Liliaceae	unknown	Forb	Not Defined
UNMO1		Unknown	monocot	Grass	Not Defined
UNPO1		Unknown	poaceae	Grass	Not Defined
UNSE1		Unknown seedling		Tree	Perennial
UNSP1		Unkown	species	Shrub	Not Defined
UNUL1		Ulmus	unknown	Tree	Not Defined
UNVI2		Unknown	vine	Vine	Perennial
VAAR1	sparkleberry	Vaccinium	arboreum	Shrub	Perennial
VAPA1	blueberry	Vaccinium	pallidum	Shrub	Perennial
VASP1		Vaccinium	species	Shrub	Not Defined
VAST1		Vaccinium	stamineum	Shrub	Perennial
VIAE1	summer grape	Vitis	aestivalis	Vine	Perennial

SP_Code	SP_CommonName	Genus	SP_LatinName	LifeForm	LifeCycle
VILA1	grape	Vitis	labrusca	Vine	Perennial
VINE1		Pos bittersweet		Not Defined	Not Defined
VIRO1	grape	Vitis	rotundifolia	Vine	Perennial
VIRU1	rusty blackhawk	Viburnum	rufidulum	Shrub	Perennial
VISP1		Viburnum	species	Shrub	Not Defined
WOOD1		Wood		Substrate	Not Defined

APPENDIX D

Data Sheets

The datasheets used by the Parkway are the standard forms from the FMH Handbook, and can be found on the fire effects server at O://fire effects/FMH/fir_eco_FEMHandbook or at <http://www.nps.gov/fire/fmh/FEMHandbook.pdf>.

These forms are:

- FMH-4 Monitoring Type Description Sheet
- FMH-5 Plot Location Datasheet
- FMH-7 Forest Plot Datasheet
- FMH-8 Overstory Tree Datasheet
- FMH-9 Pole Tree Datasheet
- FMH-10 Seedling Tree Datasheet
- FMH-11 Full Plot Tree Map
- FMH-12 Quarter Plot Tree Map
- FMH-16 30 m Transect Datasheet
- FMH-17 Shrub Density Datasheet (JUVI monitoring type)
- FMH-19 Forest Plot Fuels Inventory Datasheet
- FMH-20 Tree Postburn Assessment Datasheet
- FMH-21 Forest Plot Burn Severity
- FMH-22 Brush and Grassland Burn Severity (JUVI monitoring type)
- FMH-25 Plot Maintenance Log

Nonstandard forms that may be used for data collection include a nested herbaceous subplot datasheet (FMCO1). In order to expedite data collection in the field, the most common herbaceous species encountered in the field have been filled out on the form. Copies of these forms are filed in the black cabinet in the front room of the Fire Effects office.

APPENDIX E

Plot Monitoring and Install Schedule for NATR

Monitoring Type	FPITA	FPITA	FPITA	FPITA	FPITA	FPITA	FPITA	FPITA	FPITA	FPITA
Plot #	1	2	3	4	5	6	7	8	9	10
Burn Unit	Trace East	Witchdance SE	Witchdance East	Tishomingo Park	Tishomingo Park	Witchdance West	Witchdance West	Witchdance West	Witchdance West	Colbert Ferry
Install Date	12.04.01	12.05.01	12.06.01	9.24.02	10.16.02	1.23.02	1.24.02	1.24.02	3.15.02	10.17.02
Burn Status	4.04.02	3.21.03 03.04.05	3.21.03 03.04.05	Area burned 4.30.03; plot did not	Area burned 4.30.03; plot did not	4.16.02	(1) 4.05.02 (2) 3.10.04	(1) 4.05.02 (2) 3.10.04	(1) 4.05.02 (2) 3.10.04	unburned
00Pre	Done 12.04.01	Done 12.05.01	Done 12.06.01	Done 9.24.02 5.13.05	Done 10.16.02 5.13.05	Done 1.23.02	Done 1.24.02	Done 1.24.02	Done 3.15.02	Done 10.17.02
01Post	Done 6.21.02	Done 4.23.03	Done 4.23.03	Waiting For Burn (if no burn: RR in May 2007)	Waiting For Burn (if no burn: RR in May 2007)	Done 5.30.02	Done 5.30.02	Done 5.30.02	Done 5.30.02	Waiting For Burn (if no burn: RR in June 2005)
01Yr01	Done 6.16.03 (Incorrect Read Date)	(1) Done 5.05.04 (Incorrect Read Date) (2) Done December 2004 See (1) Below	(1) Done 5.06.04 (Incorrect Read Date) (2) Done December 2004 See (1) Below			Done 6.17.03 (Incorrect Read Date)	Done 6.18.03 (Incorrect Read Date)	Done 6.26.03 (Incorrect Read Date)	Done 7.07.03 (Incorrect Read Date)	
01Yr02	(1) Done 6.23.04 (Incorrect Read Date) (2) Done December 2004 See (1) Below	N/A	N/A			(1) Done 6.29.04 (Incorrect Read Date) (2) Done February 2005 (See 2 Below)	N/A	N/A	N/A	
02Post		Done 03.25.05	Done 03.25.05				Done 3.29.04	Done 3.29.04	Done 3.29.04	
02yr01		12.2.05	12.2.05				Done 2.15.05	Done 2.15.05	Done 3.31.05	
02yr02		TBD 12.06	TBD 12.06			done 3-06	done 3-06	done 3-06	done 3-06	
03Post										
01yr05	To Be Done December 2007					To Be Done February 2008				
03yr01										

APPENDIX E

Plot Monitoring and Install Schedule for NATR, continued

Monitoring Type	FPITA	FPITA	FPITA	FJUVI	FJUVI	FJUVI	FJUVI	OAHI	OAHI		
Plot #	11	12	13	30	31	32	33	2	3		
Burn Unit	Rocky Springs	Rocky Springs	Milepost 17	Chickasaw Village	Chickasaw Village	Chickasaw Village	Chickasaw Village	M.L.	M.L.		
Install Date	11.20.02	11.20.02	3.09.04	2.20.02	2.20.02	2.28.02	2.28.02	2.21.06	2.27.06		
Burn Status	unburned	unburned	unburned	(1) 3.07.02 (2) 4.15.03 (3) 3.24.04 (4) 04.04.05	(1) 3.07.02 (2) 4.15.03 (3) 3.24.04 (4) 04.04.05	(1) 3.07.02 (3) 3.24.04	(2) 4.15.03 (4) 04.04.05	(1) 3.07.02 (3) 3.24.04	(2) 4.15.03 (4) 04.04.05	unburned	unburned
00Pre	Done 11.20.02	Done 11.20.02	Done 03.09.04, 7.27.05	Done 2.20.02	Done 2.20.02	Done 2.28.02	Done 2.28.02				
01Post	Waiting For Burn (to burn in Spring 07)	Waiting For Burn (to burn in Spring 07)	Waiting For Burn (if no burn: RR in June 2006)	Done 4.10.02	Done 4.10.02	Done 4.01.02	Done 4.01.02				
01Yr01				N/A	N/A	N/A	N/A				
01Yr02				N/A	N/A	N/A	N/A				
02Post				Done 4.28.03	Done 4.28.03	Done 4.28.03	Done 4.28.03				
02yr01				N/A	N/A	N/A	N/A				
02yr02				N/A	N/A	N/A	N/A				
03Post				Done 04.06.04	Done 04.06.04	Done 04.06.04	Done 04.06.04				
04 Post				2.7.06	2.7.06	2.7.06	2.7.06				
04Yr01				TBD 2.07	TBD 2.07	TBD 2.07	TBD 2.07				
01yr05											
03yr01											

APPENDIX E

Notes for Monitoring Schedule

*Note: Several plots were read at the incorrect date for herbaceous analysis. I.e. post read date does not coincide with 00-PreRead date.

(1) PITA 1-3 were read December 2004 (50 M herbaceous transects and pictures only) so that we would have herbaceous and photo data which coincides with the season of the 00-Pre Read)

(2) PITA 6 read February 2005 (50M herbaceous transects and pictures only) so that we would have data and pictures which coincide with the 00Pre-Read season

Summary: No "01 yr 01" herbaceous data will exist for five PITA plots (1, 6-9) due to incorrect read dates.

APPENDIX F

Five-Year Prescribed Fire Implementation Plan (Fiscal Years 2007-2011)

Fiscal Year	Prescribed Fire Unit Name	Objective	Size (Acres) ¹	Comment
2007	Rocky Springs Campground	Forest structure, fuel reduction, habitat management	50	
	Witchdance East	Forest structure, fuel reduction, habitat management	177	USFS joint burn on 2 year rotation
	Trace West	Forest structure, fuel reduction, habitat management	150	USFS joint burn on 2 year rotation
	Needs Center	Fuel reduction	100	
	Cherokee Lease Tracts	Maintain open grassfields, reduce thatch for wildlife benefit	80	
	Old Trace Drive	Fuel reduction	300	
	Management Inspection burns	Maintain scenic vistas and slopes	5	
	Day Use Areas	Fuel reduction	10	
		Total	872	
2008				
	Meriwether Lewis	Fuel reduction	300	
	Witchdance West	Forest structure, fuel reduction, habitat management	310	
	Trace East	Forest structure, fuel reduction, habitat management	69	
	Milepost 17	Forest structure, fuel reduction, habitat management	34	
	Tishomingo State Park	Forest structure, fuel reduction, habitat management	195	
	Management Inspection burns	Maintain scenic vistas and slopes	3	
	Chickasaw Village	Prairie restoration/cedar encroachment reduction	80	
		Total	991	

¹ Acreages are estimates. Actual acreages to be determined.

APPENDIX F
Five-Year Prescribed Fire Implementation Plan, continued
(Fiscal Years 2007-2011)

Fiscal Year	Prescribed Fire Unit Name	Objective	Size (Acres)²	Comment
2009	Kudzu Patch	Reduce exotic cover	40	Burn every 2 years; spray in June and October
	Witchdance East	Forest structure, fuel reduction, habitat management	177	USFS joint burn on 2 year rotation
	Ag Lease (TBD)	Maintain open grassfields, reduce thatch for wildlife benefit	20	
	Trace West	Forest structure, fuel reduction, habitat management	150	USFS joint burn on 2 year rotation
	Bailey Farm	Maintain open grassfields, reduce thatch for wildlife benefit	360	
		Total	747	
2010	Chickasaw Village	Prairie restoration/cedar encroachment reduction	85(?, not sure with new VC)	
	Dyestone Creek	Woody encroachment reduction	30	
	Access Islands	Fuel reduction, visibility improvement	20	
	Ag Lease (TBD)	Maintain open grassfields, reduce thatch for wildlife benefit	20	
	Kudzu Patch	Exotics reduction	30	
		Total	165	
2011	Colbert Ferry	Forest structure, fuel reduction, habitat management	100	
	Lauderdale Park	Forest structure, fuel reduction, habitat management	5	
	Witchdance East	Forest structure, fuel reduction, habitat management	177	USFS joint burn on 2 year rotation
	Trace West	Forest structure, fuel reduction, habitat management	150	USFS joint burn on 2 year rotation
		Total	432	

² Acreages are estimates. Actual acreages to be determined.

APPENDIX G
2005 Project-Level Monitoring Plan
Writer's Guide
Adapted from Diane Abendroth, Grand Tetons National Park

Fire Effects Monitoring Plan EXAMPLE	
Natchez Trace Parkway	
Treatment Unit Name	District:
Project Area Name:	Responsible FMO:
Implementation Year:	Project Lead: Fuels Specialist
Treatment Activity:	Monitoring Leader: Fire Ecologist

- 1. Treatment Unit Name:** Name of this project or sub-project. Same as NFPORS treatment unit. On single projects this may be the same as the Project Name
- 2. Project Area Name:** Name of overall project, as in NFPORS. This will often be the same name as used in the NEPA document
- 3. Implementation Year: Season:** Make your best estimate. If more than one season of treatment is possible, list both – “2006: Spring or Fall.”
- 4. Type of Treatment:** Prescribed burn, Broadcast burn, Thin and Pile, etc.
- 5. District:** If more than one, list both
- 6. Responsible FMO:** Fire Management Officer who is overseeing this project.
- 7. Project Lead:** ID Team Leader and/or main person managing this project
- 8. Monitoring Leader:** Person who is responsible for data collection, data entry, and results analysis for this project. Likely this person will be consulted in writing this plan.

10. Electronic files provided:

Project Files (Provide on rewritable CD): EXAMPLE		
File Type:	File name (s):	Projection / Datum:
Unit Shape file (s)	Lakerim .dbf, .shx., .sbn, .prj	NAD 83
Orthophoto Quarter Quad Files	Bull Lake WestNE, Bull Lake West SE, New Fork lakes NW	NAD 27
Digital Topo Map Image Files	New Fork Lakes, Bull Lake West	NAD 27
Other GIS maps or coverages if available		
This monitoring plan	Lakerim monplan.doc	n/a
NEPA Document	New Fork/Boulder EA.doc	n/a
Burn Plan – if available	Lakerim burnplan.doc	n/a

11. **Monitoring Objectives, Methods, and Schedules.** See below for some examples of project-level monitoring targets, variables, and methods. **All methods should be evaluated for statistical validity prior to implementation! These are examples.**

Monitoring Objective 1: INSTRUCTIONS	
Objective Target	A specific and measurable statement that addresses a major goal of the project. Make it realistic and specify a target or amount of change desired and a time that this target should be reached by.
Variables being measured	Such as density, percent cover, height, percent browsed, percent mortality, frequency of the target
Methods / plot types	See the Fire Monitoring Handbook for a list of protocols.
Plot visits	When plots will be installed and when they must be re-visited and re-measured. This should correspond with the time target of the objective.

Monitoring Objective 1: EXAMPLE 1 – FUEL REDUCTION	
Objective Target	Decrease woody, litter, and/or duff load by 25% immediately post-burn in all burned areas.
Variables being measured	Woody, litter, and duff loading
Methods / plot types	Non-permanent Brown’s transects; determine number based on estimated variability
Plot visits	Conduct plots in spring before new stem growth begins. Pre burn, 2 years post burn, 5 years post burn, 10 years post burn.

Monitoring Objective 1: EXAMPLE 2 – WOODY SPECIES ENCROACHMENT	
Objective Target	Decrease live mature shrub density by at least 20% one year post burn
Variables being measured	Live woody density
Methods / plot types	Shrub belts
Plot visits	Pre burn, one year post burn and five years post burn

Monitoring Objective 1: EXAMPLE 3 - NATIVE GRASS	
Objective Target	Increase the percent cover of native grasses two years post burn
Variables being measured	Percent cover of native grass species
Methods / plot types	Point line intercept transects paired in treated locations paired with untreated control plots
Plot visits	Pre burn, two years post burn

APPENDIX H
Non-Fire Treatment Project Plan *DRAFT*
From Caroline Noble, SER Fire Ecologist

4-letter unit identifier: _____

Treatment Name: _____

Funding Code Name: _____

a. Signatures: The approved Non-fire treatment Project Plan constitutes a delegation of authority to implement the plan. Actions taken in compliance with the approved Non-fire treatment Project Plan will be fully supported. Personnel will be held accountable for actions taken that are not in compliance with elements of the approved plan regarding execution in a safe and cost-effective manner.

Park Fire Management Officer

Date

Superintendent

Date

b. Executive Summary: Briefly describe the purpose and justification of project:

Describe the connection with the overall management of the unit:

Describe how the project implements the fire management plan.

c. Description of Fuels Treatment Area:

1) General Area Description (narrative):

2) Location:

State:

County:

Legal (Lat/Long):

3) Geographic Attributes (Project Size, Elevation Range, Slope Range, Aspect Range):

4) Description of Project Boundaries (Define geographic, natural and human features to be used as the project boundary):

5) Vegetation Types (describe vegetation cover / cover type):

Existing Fuel ModeO:

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13

Anticipated Post-Treatment Fuel ModeO:

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13

Fire Regime:

- I
- II
- III
- IV
- V

Pre-Treatment Condition Class:

- 1 (acres: _____)
- 2 (acres: _____)
- 3 (acres: _____)

6) Vicinity Maps – attached as appendices

7) Project Maps – attached as appendices

8) Pre-Treatment Photos – attached as appendices

d. Goals and Objectives: List the purpose and goals of the non-fire treatment plan, as stated in park management and supporting management plans (i.e. Resource Management Plan, Cultural Landscape Plan, Endangered Species Recovery Plan, etc.) In addition, list specific objectives of the non-fire treatment stated in quantifiable and measurable terms.

Wildland-Urban Interface (WUI): Yes No

Community at Risk: _____

Community of Interest: _____

Problem to mitigate:

- WUI-subdivision
- WUI-single structure
- Cultural resource site protection
- Fuel accumulation – high intensity fire
- Potential smoke impacts to smoke-critical area
- Pyro-philic exotic vegetation
- Park infrastructure
- Long-term fire exclusion

Other: _____

Pre-Treatment Expected Fire Behavior:

- Crown fire
- High intensity surface fire
- Slow-spreading unchecked surface fire

Values at Risk from Fire:

- Multiple homes/structures
- Cultural resources (list): _____
- T&E species habitat
 - o T&E Species (list): _____
 - o Species of Interest (list): _____
- Smoke sensitive areas
- Ground fuels
- Visitor impacts
- Other: _____

Post-Treatment Expected Fire Behavior:

- Suppressible surface fire
- Low intensity surface fire
- Short-term change to non-flammable condition

e. Cost: Estimated total costs for all phases of the project.

f. Statement of Work: Identify methods:

Type of Treatment/Protection Measure:

- Fuelbreak construction
- Creating defensible space
- Debris removal
- Mechanical preparation for later fire use treatment
- Other: _____

Size/Type of Debris or Vegetation to be Manipulated:

- 0-1/4"
- 1/4-1"
- 1-3"
- 3"+
- Mid-story vegetation
- Standing brush
- Snags and bugkill
- Un-piled woody vegetation

Treatment Method of Choice:

- Mastication
- Lop and scatter
- Thinning via service contract
- Thinning via timber sale
- Hand pile
- Mulching
- Mowing
- Chipping

Area Measurement of Treatment:

- Width & length of fuel reduction area
- Clearance radius
- Acres
- Miles/feet

Duration: Years: _____ Months: _____

Planned Start Date: ____/____/____

Planned End Date: ____/____/____

Work Agent:

- NPS Employee
- Service contractor
- Cooperator

- Partner

Partners:

- Bureau of Indian Affairs
- U.S. Fish & Wildlife Service
- Volunteer
- Private
- State
- Volunteer or Rural Fire Department
- USDA Forest Service
- Tribe
- County or Municipal
- Other Federal Agency

Describe roles and responsibilities of work agents and partners:

Explain project coordination and special considerations needed:

g. Protection of Sensitive Features:

Values at Risk from Treatment:

- Cultural resources (all types)
- T&E species habitat
- Visual resource
- Soil disturbance
- Non-target vegetation (i.e. flowering, wildlife preferred, etc.)
- Noise-free resource
- Wetland impacts
- Other: _____

NEPA/Compliance

Categorical Exclusion: No Yes (date): ____/____/____

Section 107 Consultation (date): ____/____/____

Section 106 Consultation (date): ____/____/____

Identify treatment and mitigations needed to protect cultural sites, threatened and endangered species, or other sensitive features. Include compliance with all applicable NEPA and NHPA requirements.

h. Public and Personnel Safety:

Describe public and personnel safety and emergency procedures: Attach Completed ICS-206

Identify safety hazards in and outside the project area:

Describe measures taken to reduce or mitigate those hazards:

List Emergency Medical Service personnel assigned:

i. Interagency Coordination and Public Information: Identify actions, timelines and responsibilities for interagency and intra-agency pre- fuels treatment coordination and public involvement.

Action	Timeline	Responsibility
--------	----------	----------------

Media Release (pre and/or during and post)

Public Notice Postings

List locations to be posted:

Intra-agency Notification:

Park employees

Regional office

NPS Fire News Reporting

Notifications

List individuals to be notified:

List agencies to be notified:

j. Monitoring: Describe the pre-, during, and post-treatment monitoring needed to evaluate if project objectives have been met and if project is being conducted within prescription. Attach photos of the site before, during and after treatment:

Specify elements (may include weather, vegetation, soil, and air quality observations) required during each phase of the project including procedures and responsibilities. Reference park Fire Monitoring Plan if applicable.

k. Post Project Rehabilitation: Describe any necessary rehabilitation of disturbances that will be undertaken resulting from management activities of the project. These typically include equipment and human travel corridor restoration, minor fence repairs and other mitigation actions that are pre-identified in the Non-fire treatment project plan.

l. Post Project Reports: Identify who, what and when various reports associated with this project will be completed.

m. Appendices: Items to be reviewed/signed and attached with the Non-fire treatment plan.

- 1) Maps (vicinity and project maps)
- 2) Reviewer Comments

- 3) Before Photos including photo point for comparison with during and post photos (include caption, photographer’s name, location, and date)
- 4) Post Non-fire treatment summary report (to be submitted to SERO upon completion of project)

Post Non-fire Treatment Summary Report

(to be submitted to SERO upon completion of project)

Project completed: Yes No Date Project Completed: ____/____/____

Project met objectives: Yes No

Comments:

Appendices:

- a. Pre, During, and Post Photo Points (include caption, photographer’s name, location, and date) – see attached
- b. Public outreach documents - Press releases, community flyers, success stories (optional) – see attached
- c. Newspaper articles/media coverage (optional) – see attached

Park Fire Management Officer Date

Superintendent Date

National Park Service
U.S. Department of the Interior

Natchez Trace Parkway
Mississippi, Alabama, Tennessee



Fire Management Plan

Environmental Assessment

September 2008



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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**

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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.

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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

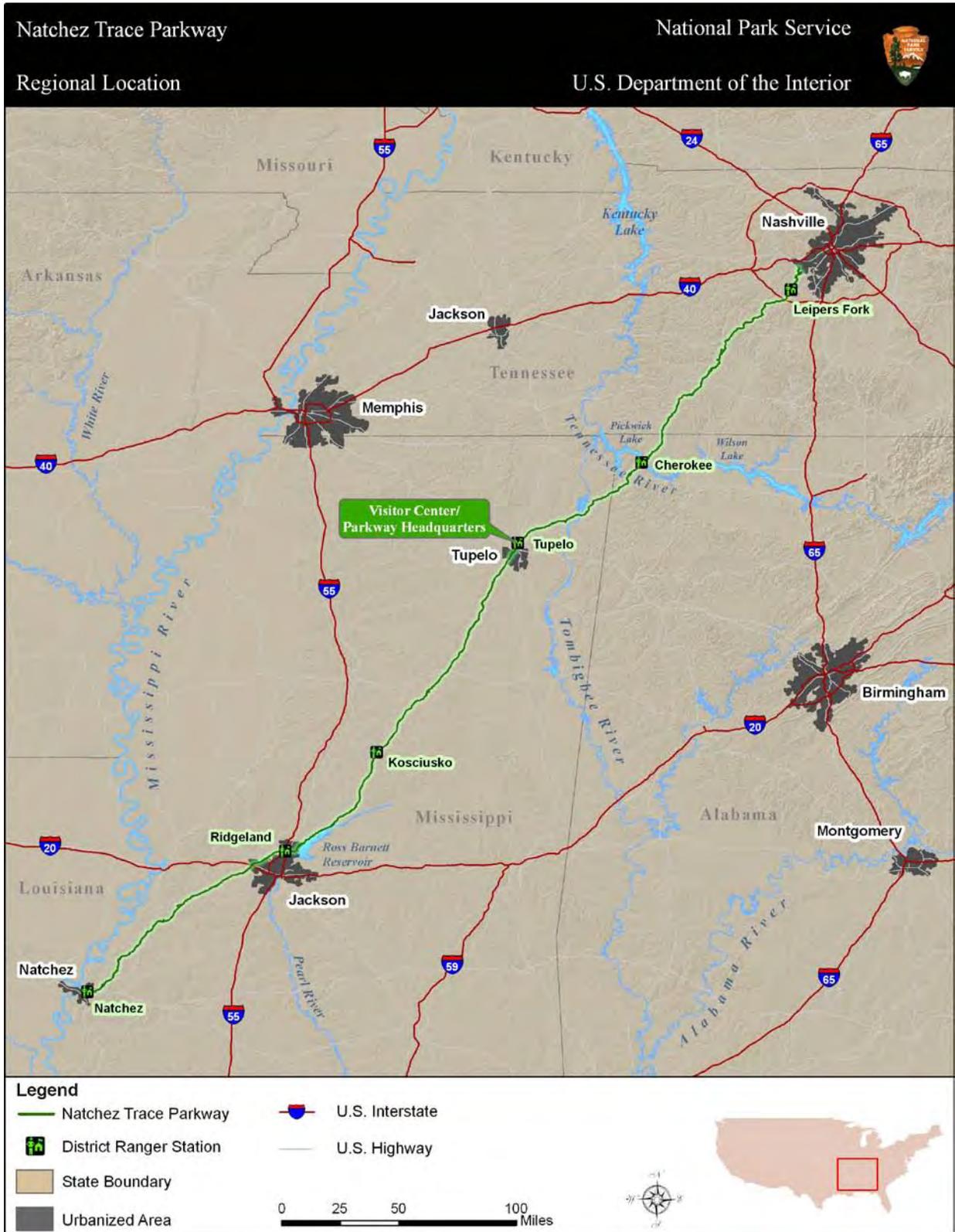
The Natchez Trace was one of the most ancient and important Indian roads leading from present day Nashville, TN in a southwest course across the Tennessee River at Colbert Shoals and through the Chickasaw and Choctaw Indian lands into present day Mississippi. The road continued in an almost direct course 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

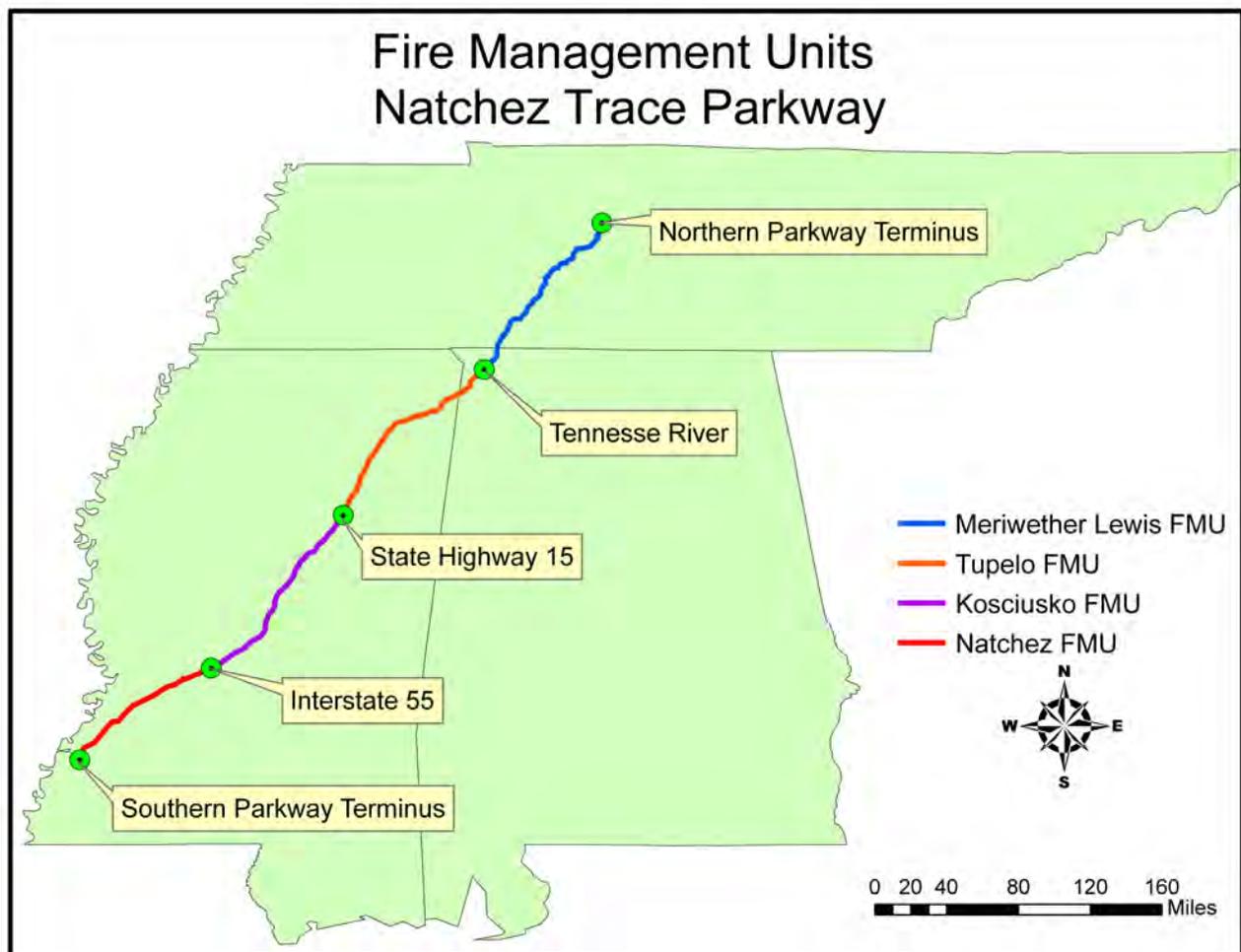
The No Action alternative, required by NEPA, assumes “no change” from current conditions or management, and provides a baseline for comparing the effects of action alternatives. Currently, fire management at the Parkway is regulated by the 2005 FMP, which serves as an implementation document to the 1997 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>Short Term Recovers in less than 3 years</p> <p>Long Term 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	<p>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.</p>	<p>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.</p>	<p>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>	<p>Short term Treatment effects on the natural elements of a cultural landscape (e.g., three to five years until new vegetation returns)</p> <p>Long term Because most cultural resources are non-renewable, any effects would be long term</p>
Park Operations	<p>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.</p>	<p>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</p>	<p>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>	<p>Short term- Effects lasting for the duration of the treatment action</p> <p>Long term- 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 var.</i>	X	SC	X	X
Pasture glade cress	<i>Leavenworthia exigua var.</i>	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 grinsescens</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

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APPENDIX A

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

STATE HISTORIC PRESERVATION OFFICES

TRIBAL HISTORIC PRESERVATION OFFICES
and
STATE WILDLIFE AGENCIES

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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.

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

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,



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 that reads "E. Patrick McIntyre, Jr." with a stylized flourish at the end.

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

Mr. Stennis Young
8/5/2008
Page 2

Typhlichthys subterraneus – Southern Cavefish – State-protected

I hope this information will be useful to you. The provided information is to help you in fulfilling your necessary legal obligations. The information does not suggest that protected species are not at this location. The specific location of a sensitive species is considered confidential information by a State Lands Division Regulation and can be released only to individuals who enter into a confidentiality and indemnity contract with the State Lands Division.

The Natural Heritage Section provides this information as a service to the people of Alabama. The NHS acts as a clearing house for species distribution data. We happily accept any information environmental researchers are willing to donate. Sensitive species exact locations are kept confidential. If you would be willing to donate any information to this database, we will be better able to assist all individuals interested in environmental compliance.

Sincerely,



Ashley Peters
Database Manager
Natural Heritage Section

Enclosures

Potentially helpful web sites

Information about federally listed species
<http://daphne.fws.gov/es/specieslst.htm>
<http://www.pfmt.org/wildlife/endangered/>
<http://www.natureserve.org/explorer/>

State Protected Species Regulations:
<http://www.outdooralabama.com/hunting/regulations/regs.cfm>



MISSISSIPPI
DEPARTMENT OF WILDLIFE, FISHERIES, AND PARKS

Sam Polles, Ph.D.
Executive Director

July 9, 2008

National Park Service
Natchez Trace Parkway
2680 Natchez Trace Parkway
Tupelo, Mississippi 38804

SUPERINTENDENT	5
ASST. SUPERINTENDENT	1
ADMINISTRATION	
MAINTENANCE	
RANGER ACTIVITIES	1
RESOURCE MANAGEMENT	1
DSC	
KURT	KF
ACTION BY:	

To Stennis Young:

The Mississippi Department of Wildlife, Fisheries & Parks would like to thank you for allowing us the opportunity to review the *Environmental Assessment (EA) for the Fire Management Plan (FMP) of the Trace Parkway*. We concur with the revisions added to the Parkway's 2005 FMP and have no further comment.

Please feel free to contact us if we can provide any additional information, resources, or assistance that will help minimize negative impacts to the species and/or ecological communities identified in this review. We are happy to work with you to ensure that our state's precious natural heritage is conserved and preserved for future Mississippians.

Sincerely,

Sherry B. Surette, Coordinator
Mississippi Natural Heritage Program
(601) 354-6367, ext. 118



BOB RILEY
GOVERNOR

M. BARNETT LAWLEY
COMMISSIONER

STATE OF ALABAMA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
WILDLIFE AND FRESHWATER FISHERIES DIVISION
64 NORTH UNION STREET, SUITE 567
POST OFFICE BOX 301456
MONTGOMERY, ALABAMA 36130-1456
(334) 242-3465
FAX (334) 242-3032
www.outdooralabama.com

*The mission of the Wildlife and Freshwater Fisheries Division is to
manage, protect, conserve, and enhance the wildlife and aquatic resources
of Alabama for the sustainable benefit of the people of Alabama.*



M. N. 'CORKY' PUGH
DIRECTOR

FRED R. HARDERS
ASSISTANT DIRECTOR

July 3, 2008

Ms. Lisa McInnis
Fire Ecologist
National Park Service
2680 Natchez Trace Parkway
Tupelo, Mississippi 38804

Re: Natchez Trace Parkway Environmental Assessment

Dear Ms. McInnis:

The Division of Wildlife and Freshwater Fisheries (DWFF) has reviewed the Environmental Assessment (EA) for the Fire Management Plan of the Natchez Trace Parkway, and has no concerns or objections regarding implementation of the proposed action. The DWFF did note that the USFWS has been previously consulted regarding impacts to candidate and listed species; however, USFWS does not provide information on state-protected species. Therefore, the Natural Heritage Section of the State Lands Division should be contacted to determine if there is a potential for adverse impacts to state-protected species (Ms. Jo Lewis, 334-353-3051, jo.lewis@dcnr.alabama.gov).

Sincerely,

Division of Wildlife and Freshwater Fisheries

James S. Cherry, II
Environmental Coordinator



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Natural Areas
7th Floor L&C Annex
401 Church Street
Nashville, Tennessee 37243
Phone 615/532-0431 Fax 615/532-0046

August 6, 2008

Lisa McInnis, PhD
Fire Ecologist
2680 Natchez Trace Parkway
Tupelo, Mississippi 38804

Dr. McInnis:

I am writing in response to the May 2008 *Environmental Assessment for the Fire Management Plan of the Natchez Trace Parkway*. We hope that our delay in responding did not adversely affect implementation of this EA. We had indeed reviewed the EA shortly after it was received, and as we had no immediate concerns with the proposed alternative, we did not respond. On a similar note, your e-mail inquiries to our division came back as undeliverable for Silas Mathes (as opposed to Matthews) is our environmental review coordinator.

Our division has a good working relationship with the National Park Service in Tennessee, and with Natchez Trace Parkway (NATR), where over twenty state-listed species occur as well as the federally endangered Tennessee yellow-eyed grass (*Xyris tennesseensis*). In 2005, we aided NatureServe with the validation of the 2004 vegetation classification along the Tennessee section of NATR. Presently, two Tennessee registered state natural areas, Little Swan Creek and Little Buffalo River Bottoms, are along NATR, and the state-owned Devil's Backbone State Natural Area is adjacent to NATR and cooperatively managed with our division and NPS staff.

In general, we support the use of fire as a management tool for preserving and restoring select natural communities and understand that the present land-use/landscape is such that natural wildland fires are not sufficient to achieve certain management goals. Therefore, we support the use of controlled fire along NATR and thus do not support Alternative 2.1.1 which would have a plan that includes fire suppression only.

We do support and endorse Alternative 2.2.2 which would implement an updated and revised fire plan and increase burning activities to approximately 2500

acres per year (up from the current plan of 600 - 1100 acres per year). Staff of NATR may wish to contact the Tennessee Wildlife Resources Agency for based on personal observations, TWRA has used, and continues to use, fire on Laurel Hill WMA. We also suggest that NATR utilize rare species data from the various state natural heritage programs to help guide management plans.

One minor note regarding the EA: two sections list that fire will be "used to accomplish a variety of objectives including improve endangered species habitat (e.g. Tennessee purple coneflower)." There are a few occurrences of Tennessee coneflower (*Echinacea tennesseensis*) in Davidson County, Tennessee, and the northern terminus of NATR is in Davidson County. However, Tennessee coneflower is restricted to the Inner Central Basin Ecoregion, and naturally occurring populations are within the Stones River Watershed. The terminus of NATR is at the transition of the Outer Central Basin and Eastern Highland Rim, and thus would not have suitable habitat for this species. We do recognize that fire can be used for rare species management, but suggest the reference to Tennessee coneflower be removed.

We appreciate the opportunity to comment on such an important management tool and look forward to continued partnership with NATR.

Sincerely,



Roger McCoy
Natural Heritage Coordinator