

Congaree
National Park
Wildland Fire Management Plan
FY 2004

2004 Fire Management Plan
Congaree Swamp National Monument
South Carolina

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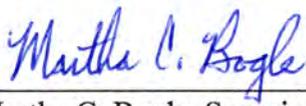
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1.0 INTRODUCTION

1.1 Reason for Development of Fire Management Plan

National Park Service (NPS) policy (*Director's Order #18: Wildland Fire Management*, Web site <http://www.fire.nps.gov/fire/policy/do18/do18.htm>) requires that all parks with vegetation capable of sustaining fire develop a wildland fire management plan approved by the unit superintendent. The fire management plan serves as a detailed and comprehensive program of action to implement fire management policy principles and goals, consistent with the unit's resource management objectives and with firefighter and public safety. This plan outlines the fire management program at Congaree National Park (hereinafter referred to as "the Park," or by NPS alpha code "COSW"). The COSW fire management program, guided by federal policy and the Park's resource management objectives, will serve to protect life, property, and natural and cultural resources.

1.2 Collaborative Processes

In addition to administering COSW, the National Park Service collaborates with the U.S. Fish and Wildlife Service, the State Historic Preservation Office, the Francis Marion and Sumter National Forests, the South Carolina Department of Health and Environmental Control, the South Carolina Forestry Commission, the City Manager of Columbia, the Georgia Pacific Corporation, the Columbia-Richland Fire Service (including the City of Columbia Fire Department and the Gadsden Volunteer Fire Department) local law enforcement, and park neighbors regarding how to best protect the integrity of the park.

Collaborative opportunities pertaining to fire management at COSW include cooperative agreements with the Columbia-Richland Fire Service, the South Carolina Forestry Commission, and the Georgia Pacific Corporation.

1.3 Implementation of Fire Management Policy

The organizational structure of this fire management plan (FMP) follows the FMP outline furnished in chapter 4 of *Wildland Fire Management Reference Manual-18* (version 3.0, dated 11/05/02), hereinafter referred to as *RM-18* (Web site <http://www.fire.nps.gov/fire/policy/rm18/index.htm>). This FMP will guide the park in implementing federal fire management policy and resource and fire management goals as defined in the *2001 Federal Fire Policy; Managing Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire-Adapted Ecosystems—A Cohesive Strategy*; and *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan*.

1.3.1 2001 Federal Fire Policy

The 1994 fire season with its 34 fatalities triggered a series of reports under the rubric FIRE 21, including the *1995 Federal Wildland Fire Management Policy and Program Review*. This review, the first comprehensive federal fire policy for the Departments of Agriculture and the Interior, provided direction for fire management programs and activities, including such areas as safety, protection priorities, preparedness, suppression, wildland fire use, prevention, and wildland-urban interface roles and responsibilities. Following the escape of the Cerro Grande Prescribed Fire in May 2000, the *1995 Federal Fire Policy* was evaluated and revised in the *2001 Review and Update of the 1995 Federal Wildland Fire Management Policy (2001 Federal Fire Policy)*. The *2001 Federal Fire Policy* finds no fundamental flaws in the 1995 document. It builds on the *1995 Federal Fire Policy*, and addresses issues not fully covered in 1995, including rehabilitation and restoration of burned lands, the importance of sound science driving fire management activities, and the need for the full range of fire management activities to achieve ecosystem sustainability.

The *2001 Federal Fire Policy* states that “...successful implementation of 2001 Federal Fire Policy depends on the development and implementation of high-quality Fire Management Plans by all land managing agencies.” The policy is founded on the following guiding principles:

1. Firefighter and public safety is the first priority in every fire management activity.
2. The role of wildland fire as an essential ecological process and natural change agent will be incorporated into the planning process.
3. Fire management plans, programs, and activities support general and resource management plans and their implementation.
4. Sound risk management is a foundation for all fire management activities.
5. Fire management programs and activities are economically viable, based upon values to be protected, costs, and general and resource management objectives.
6. Fire management plans and activities are based upon the best available science.
7. Fire management plans and activities incorporate public health and environmental quality considerations.
8. Federal, State, tribal, local, interagency, and international coordination and cooperation are essential.
9. Standardization of policies and procedures among Federal agencies is an ongoing objective.

1.3.2 Managing Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire Adapted Ecosystems—A Cohesive Strategy

The *Cohesive Strategy* was developed by the USDA National Forest Service, the US Department of the Interior, and the National Association of State Foresters, in response to the 2000 fire season, during which more than 6.8 million acres of public and private lands burned—more than twice the 10-year national average. The magnitude of these fires was attributed to severe drought, accompanied by a series of storms that produced thousands of lightning strikes followed by windy conditions; and the long-term effects of almost a century of aggressively suppressing all wildfires, resulting in an unnatural buildup of brush and small trees throughout forests and rangelands. The *Cohesive Strategy* provides an overall framework for implementing fire management and forest health programs. It is based upon the following operating principles:

- ❑ **Firefighting Readiness:** Increase firefighting capability and capacity for initial attack, extended attack, and large fire support that will reduce the number of small fires becoming large, to better protect natural resources, to reduce the threat to adjacent communities, and reduce the cost of large fire suppression.
- ❑ **Prevention Through Education:** Assist state and local partners to take actions to reduce fire risk to homes and private property through programs such as FIREWISE.
- ❑ **Rehabilitation:** Focus rehabilitation efforts on restoring watershed function, including the protection of basic soil, water resources, biological communities, and prevention of invasive species.
- ❑ **Hazardous Fuel Reduction:** Assign highest priority for hazardous fuels reduction to communities at risk, readily accessible municipal watersheds, threatened and endangered species habitat, and other important local features, where conditions favor uncharacteristically intense fires.
- ❑ **Restoration:** Restore healthy, diverse, and resilient ecological systems to minimize uncharacteristically intense fires on a priority watershed basis. Methods will include removal of excessive vegetation and dead fuels through thinning, prescribed fire, and other treatment methods.
- ❑ **Collaborative Stewardship:** Focus on achieving the desired future condition on the land in collaboration with communities, interest groups, and state and federal agencies. Streamline process, maximize effectiveness, use an ecologically conservative approach, and minimize controversy in accomplishing restoration projects.
- ❑ **Monitoring:** Monitor to evaluate the effectiveness of various treatments to reduce unnaturally intense fires while restoring forest ecosystem health and watershed function.

- ❑ Jobs: Encourage new stewardship industries and collaborate with local people, volunteers, Youth Conservation Corps members, service organizations, and Forest Service work crews, as appropriate.
- ❑ Applied Research and Technology Transfer: Focus research on the long-term effectiveness of different restoration and rehabilitation methods to determine those methods most effective in protecting and restoring watershed function and forest health. Seek new uses and markets for byproducts of restoration.

1.3.3 A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan

In August, 2001, the Secretaries of Agriculture and the Interior joined the Western Governor’s Association, National Association of State Foresters, National Association of Counties, and the Intertribal Timber Council to endorse *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy*. This report marked the initial fulfillment of two key Congressional directives that:

- ❑ The Secretaries of the Interior and Agriculture and the Governors jointly develop a long-term national strategy to address the wildland fire and hazardous fuels situation and the needs for habitat restoration and rehabilitation; and
- ❑ The strategy should be developed with “close collaboration among citizens and governments at all levels.”

The four goals of the *10-Year Comprehensive Strategy* are:

1. Improve fire prevention and suppression
2. Reduce hazardous fuels
3. Restore Fire-Adapted Ecosystems
4. Promote community assistance

Its three guiding principles are:

1. Priority setting that emphasizes the protection of communities and other high-priority watersheds at risk
2. Collaboration among governments and broadly representative stakeholders
3. Accountability through performance measures and monitoring for results

1.4 Environmental Compliance

In association with this plan, an environmental assessment that meets the requirements of the National Environmental Policy Act, including compliance with Section 106 of the National Historic Preservation Act and with Section 7 of the Endangered Species Act, is included as Appendix 13.3.

1.5 Authorities for Implementing Fire Management Plan

Authority for fire management at the park originates with the Organic Act of 1916. The Organic Act established the National Park Service “to promote and regulate the use of the Federal areas known as national parks,...which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.”

The 1978 “Redwood amendment” to the General Authorities Act of 1970 expands upon the provisions of the Organic Act, stating that, “...the protection, management, and administration of these [Park Service] 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...”

As an NPS fire management program by design tiers to the respective park unit’s general and resource management objectives, fire management is an effective way of implementing the above legislation.

2.0 RELATIONSHIP TO LAND MANAGEMENT PLANNING AND FIRE POLICY

2.1 Federal Fire Management Policy

The *2001 Federal Fire Policy*, discussed in section 1.3.1, is the product of a collaborative effort involving the U.S. Department of the Interior, the U.S. Department of Agriculture, the Department of Energy, the Department of Defense, the Department of Commerce, the U.S. Environmental Protection Agency, the Federal Emergency Management Agency, and the National Association of State Foresters. The report recognizes the role that fire plays as a critical natural process, as well as the detrimental effects of its absence in fire-adapted ecosystems. As per the report:

Historically, fire has been a frequent and major ecological factor in North America. In the conterminous United States during the preindustrial period (1500-1800), an average of 145 million acres burned annually. Today only 14 million acres (federal and non-federal) are burned annually by wildland fire from all ignition sources....

This decrease in wildland fire has been a destabilizing influence in many fire-adapted ecosystems such as ponderosa pine, lodgepole pine, pinyon/juniper woodlands, southern pinelands, whitebark pine, oak savanna, pitch pine, aspen, and tallgrass prairie. Fuels increased and understory vegetation became more dense. As a result, those wildland fires that did occur were larger and more severe than historical fires. Eliminating fire also affected individual plant species. For example, Hessl and Spackmen (1995) found that, of the 146 threatened, endangered, and rare plant species found in the conterminous U.S. for which there is conclusive information on fire effects, 135 species benefit from wildland fire or are found in fire-adapted ecosystems.

The report further states that:

...today's conditions confront us with the likelihood of more rapid, extensive ecological changes beyond any we have experienced in the past. To address these changes and the challenges they present, we must first understand and accept the role of wildland fire, and adopt land management practices that integrate fire as an essential ecosystem process.

The task before us—reintroducing fire—is both urgent and enormous. Conditions on millions of acres of wildlands increase the probability of large, intense fires beyond any scale yet witnessed. These severe fires will in turn increase the risk to humans, to property, and to the land upon which our social and economic well being is so intimately intertwined.

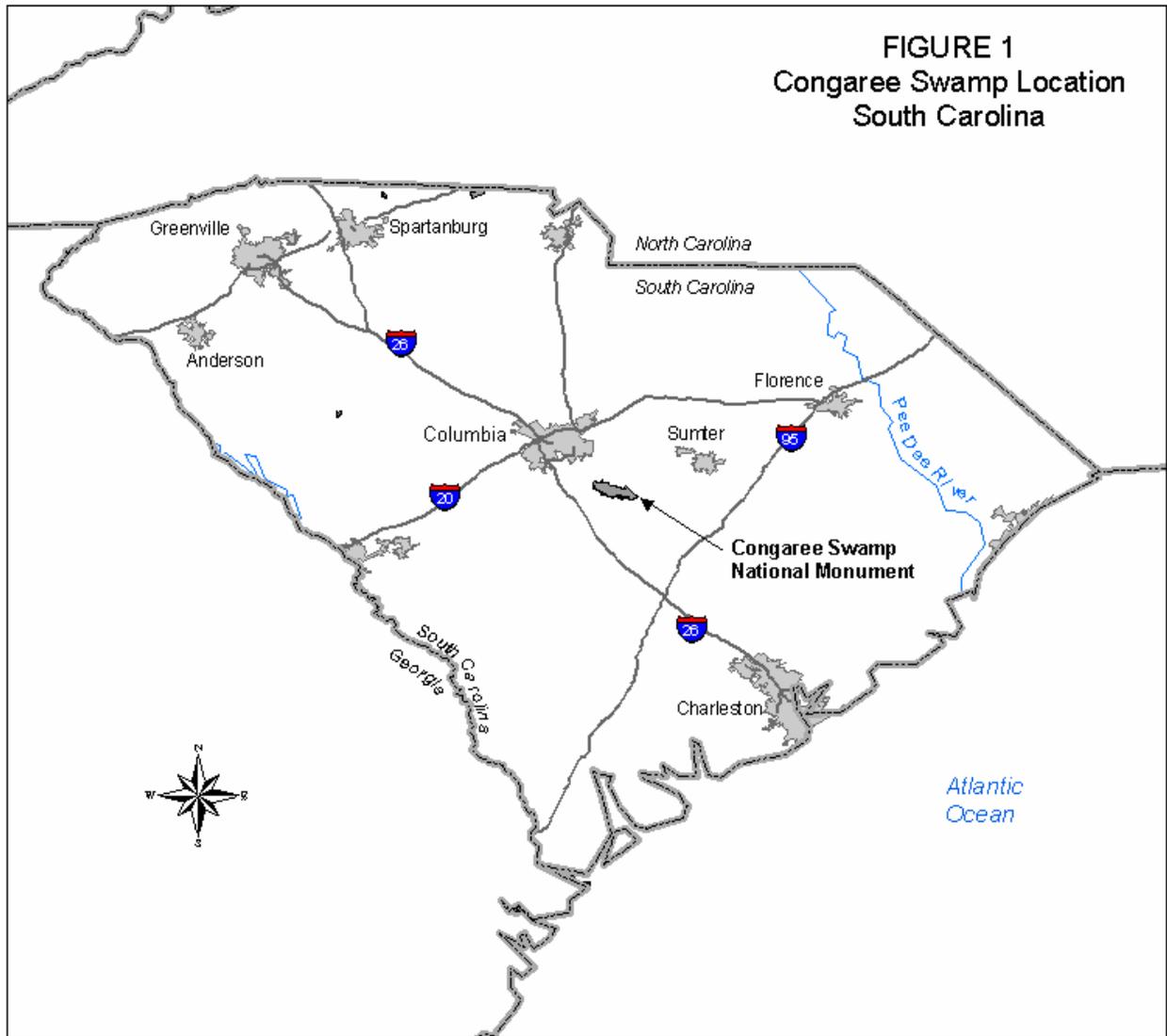
2.2 Establishment of Congaree National Park

The National Park System consists of more than 380 units representing our country's finest natural and cultural assets. Congaree Swamp is a prime and relatively undisturbed example of a mature cypress-gum and bottomland hardwood forest complex, and the largest contiguous tract of old-growth bottomland forest in the United States. It was designated a Park Service unit by Public Law 94-545, in October of 1976. The enabling legislation states that COSW was established "...to preserve and protect for the education, inspiration, and enjoyment of present and future generations an outstanding example of near-virgin southern hardwood forest..."

The park received international recognition in 1983 with its inclusion in the United Nations Man and the Biosphere program to preserve genetic diversity and to serve as an environmental baseline for research and monitoring. It boasts a wealth of varied and complex vegetative communities, containing approximately 90 tree and 700 plant species. Many of the trees are national and/or state champions in size. According to one contemporary biologist, COSW has, acre for acre, more record trees than any other place. Loblolly pines as tall as 169 feet grow here in a rare association with hardwood swamps.

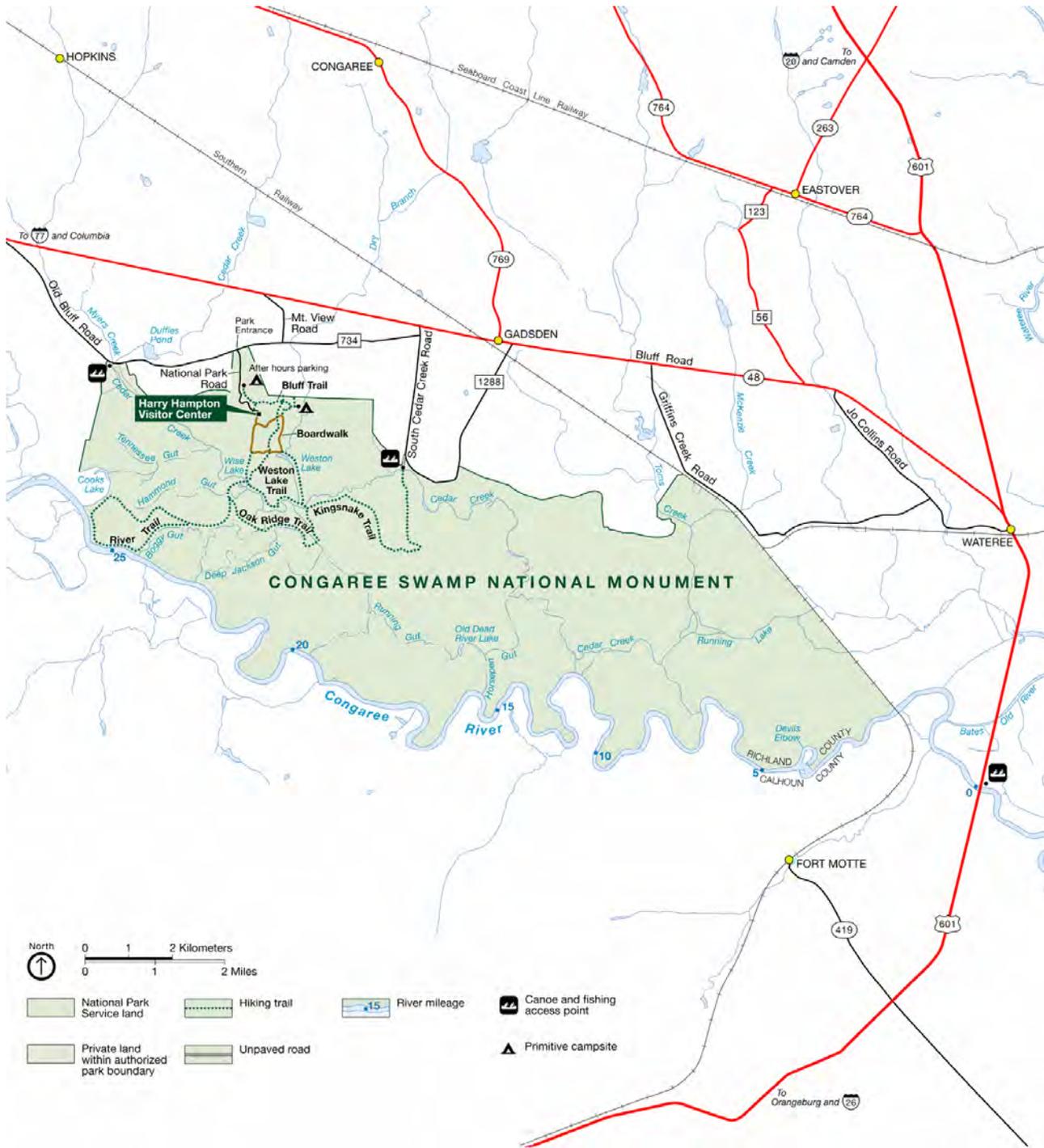
In October of 1988, Public Law 100-524 authorized expansion of COSW's boundaries to include an additional 6,840 acres, enlarging the unit to its present size of 22,200 acres. This legislation also designated approximately 70% of COSW as the Congaree Swamp National Park Wilderness, to be managed in accordance with the Wilderness Act of 1964. In November of 2003, Public Law 108-108 changed the designation of the park from Congaree Swamp National Monument to Congaree National Park and allowed for the inclusion of an additional 4,576 acres of land to be included in the authorized boundary of the park.

Figure 1: Congaree Swamp NM Location



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Figure 2: Park Administrative Map



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2.3 General Management Plan Objectives

The park's 1988 general management plan sets forth the basic management philosophy and objectives of COSW, stating that, "...conservation of natural processes, and accommodation of uses that do not adversely affect those resources and processes, will guide management action."

COSW's 1994 statement for management declares that it will accomplish the long-term goal of "preserving, protecting, and perpetuating the bottomland hardwood ecosystem in a manner that promotes the natural function of the Congaree River floodplain" by:

- ❑ Managing and restoring designated wilderness areas and all-inclusive wetlands, so as to minimize disturbances to natural landforms, vegetation, and wildlife habitat.
- ❑ Conserving the rich and abundant bio-diversity within the Congaree River alluvial floodplain by controlling, where necessary, the adverse effects caused by human activities.

2.4 Resource Management Plan Objectives

Objectives addressed in COSW's 2001 resource management plan that are pertinent to fire management include:

- ❑ Returning fire to upland areas and promoting natural successional patterns (as fire was historically a vital part of shaping this ecosystem).
- ❑ Maintaining and improving habitat for the endangered red-cockaded woodpecker and other native wildlife species.
- ❑ Reducing hazard fuel accumulations to normal, natural levels.

2.5 How Fire Management Plan Supports General Management Plan and Resource Management Plan Objectives

Principle #3 of the *2001 Federal Fire Policy* states that "fire management plans, programs, and activities [will] support general and resource management plans and their implementation." This fire management plan serves as a detailed and comprehensive program of action to implement federal fire management policy principles and goals, which in turn support the park's general and resource management plan objectives, as well as its enabling legislation. Specifically:

- ❑ Wildland fire suppression serves to protect human life, property, and natural and cultural resources from the adverse effects of unwanted fire.

- Fire and its subsequent effects contribute to healthy ecosystem function and bio-diversity preservation. According to ecologist Nat Stephenson (quoted in an article from the May/June 1995 issue of *National Parks*),

Fires thin forests, reducing competition for surviving trees, improving their vigor. Fires result in a rich legacy of snags that are important for cavity nesting birds. They recycle nutrients bound up in dead litter. They can change soil properties, such as its ability to hold water. And they kill soil pathogens.

- Prescribed fire serves to achieve the resource management objectives of “returning fire to upland areas and promoting natural successional patterns,” “maintaining and improving habitat for the endangered red-cockaded woodpecker and other native wildlife species,” and “reducing hazard fuel accumulations to normal, natural levels.” Hazard fuels reduction creates fuel conditions that support low-intensity fires, thereby reducing the threat of catastrophic wildland fire, and reducing the risk of negative impacts to natural and cultural resources, park infrastructure, and adjacent property in the event of a wildland fire. It additionally improves conditions for firefighter and public safety.

2.6 Wilderness Management Objectives

As noted above, in 1988 Congress enacted the Congaree Swamp National Monument Expansion and Wilderness Act (Public Law 100-524), which established 15,010 acres of Congaree Swamp National Monument as designated wilderness. In addition, Congress identified approximately 6,840 acres of potential wilderness that may become designated wilderness when the Secretary of the Interior determines that all activities inconsistent with the Wilderness Act have ceased thereon. Taken together, wilderness and potential wilderness make up 98.4% of the park’s land base. The statute provides that “[s]ubject to valid existing rights, the lands designated as wilderness pursuant to this Act shall be administered by the Secretary [of the Interior] in accordance with the applicable provisions of the Wilderness Act . . .”

The park does not currently have an approved wilderness management plan. Accordingly, all proposed management activities in wilderness must be evaluated for consistency with the Wilderness Act.

2.6.1 The Wilderness Act

Public Law 88-577, the Wilderness Act of 1964, established the National Wilderness Preservation System and provided for the study of Federal lands in the National Forests, National Wildlife Refuges, and the National Park System for potential inclusion in the System. Only Congress may designate an area as wilderness. The Secretary will administer wilderness areas for the use and enjoyment of the American people in such manner as will leave these unimpaired for future use and enjoyment as wilderness, including outstanding opportunities for solitude or a primitive and unconfined type of recreation. The preservation of the wilderness character and values is a major administrative responsibility of the NPS, and activities to achieve other legal purposes of areas designated as wilderness must be administered so as to preserve the wilderness character.

The Wilderness Act provides a definition of wilderness:

A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

The Wilderness Act (Section 4(a)(3)) goes on to emphasize that its purposes “are hereby declared to be within and supplemental to the purposes for which . . . units of the national park . . . system are established and administered and [that nothing] in this Act shall modify the statutory authority under which units of the national park system are created.”

Furthermore, the designation of Wilderness areas “shall in no manner lower the standards evolved for the use and preservation of such park, monument, or other unit of the national park system in accordance with the Act of August 25, 1916 [the Organic Act], the statutory authority under which the area was created, or any other Act of Congress which might pertain to or affect such area, including, but not limited to, the Act of June 8, 1906 [the Antiquities Act]...and the Act of August 21, 1935 [the Historic Sites Act].”

The Wilderness Act declares that “each agency administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area and shall so administer such area for such other purposes for which it may have been established as also to preserve its wilderness character.” In furtherance of the statute, the NPS Management Policies (2001) establish direction for management of NPS wilderness, as follows:

The National Park Service will manage wilderness areas for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and enjoyment as wilderness. Management will include the protection of these areas, the preservation of their wilderness character, and the gathering and dissemination of information regarding their use and enjoyment as wilderness. The public purpose of wilderness in the national parks includes the preservation of wilderness character and wilderness resources in an unimpaired condition, as well as ... recreational, scenic, scientific education, conservation, and historical use.

Significantly, section 6.3.1 of the NPS *Management Policies* (2001) provides that all NPS policies governing management of wilderness shall apply to potential wilderness as well.

Thus, NPS must manage all wilderness and potential wilderness at COSW in accordance with the requirements of the Wilderness Act.

The Wilderness Act prohibits specific activities, including motorized equipment use, aircraft landings, and structures or installations, when other reasonable alternatives are available. Specifically, Section 4(c) of the Wilderness Act states that:

Except as specifically provided for in this Act, and subject to existing private rights, there shall be no commercial enterprise and no permanent road within any wilderness area designated by this Act and, except as necessary to meet the minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area) there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.

NPS *Management Policies* (2001) (Section 6.3.6) interprets the above statutory provision as follows:

All management decisions affecting wilderness must be consistent with a minimum requirement concept. ... When determining minimum requirement, the potential disruption of wilderness character and resources will be considered before, and given significantly more weight than economic efficiency and convenience. If a compromise of wilderness resource or character is unavoidable, only those actions that preserve wilderness character and/or have localized short-term adverse impacts will be acceptable.

To implement this policy, NPS has established a minimum requirement determination process. This process assures that a proposed activity is appropriate in wilderness and uses the minimum tool required to accomplish project objectives.

2.6.2 Minimum Requirement Determination Process

As required by law and policy, Congaree National Park uses a documented minimum requirement determination process to evaluate proposed management activities in wilderness. The process is applied to every activity, including the 4(c) exceptions above, that has the capacity to affect the wilderness resource and wilderness values. This process includes documented compliance, which assesses impacts against benefits to wilderness.

The minimum requirement determination process involves two principal steps. First, a Minimum Requirement Questionnaire is used to evaluate whether a proposed management action (e.g., use of a temporary road, use of motor vehicles, use of motorized equipment, the landing of aircraft, any form of mechanical transport, and the use of structures or installations) is, in fact, appropriate and necessary for the administration of the area as wilderness (see Minimum Requirement Analysis Worksheet, Part A, in Appendix 13.3.1). If the project is

determined to be inappropriate and unnecessary in wilderness, the project will be denied. If the project is found to be necessary and appropriate for the purposes of wilderness, an Alternatives Worksheet is used to determine the minimum tool or technique that will result in the least amount of impact to the physical resources and experiential qualities (character) of wilderness (see Minimum Requirement Analysis Worksheet, Part B, in Appendix 13.3.1). The park's minimum requirement decision process must be accompanied by appropriate environmental compliance documentation. Final management decisions are approved by the Park Superintendent and/or Regional Director as appropriate.

2.6.3 Minimum Requirements Determination: Fire Management Activities in Wilderness

Any proposed fire management activity at COSW that has the potential to affect designated or potential wilderness must be analyzed through the park's minimum requirement procedure. Covered activities include, but are not limited to, wildland fire patrols, wildland fire suppression, wilderness overflights, mechanical hazard fuel reduction, and post-fire monitoring and rehabilitation. With respect to prescribed fire, a programmatic minimum requirement determination has been completed as part of the planning process for managing wildland fire at COSW. All aspects of the prescribed fire program that are considered routine, or non-routine but predictable, have been evaluated using the minimum requirement analysis set forth at Appendix 13.3.3. Following approval of the WFMP, these actions will be implemented without additional compliance following the identified (approved) methodologies. Any future activity undertaken in connection with prescribed fire that is not adequately addressed in this WFMP, but has the potential to affect the wilderness, will be analyzed separately using the park's minimum requirement procedure.

Any project not falling within the programmatic minimum requirement determination for prescribed fire must be submitted to the superintendent for review and approval, together with a minimum requirement analysis (see discussion of Minimum Requirement Analysis Worksheet above, and Appendix 13.3.1). The minimum requirement determination process must determine whether the action is appropriate and necessary in wilderness and identify the tools or techniques to be used should the action be approved. In particular, the minimum requirement determination process must be used to decide how staff will travel to and from or through the wilderness, what tools will be used, how often the activity will be performed, and how many staff members will participate in the activity. The analyses will clearly identify how minimum requirement decisions were developed and be accompanied by appropriate environmental compliance documentation (including reference to the WFMP Environmental Assessment). Approval will be documented with the superintendent's signature, and a permanent record of the analyses retained in the park's files.

The objective of the park's established minimum requirement process is to ensure that both the letter and spirit of the Wilderness Act, specifically the Section 4 (c) minimum requirement exceptions, are applied to all fire-management activities having the capacity to impact wilderness. The minimum requirement analysis provides a formal process for developing alternative solutions to fire-management problems and evaluating and comparing each alternative's effects on wilderness character. The impacts on wilderness resources (ecosystem processes and components) from implementing the alternative must be considered. Also, to

be considered are effects on the experiential qualities of wildness such as the preservation of natural conditions (including the lack of man-made noises), outstanding opportunities for solitude, a primitive and unconfined type of recreational experience, and the assurance that wilderness will be preserved and used in an unimpaired condition. Impacts on these elements are primary considerations in selecting the minimum requirement and are afforded significantly greater weight than cost or convenience.

3.0 WILDLAND FIRE MANAGEMENT STRATEGIES

3.1 General Management Considerations

At COSW, all wildland fire, regardless of ignition source, will be suppressed. Prescribed fire will be used to achieve a variety of resource management objectives. The park's fire management goals, which follow, incorporate COSW's overall management objectives as well as previously-discussed federal fire management policy principles and goals, including firefighter and public safety, collaboration, and accountability.

3.2 Wildland Fire Management Goals

Fire management goals at COSW are:

- ❑ Suppress all wildland fire in a cost-effective manner, consistent with resource objectives, considering firefighter and public safety (always the highest priority), and values to be protected.
- ❑ Use prescribed fire to:
 - Restore fire to the ecosystem, simulating the natural fire regime to the fullest extent possible, and thereby restoring and maintaining the integrity of the natural ecosystem and COSW's wilderness characteristics.
 - Improve habitat for the endangered red-cockaded woodpecker and other native wildlife species.
 - Reduce hazard fuels accumulations, which in turn:
 - Reduces the threat of catastrophic wildland fire, and reduces the risk of negative impacts to park resources in the event of a wildland fire.
 - Improves conditions for firefighter and public safety, and reduces suppression costs in the event of a wildland fire.
 - Perpetuate natural resources and processes, as naturally influenced by fire.
 - Promote natural succession in disturbed areas.
 - Control or eradicate exotic vegetation species.
 - Initiate nutrient recycling for healthy soil conditions.
- ❑ Manage all wildland fire incidents in accordance with accepted interagency standards, using appropriate management strategies and tactics, and maximizing efficiency via interagency coordination and cooperation.

- ❑ Maintain existing memoranda of understanding with state and local fire management agencies in order to continue close working relationships and mutual cooperation regarding fire management activities.
- ❑ Conduct a monitoring program that facilitates the identification of short- and long-term fire effects, and use the information gained to continually evaluate and improve the fire management program.
- ❑ Minimize the occurrence of human-caused wildland fires via the implementation of fire prevention activities, including public education.
- ❑ Integrate knowledge gained through natural resource research into future fire management decisions and actions.
- ❑ Maintain the highest standards of professional and technical expertise in planning and safely implementing an effective fire management program.
- ❑ Plan and conduct all fire management activities in accordance with all applicable laws, policies and regulations.
- ❑ Incorporate the minimum impact suppression tactics policy into all suppression activities, to the greatest extent feasible and appropriate.

3.3 Scope of Wildland Fire Management Elements to be Implemented

COSW will implement a combination of wildland fire suppression, prescribed fire, and non-fire applications.

3.3.1 Wildland Fire Suppression

A wildland fire is defined as any nonstructural fire, other than prescribed fire, that occurs in the wildland. All wildland fires at COSW, regardless of origin, will be suppressed.

3.3.2 Prescribed Fire

COSW will use prescribed fire to accomplish a variety of resource management objectives, as described in section 3.2. Park planning documents will guide the use of prescribed fire.

3.3.3 Non-Fire Applications

COSW will use non-fire applications (manual and mechanical techniques) to maintain a defensible space of 50 feet around park buildings.

3.4 Park Description

COSW has been divided into four fire management units (FMUs) to facilitate the achievement of fire management objectives. A description of the general physical and biotic characteristics of the park, below, is followed by descriptions of the FMUs. Unless otherwise specified, the overall description of COSW applies to all four of the FMUs.

3.4.1 Physical and Biotic Characteristics

3.4.1.1 Real Property

COSW is located along the northern border of the Congaree River in southeast Richland County, South Carolina, approximately 20 miles southeast of the capital city of Columbia. Although traditionally referred to as “the swamp,” COSW is actually an alluvial floodplain of the Congaree River. (The Congaree River overflows its banks approximately 10 times a year. Flooding, which typically occurs in late winter and early spring, may last from a few days to a few months. As much as 90% of the park is inundated at least once a year.) As documented in *Hydrology and Its Effects on Distribution of Vegetation in Congaree Swamp National Monument, South Carolina* (Patterson, Speiran and Whetstone 1985), only 10% of the park’s area contains permanent surface water. The remaining 90% of the landscape is forested. The park totals approximately 22,000 acres.

3.4.1.2 Soils

The soils at COSW consist of rich, fine-textured alluviums extending in places to depths of 10 feet or more. Immediately adjacent to streams, the soils are primarily Congaree and Chewacla series loams. Near the low northern bluffs, the soils become Tawcaw silty clay. Spots of Chastain silt loam, Toccooa loam, and Dorovan muck exist throughout the floodplain. The upland areas of the low northern bluffs primarily contain Persanti fine sandy loams, as well as spots of Cantey loams and Smithboro silt loams.

3.4.1.3 Air Quality

COSW is designated a class II air shed under the Clean Air Act. Under class II, modest increases in air pollution are allowed beyond baseline levels for particulate matter, sulfur dioxide, nitrogen and nitrogen dioxide, provided that the national ambient air quality standards, established by the Environmental Protection Agency (EPA), are not exceeded.

3.4.1.4 Vegetation

The most common forest types at COSW are:

- Bottomland hardwood – This floodplain forest type, located between the low northern bluffs and the Congaree River, includes bald cypress, cottonwood, green ash, red maple, laurel oak, sweetgum, swamp tupelo, chestnut, overcup oak, and willow oak. These are found in both solitary and mixed stands throughout the floodplain, with varying degrees of dominance.

- Upland hardwood – This forest type occurs as scattered patches on the well-drained soils of the floodplain ridges and low northern bluffs. It contains a mixture of oak, hickory, sycamore, beech, and sugarberry.
- Southern pine – This forest type is located primarily on the low northern bluffs, with patches extending into the floodplain. It is dominated by large, over-mature loblolly and longleaf pine, with a mixed hardwood and pine understory. Loblollies mixed with bottomland hardwoods within the floodplain constitute an uncommon forest association. Unknown disruptions of natural forest succession in the past enabled the loblollies to become established. Pederson and Jones (1994) propose that fire, farming and/or hurricanes may have been the disrupting factor(s).
- Plantation pine – This forest type, located on the low northern bluffs, consists of even-aged loblolly pine planted about 25 years ago. The stands were established by prior landowners and acquired as part of the 1988 park boundary expansion.

Overall, the vegetative communities within COSW are variations or successional stages of the aforementioned types.

3.4.1.5 Wildlife and Aquatic Resources

With high mast production in the fall and a variety of vegetative covers, COSW provides some of South Carolina's most exceptional wildlife habitat. Despite its periodic inundation by floodwaters throughout the year, a large variety of wildlife inhabits the park, including bats, bobcats, bobwhites, white-tailed deer, doves, egrets, foxes, hawks, herons, kestrels, muskrats, owls, rabbits, raccoons, river otters, squirrels, turkeys, vultures, wood ducks, and woodpeckers. Over 173 species of birds are represented at COSW.

Between the Congaree River, which is the primary fishery of the area, associated tributaries and various oxbow lakes, COSW harbors about 52 native species of game and non-game fish. These include large-mouth bass, striped bass, bluegill, crappie, perch, gar, shiners, and minnows. Aquatic fauna such as crayfish, clams and snails of multiple varieties proliferate throughout the floodplain. The wet environment additionally supports at least 53 kinds of reptiles and amphibians.

See Web site www.nps.gov/cosw/ for known flora and fauna species at COSW.

3.4.1.6 Threatened and Endangered Species

The federally-listed endangered red-cockaded woodpecker (*Picoides borealis*) is known to inhabit the park. This woodpecker is adapted to mature, living, open-pine forests that are maintained by periodic fire, which serves to keep the pinewoods open by controlling the hardwood understory. As per Web site <http://www.fs.fed.us/database/feis/welcome.htm>:

Fire helps to reclaim or maintain the open woodlands preferred by red-cockaded woodpeckers for both foraging and nesting... Elimination or extensive suppression of fire from red-cockaded woodpecker habitat could result in habitat abandonment by red-cockaded woodpeckers... Periodic prescribed fire may be the only practical tool for preventing hardwoods from growing into the midstory and allowing red-cockaded woodpecker colonies to persist for several generations. The maintenance of an open pine forest generally requires prescribed burning at 3-year intervals, although fire may be needed less frequently in areas away from coastal plains.

Although the habitat required for endangered species such as the ivory-billed woodpecker, bachmans warbler, and the eastern cougar exists within the park, no verifiable sightings have occurred recently at COSW.

State-listed plant species of concern known to exist at the park include:

- White grapefern (*Botrychium lunarioides*)
- Cherokee sedge (*Carex cherokeensis*)
- Ravenfoot sedge (*Carex crus-corvi*)
- Social sedge (*Carex socialis*)
- Fivelobe cucumber (*Cayaponia quinqueloba*)
- Walter's whorled horsebalm (*Collinsonia serotina*)
- Spinulose woodfern (*Dryopteris carthusiana*)
- Carolina birds-in-a-nest (*Macbridea caroliniana*)
- Weak nettle (*Urtica chamaedryoides*)

3.4.1.7 Cultural and Historic Resources

Historic sites located within park boundaries are included in the National Register of Historic Places (NRHP). These sites, briefly described in section 10.1, consist of cattle mounds, dikes, bridge abutments, homesites, stills, and prehistoric lithic scatters.

3.4.2 Management Considerations

- Ensure that firefighter and public safety remains the primary consideration in planning and conducting all fire management activities.
- Ensure that the wilderness status of the majority of COSW is considered in planning and conducting all fire management activities.
- Ensure that smoke management is considered in planning and conducting all fire management activities.
- Ensure that all applicable laws, policies and regulations are considered in planning and conducting all fire management activities.

- ❑ Ensure that socio-political economic impacts are considered in planning and conducting all fire management activities.
- ❑ Ensure that appropriate fire prevention and suppression actions are included in the right-of-way plans of development/vegetation management/contingency documents associated with and required for electrical transmission lines located on agency land.
- ❑ Ensure that fire management activities are coordinated as appropriate with all affected parties. This includes any federally recognized Indian tribes that have historical, cultural, economic or other interests in the proposed action or its effects (required, for example, by 36 CFR 800, 40 CFR 1508, and 43 CFR 10).

3.4.3 Past Role of Fire

Ecological and meteorological evidence indicates that lightning-caused fires were a major environmental force shaping the vegetation of North America for millions of years prior to human habitation (Van Lear and Waldrop 1989). Fire-adapted ecosystems developed, as did individual plant species dependent upon or adapted to wildland fire. 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."

While it is difficult to substantiate purposeful landscape burning by American Indians from the archeological record, diaries, letters, reports, and books by eyewitnesses of Indian fire use from the 1600s to the 1900s have yielded considerable evidence that American Indians did use fire to modify ecosystems (Barrett 1980, 1981; McClain and Elzinga 1994; Russell 1983; Whitney 1994), with profound cumulative effects on the landscape. At the time of European contact, many eastern deciduous forests were open and park-like, with little undergrowth (Bonnicksen 2000, Day 1953, Olsen 1996). Says Charles Kay (2000), "...the only way for eastern forests to have displayed the open-stand characteristics that were common at European settlement is if those communities had regularly been burned by native people as part of aboriginal land management activities."

As per chapter 25 (Background Paper: Fire in Southern Forest Landscapes) of the USDA Forest Service General Technical Report entitled *The Southern Forest Resource Assessment Summary Report* (2002):

To appreciate the pervasive role of fire in shaping southern forests requires an understanding of the dynamic response of southern ecosystems to climate change since the retreat of the Laurentide Ice Sheet, which began around 18,000 years ago, and the extent of human influence, which likely began about 14,000 years ago. Humans exert an influence by igniting or suppressing fires. Native Americans used fire extensively for thousands of years. The early European settlers continued and to a degree expanded the use of fire. In the last century, however, human influence over fire in the South changed markedly.

We have divided the long history of fire since humans arrived in the South into five periods:

- ❑ *From the earliest appearance of humans in North America around 14,000 years ago (Fagan 2000) until European contact 500 years ago, the first period was one of increasing human population level and more extensive use of fire.*
- ❑ *For the first 400 years after their arrival, the early European settlers continued to use fire in much the same way as Native Americans, often reoccupying and farming land cleared by Native Americans and expanding burning of woodlands to provide forage for livestock (Williams 1992).*
- ❑ *At the end of the 19th century and extending into the 20th century, the remaining southern forests were extensively logged to support economic expansion; wildfires were common in the slash left behind. In reaction to these widespread and destructive wildfires, the fourth period of fire suppression started in the early 1900s.*
- ❑ *The current period is one of fire management, in which the natural role of fire is increasingly recognized and incorporated into forest management.*

The fire history at COSW is not fully known, primarily due to the park's relative newness to the National Park Service (1976) and the lack of fire records prior to its establishment. Fire ecologist Dr. Cecil Frost recently completed research involving the low northern bluffs at the park, concluding that the presettlement fire frequency there ranged from every one to three years to every five to seven years. Wholesale fire suppression during the last century there has caused the forest type in some areas to shift from pine to more shade-tolerant hardwoods, thus altering the natural regime (see Figures 3 and 4). Fire history within the park floodplain, including the natural frequency, size and intensity of fires is unclear.

The annual occurrence of wildland fires at COSW is low, averaging less than one fire per year. The highest incidence of fires in one season was three in 1987-88. Since 1978, 20 known wildland fires have occurred within the park:

FMU #1

- ❑ 02/29/88 – 5 acres – cause unknown
- ❑ 07/13/90 – 1 acre – lightning ignition
- ❑ 07/26/92 – 1 acre – downed power line
- ❑ 06/09/93 – 1 acre – escaped debris burn
- ❑ 07/22/95 – <1 acre – lightning ignition
- ❑ 07/18/97 – <1 acre – lightning ignition
- ❑ 07/99 – <1 acre – downed power line
- ❑ 07/02 – <1 acre – lightning ignition

FMU #3

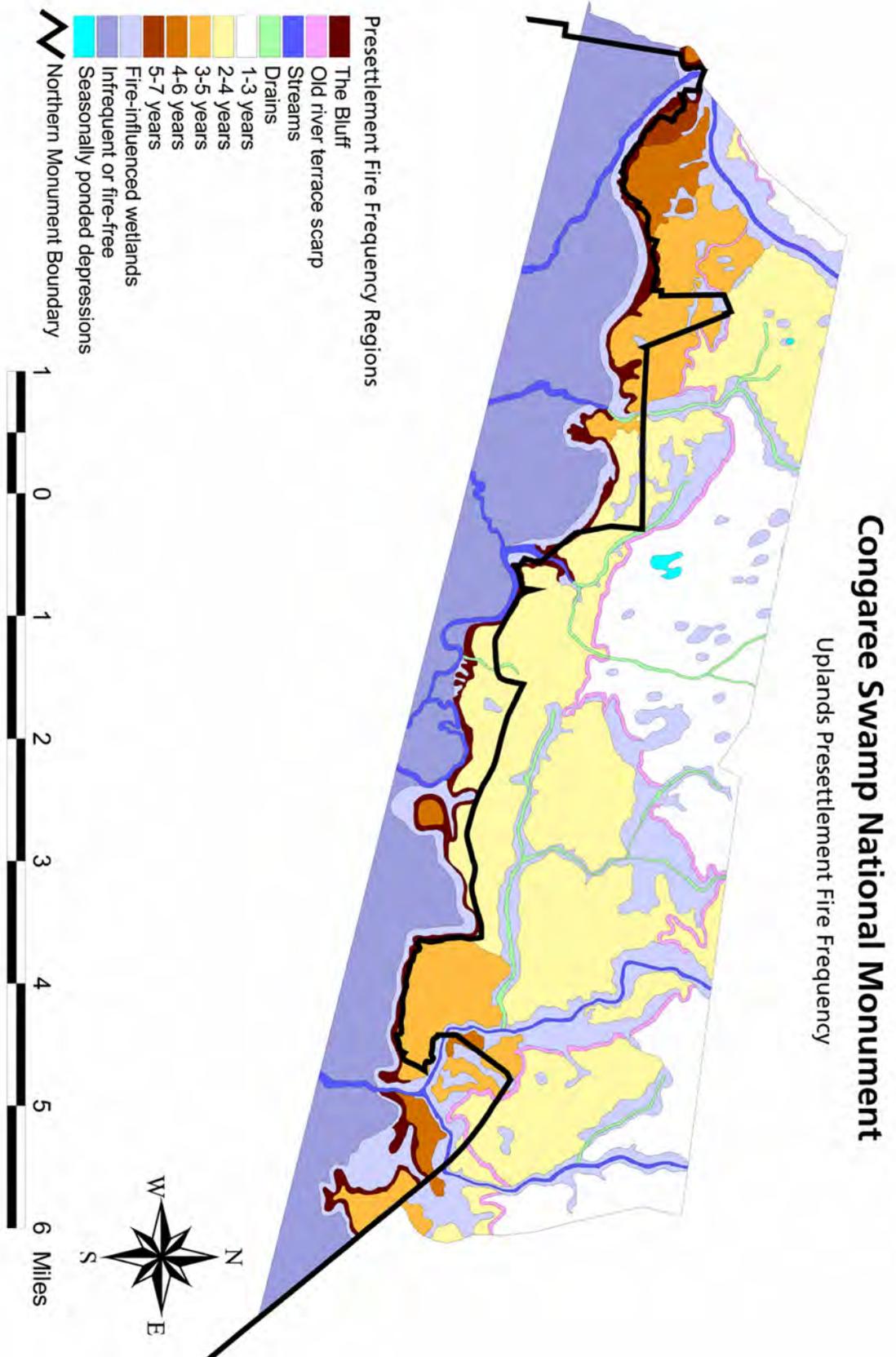
- Zone #3B – 11/21/87 – 8 acres – human-caused
- Zone #3A – 07/18/91 – <1 acre – downed power line
- Zone #3B – 12/14/91 – 35 acres – escaped debris burn
- Zone #3B – 09/10/93 – 5 acres – human-caused
- Zone #3B – 02/19/94 – 131 acre – escaped debris burn

FMU #4

- Zone #4A – 11/07/78 – 16 acres – cause unknown
- Zone #4D – 12/27/84 – 6 acres – escaped debris burn
- Zone #4D – 04/17/86 – 20 acres – escaped debris burn
- Zone #4D – 02/25/88 – 5 acres – escaped debris burn
- Zone #4D – 12/02/88 – 3 acres – railroad
- Zone #4D – 12/08/88 – 15 acres – human-caused
- Zone #4E – 08/22/91 – 21 acres – lightning ignition
- Zone #4D – 04/03/92 – 6 acres – human-caused
- Zone #4D – 03/01/99 – 212 acres – human-caused

Within the same time period, five prescribed fires have been conducted within zone B of fire management unit #2 for red-cockaded woodpecker habitat improvement.

Figure 3: COSW Uplands Presettlement Fire Frequency Map, Created by Dr. Cecil Frost



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Congaree Swamp National Monument

Uplands Presettlement Vegetation

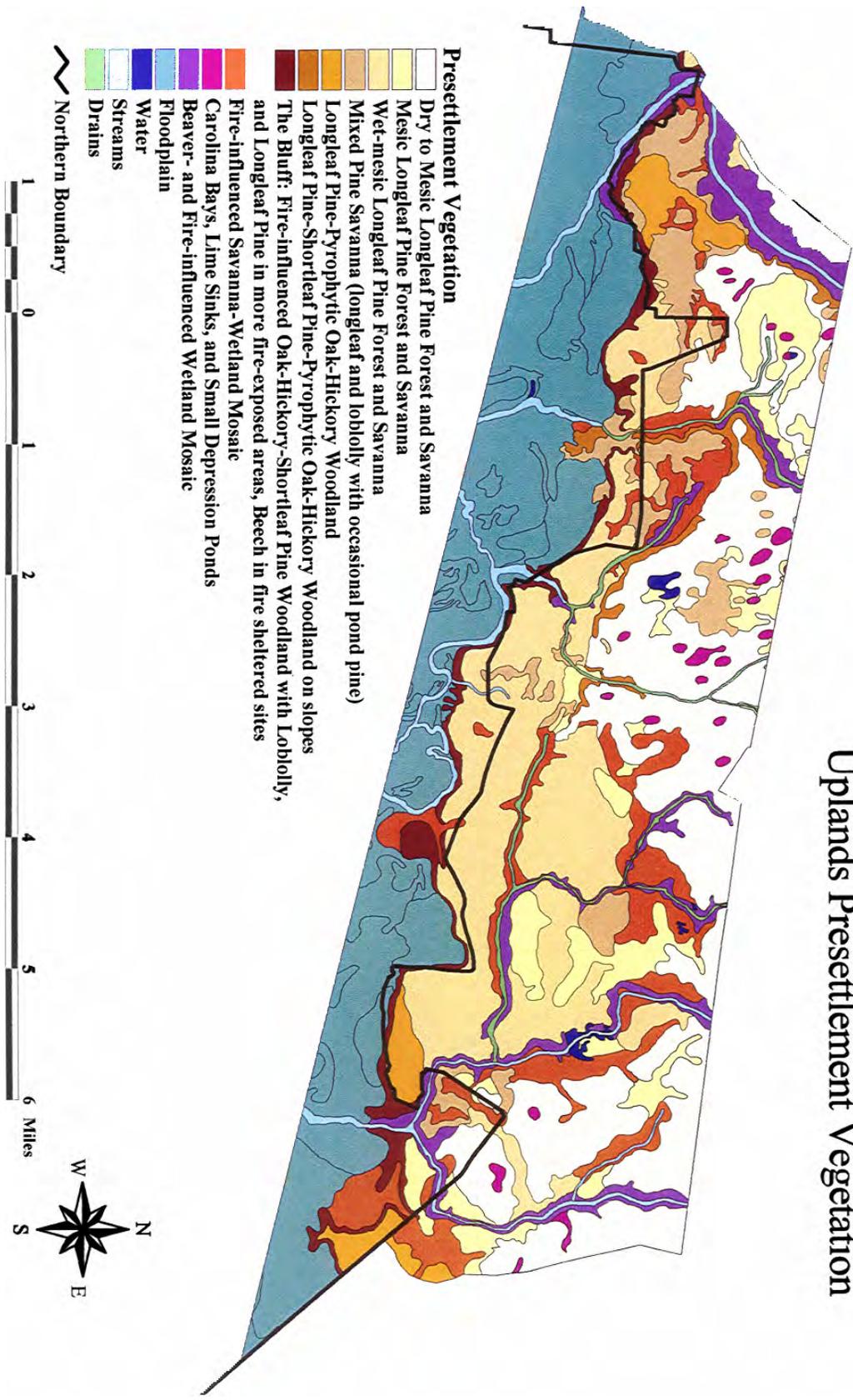


Figure 4: COSW Uplands Presettlement Vegetation Map, Created by Dr. Cecil Frost

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3.4.4 Wildland Fire Management Situation

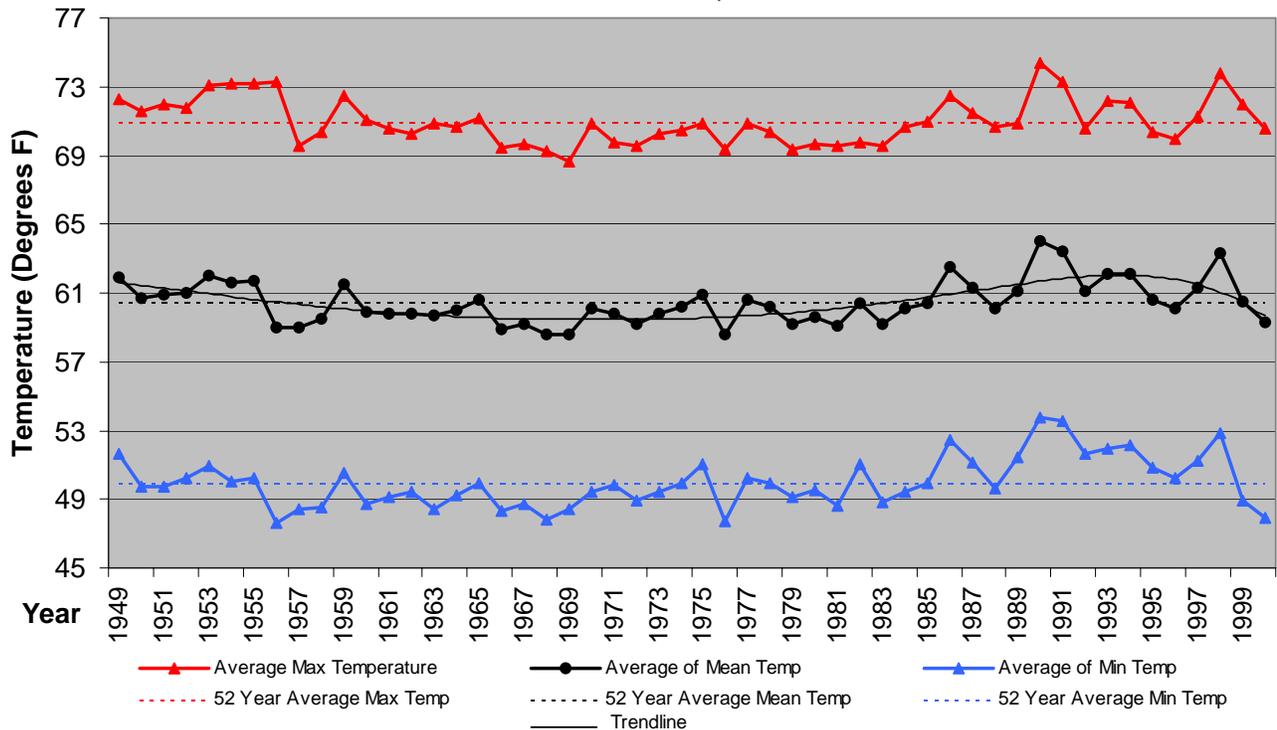
3.4.4.1 Historical Weather Analysis

The climate at COSW is temperate, characterized by warm, humid summers and mild winters, with average monthly temperatures ranging from 46° to 81° F. Spring is the most variable season, beginning with occasional cold front passages in March, but becoming generally warm and pleasant by May. Average annual rainfall is about 45 inches, with average monthly rainfall varying from seasonal lows in November of roughly 2.5 inches, to highs of 5.5 inches in August. Long summers are the norm. Hot and humid weather generally lasts from May to September, with temperatures typically ranging from 80° to 100° F during the day, and relative humidity often exceeding 85%.

Although historic weather data were not readily obtainable from Columbia, South Carolina, they were available from Charlotte, North Carolina, 90 miles to the north. As the annual temperature and precipitation trends for the Charlotte area closely approximate those of the Columbia area, these data serve as a reasonably accurate indication of historic weather patterns of the park area. For the 52-year time period from 1949 to 2000, the average mean temperature, as indicated in Figure 5, was 60.5 ° F. The curving black trend line shows mild warming and cooling cycles, which are normal ~30 year occurrences, according to Kevin Scasny, fire weather meteorologist. The temperature, however, has remained quite constant, with no discernible overall warming or cooling trend since 1949.

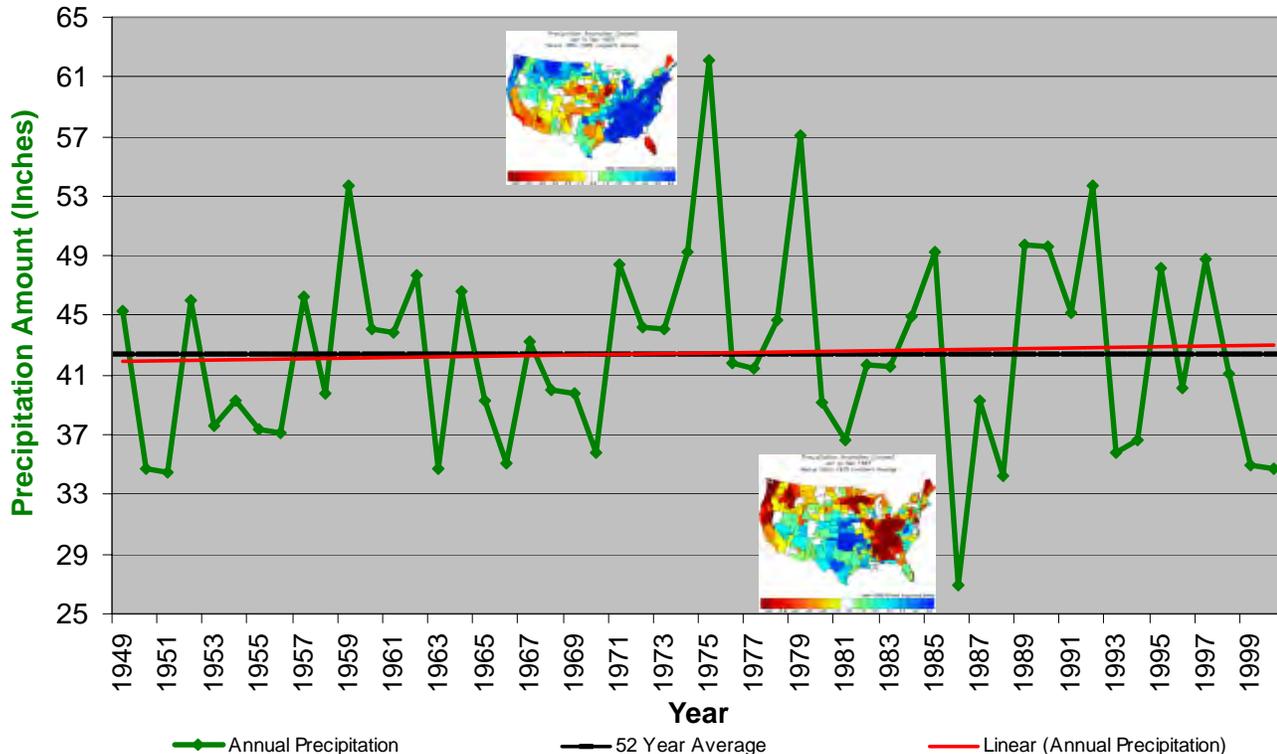
Figure 5:

**Historical View of Annual Temperatures: 1949 to 2000
Charlotte, NC**



The average annual mean precipitation from 1949 to 2000, as indicated in Figure 6, was 42.5 inches. The linear red trend line indicates a very mild overall precipitation increase, from 42 inches in 1949 to 43 inches in 2000. The thumbnail maps embedded in the graphic are associated with both extremes in precipitation (~62.5 inches in 1975 and ~26.5 inches in 1986) during the 52 years depicted, and illustrate the similarity between the Charlotte, NC and Columbia, SC areas.

Figure 6: **Historical View of Annual Precipitation: 1949 to 2000**
Charlotte, NC



3.4.4.2 Fire Season

Fire season at COSW generally runs from October 15th through May 15th, determined by historic fire occurrence in the local area. Relatively low levels of precipitation in the fall, winter and spring, combined with heavy leaf fall from the mostly deciduous forest, dry fuels out and condition them for easy ignition. During the summer growing season, higher levels of precipitation and humidity, and live, green foliage result in a lower probability of ignition. However, a fire history analysis of the nearby Sumter National Forest indicates that large (10 acres plus) fires can occur virtually any month of the year.

Coinciding with the regular occurrence of thunderstorms during the summer months are lightning-ignited fires. In fact, since 1978, all known lightning ignitions at COSW have occurred in July and August. Because of the above-mentioned higher precipitation and humidity rates at this time of year, the ignition events have been small in size.

3.4.4.3 Fuel Characteristics and Fire Behavior

The primary fuel types represented at COSW have been classified according to the National Fire Danger Rating System (NFDRS) and the Northern Forest Fire Laboratory Fire Behavior Prediction System (FBPS) (Deeming et al 1978:30, Anderson 1982).

- Fuel Model D: This model, and FBPS fuel model 7, most closely match scattered patches of pine seedlings and saplings mixed with wax myrtle that have grown up in areas of past disturbance, when the wax myrtle component is green. These patches range in height from four to ten feet. This model also matches patches of pine seedlings and saplings of similar height range, without a wax myrtle component. Fire burns through the surface and shrub strata equally. Fire can occur at higher dead fuel moisture contents due to the flammable nature of the live foliage.
- Fuel Model E: This model, and FBPS fuel model 9, most closely match hardwood stands after leaf fall (roughly coinciding with the park fire season). Leaf litter is the primary fuel. High winds will cause higher rates of spread than predicted because of spotting caused by rolling and blowing leaves. Concentrations of dead-down woody material can contribute to possible torching out of trees, spotting, and crowning activity. Fires run through the surface litter faster than fuel model R and have higher flame height. In the summer after the trees have leafed out, fuel model E should be replaced by fuel model R.
- Fuel Model O: This model, and FBPS fuel model 4, most closely match scattered patches of pine seedlings and saplings mixed with wax myrtle, described above, when the wax myrtle component is dead or cured (roughly coinciding with the park fire season). Fire intensity and fast-spreading fires involve the foliage and live and dead fine woody materials in the crowns of a nearly continuous secondary overstory. Besides flammable foliage, dead woody material significantly contributes to fire intensity.
- Fuel Model P: This model, and FBPS fuel model 9, most closely match closed stands of long-needled southern pines. A two- to four-inch layer of lightly compacted needle litter is the primary fuel. Some small-diameter branch wood is present, but the general density of the canopy precludes more than a scattering of shrubs and grass. Concentrations of dead-down woody material will contribute to possible torching out of trees, spotting, and crowning.
- Fuel Model R: This model, and FBPS fuel model 8, most closely match hardwood stands after the canopies leaf out in the spring. Slow-burning ground fires with low flame lengths are generally the case, although the fire may encounter an occasional “jackpot” or heavy fuel concentration that can flare up. Only under severe weather conditions involving high temperatures, low humidities, and high winds do the fuels pose fire hazards. This model is provided as the off-season substitute for E, and should be used during the summer.

Table 1 illustrates historic fire weather parameters at “average” and “extreme” levels for the park fire season.

Table 1: Historic Fire Weather Parameters for COSW Fire Season (October 15 – May 15) NFDRS Station 383101

Fire Weather/Behavior Parameter	Average Fire Season Weather	97th Percentile Fire Season Weather
Wind speed	6 miles/hour	12 miles/hour
Temperature	75 degrees Fahrenheit	100 degrees Fahrenheit
Relative humidity	40%	18%
10-hour fuel moisture	10%	6%
Live woody fuel moisture	100%	60%

Table 2 demonstrates anticipated fire behavior at COSW under these average and extreme conditions, as well as critical threshold values influencing fire controllability. The values were calculated using the BEHAVE (Andrews 1986) fire behavior prediction model utilizing inputs from the Savannah River weather station (NFDRS number 383101) in Aiken South Carolina, located approximately 30 miles southwest of the park. The weather data utilized cover the nine-year period from 1993-2001, and the weather indices were calculated using the Fire Family Plus (Bradshaw 1999) software package. It should be recognized that the table values are based upon models rather than direct observation of fire behavior in these fuel types. As COSW managers have the opportunity to observe and monitor fire behavior, these values may be refined and the model calibrated to better reflect local fuel and weather conditions.

The park uses the Keetch-Byram Drought Index (KBDI) as its primary drought indicator, which, based upon the level, indicates low to extreme drought conditions influencing fire behavior (see section 4.2.2.4.2.2).

Table 2: Potential Fire Behavior Under Average and Extreme Conditions

NFDRS Model	FBPS Model	Fuel Type/Vegetation	Fire Behavior; Average Conditions		Fire Behavior; Extreme Conditions	
			Flame Length (ft)	Rate of Spread	Flame Length (ft)	Rate of Spread
D	7	Pine seedlings/saplings and green wax myrtle	3	7 chains/hr	*8	50 chains/hr
E	9	Hardwood leaf litter after leaf fall	1	2 chains/hr	4	13 chains/hr
O	4	Pine seedlings/saplings and dead or cured wax myrtle	*9	16 chains/hr	*30	162 chains/hr
P	9	Pine needle litter	1	1 chain/hr	4	13 chains/hr
R	8	Hardwood leaf litter after canopy leaf out	1	1 chain/hr	1	3 chains/hr

*Exceeds direct attack capabilities = flame lengths greater than 8 feet; indirect attack required

Average conditions = 1993-2001 NFDRS station 383101 mean fire season weather conditions

Extreme conditions = 1993-2001 NFDRS station 383101 97% percentile fire season weather conditions

Assumes maximum spread with 0% slope

Table 3 outlines potential critical weather parameters that would result in fire behavior exceeding initial attack capabilities (flame lengths greater than eight feet). These values were calculated using the RX Window Module of the BEHAVE program (Andrews 1986). Such

values are useful both for facilitating recognition of potential extreme fire behavior conditions, as well as for assisting in prescription development for the prescribed fire program. It should be noted that generally two or three weather parameters must be aligned in order for extreme conditions to result. It should also be noted that these are modeled values and should serve only as guidelines. As the opportunity arises, fire monitoring data collection on both wildland fires and prescribed fires will facilitate refinement of these values as well as development of critical values for additional parameters. Last, it should be noted that while the values listed will potentially result in flame lengths greater than eight feet, this does not necessarily indicate a sustained, uncontrollable wildland fire. Rather, they indicate that direct attack is not a safe strategy at the head of the fire. Furthermore, these conditions, particularly wind speed, can vary greatly within a short time period and be fleeting in nature.

Table 3: Critical Weather Parameters Resulting in Need for Indirect Attack

NFDRS Model	FBPS Model	Fuel Type/Vegetation	Moisture of Extinction	Critical Weather Parameters Resulting in Fire Behavior Exceeding Direct Attack Capabilities
D	7	Pine seedlings/saplings and green wax myrtle	40%	Live fuel moisture <100% and 10-hr fuel moisture <10% and eye-level wind speed >6 mph.
E	9	Hardwood leaf litter after leaf fall	25%	10-hr fuel moisture <5% and eye-level wind speed >15 mph.
O	4	Pine seedlings/saplings and dead or cured wax myrtle	20%	Fire under any conditions in this type is unsafe for direct attack.
P	9	Pine needle litter	25%	10-hr fuel moisture <5% and eye-level wind speed >15 mph.
R	8	Hardwood leaf litter after canopy leaf out	30%	Flame lengths unlikely to exceed 8 feet even under extreme conditions.

Moisture of extinction is defined as the 1-hour fuel moisture upper limit beyond which the fuels described by the given model will not burn. Ten-hour fuel moisture is a function of temperature, relative humidity, and shading.

3.4.4.4 Fire Regime Alteration

The predominant fire regimes at COSW are longleaf pine and bottomland hardwood, with a narrow transitional zone of mixed hardwood and loblolly pine in between.

The following description of the longleaf pine fire regime comes from chapter 25 (Background Paper: Fire in Southern Forest Landscapes) of the USDA Forest Service General Technical Report entitled *The Southern Forest Resource Assessment Summary Report* (2002):

Open pine forests, woodlands, and savannas distinguish the longleaf pine ecosystem. Longleaf pine tolerates a wide range of sites from wet, boggy flatwoods underlain with tight clays across xeric, deep sands to thin stony soils on south-facing mountain slopes (Ware and others 1993). On infertile sites, surface soils are typically acidic, tend to dry quickly after precipitation, and are characterized by a lack of organic matter and low fertility (Landers and Wade 1994). Longleaf pine also occupied a significant area of fertile soils where frequent fires gave it the advantage over loblolly pine and hardwoods. These fertile sites were cleared for agriculture. Examples of longleaf on fertile soils persist in the red hills region of Georgia and at Fort Bragg, NC. Many soils in the Gulf Coastal Plain also tend to be more fertile than the infertile sands often associated with longleaf pine. Longleaf pine ecosystems persist and maintain their diversity because of constant disturbance

(Christensen 1993, Landers and Wade 1994, Landers and others 1995, Wells and Shunk 1931), and recurrent fire is crucial to perpetuation of these ecosystems (Andrews 1917).

Typical longleaf pine sites burned every 1 to 4 years prior to the arrival of Europeans, and then every 1 to 3 years until aggressive fire suppression activities began in the 1920s and 1930s (Landers 1991, Landers and others 1990). Fire frequency decreases as typical upland sites grade toward very wet sites where ignition is inhibited or very dry sites with low rates of fuel accumulation. Longleaf pine has numerous traits adapted to recurrent understory¹ fires. It goes through a grass stage of limited aboveground growth while an extensive root system is developed. Coming out of the grass stage, a growth spurt (called bolting) quickly gets the terminal buds above the height of the flames. The large buds of longleaf pine are protected from high temperatures by an encompassing sheaf of long needles. Stem bark rapidly thickens, protecting the seedling from light surface fires during the first year of height growth.

If the fire regime is disrupted, such as by suppression activity, longleaf stands are invaded by hardwoods such as sweetgum, oaks, hickories, common persimmon, and southern magnolia (Daubenmire 1990, Gilliam and Platt 1999). These hardwoods form a midstory that prevents the shade-intolerant longleaf pine from regenerating. Many of these hardwoods are somewhat resistant to low-intensity fires when mature (Blaisdell and others 1974), and rootstocks of even understory trees are able to withstand all but annual growing-season fires (Glitzenstein and others 1995, Waldrop and others 1987). Invasive exotics such as cogongrass (Lippincott 1997), Japanese climbing fern, and melaleuca (Wade 1981, Wade and others 1980) are promoted by fire. They create serious problems for those who are trying to restore longleaf ecosystems.

The following description of the bottomland hardwood fire regime comes from chapter 25 of the same report:

The historical role of fire in the bottomland hardwood ecosystem is unclear (Wade and others 2000). Drought probably played a role, and low- to moderate-intensity wildfires may have been frequent (Lentz 1931, Toole and McKnight 1956). Low-intensity fires are the norm in these forests because fuel loads are generally light (except after damaging wind and ice storms) due to rapid decomposition on these moist, humid sites. In canebrakes, fire intensity is much higher, but fire severity is low except during drought. Large fires can only occur after extended drought, usually when a dry fall is followed by a dry spring.

¹ As per this report, fires in the understory fire regime do not kill the dominant vegetation or substantially change its structure. Approximately 80 percent or more of the aboveground dominant vegetation survives fire (Brown 2000).

As per the USDA Forest Service General Technical report entitled *Wildland Fire in Ecosystems: Effects of Fire on Flora* (2000):

In young pole-size stands [of bottomland hardwood], fires often result in basal wounds. Although these wounds often heal over, internal decay continues with decay height closely related to time since fire. Kaufert (1933) estimated that 90 to 95 percent of the decay in merchantable Southern bottomland hardwood stands was the result of past fires. Most bottomland hardwoods, even large ones, are sensitive to fire. Low-intensity fires may initially appear benign, but the cambium has been damaged and incipient decay begins even though the bark remains intact for several years after fire.

At present, the longleaf pine fire regime, with plantation pine, loblolly pine and mixed hardwood scattered throughout it, is in condition class 3², as defined in the USDA Forest Service General Technical Report entitled *Development of Coarse-Scale Spatial Data for Wildland Fire and Fuel Management* (2002).

The bottomland hardwood fire regime appears to be in condition class 1³, as defined in the same report.

3.4.4.5 Control Problems and Dominant Topographic Features

Because the floodplain is a hydraulic ecosystem, fire rarely exhibits extreme behavior in that portion (~90%) of the park. Topography plays a minimal role in fire behavior there, as the overall elevation change is about 13 feet. Within the upland portion of COSW (gradually sloped, for the most part), scattered patches classified as NFDRS fuel model O (dead or cured wax myrtle, often mixed with pine seedlings/saplings) support flame lengths that preclude direct attack, even under average conditions. See section 3.4.4.3 for a discussion of park fuel characteristics and fire behavior, and Table 2 for potential fire behavior under average and extreme conditions.

² Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range. Where appropriate, these areas may need moderate levels of restoration treatments, such as hand or mechanical treatments, before fire can be used to restore the historical fire regime.

³ Fire regimes are within an historical range, and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and function within an historical range. Where appropriate, these areas can be maintained within the historical fire regime by treatments such as fire use.

3.5 Fire Management Units (FMUs)

As previously stated, four fire management units (FMUs) have been identified and established within COSW in order to facilitate the accomplishment of fire management objectives. These FMU's were established based on the locations of major drainages and have been developed to assist in suppression action of unplanned wildland fire events. The boundaries of these units and their corresponding zones are identified herein to act as natural "firelines" so as to minimize the actual construction of fireline on the ground. Values to protect, manage, or at risk follow descriptions of the FMUs, in section 3.6. General fire management objectives, fuel characteristics, and fire behaviors have been identified to assist in suppression actions and give a rough view of overall plans with the areas. Further detail on site specific management plans can be found in individual burn plans developed for each prescribed burn. Reference is also made to section 4.3 and appendix 13.6.

3.5.1 Fire Management Unit #1: Visitor Center

FMU #1 contains approximately 1,400 acres ranging from floodplain to low bluffs. It encompasses the primary development zone of COSW, including the learning center, maintenance compound, picnic area, boardwalk trail, and the visitor center. The roughly wedge-shaped unit is bordered by the park boundary along the north, Dry Branch Creek along the east, and Cedar Creek along the west (see Figure 7).

3.5.1.1 FMU #1 - Fire Management Objectives

Fire management objectives specific to FMU #1 include:

- ❑ Conduct initial attack within 30 minutes of the time a wildland fire report is received.
- ❑ Control 95% or higher of all wildland fires during initial attack.
- ❑ Conduct prescribed burning of two contiguous units, totaling 328 acres.

3.5.1.2 Fuel Characteristics / Fire Behavior

The primary fuel model represented in the floodplain portion of FMU #1 is E or R (hardwood leaf litter, depending upon the season). The primary fuel model represented in the upland portion of the FMU is P (southern pine needle litter), with scattered pockets of E or R, and D (pine seedlings/saplings, green wax myrtle) or O (cured/dead wax myrtle). See section 3.4.4.3 for fuel characteristics and Table 2 for potential fire behavior under average and extreme conditions. See Figure 8 for a delineation of fuel models.

3.5.2 Fire Management Unit #2: Red-Cockaded Woodpecker Habitat

FMU #2 contains approximately 1,100 acres, and is divided into two contiguous management zones (see Figure 7). The FMU is bordered by the COSW boundary along the north and east, Cedar Creek along the south, and Dry Branch Creek along the west.

Zone #2A comprises roughly 870 acres, primarily floodplain, with a narrow strip of low bluffs along the western side of the zone. Zone #2B, to the north, comprises 230 acres of low bluffs. For the purposes of wildland fire suppression, FMU #2 will be considered a single unit rather than two separate zones.

3.5.2.1 FMU #2 - Fire Management Objectives

Fire management objectives specific to FMU #2 are:

- ❑ Conduct initial attack within 60 minutes of the time a wildland fire report is received.
- ❑ Control 95% or higher of all wildland fires during initial attack.
- ❑ Conduct prescribed burning of two contiguous units, totaling 243 acres.

3.5.2.2 FMU #2 - Fuel Characteristics / Fire Behavior

The primary fuel model represented in zone #2A, is E or R (hardwood leaf litter, depending upon the season). The fuel model represented in the upland portion of the zone is P (southern pine needle litter), with scattered pockets of E or R, and D (pine seedlings/saplings, green wax myrtle) or O (cured/dead wax myrtle).

The primary fuel model represented in zone #2B is P, with scattered pockets of E or R and D or O. The fuel model represented in the floodplain portion of the zone is E or R.

See section 3.4.4.3 for fuel characteristics and Table 2 for potential fire behavior under average and extreme conditions. See Figure 8 for a delineation of fuel models.

3.5.3 Fire Management Unit #3: Air Quality Monitoring Station and Toms Creek

FMU #3 contains approximately 800 acres, primarily low bluffs, with fingers of floodplain extending up into the eastern portion (zone #3B) of the unit. The unit is divided into two noncontiguous management zones (see Figure 7). Zone #3A comprises roughly 500 acres, and houses an air quality monitoring station. Zone #3B comprises the remaining 300 acres. Both zones contain high components of plantation pine.

Zone #3A is bordered by the COSW boundary along the north, east and west, and Cedar Creek or bluff line along the south.

Zone #3B is bordered by the COSW boundary along the north, east and west, and McKenzie Creek along most of the south. The Southern Railway additionally runs along the east.

3.5.3.1 FMU #3 - Fire Management Objectives

Fire management objectives specific to FMU #3 are:

- ❑ Conduct initial attack within 90 minutes of the time a wildland fire report is received.

- Control 95% or higher of all wildland fires during initial attack.
- Conduct prescribed burning of four units, totaling 560 acres (two of these units extend south into the very upper portion of FMU #4, zone #4C).

3.5.3.2 FMU #3 - Fuel Characteristics / Fire Behavior

The primary fuel model represented in both zones is P (southern pine needle litter), with scattered pockets of E or R (hardwood leaf litter depending upon the season), and D (pine seedlings/saplings, green wax myrtle) or O (cured/dead wax myrtle). (According to park FMO Patrick Dege, patches of D or O, the largest of which is about 20 acres in size, total approximately 80 acres). The fuel model represented in the floodplain portion of zone #3B is E or R.

See section 3.4.4.3 for fuel characteristics and Table 2 for potential fire behavior under average and extreme conditions. See Figure 8 for a delineation of fuel models.

3.5.4 Fire Management Unit #4: Floodplain

FMU #4 contains 18,900 acres, almost all floodplain, divided into six management zones (see Figure 7). For the purposes of wildland fire suppression, however, FMU #4 will be considered a single unit rather than separate zones.

Zone #4A comprises roughly 3,400 acres. It is bordered by Cedar Creek from the northwest to the southeast, Running Gut and Deep Jackson Gut along the south, the Congaree River along the southwest, and the COSW boundary along the west.

Zone #4B comprises roughly 3,400 acres. It is bordered by Cedar Creek along the north and east, Horsepen Gut and Running Gut along the south, and Running Gut along the west.

Zone #4C comprises roughly 2,800 acres. It is bordered by the COSW boundary and bluff line along the north, Toms Creek along the east, and Cedar Creek along the south and west.

Zone #4D comprises roughly 1,400 acres. It is bordered by McKenzie Creek along the north, the COSW boundary and Southern Railway along the east, Running Lake Creek along the south, and Toms Creek along the west.

Zone #4E comprises roughly 3,900 acres. It is bordered by Cedar Creek and Running Lake Creek along the north, the COSW boundary and Southern Railway along the east, the Congaree River along the south, and Mazyck Gut along the west.

Zone #4F comprises roughly 4,000 acres. It is bordered by Deep Jackson Gut, Running Gut, Horsepen Gut, and Cedar Creek along the north, Mazyck Gut along the east, and the Congaree River along the south and west.

3.5.4.1 FMU #4 - Fire Management Objectives

Fire management objectives specific to FMU #4 are:

- Conduct initial attack within 120 minutes of the time a wildland fire report is received.
- Control 95% or higher of all wildland fires during initial attack.

3.5.4.2 FMU #4 - Fuel Characteristics / Fire Behavior

The fuel model represented in FMU #4 is almost exclusively E or R (hardwood leaf litter, state of the leaf litter depending upon the season). Zones #4C, #4D and #4F contain scattered pockets of P (southern pine needle litter) and D (pine seedlings/pine saplings, green wax myrtle) or O (cured/dead wax myrtle). Due to their location within the floodplain, pockets of D or O should not burn as intensely as their upland counterparts, except under extreme conditions.

See section 3.4.4.3 for fuel characteristics and Table 2 for potential fire behavior under average and extreme conditions. See Figure 8 for a delineation of fuel models.

3.6 Values to Protect, Manage, or at Risk

- Human Health and Safety: Firefighter and public safety is the highest priority in every fire management activity. In light of this:
 - Only fully qualified (i.e. meeting NPS qualifications and accepted interagency knowledge, skills and abilities for the assigned fire job), red-carded employees will be assigned fire management duties (unless assigned as trainees, in which case they will be closely supervised by an individual fully qualified for the given position).
 - No fire management operation will be initiated until all personnel involved have received a safety briefing describing known hazards and mitigating actions (LCES)⁴, current fire season conditions, and current and predicted fire weather and behavior. Hazards specific to the park include:
 - Stinging/biting insects and poisonous snakes.
 - Dehydration, heat exhaustion and heat stroke.
 - Snags and dead trees with weak root systems.
 - Wildland fire incident commanders and prescribed fire bosses will minimize firefighter exposure to heavy smoke by incorporating the recommendations outlined in the publication *Health Hazards of Smoke* (Sharkey 1997), available from the Missoula Technology and Development Center.

⁴ LCES is an acronym intended to remind firefighters of the four key elements associated with firefighter safety: Lookouts, Communications, Escape Routes, and Safety Zones.

- Prescribed burning will not be conducted when atmospheric conditions exist that could permit degradation of air quality to a degree that negatively affects public health. Federal and state air quality standards will be the basis for this decision.
- Park neighbors, visitors and local residents will be notified of all planned and unplanned fire management events that have the potential to impact them.
- The COSW superintendent or designee may, as a safety precaution, temporarily close all or part of the park to the visiting public. In the case of prescribed fire, areas needing to be closed for visitor protection will be closed prior to the initiation of prescribed burning.
- Smoke on roadways will be monitored and traffic control provisions taken to ensure motorist safety during fire events at the park, as outlined in the *Congaree National Park Action Plan for Smoke on the Highway*, included in appendix 13.4. The following procedures will be taken to compensate for reduced visibility when a paved road is affected by smoke (the incident commander or prescribed fire boss on a particular event will determine visibility levels):
 - Posting of “Smoke on Road” signs on either side of the affected area.
 - In cooperation with the Richland County Sheriff’s Office, reducing the posted speed limit when visibility is greatly reduced, and escorting vehicles with a well-marked law enforcement vehicle as necessary.
 - In cooperation with the Richland County Sheriff’s Office, closing the road to traffic when visibility is severely reduced.
- Wilderness: All fire management activities within wilderness areas at the park will follow the minimum requirements determination (see section 2.6).
- Property: To the greatest extent feasible and appropriate, park infrastructure, any other development, and adjacent private property will be protected during all fire management activities.
- Natural and Cultural Resources: Natural and cultural resources will be protected from the adverse effects of unwanted fire as well as the adverse effects of fire management activities (see section 10.0). During all suppression activities, the minimum impact suppression tactics policy will be incorporated to the greatest extent feasible and appropriate, employing methods least damaging to park resources for the given situation (see section 4.2.7).
- Air and Water Quality: The park will comply with the Clean Air Act, the Clean Water Act, and all other applicable federal, state, and local laws and requirements. Additionally:

- The suppression response selected to manage a wildland fire will consider air quality standards.
- Fire weather forecasts will be used to correlate prescribed fire ignitions with periods of optimal combustion and smoke dispersal. Any smoke situation that threatens any smoke-sensitive areas will entail *immediate* suppression action.
- Because COSW is primarily a hydraulic ecosystem, chemical fire retardant and foam will not be used within any part of the park.
- Because prescribed fire will not be applied under extreme conditions, the probability of denuding the soil will be limited, thereby limiting the possibility of extreme erosion. (The primary threat to water quality is sediments and nutrients resulting from uncontrolled erosion.)

Figure 7 – Fire Management Units & Zones

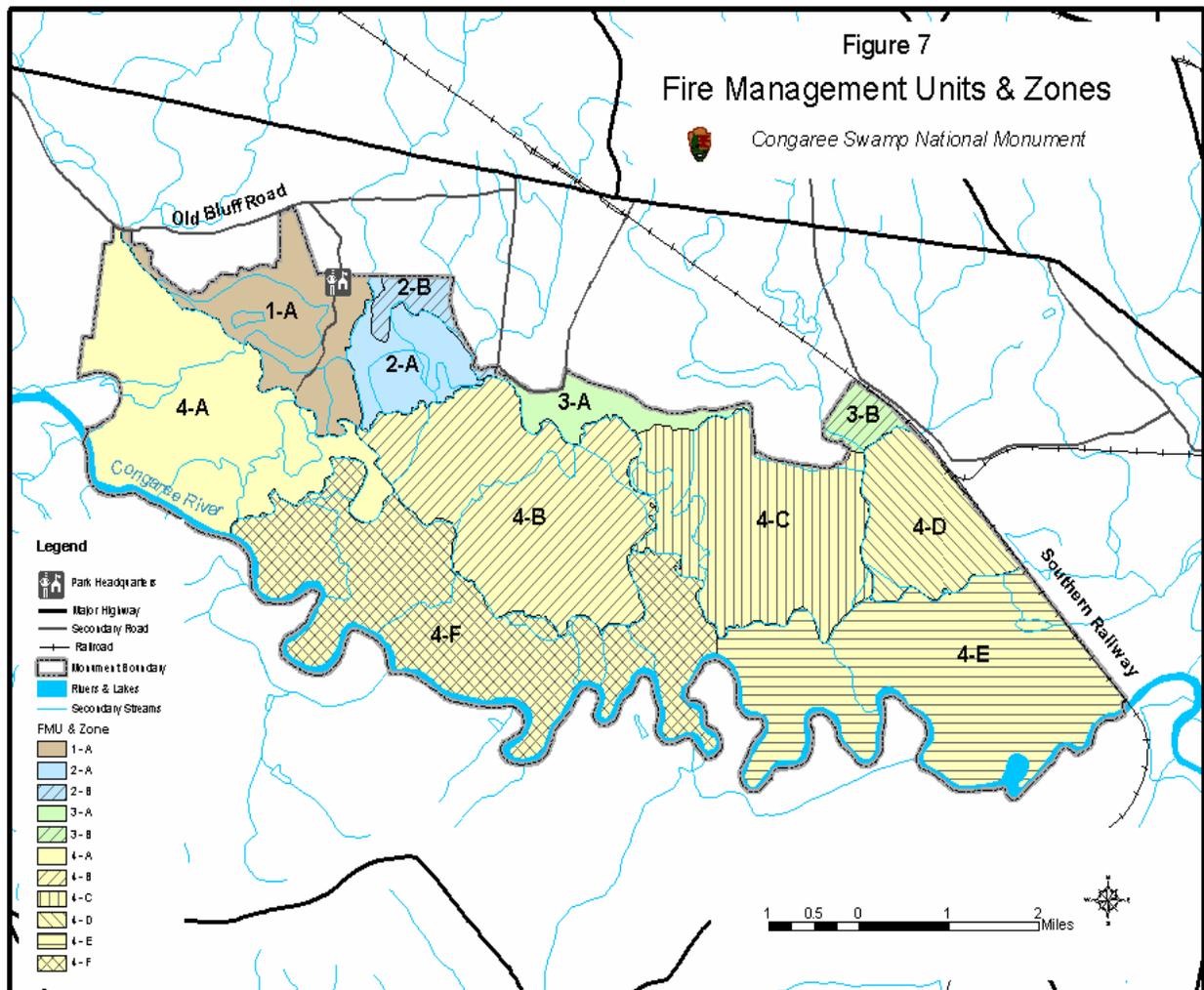
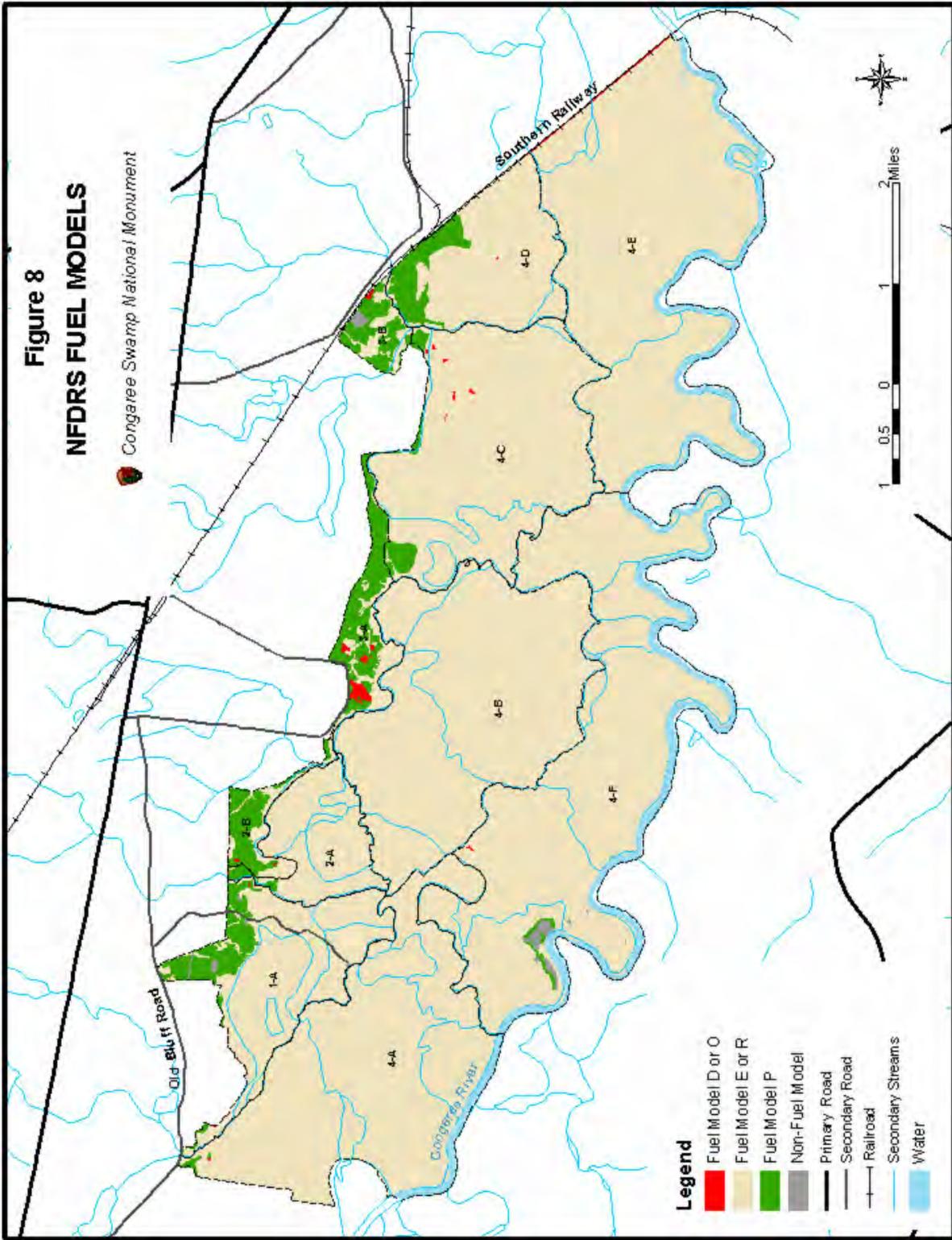


Figure 8 – NFDRS Fuel Models



4.0 WILDLAND FIRE MANAGEMENT PROGRAM COMPONENTS

4.1 General Implementation Procedures

As wildland fire will not be used for resource benefits at COSW, suppression is the only appropriate response to a wildland fire. The requirement for a decision checklist as part of the Stage 1: Initial Fire Assessment of the wildland fire implementation plan (WFIP) is considered to be met at the programmatic level in this Fire Management Plan.

4.2 Wildland Fire Suppression

As per NPS policy (*RM-18*, chapter 9),

The objective of wildland fire suppression...is to manage wildland fires safely and efficiently to accomplish protection objectives. It will be integrated into land and resource management plans and activities on a landscape scale...and will be based on best available science.

4.2.1 Range of Potential Fire Behavior

Weather and fuels are the primary influences upon fire behavior at COSW. Topography plays a minimal role, as the elevation change throughout the park is minimal and fairly gradual. Depending upon the season and fire weather conditions, fire behavior can range from low-intensity to extreme. During a typical year of normal conditions, most fires should be of low to moderate intensity at the park, and can be suppressed by direct attack strategies if desired (with the exception of pockets of NFDRS fuel model O [cured/dead wax myrtle, often mixed with pine seedlings/saplings], which supports flame lengths that preclude direct attack, even under average conditions). Because the floodplain is a hydraulic ecosystem, fire rarely exhibits extreme behavior in that portion (~90%) of the park.

During years of drought or other abnormal environmental conditions, extreme fire behavior can occur anywhere within the park, involving any of the fuel models. (Within the upland portion of COSW, extreme fire behavior occasionally occurs under normal conditions.) Extreme behavior may entail high fire intensity, rapid spread, long flame lengths, spotting, and (in rare cases) torching and crowning. Scattered patches of young pine and brush can act as ladder fuels, facilitating torching, and resulting in undesirable fire behavior such as excessive scorching.

See Table 1 for historic fire weather parameters for the COSW fire season, Table 2 for potential fire behavior under average and extreme conditions, and Table 3 for critical weather parameters resulting in the need for indirect attack. See section 3.4.4.3 for a discussion of park fuel characteristics and fire behavior.

4.2.2 Preparedness Actions

NPS policy requires that every unit with a fire management program incorporate preparedness considerations into its fire management plan (*RM-18*, chapter 7, provides guidelines).

Preparedness involves planning and implementing activities prior to wildland fire ignitions to keep the unit in a state of fire-readiness. It includes routine actions completed prior to fire season as well as incremental actions conducted during fire season in response to increasing fire danger. The COSW fire management officer (hereinafter referred to as the “park FMO”) is responsible for coordinating and completing preparedness tasks, and ensuring that the park has access to additional fire resources as needed. COSW preparedness will include:

- ❑ Maintaining a cache of supplies, materials, and equipment sufficient to meet normal fire year requirements. The park FMO will maintain the fire cache to the minimum standard of a 10-person cache (nomex, hand tools, personal protective equipment). Fire supplies will be inventoried and restocked as necessary prior to the advent of the fire season. Qualified employees will be issued initial attack gear and personal protective equipment from the cache. Permanent employees will retain their equipment when transferred to other NPS units. Temporary employees will return their equipment at the end of their employment period.

COSW maintains a 280 gallon (type 6) wildland fire engine. The engine will be inventoried and restocked as necessary prior to the advent of the fire season. All fire equipment (engine, pumps, chainsaws), will be inspected prior to the beginning of the fire season, and maintained in a state of readiness throughout the fire season.

- ❑ Maintaining fully-qualified personnel commensurate with the normal fire year workload.
- ❑ Preparing a step-up plan based upon staffing classes derived from the National Fire Danger Rating System (see section 4.2.2.5).
- ❑ Maintaining fire records, weather data, maps and other associated information. The park FMO will upload COSW data, including daily situation reports during fire events, to the Shared Application Computer System (hereinafter referred to as SACS), or the appropriate reporting system, and convert RAWs observations to NFDRS observations in WIMS (Weather Information Management System) daily. Other system options will be utilized as appropriate to maintain data on employee qualifications, hazard fuels, FIREPRO, etc.
- ❑ Preparing a pre-season risk analysis.
- ❑ Maintaining detection and initial attack capabilities. Fire detection will be accomplished primarily by park field personnel, with additional input from visitors, cooperators and adjacent landowners. During staffing class levels of 4 or 5, the park FMO will assign fire patrols as per the COSW step-up staffing plan. Also, the South Carolina Forestry Commission (SCFC) coordinates fire detection within the state via state-owned and contract aircraft. The number of flights and locations depend on the readiness level of the

day. (SCFC readiness levels roughly correlate to COSW staffing class levels 1 through 5; as the readiness level increases, the frequency of detection flights increases.) Even when COSW does not request special overflights, the SCFC still covers the immediate vicinity and reports fire locations to the park as appropriate.

- Providing a dispatch system for mobilizing wildland fire resources to local and out-of-area incidents. In order to facilitate rapid and efficient mobilization:
 - The park FMO will prepare a list of available fire-qualified personnel at the beginning of the fire season.
 - All fire-qualified personnel will be provided approved personal protective equipment and assigned park radios.
 - Response to fire will take priority over routine, scheduled work projects. Meeting park fire suppression needs will take priority over out-of-area assignments.
 - One squad (six people) will be available for initial attack throughout the fire season. They will keep their initial attack and overnight gear immediately available, and plan daily activities and off-duty hours so as to be ready to respond, fully equipped, within 15 minutes of mobilization. They will notify the park FMO of any planned annual leave and/or changes in their daily work schedules.
 - Personnel will receive specific travel, transportation and incident information at the time of mobilization.

Dispatch and mobilization guidelines and procedures are provided in the *National Interagency Mobilization Guide* and the *Southern Interagency Mobilization Guide*.

The park FMO will conduct an annual preseason fire readiness inspection, as outlined in the *Interagency Fire Readiness Review Guide*. The inspection will address detection, communication, dispatch, and response capabilities. It will also serve to determine whether or not COSW's current training levels, equipment, and organizational structure meet the standards described in this fire management plan.

4.2.2.1 Fire Prevention Activities

Prevention activities, designed to minimize the occurrence of human-caused wildland fires at the park, generally fall within one of three broad categories, as follow (*RM-18*, chapter 8, provides guidance):

- Education – Educating the public regarding the importance of wildland fire prevention can change people's behavior. Park methods include printed materials, signs, posters, face-to-face contacts with visitors, interpretive and educational programs, and outreach programs, all of which facilitate public awareness, understanding, and support.

- ❑ **Engineering** – Engineering involves reducing or eliminating fire risks (ignition sources) and hazards (fuels). Park methods include installing spark arresters on vehicles, utilizing fire-safe roofing materials (asphalt shingles or metal) on all buildings, maintaining a 50-foot defensible zone around all buildings, and using prescribed fire to reduce hazard fuels accumulations.
- ❑ **Enforcement** – Enforcement involves activities that ensure compliance with fire regulations and ordinances (including public use and access restrictions during times of high fire danger). It is park policy to aggressively investigate all wildland fires, both to identify the responsible party, and to gain information that can be applied to future prevention efforts.

A wildland fire prevention plan is included as appendix 13.7. This plan outlines specific activities related to public education, engineering, and enforcement, based upon an analysis of the park’s wildland fire risks, hazards and values.

4.2.2.2 Annual Training Needs of Fire Staff

NPS policy requires administrators to ensure that their employees are trained, certified, and made available to participate in the wildland fire program locally, regionally, and nationally as circumstances demand. NPS fire management training meets criteria specified within the training curriculum approved by the National Wildland Coordination Group (NWCG), which is tiered to positions described in the NWCG *Wildland Fire Qualifications*, *Prescribed Fire Job Qualifications*, and *Incident Command System Wildland Fire Job Performance* guides. The park FMO will conduct annual training need analyses, and coordinate training courses as appropriate. Courses identified will be based upon employee needs (as reflected in individual employee development plans), park fire management needs, and regional priorities. Training will be conducted on an interagency basis to the greatest extent possible. All fireline-qualified park staff will receive at least eight hours of annual safety refresher training (see section 8.1).

The park FMO will enter and maintain all pertinent employee data in SACS (or the appropriate reporting system), update those records annually, and ensure the accuracy and approval of annual red cards.

4.2.2.3 Annual Equipment and Supply Readiness Procedures

COSW maintains a cache of supplies and equipment sufficient to meet normal fire year requirements. Table 4 lists activities that will be performed to ensure the fire readiness of park personnel, supplies and equipment, as well as the month(s) that each should be accomplished

Table 4: Annual Fire Readiness Activities

	Jan	Feb	Mar	April	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Inspect fire engine weekly.	X	X	X	X	X	X	X	X	X	X	X	X
Maintain state of fire readiness as per step-up plan.	X	X	X	X	X	X	X	X	X	X	X	X
Convert RAWs observations to NFDRS observations in WIMS daily.	X	X	X	X	X	X	X	X	X	X	X	X
Update park firefighter qualifications.	X											
Complete park training analysis.	X											
Fitness test park staff.	X											
Issue updated red cards.		X										
Coordinate fire training.			X									
Submit FIREPRO funding requests.					X							
Inventory fire cache and fire engine; restock both as necessary.						X						
Inspect mechanical equipment, weather station.							X					
Submit fuels management funding requests.							X					
Complete project accomplishment reports.							X					
Update interagency agreements.								X				
Provide annual refresher training.									X			
Review fire management plan and program.									X			
Equip fire-qualified staff with PPE as needed.										X		

4.2.2.4 Fire Weather and Fire Danger

4.2.2.4.1 Weather Station

The park maintains a weather station (ID number 450791) included in the interagency Weather Information Management System (WIMS). This station measures pertinent fire danger parameters, facilitating accurate fire predictions and safety for fire personnel.

4.2.2.4.2 National Fire Danger Rating System

The National Fire Danger Rating System (NFDRS) enables a land management unit to determine fire danger based upon an evaluation of the upper limit of predicted fire behavior. Calculations of fire behavior are based on fuels, topography and weather. NFDRS outputs give relative ratings of potential wildland fire growth and behavior, thereby allowing a unit to systematically correlate its readiness level to the predicted fire problems of the day. COSW uses the burning index (the NPS standard) as its primary day-to-day indicator of the potential amount of effort needed to suppress a single fire in a particular fuel type within a given area, and the Keetch-Byram Drought Index as its primary drought indicator. Both of these indices influence decisions regarding prevention activities, initial attack, extended attack, and prescribed fire activities.

4.2.2.4.2.1 Burning Index

The burning index (BI) is a number on an open-ended scale (although typically between 0 and 100), expressing the potential amount of effort needed to suppress a single fire in a particular

fuel type within a given area. BI is based upon fuel model, fuel moisture, and current and forecasted weather parameters. As the BI increases, expected fire intensity increases. The higher the expected fire intensity, the more effort that will be necessary for fire suppression. Thus, BI directly influences the staffing class levels that are part of the park step-up staffing plan (see section 4.2.2.5).

4.2.2.4.2.2 Keetch-Byram Drought Index (KBDI)

The KBDI is a mathematically-calculated drought indicator relating to the amount of moisture in the top seven inches of soil or duff. It ranges from 0-800, with 0 being saturated and 800 indicating maximum drought. Drought directly influences the flammability of all fuel/vegetation complexes (as drought progresses the upper soil layers dry, increasing the amount of dead and cured live fuels available for consumption), which in turn influences fire behavior and control efforts. For a description of fire behavior and effects that can be expected at increasing levels of drought in the southeast, see Web site <http://www.tncfire.org/resource/keetch.htm>.

4.2.2.5 Step-Up Staffing Plan

As previously stated, COSW uses the burning index (BI) to indicate the potential amount of effort needed to suppress a single fire in a particular fuel type within a given area. This, in turn, determines the staffing class. Staffing classes range from 1 to 5 (lowest to highest). As BI increases, the staffing class level increases, with corresponding actions intended to mitigate the predicted difficulty of containing a wildland fire.

Table 5, below, illustrates the correlation between BI and step-up staffing class levels and actions. Burning index break points were established via a Fire Family Plus analysis, utilizing inputs from the Savannah River weather station (ID number 383101) in Aiken South Carolina (located approximately 59 miles southwest of the park), and fire history from the nearby Sumter National Forest. (It is understood that slight climatic and topographic differences exist between Aiken and COSW; however, insufficient weather data existed to run an analysis using COSW weather station inputs.) Staffing classes 4 and 5 were calculated at the 90th and the 97th percentiles, respectively. (Conditions exceeding the staffing class 4 parameters should occur only 10% of the time, and conditions exceeding the staffing class 5 parameters should occur only 3% of the time.) NFDRS fuel model P (southern pine needle litter) was utilized for step-up staffing purposes, as that is the primary fuel type of the park's uplands, where ignitions are likely to pose the greatest fire management problems at the park.

This BI/staffing class correlation should be validated based upon day-to-day observation and experience. As park managers have the opportunity to track indices influencing fire occurrence and size, the step-up staffing plan can be refined to better reflect large fire probability in the future.

Table 5: Burning Index, Staffing Class Level and Step-Up Actions

Burning Index	Staffing Class	Step-Up Actions
0-5	1	Fire engine and vehicles equipped with hand tools and maintained. Fire-qualified staff fire-ready, with all PPE and fire packs prepared and close-at-hand should suppression action become necessary.
6-10	2	All staffing class 1 actions continue. Campfires at bluff site campground restricted by informing campers of elevated fire danger and discouraging open fires.
11-20	3	All staffing class 1 and 2 actions continue. Park FMO computes daily BI / staffing class level and apprises all staff. Interpretive rangers and volunteers stress fire prevention in all visitor contacts. Notification of high fire danger posted on all park bulletin boards. Fire-qualified staff remain within 30 minutes of learning center except in emergency situations. Park FMO may implement fire spotting or prevention patrols.
21-26	4	All staffing class 1, 2 and 3 actions continue. Park FMO informs SC Interagency Communication Center daily of conditions. Fire-qualified staff advised of potential for extended tour-of duty. Daily patrols conducted of low northern bluffs.
27+	5	All staffing class 1, 2, 3 and 4 actions continue. COSW superintendent cancels leave, authorizes overtime for fire-qualified staff. Tours-of-duty for fire-qualified park staff extended to 7 days/wk, 10 hrs/day. Fire-qualified staff on call 24 hours/day for suppression duty. Comprehensive prevention effort undertaken, stressing visitor contact and notification of conditions, appropriate signing, and issuing fire danger warnings to local radio stations. COSW superintendent may, as a safety precaution, close all or part of park.

* Park FMO has authority to raise the staffing class one level to account for increased risk of starts/increased suppression difficulty due to human activity, drought, additions to the fuel load, etc.

ONPS and FIREPRO fund routine preparedness actions conducted in staffing classes 1 through 3. Emergency preparedness funds are available from the Southeast Regional Office (SERO) to accomplish approved step-up activities for staffing classes 4 and 5. If severity funding is necessary, the park FMO will submit a written assessment of the current and potential situation, including a description of mitigating actions and costs to the SERO FMO.

4.2.3 Pre-Attack Plan

RM-18, chapter 7, provides a pre-attack planning checklist that will serve as a reminder of various elements to be considered at the park (as applicable) upon reaching staffing class levels 4 and 5.

4.2.4 Initial Attack

Initial attack forces comprise the first suppression personnel to arrive at a fire, as well as any reinforcements that arrive during the first burning period. The incident commander (IC), who will be at least ICT5-qualified, will develop an appropriate management response to the incident, organize and direct the fire resources on hand toward safe, efficient implementation of that response, monitor the effectiveness of the suppression tactics, and adjust strategy and tactics accordingly. If the IC is not qualified for the existing or predicted level of complexity,

s/he will be replaced by a qualified IC at the first opportunity. The IC will be responsible for the fire until it is out or until s/he is relieved of that duty via a formal command change.

4.2.4.1 Information Used to Set Initial Attack Priorities

The goal in all initial attack actions is to suppress the fire in a safe, cost-effective manner, consistent with resource management objectives. Initial attack priorities at COSW are tiered to firefighter and public safety (the highest priority in every fire management activity) and the threat that the wildland fire poses to park values. Factors considered in assessing the degree of threat that the fire poses include the fire location, fuels, current and forecasted weather, and current and predicted fire behavior. When multiple fires are reported, fires occurring in the wildland-urban interface will take priority over fires occurring in natural areas.

4.2.4.2 Criteria for Appropriate Initial Attack Response

The appropriate initial attack response will be determined from an analysis of the given situation and must be consistent with the park's general and resource management objectives. Factors dictating the appropriate response include firefighter and public safety, fire location, current and predicted fire weather, current and predicted fire behavior, park values, cost-effectiveness, and potential adverse effects of both the fire and suppression efforts.

The appropriate initial attack response will vary from fire to fire and sometimes even along the perimeter of the same fire. Options range from monitoring with minimal on-the-ground disturbance to aggressive suppression actions along the entire fire perimeter.

4.2.4.3 Confinement as a Suppression Strategy

A confinement strategy may be implemented as the initial attack action as long as it is not used to meet resource objectives. Confinement is selected in lieu of wildland fire use to maximize firefighter safety, minimize suppression costs, minimize cost + loss in low-valued and commodity resource areas, and to maximize availability of critical suppression and management resources during periods of high fire danger associated with fire in highly-valued resource areas.

Confinement may also be a strategic selection through the wildland fire situation analysis (WFSA) process when a fire is expected to exceed initial attack capability or planned management capability. When confinement is selected as the initial action, the same management process applies as for wildland fire use decisions. A long-term implementation plan is needed to guide the implementation of the confinement strategy. The wildland fire implementation plan (WFIP), prepared in stages, meets this requirement.

4.2.4.4 Typical Fire Response Time

The typical fire response time at the park varies from one FMU to the next. Regardless of the time of year or resource type, the response time to a fire in FMU #1 should take no more than

30 minutes from the time the fire report is received. The response times to fires in FMUs #2, #3 and #4 should take no more than 60, 90 and 120 minutes, respectively.

4.2.4.5 Restrictions and Special Concerns

Chainsaws, hand tools and drip torches may be used at any time for fire management purposes. Fire engines or slip-on units may be used as water sources, provided that they stay on existing roads. Heavy equipment such as bulldozers and plows for constructing fireline will be used only in extreme situations when high value resources are at risk, and then only with the authorization of the park superintendent or designee. Heavy equipment will not be used within the floodplain portion of the park due to the boggy conditions there. Fireline explosives will not be used at the park. Because COSW is primarily a hydraulic ecosystem, chemical fire retardant and foam will not be used anywhere within the park. Furthermore, National Environmental Protection Act (NEPA) compliance must be completed on all actions not already referenced in section 2.6 and/or appendix 13.3.3 of this plan. As 98.4% of the park is designated or proposed wilderness, all management activities must comply with NEPA requirements. A simple Minimum Requirement Analysis Worksheet is provided in Appendix 13.3.1 to make this process easier and more complete.

4.2.4.6 Work / Rest Guidelines, Rest and Recuperation

The *Interagency Incident Business Management Handbook* (chapter 10, section 12.6) provides comprehensive direction on work/rest guidelines and rest and recuperation (R&R). It also provides guidance on the application of management-directed days off for employees at their home units. Management of work schedules, directed days off and R&R will be incorporated as appropriate into COSW fire management activities to give personnel proper rest so they remain productive, mentally alert, and physically capable of performing their jobs safely.

4.2.5 Extended Attack and Large Fire Suppression

4.2.5.1 Determination of Extended Attack Needs

Extended attack occurs when a wildland fire escapes initial attack, when the appropriate management response has not been successful, or when a prescribed fire can no longer be implemented in accordance with the approved plan. It requires a wildland fire situation analysis (WFSA) to guide a re-evaluation of suppression strategies. The WFSA process determines current fire complexity and facilitates selection of a new management response, which in turn determines the number and type of resources needed for extended attack. Extended attack continues until the fire has been suppressed, or until transition to a higher-level incident management team is completed.

4.2.5.2 Implementation Plan Requirements—WFSA Development

A WFSA, required when extended attack occurs, serves as the decision record for selection of the appropriate management response. Whenever reasonable doubt exists regarding the

successful outcome of an initial attack response, the incident commander will immediately begin a WFSA.

4.2.5.3 Complexity Decision Process from Initial to Extended Attack

One of the WFSA components is a fire complexity analysis guide. This guide contains specific yes/no questions regarding fire elements, including current and predicted fire behavior, resources committed, resources threatened, safety, ownership/jurisdiction, external influences, change in strategy, and existing overhead. The total number of positive responses to the questions determines the complexity/management level of the fire, i.e. type I, type II, or type III. The incident commander will submit the WFSA to the park superintendent for approval. If fire complexity dictates, the park FMO will request an interagency incident management team (type I or II) through the South Carolina Interagency Coordination Center.

4.2.5.4 Incident Commander Delegation of Authority

When an incident management (IM) team is mobilized to a COSW fire event, the park FMO will coordinate the transition of authority for suppression actions and will serve as agency advisor to the team during their time on the incident. The park superintendent will execute a written limited delegation of authority to the incoming incident commander, which will be included in the briefing package provided to the incoming IM team. The park superintendent will also conduct the eventual close-out and evaluation of the team. Appendix 13.4 includes a copy of the COSW limited delegation of authority for an incoming incident commander.

4.2.6 Exceeding Existing WFIP, Selecting New Strategy

The existing wildland fire implementation plan (WFIP) is exceeded when a wildland fire escapes initial attack or when the appropriate management response has not been successful, or when a prescribed fire can no longer be implemented in accordance with the approved plan. The incident commander will initiate a wildland fire situation analysis (WFSA), from which the most appropriate management strategy will be determined.

4.2.7 Minimum Impact Suppression Tactics

NPS policy requires fire managers and firefighters to select management tactics commensurate with a wildland fire's existing or potential behavior, but which cause as little impact to natural and cultural resources as possible. All suppression activities at COSW will therefore incorporate the minimum impact suppression tactics policy, to the greatest extent feasible and appropriate for the given situation. Examples of minimum impact suppression tactics that will be implemented include:

- ❑ Keeping fire engines or slip-on units on existing roads.
- ❑ Restricting the use of heavy equipment for constructing fireline. A bulldozer or plow may be used for fireline construction only in extreme situations when high value resources are at risk, and then only with the authorization of the superintendent or designee. Heavy equipment will not be used within the park floodplain.
- ❑ Prohibiting the use of fireline explosives.

- ❑ Using existing natural fuel breaks and human-made barriers, wet line, or cold trailing the fire edge in lieu of handline construction whenever possible.
- ❑ Keeping fireline width as narrow as possible when it must be constructed.
- ❑ Avoiding ground disturbance within known natural (e.g. red-cockaded woodpecker habitat) and archeological/cultural/historic resource locations. When fireline construction is necessary in proximity to these resource locations it will involve as little ground disturbance as possible and be located as far outside of resource boundaries as possible.
- ❑ Prohibiting the use of fire retardant or foam anywhere within the park.
- ❑ Using soaker hose, sprinklers or foggers in mop-up; avoiding boring and hydraulic action.
- ❑ Minimizing cutting of trees.
- ❑ Scattering or removing debris as prescribed by the incident commander.
- ❑ Protecting air and water quality by complying with the Clean Air Act, the Clean Water Act, and all other applicable federal, state, and local laws and requirements.

RM-18, chapter 9, provides minimum impact suppression tactics guidelines. The COSW resource program manager will provide input in the selection and implementation of minimum impact suppression tactics for any wildland fires that go into extended attack. (Additional minimum impact suppression tactic guidelines can be found in Appendix A of the Environmental Assessment (EA) for this Wildland Fire Management Plan.) Reference should be made to section 2.6 and appendix 13.3.3 of this plan for further qualifications and restrictions of the use of tools within the park.

4.2.8 Rehabilitation Guidelines and Procedures

Fire rehabilitation involves short-term actions (generally 0-6 months) to stabilize a burned area and mitigate the effects of fire suppression activities. Immediate rehabilitation actions to prevent further land degradation or resource loss, or to ensure safety, may be undertaken as part of the incident. The incident commander is responsible for immediate rehabilitation action, which typically includes:

- ❑ Removing trash and debris from all incident locations and along the fireline.
- ❑ Flush-cutting all stumps created by suppression activities on the incident.
- ❑ Re-scattering brush and litter over constructed firelines and breaking up slash piles.
- ❑ Constructing water bars on firelines located on steep slope (the northern bluffs).

Firelines and burned areas will be allowed to regenerate naturally (as opposed to seeding), so as to maintain the undisturbed appearance of the park.

Rehabilitation actions may be funded through emergency fire operations accounts. The park resource program manager will plan major rehabilitation efforts, which cannot be undertaken during or immediately after an incident, for implementation as soon as feasible. Reference should be made to section 2.6 and appendix 13.3.3 of this plan for further qualifications and restrictions on the rehabilitation of park lands affected by fire management activities.

4.2.9 Reporting and Documentation

When COSW reaches staffing class levels 4 or 5, or upon confirmation of a wildland fire on park land, the park FMO will notify the Southeast Regional Office FMO of such at the earliest possible time. During a fire event, the park FMO will enter a daily situation report into SACS (or the appropriate reporting system). The park FMO will also complete a final record for each wildland fire, to be kept on file at COSW, which will include:

- ❑ Individual fire report DI-1202 (uploaded to SACS within 10 working days after the fire has been declared out)
- ❑ Narrative
- ❑ Wildland fire implementation plan
- ❑ Daily weather forecasts and spot weather forecasts
- ❑ Cumulative fire map showing acreage increase by day
- ❑ Total cost summary
- ❑ Monitoring data

GPS/GIS data should be the norm for recording location information whenever practical.

4.3 Prescribed Fire

Prescribed fires are ignited by management to achieve resource objectives, most often a combination of ecosystem restoration or maintenance objectives and reduction of high hazard fuel loadings. These objectives are not mutually exclusive and usually all prescribed fire operations contain a mix of them.

Prescribed fires must be described in a prescribed fire burn plan. The plan will contain a prescription defining goals, objectives, and treatment methods employed to achieve the objectives (see section 4.3.1.7).

Prescribed fire also may be used in concert with mechanical treatment. High hazard fuel conditions can be reduced while meeting structural objectives in areas immediately adjacent to infrastructure values or in boundary areas through a mix of mechanical treatment and prescribed fire. Mechanical treatment can be used as the primary method of reaching structural goals while prescribed fire actually removes the hazardous fuels.

Examples:

- ❑ There is a hazardous accumulation of fuels adjacent to urban interface values that can be mitigated with the use of prescribed fire. The main objective of the burn operation would be reducing high hazard fuels with ecosystem restoration as a secondary consideration.
- ❑ There is an area that requires restoration of the ecological fire process. There are no infrastructure values or boundary issues. The main objective of the burn would be restoration of ecological processes. The secondary objective would be reducing high hazard fuels.

- ❑ There is an area that has been prescribed burned for ecosystem restoration. For a variety of reasons, several constraints have precluded fire use for ecosystem maintenance. The area has missed 1 or 2 fire return intervals and is showing signs of high hazard fuels build-up, species composition shift, and increased stand density. The main objective of the burn would be for ecosystem maintenance purposes.

As previously discussed, prescribed fire will be used to achieve a variety of goals at the park, including:

- ❑ Restoring fire to the ecosystem, simulating the natural fire regime to the fullest extent possible, and thereby restoring and maintaining the integrity of the natural ecosystem and COSW's wilderness characteristics.
- ❑ Improving habitat for the endangered red-cockaded woodpecker and other native wildlife species.
- ❑ Reducing hazard fuels accumulations (which in turn reduces the threat of catastrophic wildland fire, reduces the risk of negative impacts to park resources in the event of a wildland fire, improves conditions for firefighter and public safety, and reduces suppression costs in the event of a wildland fire)
- ❑ Perpetuating natural resources and processes, as naturally influenced by fire.
- ❑ Promoting natural succession in disturbed areas.
- ❑ Controlling or eradicating exotic plant species.
- ❑ Initiating nutrient recycling for healthy soil conditions.

Selection of burning units and the seasonality of burning are evaluated prior to each fiscal year's budget submissions. Consultation is sought from the Resource Management Division of the park, regional and national fire effects personnel and individual researchers involved in fire and ecosystem research as well as other federal, state and local agencies.

Ideally the goal of prescribed fire at the park is to restore all natural fire regimes in a manner that mimics nature as closely as possible. This would involve burning all fire dependent areas of the park at the frequency and timing that could have been expected naturally. Due to safety and urban interface concerns however, it is not always possible to burn under completely natural conditions. According to Cecil C. Frost, Plant Ecologist with the North Carolina Department of Agriculture:

“Burning according to the fire frequencies... [figure 3 in this WFMP] ...should approximate the original fire regime. Slightly more frequent burning, however, may be justified in view of the fact that under prescribed burning conditions it will not often be acceptable to burn under conditions hot and dry enough to simulate the conditions under which most wildfires once occurred.” (Frost, 2001)

General plans for burning at the park over the next 5 years have been made based on the effects of past burns, along with information gained from researchers and fire effects personnel (Appendix 13.6).

4.3.1 Planning and Documentation

The prescribed fire program at COSW is tiered to resource management objectives. Permissible prescribed fire intensity will be based upon the desired fire effects specified in the burn prescription.

Prior to all COSW prescribed fires, the park FMO will obtain a burning permit from the South Carolina Forestry Commission. Nearby landowners and other interested parties, such as the Sheriff's Department or area fire departments, will be notified prior to and on the day of the planned ignition.

Go/no-go documents, one for the COSW superintendent's approval and the other for the prescribed fire burn boss, will be completed and signed prior to executing a prescribed fire. The superintendent's go/no-go approval is the final management approval prior to ignition of the prescribed fire. It is valid for up to 30 days after the approved date; if ignition does not occur prior to expiration of the superintendent's approval, a new go/no-go approval document will be completed.

The prescribed fire operations go/no-go checklist is the final operational confirmation that all requirements of the prescribed fire plan have been met and conditions are appropriate for initiation of the prescribed fire (i.e. do we commence with firing or not?). This checklist will be used as a daily validation until ignition is completed and there are no existing or eminent threats to the fireline/project boundary.

4.3.1.1 Annual Activities for Preparation and Implementation of Prescribed Fire Program

Table 6: Annual Prescribed Fire Program Activities

	Jan	Feb	Mar	April	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Inspect fire engine weekly.	X	X	X	X	X	X	X	X	X	X	X	X
Convert RAWs observations to NFDrs observations in WIMS daily.	X	X	X	X	X	X	X	X	X	X	X	X
Update park firefighter qualifications.	X											
Complete park training analysis.	X											
Fitness test park staff.	X											
Refurbish prescribed fire lines.	X			X	X	X	X	X	X	X	X	X
Conduct prescribed burning.	X			X	X	X	X	X	X	X	X	X
Issue updated red cards.		X										
Coordinate fire training.			X									
Submit FIREPRO funding requests.					X							
Inventory fire cache and fire engine; restock both as necessary.						X						
Inspect mechanical equipment, weather station.							X					
Submit fuels management funding requests.							X					
Complete project accomplishment reports.							X					
Provide annual refresher training.									X			
Review prescribed fire program.									X			
Equip fire-qualified staff with PPE as needed.										X		

4.3.1.2 Long-Term Prescribed Fire Strategy

See Appendix 13.6 for COSW’s five-year fuels treatment plan, including a display of planned burn units.

4.3.1.3 Personnel Requirements for Program Implementation

A certified prescribed fire burn boss is required to implement every prescribed fire at the park. The burn boss may be from another agency as long as s/he is qualified to burn in the fuel type of the proposed prescribed fire. The burn boss type (RXB1, RXB2) will be determined via the prescribed fire complexity rating process (see *RM-18*, chapter 10). The burn boss will use the complexity rating process to determine the minimum type, number and response time of holding resources. Prescribed fire crewmembers will each be minimally qualified at the type II firefighter level. NPS burn bosses and all other positions assigned to prescribed fires at the park will meet all national requirements for training and experience.

In the absence of qualified COSW personnel, the park FMO will coordinate with cooperators to obtain qualified personnel. The park FMO will obtain any necessary regional and national clearance for use of such personnel.

4.3.1.4 Prescribed Fire Monitoring

See section 6.3 for a discussion of monitoring.

4.3.1.5 Prescribed Fire Project Critiques

See section 11.1 for a discussion of wildland fire and prescribed fire critiques.

4.3.1.6 Reporting and Documentation Requirements for Accomplishments and Escaped Fires

The burn boss on a prescribed fire will document the fire with the following information, stored individually in COSW files:

- ❑ Original signed prescribed fire plan
- ❑ Checklist of pre-burn prescribed fire activities
- ❑ All reviewer comments
- ❑ All maps
- ❑ Notification checklist
- ❑ Permits (e.g. burn, smoke, etc.)
- ❑ Monitoring data
- ❑ Weather forecasts
- ❑ Agency administrator go/no-go pre-ignition approval
- ❑ Operational go/no-go checklist
- ❑ Incident action plan(s)
- ❑ Unit logs, daily validation, or other unit leader documentation
- ❑ Press releases, public comments, complaints
- ❑ Smoke dispersal information
- ❑ Post-fire critique
- ❑ Individual fire report Fire DI-1202, completed by the burn boss and entered into SACS within 10 working days after the fire has been declared out

4.3.1.7 Prescribed Fire Plan

An individual plan is required for every prescribed fire application. While prescribed fire plans will vary in their degree of detail depending upon the scale of the application, each of the following elements will be fully considered (see chapter 10 of *RM-18* for element details):

- ❑ Technical review
- ❑ Seasonal severity
- ❑ Collaborative planning and review
- ❑ Prescribed fire project plan, which will include, at a minimum:
 - Signature page
 - Executive summary
 - Description of the prescribed fire area
 - Goals and objectives
 - Justification
 - Risk management
 - Project complexity
 - Organization

- Cost
- Scheduling
- Pre-burn considerations
- Prescription
- Ignition and holding actions (including test fire, firing and ignition, holding actions, critical holding areas, project area division, and mop-up operations)
- Wildland fire transition (contingency) plan
- Protection of sensitive features (include compliance with all applicable NEPA and NHPA requirements)
- Public and firefighter safety
- Smoke management
- Interagency coordination and public information (including media releases, public notice postings, notifications)
- Monitoring (including fire behavior and fire effects)
- Post-fire rehabilitation
- Post-fire reports
- Appendices (including reviewer comments, technical reviewer checklist and comments, maps, prescribed fire complexity rating worksheet, fire modeling outputs, adequate holding resources worksheet, agency administrator go/no-go pre-ignition approval, and prescribed fire operations go/no-go checklist)

All burn plans used at COSW will follow the above format.

4.3.2 Exceeding Existing Prescribed Fire Plan

If a prescribed fire can no longer be implemented in accordance with the approved plan, the entire prescribed fire area will be declared a wildland fire, and suppression action taken. All subsequent action (i.e. initial incident commander, operational needs, notifications, strategies, resource orders, etc.) will be defined under the wildland fire transition plan, included in the prescribed fire plan. The contingency plan should be tiered to the worst-case scenario, utilizing current fire behavior processing systems for the fuel types and conditions outside the burn block and adjacent to the project area. In the event that the contingency plan is unsuccessful, the incident commander will develop a WFSA (see section 4.2.5.2).

4.3.3 Air Quality and Smoke Management

As a chemical air pollutant, smoke is subject to scrutiny under federal legislation established by the Environmental Protection Agency. In addition to posing health risks, smoke can reduce visibility many miles away from its source, affecting the safe operation of automobiles and aircraft and diminishing the quality of scenic views.

As previously stated, COSW is designated a class II air shed under the Clean Air Act. Under class II, modest increases in air pollution are allowed beyond baseline levels for particulate matter, sulfur dioxide, nitrogen and nitrogen dioxide, provided that the national ambient air quality standards, established by the Environmental Protection Agency (EPA), are not exceeded. The fire management program at COSW will manage smoke in compliance with

the Clean Air Act and South Carolina State requirements, so as to minimize its effects on park visitors, firefighters, adjoining lands and neighbors, natural and cultural resources, and roads and highways. Smoke management will be incorporated into all COSW fire management planning and operations. Each prescribed fire plan will include smoke trajectory maps and identify smoke-sensitive areas. Fire weather forecasts will be used to correlate ignitions with periods of optimal combustion and smoke dispersal. Mitigation measures will be defined in the plan and arrangements made prior to ignition to ensure that designated resources are available if needed to implement the mitigation measures. Prescribed fire will not be implemented when atmospheric conditions exist that could permit degradation of air quality to a degree that negatively affects public health. (Federal and state air quality standards will be the basis for this decision.) Any smoke situation that arises and threatens any smoke-sensitive areas will entail *immediate* suppression action.

Smoke on roadways will be monitored and traffic control provisions taken to ensure motorist safety during fire events at the park, as outlined in the *Congaree National Park Action Plan for Smoke on the Highway*, included in appendix 13.4. The following procedures will be taken to compensate for reduced visibility when a paved road is affected by smoke (the incident commander or prescribed fire boss on a particular event will determine visibility levels):

- Posting of “Smoke on Road” signs on either side of the affected area.
- In cooperation with the Richland County Sheriff’s Office, reducing the posted speed limit when visibility is greatly reduced, and escorting vehicles with a well-marked law enforcement vehicle as necessary.
- In cooperation with the Richland County Sheriff’s Office, closing the road to traffic when visibility is severely reduced.

4.4 Non-Fire Fuel Treatment Applications

Non-fire fuels management at the park includes manual and mechanical techniques to maintain existing defensible space of 50 feet around all park buildings. All non-fire applications will be conducted in compliance with NEPA, NHPA, and other legal requirements.

4.5 Emergency Rehabilitation and Restoration

Burned area stabilization and rehabilitation actions are intended to protect public safety, stabilize and minimize unacceptable change to biotic communities, improve ecosystem structure and function according to approved field unit management plans, and repair or replace minor facilities damaged or destroyed by a wildland fire. Burned area rehabilitation (BAR) subactivity funds can only be used for treatments on agency lands within the perimeter of the fire or impact area downstream from the burned area. The use of BAR funding is further limited based on treatment effectiveness and to improve economic efficiencies. The Interagency Burned Area Emergency Stabilization and Rehabilitation Handbook provides treatment guidance and standards.

5.0 ORGANIZATIONAL AND BUDGETARY PARAMETERS

5.1 Fire Management Team Member Responsibilities⁵

SUPERINTENDENT

- Approves:
 - Park fire management plan.
 - Delegation of authority and briefing statement for incoming incident management teams.
 - Prescribed fire plans.
 - Wildland fire situation analysis.
- Ensures that:
 - All aspects of the park fire management program are effectively planned and implemented.
 - The park fire management plan is reviewed and revised as necessary.
 - An adequate number of trained and qualified personnel is available (onsite or via intra- and interagency cooperation) to meet park fire management needs.
- Conducts a post-fire critique of every wildland and prescribed fire at the park.
- Establishes and maintains cooperative relationships with the public, media, other agencies, and park neighbors regarding COSW's fire management program.
- May, as a safety precaution, temporarily close all or part of the park to the visiting public in the case of a wildland fire or as necessary during prescribed fire operations.

PARK FMO

- Plans, coordinates and implements all aspects of the park fire management program, including:
 - Conducting an annual preseason fire readiness inspection.
 - Coordinating and completing preparedness tasks.
 - Maintaining park fire cache and fire equipment.
 - Conducting annual fire-related training need analyses; organizing or arranging for training courses as appropriate.
 - Maintaining a current roster of fire-qualified resources.
 - Conducting FIREPRO budgeting process, requesting and tracking emergency preparedness and suppression expenditures, and fuels management accounts.

⁵ One individual may act in more than one of these roles.

- Maintaining fire-related computer files and updating SACS (or the appropriate reporting system) and WIMS.
- Operating and maintaining the park weather station.
- Apprising park staff of staffing class levels, and any fire management activities.
- Providing fire-related input to park superintendent, including research proposals, and recommending restrictions/area closures, as appropriate, when fire danger reaches critical levels.
- Preparing delegation of authority for park superintendent's signature, and representing superintendent with incoming incident management teams.
- Serving as primary park initial attack incident commander.
- Coordinating patrols of the park during times of critical fire danger.
- Providing or coordinating the required physical fitness testing for park personnel.
- Ensuring that only NWCG-qualified personnel are assigned to fire management activities at COSW.
- Requesting additional fire resources as necessary through the SC Interagency Coordination Center, and serving as the primary mobilization coordinator for any park fire resources requested for out-of-area assignments.
- Planning and coordinating the park prescribed fire program.
- Obtaining burning permits as appropriate from the SC Forestry Commission.
- Collaborating with park superintendent to ensure that fire-related MOUs and cooperative agreements are updated/revised as appropriate.

LAW ENFORCEMENT OFFICER

- ❑ Investigates all wildland fire ignitions at the park.
- ❑ Conducts evacuations, controls/escorts traffic, and performs other public safety duties as needed during wildland fire and prescribed fire events.
- ❑ Assists park FMO in all fire-related duties; serves as alternate FMO as necessary.

RESOURCE MANAGEMENT SPECIALIST

- ❑ Coordinates with the U.S. Fish and Wildlife Service to ensure that COSW has the most current data regarding identified sensitive, proposed, and listed species, as well as any proposed or designated critical habitat areas within its boundaries. Provides recommendations on how to mitigate adverse effects to these resources during fire management activities.
- ❑ Coordinates with the Southeast Archeological Center to ensure that COSW has the most current data regarding archeological resources within its boundaries. Provides recommendations on how to mitigate adverse effects to these resources during fire management activities.
- ❑ Provides input regarding minimum impact suppression tactics.

- ❑ Assists park FMO with prescribed fire program implementation by helping to determine prescribed fire units and objectives.
- ❑ Provides input regarding the fire monitoring program to ensure that prescribed fire at COSW effectively meets overall objectives.
- ❑ Coordinates any necessary compliance with Section 106 of the National Historic Preservation Act and Section 7 of the Endangered Species Act.

CHIEF RANGER

- ❑ Assists in fire management-related public education activities.
- ❑ Assists park FMO as needed.
- ❑ Enforces any temporary park closures.

ADMINISTRATION

- ❑ Notifies FMO and LEO of smoke/fire reports.
- ❑ Follows established mobilization guidelines.
- ❑ Acts as communication center during ongoing fire management activities.

SEASONAL EMPLOYEES

- ❑ Help maintain fire cache and fire equipment.
- ❑ Assist with prescribed fire program.
- ❑ Patrol COSW during times of critical fire danger.

5.2 FIREPRO Funding

FIREPRO funds are separate from the ONPS appropriation, and must be utilized for fire-dedicated functions. Base funding needs are calculated each year through the FIREPRO funding analysis. All positions base-funded by FIREPRO will remain dedicated to wildland fire management, with at least 80% of their normal tour-of-duty spent on wildland fire activities. FIREPRO provides funding for fire planning and oversight functions, budgeted activities necessary to prepare for the normal fire year, and for the development and implementation of the wildland fire suppression, emergency rehabilitation, and hazard fuels reduction programs. Reference should be made to section 2.6 and appendix 13.3.3 of this plan for further qualifications and restrictions of the use and implementation of the wildland fire suppression, emergency rehabilitation, and hazard fuels reduction programs at the park.

FIREPRO-funded fire management program elements include (*see chapter 18 of RM-18 for element details*):

- ❑ Preparedness
- ❑ Prescribed fire management
- ❑ Wildland fire management
- ❑ National resource crews
- ❑ Step-up plans
- ❑ Severity
- ❑ Emergency rehabilitation
- ❑ Hazard fuels reduction operations

5.3 Organizational Structure of Fire Management Program

Appendix 13.4 includes an organizational chart depicting the COSW fire management program and its relationship to the park’s overall organizational structure.

5.4 Interagency Coordination

COSW coordinates with the South Carolina Forestry Commission, the South Carolina Interagency Coordination Center, the Columbia-Richland Fire Service (which includes the City of Columbia Fire Department and the Gadsden Volunteer Fire Department), the Francis Marion and Sumter National Forests, and the Richland County Sheriff’s Office (*see chapter 5 of RM-18 for authority and guidelines regarding interagency coordination*).

5.5 Interagency Contacts

City of Columbia Fire Department, (803) 733-8350
Francis Marion and Sumter National Forests, (803) 561-4086
Gadsden Volunteer Fire Department, (803) 733-8350
South Carolina Forestry Commission, Columbia, (803) 896-8800
South Carolina Interagency Coordination Center, (803) 561-4086
Richland County Sheriff’s Department, (803) 691-9000

5.6 Fire-Related Agreements

COSW maintains a memorandum of understanding (MOU) with the Columbia-Richland Fire Service. The COSW superintendent and FMO reviews the MOU annually and updates as necessary. A statewide reciprocal fire protection MOU exists between the National Park Service and the South Carolina Forestry Commission, including an annual operating plan. Appendix 13.4 includes copies of fire-related MOUs.

COSW has no structural firefighting capability. All structural fire events at the park will be referred to the Columbia-Richland Fire Service under the authority of the City of Columbia Fire Department. The COSW Emergency Response Plan, filed onsite, contains a structural fire control plan, with specific guidelines to be followed in the event of a structural fire at the park.

6.0 MONITORING

6.1 NPS Fire Monitoring Handbook

NPS policy requires managers to monitor the effects of all wildland and prescribed fires. Monitoring directives, summarized here from *Director's Order #18* are:

- ❑ Fire effects monitoring must be done to evaluate the degree to which objectives are accomplished.
- ❑ Long-term monitoring is required to document that overall programmatic objectives are being met and undesired effects are not occurring.
- ❑ Evaluation of fire effects data is the joint responsibility of fire management and natural resource management personnel.

COSW will conduct its fire monitoring program in accordance with the *NPS Fire Monitoring Handbook 2001 (FMH 2001)*, which outlines standardized methods to be used for monitoring both wildland and prescribed fires. Monitoring protocols will be reviewed and approved at the Southeast Regional Office level before receiving funding.

6.2 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 7 illustrates how these monitoring levels correspond to the given park management strategy.

Table 7: 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 the fire.	1. Environmental 2. Fire observation - Reconnaissance - Fire conditions
Prescribed fire: Management uses intentionally set fires as a management tool to meet management 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.

6.3 Wildland and Prescribed Fire Monitoring

As indicated, wildland fire suppression requires level 1 and the first stage of level 2 monitoring. Level 1 monitoring, coordinated by the park FMO, involves environmental or planning data that provide the basic background information needed for decision-making when a wildland fire occurs. The reconnaissance stage of level 2 monitoring, coordinated by

the incident commander, provides a basic overview of a fire event. Monitoring the effect of suppressed wildland fire on vegetation or other area-specific variables can identify specific threats to park resources, facilitate adjustments to suppression actions, and identify the need for a rehabilitation response.

Prescribed fire requires all four monitoring levels to determine changes/trends in fuel loading and vegetative composition over time. These changes, sometimes subtle, can be critical indicators of whether the prescribed fire program is meeting specific objectives. Levels 3 and 4 monitoring objectives are tiered to resource and fire management objectives. COSW fire and resource managers will collaborate to ensure that prescribed fire effectively meets overall objectives.

Level 3 (short-term change) monitoring provides information on vegetative change within a specific vegetation and fuel complex. These data allow for a quantitative evaluation of whether or not a stated objective was achieved. Data are collected primarily through sampling of permanent monitoring transects or plots. Level 4 (long-term change) monitoring typically involves a continuation of level 3 monitoring at the same permanent transects or plots and serves to identify trends that can guide management decisions.

In coordination with the Southeast Regional Office Fire Ecologist, monitoring plots have been established at select locations within the park. The Great Smoky Mountains Fire Effects Team will conduct the levels 3 and 4 monitoring of these plots and complete associated documentation. The information gathered will be used as feedback to make any necessary refinements or changes to the prescribed fire objectives and prescriptions in place at the park. The monitoring program will continue to be refined as more intelligence is gathered through research regarding the role of fire in the various park vegetation communities.

7.0 FIRE RESEARCH

7.1 Previous and / or Ongoing Fire Research

Fire ecologist Dr. Cecil Frost recently completed an analysis of remnant savanna vegetation within the park uplands. Combining this information with historical survey records, Dr. Frost created two maps—uplands presettlement vegetation and uplands presettlement fire frequency (see Figures 3 and 4).

Future research regarding the appropriateness of wildland fire use for resource benefits as a management option will focus upon:

- ❑ Wildland fire effects on forest ecology and succession.
- ❑ The natural role, history and effects of fire in the park's floodplain ecosystem.
- ❑ The relationship and effects of natural and human-caused wildland fire ignitions on resource ecology.
- ❑ Land use patterns within and around COSW that influence the effectiveness of wildland fire use.

7.2 Fire Research Needs as Determined by Resource Management Plan

The COSW resource management plan states that:

...the fire history of the area should be more thoroughly studied and documented including soil coring of the organic and inorganic soils. This historical account would provide a better understanding of the role fire ecology plays within river floodplains and the effect of fire on a variety of plant communities and animal populations. There are numerous areas within the interior of the monument [park] where scarification from fire is evident. Whether it is entirely from human-caused sources or natural causes is a judgment guess, at best.

Secondly, and equally important, is the need to develop appropriate fire behavior and basic fuel models pertinent to fire at COSW. A better description of fire behavior and basic fuel models is needed to identify the fire management zones most susceptible to wildland fire and spread. Also, such information would better enable management to develop fire suppression tactics and attack strategies.

8.0 FIREFIGHTER AND PUBLIC SAFETY

8.1 Firefighter Safety and Related Training, Qualifications, and Fitness Standards

Firefighter and public safety is the first priority in every fire management activity. Agency administrators at all levels must stress that firefighter and public safety *always* takes precedence over property and resource loss. This policy will be emphasized throughout all fire management operations at the park.

NPS wildland fire training, qualification, and certification system meets or exceeds all National Wildfire Coordinating Group (NWCG) standards. Only fully qualified (i.e. meeting NPS qualifications and accepted interagency knowledge, skills and abilities for the assigned fire job), red-carded employees will be assigned fire management duties (unless assigned as trainees, in which case they will be closely supervised by an individual fully qualified for the given position). All personnel (including emergency hire firefighters) engaged in fireline operations must have completed a minimum of 32 hours of basic wildland fire training, including the modules on basic firefighting, basic fire behavior, and standards for survival⁶. The park FMO will coordinate at least eight hours of mandatory annual safety refresher training for all COSW staff likely to be on the fireline.

Refresher training will concentrate on local conditions and factors, the 10 Standard Fire Orders, 18 Watch Out Situations, LCES (Lookouts, Communication, Escape Routes, Safety Zones), and common denominators of tragedies and near-miss situations. NWCG courses such as Standards for Survival, Lessons Learned, and Look Up, Look Down, Look Around, meet the firefighter safety refresher training requirement. Hands-on fire shelter inspection and deployment practice *will* be included as part of the annual refresher. Efforts should be made to vary the training from one year to the next. It can be presented in an eight-hour block or in increments. The park FMO will document completed training in SACS (or the appropriate reporting system) for each firefighter.

All park fire management personnel will be equipped with approved personal protection equipment (PPE) and trained in its proper use. Operational personnel on wildland and prescribed fires are required to use the PPE. Mandatory PPE includes:

- ❑ 8” high, laced, leather boots with lug soles
- ❑ Fire shelter
- ❑ Hard hat with chin strap
- ❑ Goggles/safety glass
- ❑ Ear plugs
- ❑ Nomex shirt and trousers
- ❑ Leather gloves

⁶ Exceptions to this are members of the City of Columbia Fire Department and the Gadsden Volunteer Fire Department, who adhere to state-determined standards during the first operational period of a wildland fire (beyond that, they must adhere to NWCG standards).

The NPS *Wildland Fire Qualification System Guide* contains a supplemental list of PPE. Special PPE and hazard analysis is required for operations involving fuel gelling agents, fireline explosives, aircraft (particularly helicopters), and chainsaw operations.

Prior to and throughout all fire management field operations at the park, fireline supervisors will cover safety factors with incident personnel, via operational briefings beforehand and safety briefings that occur during the incident. At least one person operationally qualified at a level corresponding to the complexity of the given incident should be assigned responsibility for safety oversight. Fireline supervisors will designate lookouts, and all operational personnel will maintain open lines of communication and know where escape routes and safety zones are located at all times. No NPS employee, contractor or cooperator will ever be intentionally exposed to life-threatening conditions (see *RM-18*, chapter 3, for further safety-related planning and operational guidelines).

NPS policy requires that all personnel (including emergency firefighters) engaged in suppression and prescribed fire duties meet the physical fitness standards set by the NWCG. Physical fitness/work capacity levels for wildland firefighters and other fire-qualified employees will be determined by the “pack test” series of tests. Descriptions of the three work capacity levels (light, moderate and arduous), as well as medical and physical fitness requirements and procedures are outlined in the NWCG *Wildland Fire Qualifications Subsystem Guide*. The park FMO will annually administer (or coordinate the administration of) the pack test to COSW fire management personnel and will maintain up-to-date records of employee qualifications.

8.2 Public Safety Issues / Concerns, and Mitigation Procedures

Under no circumstances will an individual be permitted near a wildland fire at COSW without the appropriate training and required personal protective equipment (PPE). Members of the press will be allowed in the vicinity of a fire only if they are determined to meet the standards established for the light fitness rating, wear the required PPE, and are accompanied by a trained, qualified firefighter who can assist them. In the case of a large wildland fire or prescribed fire operations, or during times of extraordinary fire danger, the COSW superintendent or designee may, as a safety precaution, temporarily close all or part of the park to the visiting public. The chief ranger is responsible for enforcing the closure. Every effort will be made to inform the general public of the situation and evacuate the area, if necessary. If a fire threatens to escape park boundaries, adjacent authorities and landowners will be given as much advance warning as possible so they may take appropriate action.

Every prescribed fire plan will outline safety measures. Actions will be taken as needed to ensure public safety, including contacting COSW neighbors with as much advance notice as possible for them to properly prepare for the event, posting signs at the park alerting visitors of the planned event, ensuring that areas to be ignited are cleared of all visitors prior to ignition, closing portions of the park as appropriate, and posting “smoke on road” signs and controlling/escorting traffic as needed.

9.0 PUBLIC INFORMATION AND EDUCATION

9.1 Public Information Capabilities and Needs

The COSW wildland fire prevention plan, included as appendix 13.7, outlines public information/education activities related to the park fire management program.

9.2 Step-Up Public Information Activities and Capabilities

Table 5 includes step-up public information activities correlating with escalating fire danger.

10.0 PROTECTION OF SENSITIVE RESOURCES

10.1 Archeological / Cultural / Historic Resources

Archeological sites at COSW are limited in number and size. Twenty eight historic or archeological sites are located within COSW of which 9 are included on the National Register of Historic Places. The sites are listed in figure 9 and described in the accompanying table (table 8).

The park will incorporate archeological/cultural/historic resources protection into fire management in a variety of ways. For example:

- The park resource program manager will coordinate with the Southeast Archeological Center to ensure that COSW has the most current data regarding archeological resources within its boundaries. S/he will provide recommendations on how to mitigate adverse effects (including the effects of smoke) to these resources during fire management activities, and will coordinate any additional compliance with Section 106 of the National Historic Preservation Act, as appropriate. As per the completed Minimum Requirement Analysis Worksheet incorporated herein as Appendix 13.3.3 and in the associated environmental assessment as Appendix C, all known cultural sites will be lined around to prevent any potential fire scarring or damage.
- In order to protect unknown cultural resources, all constructed fireline on prescribed and wildland fire activities at the monument will be accomplished through the use of primitive tools (rakes, shovels, etc...), blowers and hand and/or chainsaws. In no case will the disturbance of the ground be greater than a scraping off of the duff and litter layers to expose the mineral soil. This would also include the removal of surface roots from vegetation exposed through the removal of the duff and litter layer. Only in a matter of significant resource protection, authorized by the superintendent, or in a matter of life and death would mechanical methods, such as plows, be used to construct fireline.
- During all suppression activities, the minimum impact suppression tactics policy (see section 4.2.7) will be incorporated to the greatest extent feasible and appropriate for the given situation. Tactics directly or indirectly facilitating the protection of archeological/cultural/historic resources include:
 - Keeping fire engines or slip-on units on existing roads.
 - Restricting the use of heavy equipment for constructing firelines. A bulldozer or plow may be used for fireline construction only in extreme situations when high value resources are at risk, and then only with the authorization of the superintendent or designee. Heavy equipment will not be used within the park floodplain.
 - Not using fireline explosives.
 - Using existing natural fuel breaks and human-made barriers, wet line, or cold trailing the fire edge in lieu of fireline construction whenever possible.
 - Keeping fireline width as narrow as possible when it must be constructed.

- Avoiding ground disturbance within known archeological/cultural/historic resource locations. When fireline construction is necessary in proximity to these resource locations it will involve as little ground disturbance as possible and be located as far outside of resource boundaries as possible.
- Using soaker hose, sprinklers or foggers in mop-up; avoiding boring and hydraulic action.

10.2 Natural Resources

The park will incorporate natural resources protection into fire management in a variety of ways, including minimum impact suppression tactics. The tactics listed in 10.1 as directly or indirectly facilitating the protection of archeological/cultural/historic resources also directly or indirectly facilitate the protection of natural resources. Additional tactics include:

- Avoiding ground disturbance within known natural (e.g. red-cockaded woodpecker habitat) resource locations. When fireline construction is necessary in proximity to these resource locations it will involve as little ground disturbance as possible and be located as far outside of resource boundaries as possible.
- Using water instead of fire retardant. (Because the park is primarily a hydrological ecosystem, fire retardant and foam will not be used.)
- Minimizing cutting of trees.
- Protecting air and water quality by complying with the Clean Air Act, the Clean Water Act, and all other applicable federal, state, and local laws and requirements.

Prior to prescribed burning within red-cockaded woodpecker habitat, a non-flammable zone, five meters in diameter, will be cleared around the bases of all known cavity trees. This will involve using hand tools to scrape away duff and litter, and using hand tools or chainsaws to cut away the shrub layer within the zone.

The park resource program manager will coordinate with the U.S. Fish and Wildlife Service to ensure that COSW has the most current data regarding identified sensitive, proposed, and listed species, as well as any proposed or designated critical habitat areas within park boundaries. S/he will provide recommendations on how to mitigate adverse effects to these resources during fire management activities, and will coordinate compliance with Section 7 of the Endangered Species Act, as appropriate.

Figure 9 – Archeological Sites Inventory

**Congaree Swamp National Monument
Richland County, South Carolina**

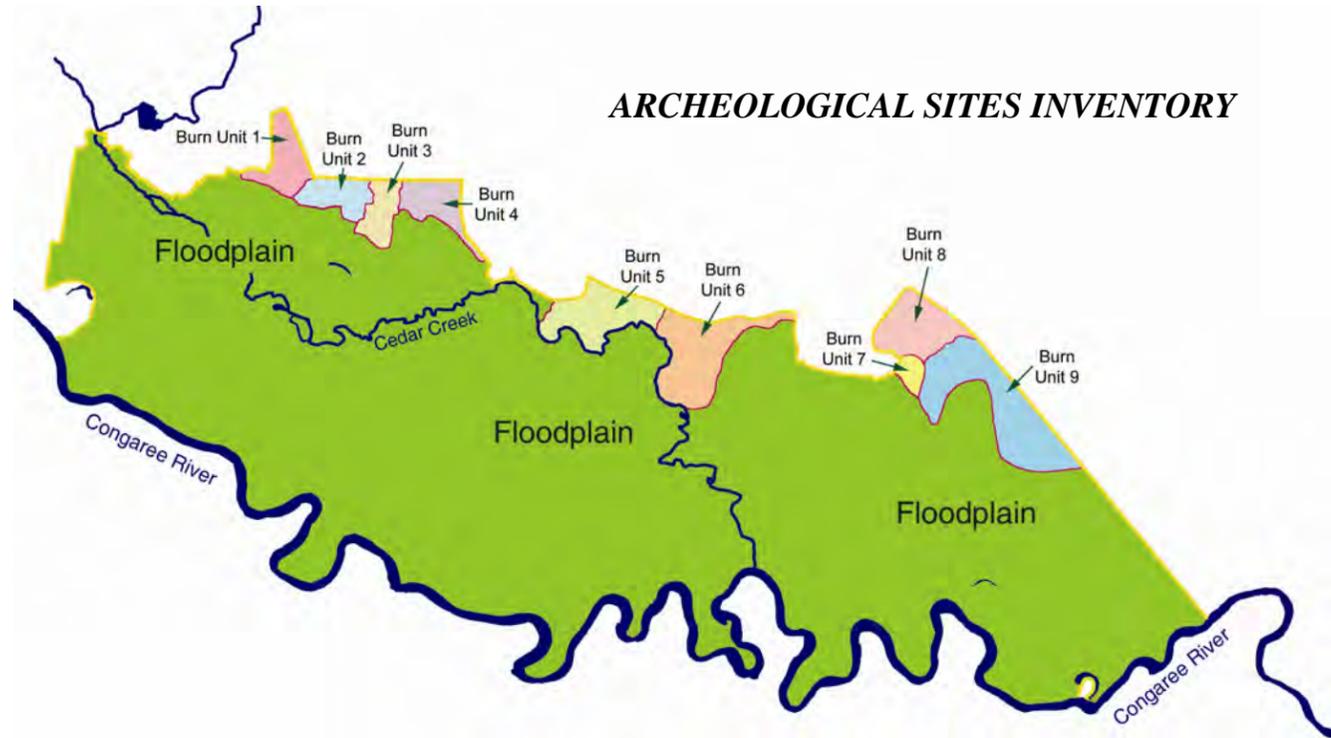


Table 8: Archeological Sites Inventory Legend

Map Area Location	Site ID #*	Name	Description**
Floodplain	38RD192	Dead River Dike	The dike was recorded as measuring approximately zero to three feet high, and its construction was assumed to be associated with slave labor. The dike ranges in height from two to four feet and is L-shaped, surrounding a nearby mound. A canal was described as running adjacent to the dike.
Floodplain	38RD193	Dead River Cattle Mound	A mound as measuring 45 feet by 75 feet and two feet high. The fill is a fine silty clay, though no test excavations were conducted. The construction of the mound was attributed to Paul Spigner sometime in the 1840s, and possibly built at roughly the same time as Cooner's Cattle Mound.
Floodplain	38RD195	Big Lake Cattle Mound	A mound, irregular in shape and measuring 75 feet by 35 feet, and two feet high.
Floodplain	38RD194	Cooner's Cattle Mound	A mound, rectangular in shape and measuring 160 feet by 52 feet, and five feet high.
Burn Unit 2	38RD198	Old Whiskey Still	The remains of rusted pails and cans, fragments of glass Mason-type jars, and copper pipes scattered across a 10 yard area. The still is evidence of the illegal production of moonshine whiskey, and according to COSW park ranger Guy Taylor, the still had been functioning up to the early 1970s.
Floodplain	38RD191	Northwest Boundary Dike	The dike measures an estimated 10 to 30 feet in width and five to six feet in height, and runs roughly from north to south for nearly 2000 feet. The dike is broken in several places.
Floodplain	38RD188	Blackchin Red	The site was identified on the basis of artifacts exposed on the ground surface, which consisted of a single chert flake, 44 rhyolite flakes, and one pottery sherd with sand-tempering. It was concluded that the existence of this site was probably not attributable to road fill, and may represent a brief prehistoric occupation.
Floodplain	38RD187	Carolina Spring	This site consisted of 3 rhyolite flakes.

Map Area Location	Site ID #*	Name	Description**
Floodplain	38RD196	Brady's Cattle Mound	A mound oval in shape, six to seven feet high and roughly 300 feet in circumference, with sides sloped at approximately 45 degrees.
Floodplain	38RD207	Huger's Bridge	The site consists of four pairs of earthworks. Wooden bridge ties were observed on the southernmost earthworks. These abutments are severely eroded.
Burn Unit 2	38RD199	New Whiskey Still	The site consists of two large steel boilers, several 30-gallon steel drums, fragments of glass Mason-type jars, pieces of black plastic hose, wire strainers, and charcoal. The Richland County Sheriff Dept. had destroyed the site with dynamite in the years just before the Monuments designation.
Floodplain	38RD197	Firebreak	The Firebreak site has been interpreted as a small prehistoric occupation, evidenced by a light scattering of five artifacts: two small sand-tempered pottery sherds, one of which had an indeterminate incised design, one fossiliferous chert thinning flake, and two pieces of shattered quartzite (possibly fire cracked)
Floodplain	38RD178	Southern Red	The "site" consisted of a single utilized quartz flake. The isolated find may have been imported with road fill.
Floodplain	38RD177	Spotted Dusky	This small site consisted of one chert thinning flake and a heat-treated chert biface fragment that may be the base of a Kirk Stemmed projectile point. Their presence at this location was possibly the result of soils being imported as road fill from an adjacent area, or from a non-adjacent area located within the Monument.
Floodplain	38RD176	Blackbelly	This site consisted of one chunk of light-yellow chert, one light-yellow chert flake with bifacial retouch, and one heat-treated chert biface basal fragment that possibly came from a Kirk Stemmed projectile point. These materials were probably deposited there along with imported road fill
Floodplain	38RD175	Flatwoods	This site consists of an isolated chert flake. The flake was probably deposited at this location during road maintenance along with imported road fill.
Floodplain	38RD179	Eastern Tiger	This site consisted of 13 shattered quartz cobbles, a silicified sandstone Morrow Mountain projectile point, a chert Yadkin projectile point, one heat treated chert projectile point fragment, the basal portion of a Kirk Stemmed projectile point made from heat altered chert, 9 rhyolite flakes, 2 chert flakes, and a heat-treated chert flake. Additionally, 3 sherds of sand-tempered plain pottery were recovered.
Floodplain	38RD173	Red Spotted	This site consisted of one heat-treated chert flake, which may have been brought in with road fill.
Floodplain	38RD174	Mudpuppy	This site consisted of a single flake of silicified sandstone. The flake may have been imported with road fill taken from adjacent soils.
Floodplain	38RD190	Sandbar	Materials recovered from this site include nine sherds of sand-tempered plain ceramics, three sand-tempered Lamar Complicated Stamped ceramic sherds, five sherds of an indeterminate stamped design, seven sherds of sand-tempered plain ceramics with a high degree of sand tempering, and one fragment of daub. All the sherds were described as being extremely eroded.
Floodplain	38RD229	Cook's Lake Cattle Mound	The mound is approximately three feet high with a circumference of roughly 165 feet and oval in shape. The sides of the mound are at a 45 degree slope, and the top is said to be flat.
Floodplain	38RD230	Southwest Boundary Dike	The site is approximately three to four feet high running northwest to southeast for approximately 650 feet. It is then cut through and continues for another 1300-1400 feet.
Floodplain	38RD231	Old Dead River Dike II	The dike is described as a remnant of an historic-period rice plantation. No further description of the site is given.
Floodplain	38RD1235	Buyck's Ring	The ring measures approximately 440 feet in circumference, with an interior diameter of 110 feet. The sides have an approximate 45 degree slope, and the raised levee was approximately four to five feet above the floodplain floor.
Floodplain	38RD1236	Cattle Mound #6	The mound is oval-shaped, measuring eight to ten feet high and roughly 400 feet in circumference, with a flat top and sides with a slope of approximately 45 degrees.
Floodplain	38RD1237	Starling's Mound	This mound measures approximately 13 feet wide by 30 feet long, running northeast to southwest.
Burn Unit 5	38RD1238	RCW Site	The site consists of nine red-brick piers, the remains of a well, and scattered glass bottles. The total size of the structure demarcated by the brick piers measured 10.8 by 12.1 feet, and the well measured approximately 4.9 to 5.9 feet in diameter and was roughly 6.2 feet meters deep.
Burn Unit 1	38RD1239	Entrance Road Site	Evidence of a former house site was found.

*Site ID number is assigned by the National Register of Historic Places

**Taken from the appendix of the Draft version of the "Archeological Overview and Assessment of Congaree Swamp National Monument, Richland County, South Carolina" by Meredith D. Hardy, M.A., M.S.: SEAC Accession #1817.

10.3 Development / Infrastructure / Inholdings

Park development/infrastructure includes the visitor center, learning center, maintenance compound, picnic area, boardwalk nature trails, and the air quality control monitoring station. These structures will be protected from wildland fire via defensible space around each (50 feet around buildings). Defensible space may consist of nonflammable material (asphalt, concrete), mowed grass, or a lack of fuel resulting from prescribed fire.

11.0 FIRE CRITIQUES AND ANNUAL PLAN REVIEW

11.1 Critiques

As per NPS policy, the park superintendent or designee will conduct a post-fire critique of every wildland and prescribed fire at COSW, involving as many personnel who participated in the incident as possible. The critique will follow *RM-18* (chapter 13) guidelines, and will cover all aspects of the incident, including safety, tactics, difficulties encountered, areas needing improvement, and whether or not specified objectives were met. The information gathered from these critiques will be used to continually improve the effectiveness and efficiency of the fire management program. The critique will be attached to the associated DI-1202 fire report as a permanent record, and stored in park fire files.

As previously stated, firefighter and public safety is the first priority in every fire management activity. Any incident which results in human entrapment, serious injury, fatalities, or near-misses, will be investigated and reviewed, with appropriate administrative action taken based upon investigation results. Additionally, the park superintendent may request a regional-level review of any incident in which:

- ❑ The fire crosses park boundaries into another jurisdiction without the approval of the adjacent landowner or agency.
- ❑ The park receives adverse media attention.
- ❑ Significant property damage occurs.
- ❑ Controversy involving another agency occurs.

The Southeast Regional Office FMO will conduct an in-depth review of any wildland fires involving a type I or type II team.

11.2 Annual Plan Review

The park FMO will review the fire management plan annually and identify any changes that should be made to improve the effectiveness of the plan. The COSW superintendent will approve significant changes to the body of the plan (excluding grammatical corrections, minor procedural changes, deletions, corrections, and additions to the appendices). The park FMO will promptly forward copies of all changes to the Southeast Regional Office FMO for review and comment. Changes requiring approval will be submitted with a new cover sheet for signatures and dates, which will replace the original cover sheet.

A formal plan review will be conducted every five years, and the plan will be revised to incorporate any policy changes that have occurred in that five-year period.

12.0 CONSULTATION AND COORDINATION

The following individuals provided assistance and guidance in the preparation of this plan:

Clint Cross, Wildland Urban Interface Coordinator, Southeast Regional Office
Bob Dillenger, Fire Ecologist, Great Smoky Mountains National Park
Patrick Dege, Fire Management Officer, COSW
Dr. Cecil Frost, Fire Ecologist, NC Department of Agriculture and Consumer Services
Ken Garvin, Regional Fire Management Officer, Southeast Regional Office
Dean Gettinger, Regional Fire GIS Specialist, Southeast Regional Office
Caroline Noble, Regional Fire Ecologist, Southeast Regional Office
Bobbi Simpson, Former Resource Management Specialist, COSW
Kevin Scasny, Fire Weather Meteorologist, Southern Area Coordination Center
Kevin Walsh, Regional Prescribed Fire Specialist, Southeast Regional Office

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13.0 APPENDICES TO THE WFMP

- 13.1 References Cited
- 13.2 Definitions of Fire Management Terms
- 13.3 NEPA Compliance
- 13.4 Supplemental Information
 - 13.4.1 Fire Call-Up List
 - 13.4.2 Preparedness Inventory
 - 13.4.3 Memoranda of Understanding
 - 13.4.4 Limited Delegation of Authority
 - 13.4.5 Fire Management Program Organizational Chart
- 13.5 Wildland and Prescribed Fire Monitoring Plan
- 13.6 Five-Year Fuels Treatment Plan
 - 13.6.1 Multi-Year Prescribed Fire Schedule
 - 13.6.2 Hazard Fuels Reduction Areas and Schedule
- 13.7 Wildland Fire Prevention Plan

Appendix 13.1

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Appendix 13.2

Definitions of Terms, as They Pertain to Fire Management

Burning index (BI): A relative number related to the contribution that fire behavior makes to the amount of effort needed to contain a fire in a specified fuel type. Doubling the burning index indicates that twice the effort will be required to contain a fire in that fuel type as was previously required, providing all other parameters are held constant.

Confinement: The restriction of a wildland fire within specific boundaries identified prior to or during the fire event. The boundaries, which are natural or human-made barriers, serve to confine the fire. Direct and/or indirect attack methods can be taken to hold the fire at the barriers, including backfiring, cold trailing, use of hose lays, and patrolling or mopping up the fire perimeter.

Cultural resource: Any physical evidence of past human activity used to reconstruct human history and prehistory.

Direct attack: Any treatment applied directly to burning fuel such as wetting, smothering, or chemically quenching the fire or by physically separating the burning from unburned fuel.

Extended attack: Occurs when a wildland fire cannot be controlled through initial attack and requires more than two operational periods to be controlled, and/or when the appropriate management response has not been successful. Extended attack implies that the complexity level of the incident will increase beyond the capabilities of initial attack incident command.

Fire management plan (FMP): A strategic document that defines a long-term program to manage wildland and prescribed fires within an NPS unit, in support of the unit's general and resource management plans.

Fire management unit (FMU): Any land management area definable by objectives, topographic features, access, values to be protected, political boundaries, fuel types, major fire regimes, etc. that set it apart from management characteristics of an adjacent unit.

Fire regime: The pattern of fire in an area as determined by its systematic interaction with the biotic and physical environment. It includes the timing, number, spatial distribution, size, duration, behavior, return interval, and effects of natural fires.

Fire weather: Weather conditions that affect fire ignition, behavior, and suppression.

Fuel: All combustible material, including grasses, dead branches and pine needles on the ground, standing live and dead trees, flammable minerals near the surface (e.g. coal) and

human-built structures. Fuels are generally divided into four size classes based on their ability to ignite:

- ❑ 1 - hour time lag - <1/4" diameter (grass, litter, duff)
- ❑ 10 - hour time lag – 1/4" to 1" diameter (twigs, small stems)
- ❑ 100 - hour time lag – 1" to 3" diameter (branches)
- ❑ 1000 - hour time lag - >3" diameter (large branches and stems)

Fuel model: A simulated fuel complex for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.

Hazard fuels: Large or abnormal fuel concentrations that form a special threat of ignition and resistance to control.

Hazards: The fuels and topography on which a wildland fire will spread.

Holding actions: Planned actions required to achieve wildland and prescribed fire management objectives. 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 (IC): Person responsible for incident activities including the development and implementation of strategic decisions, and for approving, ordering and releasing resources.

Indirect attack: A method of suppression in which the control line is located some considerable distance away from the fire's active edge. Generally done in the case of a fast-spreading or high-intensity fire and to utilize natural or constructed firebreaks or fuel breaks and favorable breaks in the topography. The intervening fuel is usually backfired; but occasionally the main fire is allowed to burn to the line, depending on conditions.

Initial attack: The actions taken by the first resources to arrive at a wildland fire to protect lives and property, and prevent further extension of the fire.

National Fire Danger Rating System (NFDRS): A set of computer programs and algorithms that allow a unit to estimate fire danger, based on an evaluation of the upper limit of predicted fire behavior.

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.

Prescribed Fire: A management-ignited wildland fire that burns under specified conditions of weather, fuel moisture, soil moisture, etc., which allow confinement of the fire to a

predetermined area, and at the same time produce the fire behavior and fire characteristics required to accomplish planned management objectives.

Risk: Any heat source or human activity that can result in wildland fire ignition.

Suppression: All actions intended to extinguish or limit the growth of a fire, regardless of the strategies or tactics chosen.

Values: Areas where losses from wildland fire are unacceptable, such as archeological sites, developments, endangered species, adjacent land, etc.

Wildland fire: Any non-structural fire, other than prescribed fire, that occurs in the wildland.

Wildland fire implementation plan (WFIP): A progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a wildland fire. A full WFIP consists of three stages. Different levels of completion may occur for differing management strategies (i.e., fires managed for resource benefits will have two-three stages of the WFIP completed, while some fires that receive a suppression response may only have a portion of stage I completed.)

Wildland fire situation analysis (WFSA): A systematic decision-making process that evaluates alternative management strategies to determine the most appropriate management strategy for a particular situation. Reasonable management alternatives are identified, analyzed and evaluated, consistent with the expected probability of success/consequences of failure. Evaluation criteria include firefighter and public safety, anticipated costs, resource impacts, and environmental, social and political considerations. From the management alternatives, a preferred alternative is selected, and the decision documented. The evaluation must clearly identify the point at which failure of the alternative is imminent. This becomes the triggering mechanism for re-evaluation of the WFSA, at which point the WFSA is amended or a new WFSA is completed to develop new alternatives.

Wildland fire use: The permitting of a naturally-ignited fire to burn under specific, predetermined environmental conditions, in pre-designated areas, in order to achieve defined resource management objectives.

Weather Information and Management System (WIMS): An interactive computer system designed to accommodate the weather information needs of all federal and state natural resource management agencies. Provides timely access to weather forecasts, current and historical weather data, the National Fire Danger Rating System (NFDRS), and the National Interagency Fire Management Integrated Database (NIFMID).

Appendix 13.3

NEPA Compliance

13.3.1 Minimum Requirement Analysis Worksheet (Blank)

13.3.2 WFMP Environmental Assessment

13.3.3 Minimum Requirement Analysis Worksheet (Completed)

Appendix 13.3.1

MINIMUM REQUIREMENT ANALYSIS WORKSHEET CONGAREE NATIONAL PARK

COSW-180 (7/2003)

PROPOSED ACTION:

DATE:

LEAD PERSON(S):

WORK
UNIT(S):

PART A: Minimum Requirement *(should the action be done in wilderness)*

1 IS ACTION AN EMERGENCY?

Answer: Yes No

Explain:

YES

NO

ACT ACCORDING TO
APPROVED EMERGENCY
MINIMUM TOOL CRITERIA

2 DOES ACTION CONFLICT WITH LEGISLATION,
PLANNED WILDERNESS GOALS, OBJECTIVES
OR FUTURE DESIRED CONDITIONS?

Answer: Yes No

Explain:

YES

NO

DO NOT DO IT

3 IS ACTION PRE-APPROVED BY
THE WILDERNESS AND BACKCOUNTRY
OR OTHER PARK MANAGEMENT PLAN?

Answer: Yes No

Explain:

YES

NO

DO ACCORDING TO
APPROVED CRITERIA

4 CAN ACTION BE ACCOMPLISHED
THROUGH A LESS INTRUSIVE ACTION THAT
SHOULD BE TRIED FIRST? (Visitor Education...)

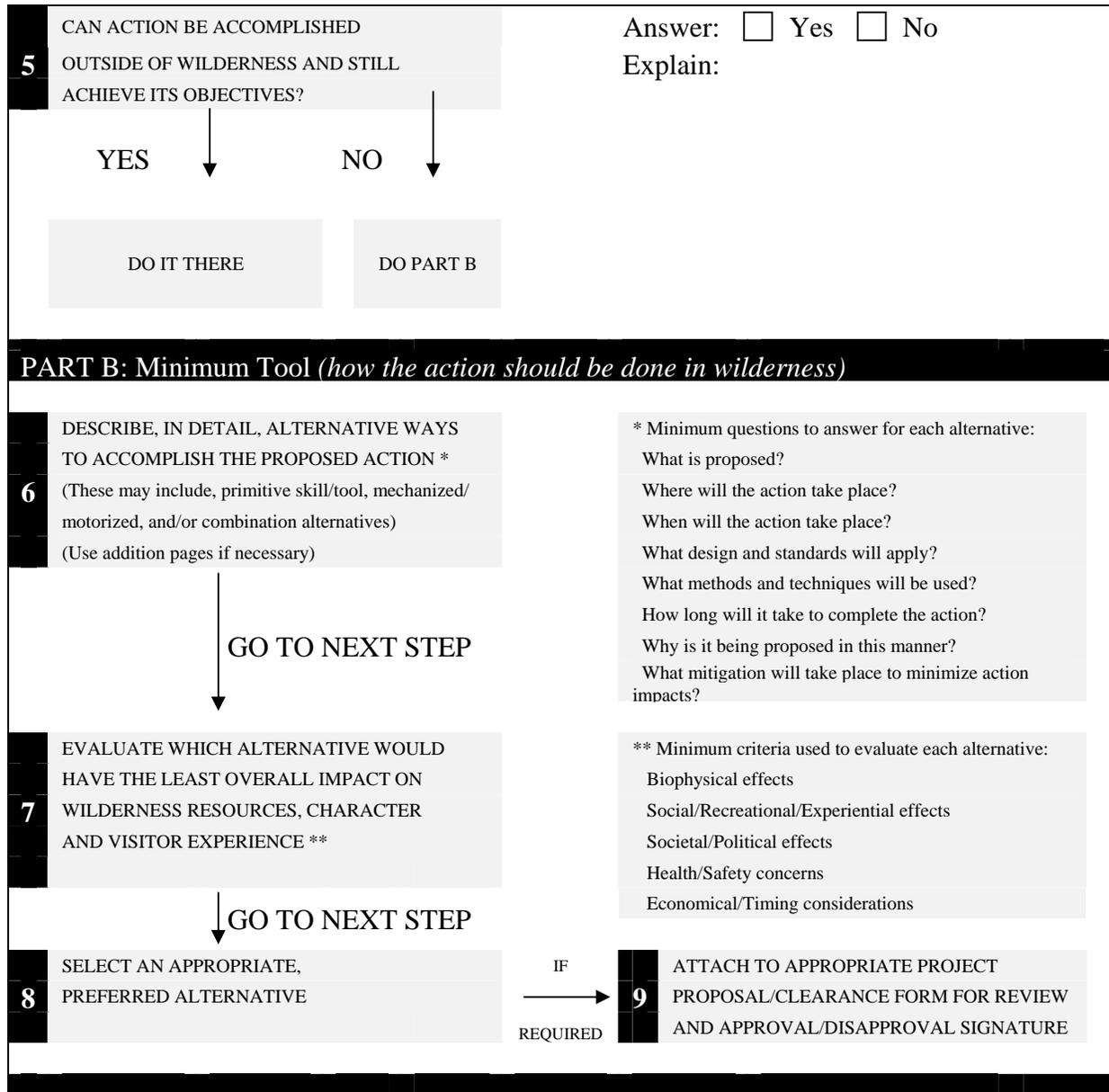
Answer: Yes No

Explain:

YES

NO

DO IT



PROJECT SUMMARY:

Goals:

Objectives:

Alternative 1 - _____

- a. What is proposed?*

- b. Where will the action take place?*

- c. When will the action take place?*

- d. What design and standards will apply?*

- e. What methods and techniques will be used?*

- f. How long will it take to complete the action?*

- g. Why is it being proposed in this manner?*

- h. What mitigation will take place to minimize the impact?*

Analysis:

Alternative 2 – _____

- a. What is proposed?*

- b. Where will the action take place?*

- c. When will the action take place?*

- d. What design and standards will apply?*

- e. What methods and techniques will be used?*

- f. How long will it take to complete the action?*

- g. Why is it being proposed in this manner?*

- h. What mitigation will take place to minimize the impact?*

Analysis:

Alternative 3 – _____

- a. What is proposed?*

- b. Where will the action take place?*

- c. When will the action take place?*

- d. What design and standards will apply?*

- e. What methods and techniques will be used?*

- f. How long will it take to complete the action?*

- g. Why is it being proposed in this manner?*

- h. What mitigation will take place to minimize the impact?*

Analysis:

Alternative 4 – _____

- a. What is proposed?*

- b. Where will the action take place?*

- c. When will the action take place?*

- d. What design and standards will apply?*

- e. What methods and techniques will be used?*

- f. How long will it take to complete the action?*

- g. Why is it being proposed in this manner?*

- h. What mitigation will take place to minimize the impact?*

Analysis:

Alternative 2: _____

1. Biophysical effects:

2. Social/Recreational/Experiential effects:

3. Societal/Political effects:

4. Health/Safety concerns:

5. Economic/Timing considerations:

Alternative 4: _____

1. Biophysical effects:

2. Social/Recreational/Experiential effects:

3. Societal/Political effects:

4. Health/Safety concerns:

5. Economic/Timing considerations:

Appendix 13.3.2

Environmental Assessment

5 CAN ACTION BE ACCOMPLISHED OUTSIDE OF WILDERNESS AND ACHIEVE ITS OBJECTIVES?

YES ↓ NO ↓

DO IT THERE DO PART B

Answer: Yes No
 Explain: The preparatory work needed to implement the prescribed fire project extends into designated or potential wilderness. It is necessary to construct control lines on the perimeter of the burn unit for safe implementation. Work within designated/potential wilderness prior to ignition as well as during ignition is addressed in this analysis.

PART B: Minimum Tool (how the action should be done in wilderness)

6 DESCRIBE, IN DETAIL, TO ACCOMPLISH THE PROPOSED (These may include, primitive skill/tool, motorized, and/or combination (Use addition pages if necessary)

↓ GO TO NEXT STEP ↓

7 EVALUATE WHICH ALTERNATIVE HAVE THE LEAST OVERALL WILDERNESS RESOURCES, AND VISITOR EXPERIENCE **

↓ GO TO NEXT STEP ↓

8 SELECT AN APPROPRIATE, PREFERRED ALTERNATIVE

IF → REQUIRED

9 ATTACH TO APPROPRIATE PROPOSAL/CLEARANCE FORM FOR AND APPROVAL/DISAPPROVAL

* Minimum questions to answer for each
 What is proposed?
 Where will the action take place?
 When will the action take place?
 What design and standards will apply?
 What methods and techniques will be used?
 How long will it take to complete the
 Why is it being proposed in this manner?
 What mitigation will take place to minimize action impacts?

** Minimum criteria used to evaluate each
 Biophysical effects
 Social/Recreational/Experiential effects
 Societal/Political effects
 Health/Safety concerns
 Economical/Timing considerations

PROJECT SUMMARY:

In response to the impacts of the 2000 fire season on urban interface communities, a National Fire Plan was developed that focuses on identifying communities at high risk from wildland fire and mitigating these risks through hazard fuel reduction efforts. The Wildland/Urban Interface initiative was enacted in 2001 that supported hazard fuel reduction projects adjacent to high-risk communities.

At Congaree National Park, the presence of vegetation characterized by moderate to high severity fire regimes and/or unnatural accumulations of fuels due to fire suppression actions and proximity of communities/structures to the Park’s north boundary creates a high risk wildland/urban interface situation. Late summer prevailing wind patterns can exacerbate this

situation. To help mitigate this risk, fire management is proposing to conduct a series of prescribed fires over the next six years (2003 to 2008) to reduce hazardous fuels along the park's northern boundary. These areas are delineated in the Wildland Fire Management Plan (WFMP) as Burn Units 1 through 8. Burning these units would help strengthen hazard fuel reduction activities (prescribed fires and mechanical fuel treatments) that have taken place between the northern boundary and the park's interior. These prescribed burn units are part of the original five year prescribed fire plan designed to restore the natural process of fire to the ecosystem as well as reduce fuel accumulations to further protect our neighbors to the north from catastrophic wildfire.

The primary goals of these prescribed fire projects are to reduce the risk of wildland fire to life and property. This will be accomplished by altering fuel loading, both surface as well as canopy, in order to modify fire behavior to a level that is safer and easier to control by firefighters in the event of a wildland fire. Specific project goals and objectives include:

Goals:

1. Within the pine plantation areas and abandoned fields:
 - Convert the sites to a more natural wilderness area
2. Within the scattered mature pine areas:
 - Improve wildlife habitat
 - Restore the historic fire regime
3. Entire Unit:
 - Hazardous fuel reduction
 - Improve endangered species habitat (Red cockaded woodpecker)

Objectives:

- Provide for firefighter and public safety
- Reduce litter and 1 and 10 hr woody fuel loads by >50% as measured immediately post-burn
- Achieve mortality on >50% of pole size trees as measured one year post-burn
- Limit mortality to less than 10% of overstory Longleaf pine as measured 2 years post-burn
- Limit mortality to less than 20% of overstory Loblolly pine as measured 2 years post-burn

Ultimately, the prescribed fire project will benefit wilderness values on a landscape level by minimizing the need for continued fire suppression and allowing fire to be managed in a manner that more readily mimics natural fire regimes and perpetuates natural processes.

To complete this prescribed fire project in a safe, effective, and controlled manner, first it will be crucial to prepare the unit perimeter by removing jackpot fuels as well as adjacent ladder fuels. Control lines or "firelines" will need to be established in appropriate areas (as needed to

contain a fire within a certain defensible area and prevent spread). Constructed fireline on prescribed and wildland fire activities at the park will be accomplished through the use of primitive tools (rakes, shovels, etc...), blowers, and hand and/or chainsaws. In no case will the disturbance of the ground be greater than a scrapping off of the duff and litter layers to expose the mineral soil. This would also include the removal of surface roots from vegetation exposed through the removal of the duff and litter layer. Only in a matter of significant resource protection, authorized by the superintendent, or in a matter of life and death would mechanical methods, such as plows, be used to construct fireline. In addition, during implementation of the burn it will be necessary to utilize water to maintain safe control of the fire. Prior to conducting the prescribed fire, notifications must be given and permit numbers obtained from the South Carolina Forestry Commission. Additionally a prescribed burn plan for each scheduled burn will be prepared and approved prior to implementation in order to further delineate the ground operations of the burn.

This minimum requirement analysis is intended to determine tool use for the completion of the prescribed fire projects located along the northern boundary of the park and as delineated in the WFMP as Burn Units 1 through 8, portions of which are within designated and/or potential wilderness.

The following alternatives have been analyzed in order to determine the appropriate tools to use when preparing control lines, implementing, monitoring and rehabilitating the aforementioned Prescribed Fire Projects: 1) No Action; 2) Primitive Tools Only; 3) Unrestricted Use of Non-Primitive Tools; and 4) Combination – Primitive Tools and Restricted Use of Mechanized/Motorized Tools.

Alternative 1 - No Action

- a. What is proposed?*
No action.
- b. Where will the action take place?*
N / A
- c. When will the action take place?*
N / A
- d. What design and standards will apply?*
N / A
- e. What methods and techniques will be used?*
N / A
- f. How long will it take to complete the action?*
N / A
- g. Why is it being proposed in this manner?*
N / A
- h. What mitigation will take place to minimize the impact?*
N / A

Analysis: No preparation work would take place and no prescribed fire projects would be implemented. This alternative would allow for the continued accumulation of dead and down

woody debris and dense vegetative conditions that could eventually lead to extreme fire behavior during a wildland fire. The risk to life and property would increase with time as the potential for extreme fire behavior increases. Park management would be restricted in the use of wildland fire used for resource benefit given the risk to adjacent communities in the event of fire escape. Suppression would be the primary management response to wildland fire ignitions in most areas on the north side of the park. Actions taken to suppress fires are often destructive to the environment and are not compatible with wilderness values. Absence of fire will continue to alter natural conditions within designated and potential wilderness and may result in negative impacts to forest ecosystems and loss of species due to habitat change and lack of disturbance.

Alternative 2 – Primitive Tools Only

a. What is proposed?

Conduct prescribed fire using primitive tools only, such as pruning shears, crosscut and hand saws, axes, hand scythes, bladder bags, handheld weather instruments, and non-mechanized/non-motorized water delivery systems in project areas during preparation work and execution of prescribed fire projects.

b. Where will the action take place?

Within, along and adjacent to each Prescribed Burn Unit (see project map).

c. When will the action take place?

Prescribed burn projects will begin between late spring and fall of each year (or later) depending on weather and fuel conditions. Control line prep work will begin prior to burn execution, preferably in spring or early summer of each year.

d. What design and standards will apply?

The Prescribed Burn Plan for each scheduled burn will comply with Chapter 10 of RM-18 requirements. Burn Plans include fire behavior modeling to determine a prescription that facilitates the safe execution of the prescribed fire as well as one that reduces fuel accumulations that will result in reduced fire behavior in the future. Restoring the natural role of fire to the environment is also a project goal.

e. What methods and techniques will be used?

Under this alternative pruning shears, council rakes, Mcleods, crosscut and hand saws would be used for removing trees and branches as well as dead and down material that would compromise the integrity of the control line. Bladder bags would be used for wetting adjacent non-target fuels as well as vegetation within a burn unit to reduce fire intensity. Gravity socks from porta-tanks positioned near roads would be utilized for delivering water to burn units. Handheld weather instruments would be used within designated/potential wilderness and observations recorded.

f. How long will it take to complete the action?

Under this alternative completion of unit preparation work could take many months. In addition the execution of prescribed burns would take much longer since it would require that each burn unit be divided into much smaller subunits to safely conduct prescribed fire. It is estimated that preparation work and implementation under this alternative would take 1-2 years.

g. Why is it being proposed in this manner?

It is being proposed in this manner to strictly comply with the use of primitive tools to protect wilderness values.

h. What mitigation will take place to minimize the impact?

Since this is the least intrusive, no additional mitigation to reduce impact can be utilized and still complete the project.

Analysis: Conducting prescribed fire using primitive tools only would necessitate breaking each burn unit into much smaller subunits to allow for the safe execution of prescribed fire. Burning in smaller subunits would require more established control lines, thus more impact to the wilderness environment.

Using primitive tools alone would increase the duration of each project because a reduction in the acreage burned per day would be needed to safely execute burns. In addition, even more fire personnel (see Appendix 10 of the burn plan) would be needed, thus increasing project costs and delaying the benefits of prescribed fire treatments. A much more conservative burn prescription would need to be applied to safely execute each burn, thus potentially reducing the ability to accomplish burn objectives. Safety of project personnel would be compromised in the event of escape fires due to the increased exposure to hazards during suppression activities. Using handheld weather instruments only would limit the environmental information that is needed for fire managers to make sound decisions regarding the implementation of prescribed fire. The use of primitive tools alone to complete prescribed fire projects would likely inhibit project completion due to safety concerns, unacceptable project costs, and substantial project delays.

Alternative 3 – Unrestricted Use of Non-primitive Tools

a. What is proposed?

Conduct prescribed fire allowing full use of mechanized/motorized equipment such as automated weather station, helicopter, engines, portable pumps, sprinkler systems, cord trimmers, and chainsaws in the project area during preparation work and execution of the Prescribed Fire Projects.

b. Where will the action take place?

Within, along and adjacent to the Prescribed Burn Unit (see project map).

c. When will the action take place?

The prescribed burn project will begin sometime between spring and fall of each year (or later) depending on weather and fuel conditions. The control line preparation work will occur prior to the burn execution, preferably in spring or early summer of each year.

d. What design and standards will apply?

The Prescribed Burn Plan for each scheduled burn will comply with Chapter 10 of RM-18 requirements. Burn Plans include fire behavior modeling to determine a prescription that facilitates the safe execution of the prescribed fire as well as one that reduces fuel accumulations that will result in reduced fire behavior in the future. Restoring the natural role of fire to the environment is also a project goal.

e. What methods and techniques will be used?

Chainsaws and cord trimmers will be utilized to prepare control lines prior to the execution of the prescribed burn. This involves the removal of dead and down material as well as trees and brush that might present a threat near the control lines. A portable weather station may be set up within the burn unit for recording weather observations in accordance with NPS requirements. Just prior to and on the day of burn execution, engines, portable pumps and

sprinklers may be used to adequately wet fuels to allow the safe execution of the prescribed burn. If needed, a helicopter may be utilized as an aerial platform for reconnaissance during ignition as well as for suppression purposes.

f. How long will it take to complete the action?

With the unrestricted use of the above tools the preparation of the unit would take only about 1-2 weeks. Execution of the prescribed burn would be much faster with helicopter reconnaissance, allowing for quicker and more aggressive ignition as well as suppression activities. It is estimated that ignition could be completed within a few days utilizing this alternative.

g. Why is it being proposed in this manner?

Using non-primitive tools would facilitate the most effective and timely implementation of prescribed fire projects. Using an automated weather station will provide fire managers with information that will help provide the knowledge of when and how the prescribed fire should be executed. The use of a helicopter, engines, portable pumps and sprinkler systems will ensure safe and efficient means for controlling potential spot fires or slopovers. Chainsaws would provide an efficient and safe method of preparing control lines as well as suppressing fires.

h. What mitigation will take place to minimize the impact?

The prep work will be completed as early in the spring or summer as possible to minimize the visual and auditory impact to visitors. Saw cuts will be camouflaged as much as possible in high visibility areas. The prep work will be completed in the fewest days possible by utilizing a large number of personnel in order to reduce the number of days of visitor / wildlife impact. Because of the relative ease with which portable pumps and sprinkler systems can be set up, these tools will not need to be deployed until a few days or so prior to planned burn execution. The portable weather station will be located in an unobtrusive area of the burn unit. Constructed fireline will be rehabbed following the prescribed burn. No chemical agents (such as foam) will be added to the water unless it is necessary for the saving of life or significant property, and is approved by the agency administrator or their representative. Portable pumps (and associated fuel cans) inside and outside the designated/potential wilderness will be placed on plastic/absorbent sheeting to prevent fuel spills onto the ground or into streams.

Analysis: Conducting prescribed fire projects allowing the full use of mechanized/motorized equipment would provide a cost-effective and safe preparation and implementation of prescribed burns. Through the use of non-primitive tools, larger subunits could be burned at one time, thereby reducing environmental impact caused by the need to create more fire control lines if these tools were not utilized. Completing prescribed burns will reduce fuel accumulations, thus reducing risks to life and property. In addition, designated/potential wilderness areas would benefit from the restoration of fire to its natural role in the ecosystem.

Alternative 4 – Combination – Primitive Tools and Restricted Use of Mechanized/Motorized Tools

a. What is proposed?

Conduct prescribed fire using a combination of primitive tools and mechanized/motorized equipment. Primitive tools (handsaws, crosscut saws, axes, and pruning shears) would be utilized within the designated/potential wilderness to the extent possible. Restrict the use of portable pumps (where possible), engines, weather station, and helicopter to outside the designated/potential wilderness area, unless the helicopter is needed for emergency suppression of spot fires or slopovers. A combination of chainsaws and handsaws would be used to prepare the control lines for project execution. Cord trimmers would be used minimally to prepare control lines through grassy areas.

b. Where will the action take place?

Within, along and adjacent to the Prescribed Burn Units (see project map).

c. When will the action take place?

Prescribed burn projects will begin between spring and fall of each year (or later) depending on weather and fuel conditions. Control line prep work will occur prior to burn execution, preferably in spring or early summer of each year.

d. What design and standards will apply?

Prescribed Burn Plan for each scheduled burn will comply with Chapter 10 of RM-18 requirements. Burn Plans include fire behavior modeling to determine a prescription that facilitates the safe execution of the prescribed fire as well as one that reduces fuel accumulations that will result in reduced fire behavior in the future. Restoring the natural role of fire to the environment is also a project goal.

e. What methods and techniques will be used?

A combination of pruning shears, axes, handsaws and chainsaws will be utilized to prepare control lines within designated/potential wilderness prior to the execution of prescribed burns. Handsaws, axes, and/or pruning shears will be used to the extent possible where fire personnel safety would not be compromised. Chainsaws would be used for felling trees and cutting large down and dead material. A portable weather station may be set up just inside the burn unit (but outside the designated/potential wilderness, where feasible) for recording weather observations. Just prior to and on the day of burn execution, portable pumps and sprinklers will be used to adequately wet fuels to ensure the controlled execution of the prescribed fire. Engines will only be stationed along the roads in the non-wilderness corridor, except in the event of an escape fire (emergency).

f. How long will it take to complete the action?

Using chainsaws and blowers in addition to hand tools will reduce the prep work from several months (if only primitive tools are used) to possibly 2 weeks. The ignition phase of the burn could be accomplished in 3 days or less as opposed to many weeks without the use of the helicopter (for emergencies), engines, sprinklers and pumps.

g. Why is it being proposed in this manner?

The work is being proposed in this manner to protect wilderness values to the extent possible but still facilitate the effective safe and timely implementation of the prescribed fire project. Locating the portable weather station in non-wilderness, although not ideal, will provide adequate information. Using handsaws, axes, and pruning shears where possible will slow the prep work somewhat but help minimize the impacts of power tools within the designated/potential wilderness. The use of chainsaws for felling trees and cutting large dead and down fuels along control lines will increase safety by minimizing exposure of fire personnel to the dangers associated with hand sawing. In addition, using chainsaws will expedite the prep work and in return allow the prescribed fire to occur sooner, thus reducing

the risk of high intensity, damaging wildfire. Utilizing a blower and/or a cord trimmer rather than a hand scythe would be safer and more efficient, as well as more effective for preparing control lines in grassy areas. Its use would also minimize the amount of ground disturbance that would be required. There is no prudent way to execute a burn without using portable pumps and sprinklers to help maintain control of the burn. The use of portable pumps and sprinkler systems will help ensure safe and efficient means for controlling potential spot fires or slopovers. The use of a helicopter and chainsaws would provide the most efficient methods of suppressing fires.

h. What mitigation will take place to minimize the impact?

The prep work will be completed as early in the spring or summer as possible to minimize the visual and auditory impact to visitors. Saw cuts will be camouflaged as much as possible in high visibility areas. The prep work will be completed utilizing a large number of personnel in order to reduce the number of days of visitor/wildlife impact. Because of the relative ease with which portable pumps and sprinkler systems can be set up, these tools will not need to be deployed until a few days prior to planned burn execution. The portable weather station will be located in an unobtrusive area at the edge of a given burn unit, outside the wilderness area where feasible. The helicopter (if needed) will be on call and utilized for emergencies only. Constructed fireline will be rehabbed following the completion of each prescribed burn. No chemical agents (such as foam) will be added to the water unless it is necessary for the saving of life or significant property, and is approved by the agency administrator or his/her representative. Portable pumps (and associated fuel cans) inside and outside the designated/potential wilderness will be placed on plastic/absorbent sheeting to prevent fuel spills onto the ground or into streams.

Analysis: This combination alternative utilizes both primitive tools as well as the restricted use of mechanized/motorized equipment. Some tools such as the weather station, most of the portable pumps, engines and the helicopter (except in the event of an emergency) will be operated outside (but adjacent to) the designated/potential wilderness. Primitive tools would be utilized to the extent possible within the interior of a burn unit where the safety of fire personnel will not be compromised. This alternative is a compromise between the unrestricted use of mechanized/motorized equipment and the complete use of primitive tools. The ability to use some non-primitive tools in designated/potential wilderness would help expedite unit preparations as well as increase efficiency and safety of prescribed fire implementation. In addition, because larger subunits could be burned under this alternative, fewer control lines would be needed, thus less resource damage would occur.

Preferred alternative: Alternative 4. Justification: This combination alternative provides the most efficient method of implementing prescribed fire while still protecting wilderness values within the project areas. Allowing the limited use of mechanized/motorized equipment as tools needed for control line preparation, monitoring, holding operations and for possible suppression activities in designated/potential wilderness would minimize impacts to wilderness values while providing a method of safely implementing prescribed fire. This will ultimately reduce risks of catastrophic wildland fire to life and property, thus perpetuating natural processes which are commensurate with wilderness values.

IMPACTS OF EACH ALTERNATIVE

Alternative 1: No Action

- 6) Biophysical effects: Not conducting Prescribed Fire Projects would limit park management's ability to use fire as a resource management tool. Fire is a key element in forest ecosystems in and adjacent to Congaree National Park. The continued absence of fire will alter the natural conditions of designated/potential wilderness and may result in loss of fire dependent species. Suppression-only would not be an appropriate management response for most areas on the north side of the park due to the prevailing wind patterns and continuous fuels leading into developed areas.
- 7) Social/Recreational/Experiential effects: No impact would be foreseen in the short term. However, in the event of unwanted wildland fire, suppression operations and/or evacuations and park closures could cause severe social/recreational/experiential impacts.
- 8) Societal/Political effects: Hazard fuel reduction projects, and, subsequently, prescribed fires, are federally mandated by the National Fire Plan to help protect life and property in close proximity to urban areas. The no-action alternative would deviate from this federal mandate. In the event of unwanted wildland fire, the lack of fuel treatments in and around developed areas may result in loss of life and property.
- 9) Health/Safety concerns: The risk to life and safety would increase over time as fuels continue to accumulate near developed areas. This would create conditions favorable for extreme fire behavior. In the event of unwanted wildland fire, lack of treated fuels would create fire behavior that would be more difficult to control. Given the proximity of communities and high densities of visitors during times of peak fire danger, the risk to life and property would continue to increase over time.
- 10) Economic/Timing considerations: No action at this time would result in higher costs in the future with suppression costs and/or reimbursement costs of property losses or lawsuits.

Alternative 2: Use of Primitive Tools only

Prescribed fire projects would be conducted using primitive tools only, including handheld weather instruments (no means of recording 24 hour data), bladder bags, and other non-mechanized/motorized water delivery systems, and only cross-cut saws or axes to suppress a spot fire or slopover.

At this time there is no known non-motorized water delivery system that could adequately be used to quickly attack spot fires. Because of the near impossibility of executing the burn safely and efficiently with only primitive tools, the prescribed fire would not take place therefore this alternative would be the same as the NO ACTION alternative.

Alternative 3: Unrestricted Use of Mechanized/Motorized Equipment

- 1) Biophysical effects: Prescribed fires would be conducted using mechanized/motorized equipment in each project area. The completion of prescribed fires would alter the current forest structure by increasing the live canopy spacing through the mortality of small trees and reducing dead and down fuels, thus creating a more open, natural forest featuring longleaf pine and related community types. In the event of a future unwanted wildland fire, prescribed fire areas could be used by fire fighting personnel to safely help slow and/or stop fire spread. The use of fire as a resource management tool would ultimately benefit wilderness values on a landscape level within the park. By allowing fire to occur, natural processes would be perpetuated and fire-dependent ecosystems/species would benefit.
- 2) Social/Recreational/Experiential effects: Short-term effects would include the associated noise, emission odors as well as visual impacts of equipment to hikers and other visitors. Project duration (perhaps up to 2 to 4 weeks) would be minimized through the use of mechanized/motorized equipment therefore reducing long-term impacts to visitors. Mitigation of impacts includes public education and project scheduling (prior to high visitor use times).
- 3) Societal/Political effects: Prescribed Fires (as hazard fuel reduction) projects are federally mandated by the National Fire Plan to help protect life and property in close proximity to urban areas. Conducting prescribed fire projects would reduce the risk of wildland fire to life and property.
- 4) Health/Safety concerns: Future health and safety concerns would be lessened through the reduction in fuel loading from the completion of prescribed fire projects. Mechanized/motorized equipment (such as helicopter, engines, pumps, sprinkler systems, chainsaws) are considered the safest and quickest tools for conducting prescribed fire projects because they reduce the exposure of firefighters to the hazards of fire suppression efforts in the event of an escape fire. In addition, the ability to use equipment as holding-resources for the execution of burns will significantly reduce the possibility of an escape fire that could threaten nearby private stakeholders. Mechanized/motorized equipment use is generally less strenuous than using primitive tools, therefore reducing the risk of fatigue-related injuries and accidents. Project objectives would be achieved more quickly and safety benefits of the reduction of hazardous fuels through prescribed fire would be in place sooner.
- 5) Economic/Timing considerations: Using mechanized/motorized equipment has the most beneficial effects with respect to safety, economic and timing considerations. The use of mechanized/motorized equipment would expedite project completion and be the most economical method for reducing fuel accumulations as well as being the safest way to accomplish prescribed fires. This, in turn, would provide more acceptable project costs and the fastest risk reduction of wildland fire to life and property. It would also help mitigate project impacts related to social, recreational, experiential, health, and safety through minimizing project duration.

Alternative 4 – Combination Alternative: Utilize primitive tools during prep work to the extent possible, as long as fire personnel safety is not compromised. Otherwise allow the use of chainsaws, blowers, and cord trimmers. Restrict the use of the most intrusive mechanized/motorized equipment (engines, most portable pumps, automated weather station) to just outside designated/potential wilderness but allow chainsaws, limited portable pumps and sprinkler systems in designated/potential wilderness to allow for the safe and efficient execution of prescribed fires. A helicopter would be on standby (if called for in the burn plan) and would be used for emergency purposes only.

- 1) Biophysical effects: Prescribed fires would be conducted by restricting (as much as possible) the use of the most intrusive mechanized/motorized equipment (engines, most portable pumps, automated weather station and smoke monitor) to just outside the wilderness. However, the use of ATV's, chainsaws, limited portable pumps, and sprinkler systems in designated/potential wilderness would be permitted to allow for the safe and efficient execution of prescribed fires. Each prescribed fire would alter the current forest structure by increasing the live canopy spacing through the mortality of small trees and reducing dead and down fuels, thus creating a more open, natural forest featuring native longleaf pine and related community types. In the event of a future unwanted wildland fire, prescribed fire areas could be used by fire fighting personnel to safely help slow and/or stop fire spread. The use of fire as a resource management tool would ultimately benefit wilderness values on a landscape level within the park. By allowing fire to occur, natural processes would be perpetuated and fire dependent ecosystems/species would benefit.
- 2) Social/Recreational/Experiential effects: Short-term effects would include the associated noise, emission odors as well as visual impacts of equipment to hikers and other visitors. Project duration (perhaps 2 to 4 weeks) would be minimized through the use of mechanized/motorized equipment therefore reducing long-term impacts to visitors. Mitigation of impacts includes public education and project scheduling (outside high visitor use times).
- 3) Societal/Political effects: Prescribed fire (as hazard fuel reduction) projects are federally mandated by the National Fire Plan to help protect life and property in close proximity to urban areas. Conducting hazard fuel reduction projects would reduce the risk of catastrophic wildland fire to life and property.
- 4) Health/Safety concerns: Future health and safety concerns would be lessened through the reduction in fuel loading from the completion of prescribed fire projects. The mechanized/motorized equipment to be used in designated/potential wilderness (a helicopter, limited portable pumps, sprinkler systems, ATV's, and chainsaws) are considered the safest and quickest tools for conducting prescribed fire projects because they reduce the exposure of firefighters to the hazards of fire suppression efforts in the event of an escape fire. In addition, the ability to use some of the equipment during holding operations for the execution of the burn will significantly reduce the possibility of an escape fire that could threaten nearby private stakeholders. Mechanized/motorized equipment use is generally less strenuous than using primitive tools, therefore reducing

the risk of fatigue-related injuries and accidents. Using primitive tools (handsaws, axes, and pruning shears) for some removal of woody (small diameter) material should not present a safety concern. However, it will be necessary to use chainsaws for felling trees so fire personnel safety is not compromised. Project objectives would be achieved more quickly than using primitive tools only and safety benefits of the reduction of hazardous fuels through prescribed fire would be in place sooner.

- 5) Economic/Timing considerations: This combination alternative of using mechanized/motorized equipment as well as primitive tools to the extent possible will not be as efficient as the unrestricted use of non-primitive tools, but it will be more conducive to preserving wilderness values. Although this alternative would not facilitate the completion of prescribed fires as expeditiously and economically as Alternative 3, it is a reasonable compromise between all primitive tools (Alternative 2) and all mechanized/motorized tools (Alternative 3).

Appendix 13.4

Supplemental Information

13.4.1 Fire Call-Up List

13.4.2 Preparedness Inventory

13.4.3 Memoranda of Understanding

13.4.4 Limited Delegation of Authority

13.4.5 Fire Management Program Organizational Chart

Appendix 13.4.1

COSW Fire Call-Up List

During business hours, 08:30 to 17:00, contact should be made with the park directly by calling:

(803) 776-4396

After business hours the order in which contact should be made if there is a fire event at Congaree National Park is as follows*:

1. Patrick T. Dege** Fire Management Officer (803) 419-6432 (home)
2. Lewis Prettyman** Facility Manager (803) 926-7166 (home)
3. John Torrence** Maintenance Worker (803) 782-1800 (home)
4. Martha Bogle Superintendent (803) 695-9308 (home)
5. Quentin Goodson Administrative Officer (803) 695-1752 (home)
6. Francis Rametta Park Ranger (803) 776-0499 (home)
7. Gadsden Volunteer Fire Department (803) 733-8351
8. South Carolina Forestry Commission (803) 321-0200
9. South Carolina Interagency Coordination Center (803) 561-4086

*** Firefighter Qualified*

****NOTE: If there is an immediate threat to structures or neighboring properties after hours, contact should begin with the Gadsden Volunteer Fire Department at 803-733-8351 and then proceed from the beginning of the list.***

Appendix 13.4.2

Preparedness Inventory

(In Progress)

Appendix 13.4.3

Memoranda of Understanding

MEMORANDUM OF UNDERSTANDING NO: 1443MU524097001

ANNUAL OPERATING PLAN

BETWEEN THE

NATIONAL PARK SERVICE CONGAREE NATIONAL PARK

AND THE

SOUTH CAROLINA FORESTRY COMMISSION

1) PURPOSE

The purpose of this plan is to outline the operating procedures between the participating agencies within the framework of the master cooperative agreement (USNPS #CA-5023-6-9002) between the South Carolina Forestry Commission and the National Park Service.

The South Carolina Forestry Commission will be referred to as the Commission and the Congaree National Park will be referred to as the Park for the purposes of brevity in this document.

2) RESOURCE MANAGEMENT

While conducting fire management activities, or responding to fire events on lands managed by the other agency, the Commission and the Park will adhere to the land management policies and standards of the host agency. In no instance will employees of either agency be expected or mandated to perform duties outside the scope of their own agency performance and safety standards.

National Park Service policy mandates the use of minimum impact suppression tactics while fighting fires on Park lands, many of which are designated as wilderness, in order to mitigate the lasting effects of suppression actions to resources including scarification to the landscape. When suppressing fires within the authorized boundary of the Park, the Commission will adhere to this standard except in the case of immediate or imminent threats to human life or substantial property. This is meant to mean that bulldozers or plows will only be used in the event of the above mentioned

threats. The Park's Superintendent must approve the use of bulldozers or plows in other circumstances on the lands of the Park in writing. Foam or wetting agents may be used, as needed, but may not be used over water in order to prevent the transport of chemical agents in the wilderness ecosystem.

Endangered species are an important concern to both agencies and will be considered in any suppression action in regards to negative impacts on sensitive habitat.

3) MUTUAL THREAT & PRIMARY AID ZONE

The Commission maintains primary responsibility for wildfire suppression on non-federal lands. The Park maintains primary responsibility for wildfire suppression within the authorized boundary of the Park. The Park and Commission agree to the establishment of a primary aid zone. The primary aid zone shall include Park lands and those lands within 1/4-mile of the Park's authorized boundary. The Park and Commission agree to initiate initial suppression action on any unmanned wildfire within the primary aid zone while attempting to contact the agency with primary responsibility. The initial responding agency shall remain on-scene until released by arriving resources from the other agency, or until the fire is controlled.

It is recognized that the Park has limited fire-fighting capabilities and immediate initial response to fires within 1/4-mile of the authorized boundary of the Park may not always be feasible.

4) PRESCRIBED BURNING & AUTHORIZATION

Congaree National Park is mandated to observe all federal and state regulations pertaining to open burning and air quality. The Park has a Fire Management Plan that covers fire suppression and prescribed fire. Prescribed burn plans are produced, with individual prescriptions, for areas to be treated during the year. The Park will provide notification and obtain the necessary burn permits from the Commission.

The burn boss on any Park prescribed burn shall comply with all Commission requirements, as well as training mandated by the National Park Service and the National Wildfire Coordinating Group (NWCG).

5) OPERATIONS

Both agencies operate on wildfires under the Incident Command System (ICS). Each agency will retain primary responsibility for fire operations within their jurisdictions. The Incident Commander on a wildfire will be from the effected agency. If a fire is burning on both jurisdictions, or has immediate threats to both, the fire will be run under a Unified Command.

The Commission and the Park both have limited forces available for suppression and prescribed fire operations. They will share resources to the extent possible while

meeting their primary obligations to protect their own geographic area. In the event either agency experiences an incident on their jurisdiction while working on a fire for the other agency, if requested, every effort will be made to release the resource back to their home unit as soon as is reasonably possible without jeopardizing the first fire action. Safety of life and property are the concerns of both agencies.

Both agencies use counter-firing or burnout as a tactic for suppression. The decision when to use these tactics rests with the IC from the agency with jurisdiction unless delegated by the IC to subordinate personnel.

Smoke on the highways is a major concern for the cooperating agencies. Every effort will be made to avoid this situation happening or to mitigate the hazard. Portable roadside smoke signs will be used when smoke is on the roadway or needed to warn travelers of the threats. Law enforcement will be requested to perform traffic control as needed. The Department of Transportation and the Highway Patrol will be notified whenever smoke hazards may require road closures as indicated by the attached

Smoke on the Highways Action Plan.

Both agencies will report smokes located on the others lands upon detection.

6) COMMUNICATIONS

The Park has its central dispatch located at Congaree National Park. During normal duty hours (0830-1700) contact the park's Fire Management Officer directly at (803) 776-4396. The South Carolina Forestry Commission can be contacted by calling the Newberry dispatch center at (800) 777-3473. This number can be called 24 hours a day.

Exhibit #1 (attached), shall be used for purposes of annually updating and making changes to this Annual Operating Plan. These updates, upon completion and receiving appropriate signature, will then be attached to this Annual Operating Plan.

7) PERSONNEL AND EQUIPMENT

The Commission and the Park will provide each other with lists of equipment and personnel that each have as resources for suppression and prescribed fire activities. These lists will become attachments to this operating plan. Lists should include mechanized equipment, portable pumps, and communication equipment, other specialized fire tools/equipment and aircraft on contract (for detection, suppression or prescribed fire). Approved ICS terminology should be used as appropriate when listing the equipment and other resources. Call out phone numbers and procedures should be included with personnel listings. Temporary personnel working for either agency need only be listed by the number available and the months of the year when they are anticipated to be on staff.

8) FIRE PREVENTION AND EDUCATION

The Park's Fire Management Officer will participate in joint fire prevention with Commission personnel. Cooperative efforts could include but are not limited to; participation in fire prevention week activities, brochure development, school programs, or other activities aimed at informing and educating the public about wildland fire prevention.

9) FIRE CAUSE INVESTIGATION

Fire cause determination will be attempted on all fires within the Park. The level of investigation will depend on property or resource damage caused by the fire, injury or death to the public or employee(s), or other factors as determined by the Park's Chief Ranger. All Incident Commanders will be responsible for protecting the point of origin on human caused fires, within the primary aid zone. The Park's Chief Ranger will be the primary investigative agent for determining fire cause within the Park's authorized boundary. If additional expertise is required, a formal request will be made through the Commission for additional investigators. The Park's Chief Ranger may perform investigation for fire cause on Commission lands within the primary aid zone if requested to do so by the Commission.

10) INCIDENT REPORTS & NOTIFICATION

The Park and the Commission agree to immediately notify the other agency of all fire events (wildfire and prescribed fire) within in the primary aid zone. Additionally, the Park and the Commission agree to provide copies of fire reports for all fire events located in the primary aid zone within ten (10) days of the date fire is declared out. Reports may be exchanged as hard copy, e-mail attachment, or electronic media (computer disks).

11) TRAINING

The Park and the Commission will share annual training schedules and announcements of course offerings. Each agency will endeavor to assist the other in training activities by providing instructors or subject matter experts (subject to fire activity, workload limitations, etc).

Area familiarization trips will be coordinated to acquaint Park or Commission personnel with extended response areas.

12) FACILITIES

The PARK and the COMMISSION have various facilities that may be used upon proper notification and consent for meetings and other fire related events.

13) FINANCIAL ARRANGEMENTS

Remuneration for services is provided for in the master agreement between the South Carolina Forestry Commission and the National Park Service in article IV (AWARD). Each agency will endeavor to minimize charges to the extent allowed by this **article and will inform the other participant** in advance when there is a likelihood of charges being assessed for use of resources.

14) APPROVALS

CONGAREE NATIONAL PARK (USNPS)

Date

Martha C. Bogle

SUPERINTENDENT

SOUTH CAROLINA FORESTRY COMMISSION (SCFC)

Date

AREA FORESTER

SMOKE ON THE HIGHWAYS ACTION PLAN

NATIONAL PARK SERVICE CONGAREE NATIONAL PARK

As a Federal law enforcement agency concerned about motorist safety and a resource management entity involved in all aspects of fire management, the National Park Service, Congaree National Park seeks to minimize, to the greatest extent possible, smoke on the highways.

Congaree National Park employees will make every effort to provide for motorist safety along Park highways in the course of all wildland and prescribed fire management activities. This Action Plan outlines procedures that will be followed in the event wildland or prescribed fire smoke threatens highways within the vicinity of the Park's boundaries.

Each applicable prescribed fire burn plan developed at Congaree National Park will address the possibility for smoke on highways and WILL outline action to be taken, consistent with this Action Plan. Burn Bosses will plan for such contingencies and will ensure that all involved personnel know and comply with these established procedures.

A. HIGHWAY SIGNING:

The Congaree National Park will place approved highway warning signs immediately when a need develops.

The South Carolina Highway Patrol (SCHP) and the Richland County Sheriffs Office (RCSO) will be contracted when such a need develops and will be advised when Park personnel place signs as to highway and location. Additionally, the South Carolina Forestry Commission will also be contacted and advised. Contact numbers in order are as follows:

South Carolina Highway Patrol (SCHP)	(803) 737-1030
Richland County Sheriffs Office (RCSO)	(803) 691-9000
South Carolina Forestry Commission (SCFC)	(803) 896-8815

Immediate suppression action will be taken on fires producing smoke on the highway that limits visibility to less than 500 feet (see HIGHWAY CLOSURE below). Fire Management will ensure thorough mop-up operation after control is obtained, particularly along highways.

B. HIGHWAY CLOSURES:

If visibility on highways is reduced to less than 500 feet, closure will be initiated immediately with the fullest cooperation of all involved agencies. **Upon recognizing that smoke from a fire on NPS lands is impacting the roadway immediate action to reduce this threat by Congaree National Park personnel and other cooperators that may be on scene must occur.**

1. Closure may be either partial or full. It will be up to the Incident Commander or Ranger-in-charge on scene to make the initial determination based upon density of smoke, volume of traffic, distance of affected area, roadway condition etc. Administrative personnel at Park Headquarters will be notified by the individual determining the closure and asked to contact the South Carolina Highway Patrol, Richland County Sheriffs Office and the South Carolina Forestry Commission. The South Carolina Highway Patrol has primary jurisdiction for closure of highways. When other agency enforcement resources arrive on the scene NPS units will follow the lead of the senior officer from the agency with primary responsibility for law enforcement in the highway corridor and will assist as needed to implement actions to protect the public.
 - a) Partial Closure: Visibility sufficient to safely allow one-way-only traffic, with headlights illuminated. Close traffic control coordination and communication must be maintained by controlling officers.
 - b) Full Closure: Visibility insufficient to safely allow any non-government emergency traffic through the affected area.
2. Closure must be implemented by a minimum of two law enforcement mobile units, with common radio frequencies (particularly if using officers from more than one agency).
3. Necessary traffic control assistance and signing will be obtained through appropriate dispatch.
4. Closures will be fully documented by NPS law enforcement personnel on a Form 10-343 "Case Incident Report", minimally indicating time and duration of closure, exact location of highway, smoke intensity, rationale for closure, agencies and personnel implementing closure, area affected, related problems or incidents, and other pertinent information.
5. The NPS and another assigned enforcement agency (South Carolina Highway Patrol and/or the Richland County Sheriffs office will jointly investigate any motor vehicle accident occurring in the involved smoke area. Copies of same (both agency reports) will be forwarded to the Park's Park Fire Coordinator.

Appendix 13.4.3 (cont.)

MEMORANDUM OF UNDERSTANDING NO: 1443MU524097002

MEMORANDUM OF UNDERSTANDING

BETWEEN THE

**NATIONAL PARK SERVICE
CONGAREE NATIONAL PARK**

AND THE

COLUMBIA FIRE DEPARTMENT

ARTICLE I. BACKGROUND AND OBJECTIVES

WHEREAS, this agreement is entered into between the National Park Service, Congaree National Park, hereinafter referred to as the PARK, and the Columbia-Richland Fire Service, under authority of the City of Columbia Fire Department, hereinafter referred to as the DEPARTMENT; and

WHEREAS, the PARK and the DEPARTMENT share common interest in the safe, efficient, and effective suppression of wildfires employing the concepts of total mobility and closest forces concepts where practical; and

WHEREAS, the PARK and the DEPARTMENT have previously cooperated in the suppression of wildfires and desire to establish guidelines for continued cooperation on wildfire incidents of mutual concern to the PARK and the DEPARTMENT within Lower Richland County; and

WHEREAS, the DEPARTMENT, based on Local and State authority, provides structural and vehicle fire suppression within Lower Richland County; and

WHEREAS, the PARK, based on existing Federal legislative authority, may enter into this memorandum with the DEPARTMENT in furtherance of the protection of human life, property, and natural resources subject to loss through wildfire (Reciprocal Fire Protection Act of May 27, 1955, 42 USC 1856a-1856d; National Park Service Organic Act, 16 USC 1(b) (1)).

ARTICLE II. PROVISIONS

1. *Wildfire Suppression*

(a) The DEPARTMENT responsibility for wildfire suppression on non-Federal lands supersedes that of the PARK. The PARK maintains primary responsibility for wildfire suppression on PARK lands. Each agency agrees to manage wildfire suppression operations using the total mobility and closest forces concept within the primary aid zone (see 1(b) below). Wildfires occurring in the primary aid zone, when resources from the PARK, DEPARTMENT, and other cooperators are at the scene, shall be managed under the Incident Command System.

(b) The PARK and DEPARTMENT agree to the establishment of a primary aid zone. The primary aid zone shall include PARK lands and those lands within 1/4-mile of PARK lands within Lower Richland County.

(c) The PARK and DEPARTMENT agree to initiate suppression action on any unmanned wildfire found within the other's responsibility. Either agency may request initial assistance from the other through the dispatch offices specified in section 1 (g), below, for wildfires occurring within the mutual aid zone. To minimize resource impact to PARK lands, many of which are designated wilderness, the use of tractor plows by either agency on PARK lands is restricted to individual actions approved in writing by the PARK Superintendent, his/her authorized designee, or when human life or significant property is imminently at risk.

*It is recognized that the Park has limited firefighting capabilities and immediate initial response to wildland fires within 1/4-mile of the authorized boundary of the Park may not always be feasible. *

(d) The PARK and DEPARTMENT agree that when suppressing wildfire in the other agency's jurisdiction they will adhere to the suppression and mop-up standards of the receiving agency insofar as resources and manpower are available. If adequate facilities and manpower are not available to meet standards, the responding agency will notify the other agency at the earliest possible time.

(e) The PARK and DEPARTMENT agree to release the other's personnel and equipment as soon as it is feasible for the Incident Commander to do so, or upon the request of the responding agency.

(f) The PARK and DEPARTMENT are authorized to utilize the other's radio frequencies and roads for emergency purposes. Such radio frequencies will be furnished upon request.

(g) The PARK agrees to immediately report all potential wildfires to the DEPARTMENT'S dispatch office. The DEPARTMENT agrees to immediately report all potential wildfires on PARK lands or within 1/4-mile of PARK boundaries to the

PARK dispatch office identified in attachment #1 of this MOU. Contact personnel and phone numbers are to be attached to this memorandum and updated as necessary when changes occur.

2. *Structural and Vehicle Fire Suppression*

(a) The DEPARTMENT agrees to suppress all structure and vehicle fires occurring on PARK lands within the jurisdiction of the DEPARTMENT.

(b) The PARK does not have structural or vehicle fire suppression capability or training. The PARK will NOT be involved in structural or vehicle fire suppression with the exception of indirect involvement to assist the DEPARTMENT, as specifically directed, in helping to prevent the spread of the fire onto forested lands. All structural fire responsibility will be so deferred to the DEPARTMENT for appropriate response.

3. *Payment of Costs*

(a) The PARK and DEPARTMENT agree not to bill each other for services rendered in the, suppression of wildfires or extinguishment of structure or vehicle fires within the primary mutual aid zone. Each agency shall, upon request, forward specific cost information for billing to third parties, for management review and use.

4. *Communications*

(a) The PARK and DEPARTMENT agree to annually review the full contents of this memorandum so as to familiarize all concerned with its provisions.

(b) The PARK and DEPARTMENT agree to contact each other annually, and meet if necessary and desirable, to review this memorandum and prepare an update of the attachment information. The memorandum may be amended at any time by the written mutual consent of both parties. The approved amendment will immediately become part of this memorandum.

(c) Exhibit #1 (attached), shall be used for purposes of annually updating and making changes to this memorandum. These updates, upon completion and receiving appropriate signature, will then be attached to this memorandum.

ARTICLE III. TERM OF AGREEMENT

1. The term of this Memorandum of Understanding is five (5) years, commencing upon the date of signature of the final signatory party to the Memorandum.

ARTICLE IV. REPORTS

1. The PARK and DEPARTMENT agree to provide one another copies of all wildfire incident reports, located in the primary aid zone, within ten (10) days of the fire being declared out.
2. The PARK and DEPARTMENT agree to furnish each other such reports and documents as may be specified in the preceding sections of this memorandum, subject to the National Park Service and the State of South Carolina rules and regulations.

ARTICLE V. TERMINATION

1. This memorandum may be terminated by either party upon 60 days written notice.

ARTICLE VI. REQUIRED CLAUSES

1. During the performance of this memorandum, the participants agree to abide by the terms of USDI-Civil Rights Assurance Certification, non-discrimination and will not discriminate against any person because of race, color, religion, sex, or national origin. The participants will take affirmative action to ensure that applicants are employed without regard to their race, color, religion, sex, or national origin.
2. No member or delegate to Congress or resident Commissioner shall be admitted to any share or part of this memorandum or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this memorandum if made with a corporation for its general benefit.

ARTICLE VII. KEY OFFICIALS

1. National Park Service, Congaree National Park.

(a) Policy Level: Superintendent
Congaree National Park
100 National Park Road
Hopkins, SC 29061
(803) 776-4396

(b) Technical & Operations Level: Fire Management Officer
Congaree National Park
100 National Park Road
Hopkins, SC 29061
(803) 776-4396

2. Columbia Fire Department, City of Columbia.

(a) Policy Level: Chief
City of Columbia Fire Department
Headquarters
1800 Laurel Street
Columbia, SC 29201
(803) 733-8351

(b) Technical & Operations Level: Assistant Chief
Operations Division-Columbia Fire Department
Headquarters
1800 Laurel Street
Columbia, SC 29201
(803) 733-8355

IN WITNESS WHEREOF, the National Park Service, Congaree National Park and the Columbia Fire Department, under the authority of the City of Columbia, have executed this Memorandum of Understanding on the dates herein below written.

SIGNATURES

Martha C. Bogle
Superintendent
Congaree National Park

Date

City Manager
City of Columbia

Date

Attachment #1

DISPATCH INFORMATION
Pursuant to Memorandum of Understanding
between
National Park Service, Congaree National Park.
and
Columbia Fire Department, City of Columbia

TO REPORT WILDFIRES:

Wildfire Notification [II. 1. (g)]

REPORT WILDFIRES TO: Patrick Dege, Fire Management Officer between 08:30 – 17:00 hours; after hours call as listed until contact is made:

Fire Management Officer - Patrick Dege (803) 732-4737 (home)

Acting Chief Ranger - Lewis Prettyman (803) 926-7166 (home)

Superintendent - Martha C. Bogle (803) 695-9308 (home)

PARK-Dispatcher (803) 776-4396 (08:30-17:00 hours)

DEPARTMENT-Dispatcher (803) 359-2521

Appendix 13.4.4

LIMITED DELEGATION OF AUTHORITY

Memorandum

To: _____, Incident Commander

From: Superintendent, Congaree National Park

Subject: Limited Delegation of Authority

Effective as of ____/____/____ (mm/dd/yyyy), at _____ hours, I have delegated you limited authority to manage the _____ fire, number _____, in the Congaree National Park.

As Superintendent I maintain ultimate responsibility for the protection of the Park's resources and the lives of visitors and employees. You have full authority and responsibility for managing the incident activities within the confines of the law, National Park Service Policy, the direction given in the Incident Briefing and this Delegation.

Specific direction for this Incident and my considerations for management are:

1. Provide for firefighter, visitor, employee and neighbor SAFETY FIRST.
2. My preferred suppression strategy for this fire is one of: (*check one*) **Confine** **Contain** **Control**. This strategy should be implemented with as little resource damage as possible. Attached are the NPS definitions of CONFINE, CONTAIN, and CONTROL strategies (Exhibit 1) and Minimum Impact Suppression Guidelines (Exhibit 2.)
3. Dozers or tractor plows may not be used within Park boundaries without my prior approval. The only exception would be in case of the immediate need for the protection of human life, and such use must be documented.
4. Tracked or wheeled vehicles may be used inside the Park where roads exist, and that are identified for public or administrative use. Helicopters, power saws, portable pumps, and leaf blowers may be used as required within the Park.
5. Cultural features requiring priority protection are:

6. Key resource considerations are:

7. Constructed firelines must be rehabilitated as per NPS policy.
8. Disruption of visitor access and use should be kept to a minimum if consistent with public safety.
9. Training opportunities for Park personnel shall be provided when possible to strengthen our organizational capabilities.
10. A close-out fire analysis and evaluation will be conducted by me or my representative prior to team departure. I request at least 24 hour advance notice for this meeting.
11. My Agency Advisor is:

Signed:

Superintendent
Congaree National Park

Incident Commander

Name (*printed*)

Name (*printed*)

Date: _____

Date: _____

SUPPRESSION STRATEGIES

The National Park Service recognizes three levels of suppression response strategies known as: CONFINE, CONTAIN, and CONTROL.

Differences between these strategies is subtle, however their consequences can vary substantially. The definitions are as follows:

CONFINE:

To restrict the wildland fire within predetermined boundaries established either prior to, or during a wildland fire event. These identified boundaries should contain the fire with no suppression action being taken on the ground until the fire is declared out.

CONTAIN:

To restrict a wildland fire to a defined area using a combination of natural and constructed barriers that will stop the spread of the wildland fire under the prevailing and forecasted weather conditions, until the fire is declared out.

CONTROL:

Aggressive action taken through the skillful use of personnel, equipment, and aircraft to establish fireline around a wildland fire to halt the spread of the wildland fire and to extinguish all "hot spots" until the fire is declared out.

All three strategies require continuous monitoring of fire behavior and strict adherence to safety concerns.

MINIMUM IMPACT SUPPRESSION TACTICS “MIST” GUIDELINES

CONCEPT

The concept of Minimum Impact Suppression Tactics (MIST) is to use the minimum amount of forces necessary to effectively achieve the fire management protection objectives consistent with land and resource management objectives. It implies a greater sensitivity to the impacts of suppression tactics and their long-term effects when determining how to implement an appropriate suppression response. In some cases MIST may indicate cold trailing or wet line may be more appropriate than constructed hand line. In another example, the use of an excavator may be used rather than a dozer. Individual determinations will be dependent on the specific situation and circumstances of each fire.

MIST is not intended to represent a separate or distinct classification of firefighting tactics but rather a mind set of how to suppress a wildland fire while minimizing the long-term effects of the suppression action. When the term MIST is used in this document it reflects the above principle.

Suppression actions on all wildland fires within National Park Service protected wilderness in the Congaree National Park will be those having a minimum impact on the physical resources associated with each site. In so doing, the principle of fighting fire aggressively but providing for safety first will not be compromised.

The key challenge to the line officer, fire manager and firefighter is to be able to select the wildland fire suppression tactics that are appropriate given the fire's probable or potential behavior. The guiding principle is always least cost plus loss while meeting land and resource management objectives. It is the second part of this statement which must be recognized more than it has in the past. Appreciation of the values associated with wilderness has been more difficult to articulate but, nevertheless, is important. As this recognition emerges, actions must be modified to accommodate a new awareness of them.

These actions, or MIST, may result in an increase in the amount of time spent watching, rather than disturbing, a dying fire to insure it does not rise again. They may also involve additional rehabilitation measures on the site that were not previously carried out.

When selecting an appropriate suppression response, firefighter safety must remain the highest concern. In addition, fire managers must be assured the planned actions will be effective and will remain effective over the expected duration of the fire.

GOAL

The goal of MIST is to halt or delay fire spread in order to maintain the fire within predetermined parameters while producing the least possible impact on the resource being protected. These parameters are represented by the initial attack incident commander's size-up of the situation in the case of a new start or by the escaped fire situation analysis (EFSA) in case of an escaped fire.

It is important to consider probable rehabilitation need as a part of selecting the appropriate suppression response. Tactics that reduce the need for rehab are preferred whenever feasible.

GUIDELINES

Following is a list of considerations for each fire situation.

Hot-Line/Ground Fuels

- Allow fire to burn to natural barriers.
- Use cold-trail, wet line or combination when appropriate.
- If constructed fireline is necessary, use only width and depth to check fire spread.
- Burn out and use low impact tools like swatter or 'gunny' sack.
- Minimize bucking and cutting of trees to establish fireline; build line around logs when possible.
- Constantly re-check cold trailed fireline.

Hot-Line/Aerial Fuels

- Limb vegetation adjacent to fireline only as needed to prevent additional fire spread.
- During fireline construction, cut shrubs or small trees only when necessary. Make all cuts flush with the ground.
- Minimize felling of trees and snags unless they threaten the fireline or seriously endanger workers. In lieu of felling, identify hazard trees with a lookout or flagging.
- Scrape around tree bases near fireline if it is likely they will ignite.

Mopup/Ground Fuels

- Do minimal spading; restrict spading to hot areas near fireline.
- Cold-trail charred logs near fireline; do minimal tool scarring.
- Minimize bucking of logs to extinguish fire or to check for hotspots; roll the logs instead if possible.
- Return logs to original position after checking and when ground is cool.
- Refrain from making bone yards; burned and partially burned fuels that were moved should be returned to a natural arrangement.

- Consider allowing large logs to burnout. Use a lever rather than bucking to manage large logs which must be extinguished.
- Personnel should avoid using rehabilitated firelines as travel corridors whenever possible because of potential soil compaction and possible detrimental impacts to rehab work, i.e. water bars.

Mopup/Aerial Fuels

- Remove or limb only those fuels which if ignited have potential to spread fire outside the fireline.
- Before felling consider allowing ignited tree/snag to burn itself out. Ensure adequate safety measures are communicated if this option is chosen.
- Identify hazard trees with a lookout or flagging.
- If burning trees/snag poses a serious threat of spreading fire brands, extinguish fire with water or dirt whenever possible. Felling by crosscut or chainsaw should be the last resort.
- Align saw cuts to minimize visual impacts from more heavily traveled corridors. Slope cut away from line of sight when possible.

LOGISTICS

Campsite Considerations

- Locate facilities outside of wilderness whenever possible.
- Coordinate with the Resource Advisor in choosing a site with the most reasonable qualities of resource protection and safety concerns.
- Evaluate short-term low impact camps such as coyote or spike versus use of longer-term higher impact camps.
- Use existing campsites if possible.
- New site locations should be on impact resistant and naturally draining areas such as rocky or sandy soils, or openings with heavy timber.
- Avoid camps in meadows, along streams or on lakeshores. Located at least 200 feet from lakes, streams, trails, or other sensitive areas.
- Consider impacts on both present and future users. An agency commitment to wilderness values will promote those values to the public.
- Lay out the camp components carefully from the start. Define cooking, sleeping, latrine, and water supply.
- Minimize the number of trails and ensure adequate marking.
- Consider fabric ground cloth for protection in high use areas such as around cooking facilities.
- Use commercial portable toilet facilities where available. If these cannot be used a latrine hole should be utilized.
- Select latrine sites a minimum of 200 feet from water sources with natural screening.
- Do not use nails in trees.
- Constantly evaluate the impacts which will occur, both short and long term.

Personal Camp Conduct

- Use “leave no trace” camping techniques.
- Minimize disturbance to land when preparing bedding site. Do not clear vegetation or trench to create bedding sites.
- Use stoves for cooking, when possible. If a campfire is used limit to one site and keep it as small as reasonable. Build either a “pit” or “mound” type fire. Avoid use of rocks to ring fires.
- Use down and dead firewood. Use small diameter wood, which burns down more cleanly.
- Don’t burn plastics or aluminum – “pack it out” with other garbage.
- Keep a clean camp and store food and garbage so it is unavailable to bears. Ensure items such as empty food containers are clean and odor free, never bury them.
- Select travel routes between camp and fire and define clearly.
- Carry water and bathe away from lakes and streams. Personnel must not introduce soaps, shampoos or other personal grooming chemicals into waterways.

AVIATION MANAGEMENT

One of the goals of wilderness managers is to minimize the disturbance caused by air operations during an incident.

Aviation Use Guidelines

- Maximize back haul flights as much as possible.
- Use long line remote hook in lieu of constructed helispots for delivery or retrieval of supplies and gear.
- Take precautions to insure noxious weeds are not inadvertently spread through the deployment of cargo nets and other external loads.
- Use natural openings for helispots and paracargo landing zones as far as practical. If construction is necessary, avoid high visitor use areas.
- Consider maintenance of existing helispots over creating new sites.
- Obtain specific instructions for appropriate helispot construction prior to the commencement of any ground work.
- Consider directional falling of trees and snags so they will be in a natural appearing arrangement.
- Buck and limb only what is necessary to achieve safe/practical operating space in and around the landing pad area.

Retardant Use

During initial attack, fire managers must weigh the non-use of retardant with the probability of initial attack crews being able to successfully control or contain a wildland fire. If it is determined that use of retardant may prevent a larger, more damaging wildland fire, then the manager might consider retardant use even in

sensitive areas. This decision must take into account all values at risk and the consequences of larger firefighting forces' impact on the land.

- Consider impacts of water drops versus use of foam/retardant. If foam/retardant is deemed necessary, consider use of foam before retardant use.

HAZARDOUS MATERIALS

Flammable/Combustible Liquids

- Store and dispense aircraft and equipment fuels in accordance with National Fire Protection Association (NFPA) and Health and Safety Handbook requirements.
- Avoid spilling or leakage of oil or fuel, from sources such as portable pumps, into water sources or soils.
- Store any liquid petroleum gas (propane) downhill and downwind from firecamps and away from ignition sources.

Flammable Solids

- Pick up residual fusees debris from the fireline and dispose of properly.

Fire Retardant/Foaming Agents

- Do not drop retardant or other suppressants near surface waters.
- Use caution when operating pumps or engines with foaming agents to avoid contamination of water sources.

FIRE REHABILITATION

Rehabilitation is a critical need. This need arises primarily because of the impacts associated with fire suppression and the logistics that support it. The process of constructing control lines, transport of personnel and materials, providing food and shelter for personnel, and other suppression activities has a significant impact on sensitive resources regardless of the mitigating measures used. Therefore, rehabilitation must be undertaken in a timely, professional manner.

During implementation, the resource manager should be available for expert advice and support of personnel doing this work as well as quality control.

Rehabilitation Guidelines

- Pick up and remove all flagging, garbage, litter, and equipment. Dispose of trash appropriately.
- Clean fire pit of unburned materials and fill back in.

- Discourage use of newly established trails created during the suppression effort by covering with brush, limbs, small diameter poles, and rotten logs in a naturally appearing arrangement.
- Replace dug-out soil and/or duff and obliterate any berms created during the suppression effort.
- If impacted trails have developed on slopes greater than six percent, construct waterbars according to the following waterbar spacing guide:

Trail Percent Grade	Maximum Spacing Ft.
6-9	400
10-15	200
15-25	100
25 +	50

- Where soil has been exposed and compacted, such as in camps, on user-trails, at helispots and pump sites, scarify the top 2-4 inches and scatter with needles, twigs, rocks, and dead branches. It is unlikely that seed and fertilizer for barren areas will be appropriate, in order to maintain the genetic integrity of the area. It may be possible, depending on the time of year and/or possibility of a rainy period, to harvest and scatter nearby seed, or to transplant certain native vegetation.
- Blend campsites with natural surroundings, by filling in and covering latrine with soil and/or other natural material. Naturalize campfire area by scattering ashes in nearby brush (after making sure any sparks are out) and returning site to a natural appearance.
- Where trees were cut or limbed, cut stumps flush with ground, scatter limbs and boles, out of sight in unburned area. Camouflage stumps and tree boles using rocks, dead woody material, fragments of stumps, bolewood, limbs, soil and fallen or broken green branches. Scattered sawdust and shavings will assist in decomposition and be less noticeable. Use native materials from adjacent, unimpacted areas if necessary.
- Remove newly cut tree boles that are visible from trails or meadows. Drag other highly visible woody debris created during the suppression effort into timbered areas and disburse. Tree boles that are too large to move should be slant cut so a minimal amount of the cut surface is exposed to view. Chopping up the surface with an axe or pulaski, to make it jagged and rough, will speed natural decomposition.
- Leave tops of felled trees attached. This will appear more natural than scattering the debris.
- Consider, if no other alternatives are available, helicopter sling loading rounds and tops from a disturbed site when there has been an excessive amount of bucking, limbing and topping.
- Tear out sumps or dams, where they have been used, and return site to natural condition. Replace any displaced rocks or streambed material that has been moved. Reclaim streambed to its predisturbed state, when appropriate.

- Walk through adjacent undisturbed area and take a look at your rehab efforts to determine your success at returning the area to as natural a state as possible. Good examples should be documented and shared with others!

DEMOBILIZATION

Because demob is often a time when people are tired or when weather conditions are less than ideal, enough time must be allowed to do a good job. When moving people and equipment, choose the most efficient and least impactful method to both the landscape and fire organization mission. An on-the-ground analysis of "How Things Went" will be important.

POST-FIRE EVALUATION

Post-fire evaluation is important for any fire occurrence so management can find out how things went. Identify areas needing improvement, to formulate strategies and to produce quality work in the future. This activity is especially important in wilderness and like sensitive areas due to their fragility and inclination to long-term damage by human impacts.

Resource managers and specialists will be responsible for conducting the post-fire evaluation. They are the people who have the experience and knowledge to provide information required to make the evaluation meaningful and productive.

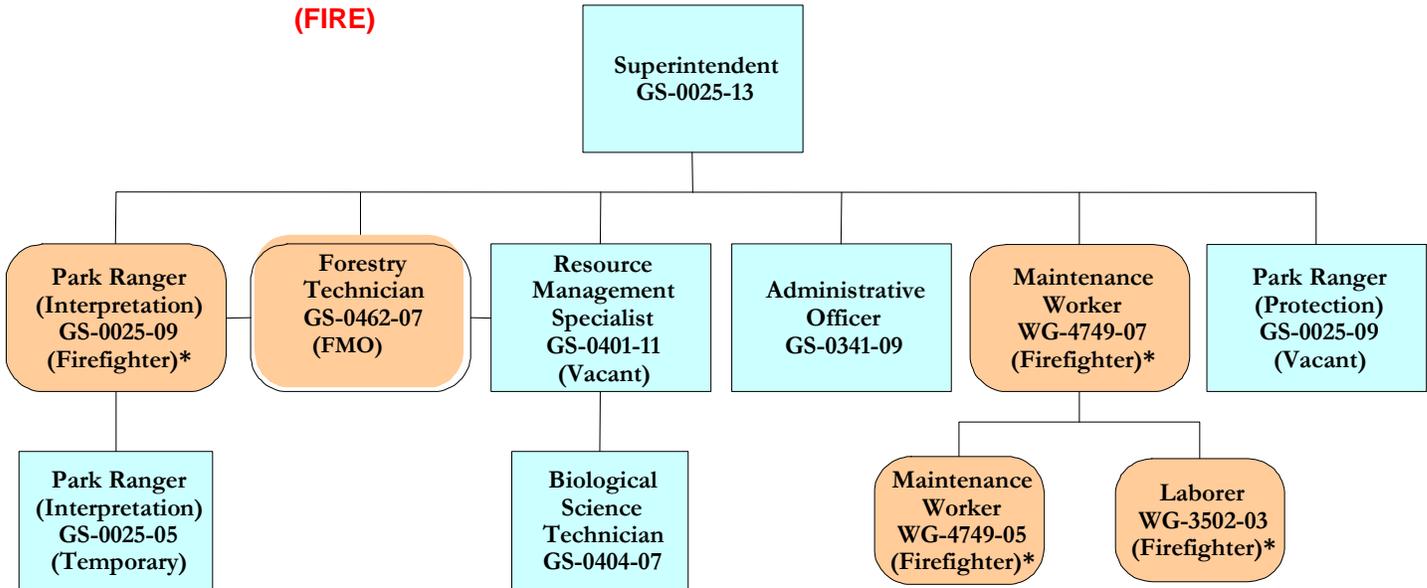
Post-fire evaluation will consist of data collection, documentation and recommendations. This process and report will, in most cases, be fairly simple and to the point. It should be accomplished before an overhead team departs from the fire. The evaluation emphasis should be on the MIST actions and not on the effects on the fire.

Evaluation will be completed on wildland fires exceeding 100 acres and on all prescribed fires.

Appendix 13.4.5

Congaree Swamp National Monument Organizational Chart FY2003

(FIRE)



** Depending on training*

Appendix 13.5

Wildland and Prescribed Fire Monitoring Plan

(In Progress)

Appendix 13.6

Five-Year Prescribed Fire and Hazard Fuels Reduction Plan

13.6.1 Multi-Year Prescribed Fire Schedule

13.6.2 Hazard Fuels Reduction Areas and Schedule (Including Proposed Treatment Techniques)

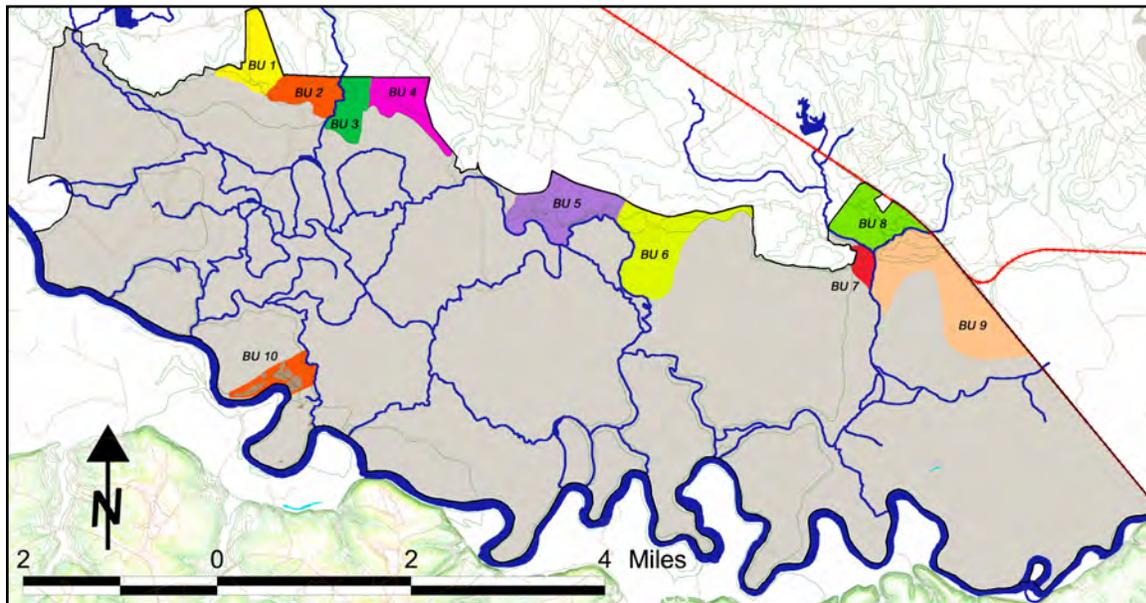
13.6.1 Five-Year Prescribed Fire and Hazardous Fuels Reduction Plan, Congaree National Park

Congaree National Park is proactive in protecting, maintaining, and restoring the natural and wilderness areas placed under its jurisdiction. As a part of the park’s management plan, much of the upland area of the park is scheduled for burning under controlled conditions. For the present fiscal year (FY03) and the following 5 years, the park plans to prescribe burn the burn units 1 through 8 on the schedule listed in the table below. As indicated, the park expects to burn between roughly 200 to 600 acres per year.

Fiscal Year	Burn Unit (s)	Treatment Area*	# of Acres	Season of Burning
2003	5	Dawson Area	190	Spring
2004	1,2,3,& 4	VC Area	575	Spring
2005	5	Dawson Area	190	Spring
2006	1,2,3,& 4	VC Area	575	Fall/Winter
2007	5 & 6	Dawson Area	380	Spring
2008	7 & 8	Griffins Creek Area	170	Spring

*Required for NFPORs entry

Burn Unit Location Map



This burning cycle schedule is dependent on a number of factors. Changes in expected and actual fire effects; funding; personnel; and expected weather patterns could alter the schedule significantly. Consideration must be given to outcomes of the previous years burning and the type and amount of fuels present. This chart is meant to be only a guide to yearly scheduling of burning operations.

13.6.2 Hazard Fuels Reduction Areas and Schedule

Burning operations are carried out at the Congaree National Park to accomplish a variety of resource and fire management goals. Among these objectives is the need for reduction of hazardous fuels. The areas of highest concern to the park are those areas that are adjacent to private land containing single family home sites. The areas to the north of Burn Units 1, 2, 3, 4, and 8 all meet these criteria. Additionally of concern are lands that are in commercial use whether for timber, agricultural, or other type use. The areas to the north of Burn Units 5, 6, 7 and 9 meet these criteria.

The burning operations on the park constitute the bulk of the hazardous fuel reduction that is taken on by the park and the burning schedule can also be thought of as a Hazardous Fuels Reduction schedule. Additional work that could be performed to alleviate some of the hazardous fuels accumulation at the park involve possible thinning operations in some of the pine plantations acquired as a part of the 1988 boundary expansion. As much of this type work is still in the planning stages, reference should be made to the Congaree National Park Resource Management Plan (RMP) for more detail.

Appendix 13.7

Congaree National Park Wildland Fire Prevention Plan

*United States Department of the Interior
National Park Service*



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Purpose & Need

This Wildland Fire Prevention Plan is intended to define activities that are necessary in order for the Park to proactively safeguard parklands and adjoining properties.

Although natural fire occurring within the woodlands is a normal part of the ecosystem, for safety and property concerns we cannot allow fire to reign unchecked. This Congaree National Park Wildland Fire Prevention Plan attempts to identify pertinent wildland fire prevention activities and responsibilities consistent with the Congaree National Park's land management and fire management planning goals.

It is intended to be an adaptable document whose shortfalls can be addressed through the review of Park priorities, resources, personnel, and updated yearly, or as necessary.

Objective

This Wildland Fire Prevention Plan selected a mix of activities to consider that could mitigate potential fire situations within the Park. The objective of the WPP is the protection of valuable resources from Wildland fire through focusing Fire Prevention activities, cost efficiently, in the priority areas of the Park.

Responsibility

This Wildland Fire Prevention Plan serves as the Park's methodology for the protection of valuable resource loss by wildland fire. The Superintendent is responsible for the approval and implementation of this Wildland Fire Prevention Plan and the Superintendent also has the authority to assign individual responsibilities among the various divisions within the Park.

The Park Fire Management Officer is responsible for the integration of this activity plan into the Fire Management Plan and ensuring that the actions called for are implemented.

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

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Actions & Activities

The Congaree National Park has implemented this Wildland Fire Prevention Plan (WFPP), as an integrated element of the Park's fire management program through the guidance of the Wildland Fire Management Plan (WFMP). Wildland fire prevention activities are primarily directed toward ignitions, which pose the greatest potential to cause unacceptable damage or loss to Park resources.

The WFPP addresses the prevention activities and uses. It defines what actions have or will take place, and who is responsible. Wildland fire prevention activities generally fall within one of four broad categories. These categories include:

Education

Education is aimed at changing people's behavior through awareness and knowledge. The primary methods used at the Park are through the use of printed materials and one-on-one contacts or group presentations. Information is also delivered through signs, displays, etc....

Engineering

Engineering is an activity designed to reduce or eliminate fire risks (e.g. spark arrester) and hazards (e.g. reduction of fuels around structures).

Enforcement

Enforcement is used to gain compliance with fire regulations and ordinances.

Administration

The group of activities that include Planning, Budgeting, and Training.

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Fire Prevention Tasks

The following Tasks have been identified as elements of this Fire Prevention Program. These items require annual coordination to ensure a balanced, cost-effective Fire Management Program. The tasks designated are designed to mitigate the highest potential losses due to Wildland Fire. Implementation of these tasks is dependent on the level and type of funding available.

EDUCATION TASKS:

DIVISION RESPONSIBLE	ACTION/ACTIVITY
Superintendent Interpretation	Develop a review system to ensure Fire Management input into reprints/new printing of all relevant documents.
Superintendent Interpretation	Determine if new fire prevention material is needed to deal with specific Fire Management issues and arrange for production.
Interpretation	Participate in educational programs to maintain high visibility of the Fire Prevention effort. These are programs such as Smokey Bear (CFFP).
Interpretation	Consider agency involvement in other Fire Prevention activities, such as: Fire Prevention Week-Mail Display, Oil & Gas Show, Recreation & Boat Show, Children's Festivals, and Hunter Safety Booth, as appropriate.
Interpretation Education Spec.	Consider agency involvement in additional school/youth educational activities with the following: Environmental Education, Day Care Centers, Intermediate Schools, Fishing Clinics, Indian Reservations, and Boy/Girl Scouts.
Resource Man.	Participate in local Town Meetings.
Education Spec.	Include Fire Prevention information in Public Education Programs with local service clubs as warranted.

EDUCATION TASKS (continued):

DIVISION RESPONSIBLE	ACTION/ACTIVITY
Resource Man.	Participate with Local County Planning Commissions
Interpretation	Implement programs such as Junior Ranger that include Fire Prevention information and/or activities.
Law Enforcement Fire Management	Utilize effective Fire Information procedures/systems during incidents while stressing the importance of increased fire prevention efforts.
Fire Management	Provide local written media with timely news releases. This includes information on management ignited prescribed fire and natural prescribed fire (RMS duty), and Fire Prevention information (CIR duty).

ENGINEERING TASKS:

DIVISION RESPONSIBLE	ACTION/ACTIVITY
Superintendent Maintenance	Monitor all construction activities for compliance with Fire Safety Criteria.
Fire Management Maintenance	Complete physical inspections of all power-lines in hazardous fire areas.

ENGINEERING TASKS (continued):

DIVISION RESPONSIBLE	ACTION/ACTIVITY
Fire Management Law Enforcement	Participate in fire safe evaluations, as requested, on homes and properties adjacent to the Park.
Maintenance	Maintain picnic fire pits/grates and the campfire ring at the Bluffsites & After Hours Campsites.
Fire Management	Complete prescribed burning of piles, debris and slash.
Superintendent Fire Management	Fire Management will provide input into all recreation area/campground development projects.
Fire Management Maintenance Law Enforcement	Inspect Park facilities for fire hazards and hazard reduction needs.
Fire Management Resource Man.	Inventory undeveloped sites and hazard areas, and complete necessary hazard reduction.
Fire Management Resource Man.	Evaluate the use of Prescribed Fire to reduce hazards in high use/value areas.
Resource Man.	Coordinate annually with the Railroad companies concerning right-of-way clearance requirements and Fire prevention measures that will be undertaken along the Railroad, (eastern border of the Park).

ENFORCEMENT TASKS:

DIVISION RESPONSIBLE	ACTION/ACTIVITY
Fire Management Law Enforcement	Continue the Park's investigation program to determine Fire Causes.
Fire Management Law Enforcement	Provide Basic Fire Investigation training to all Initial Attack Incident Commanders.
Law Enforcement	Investigate all human caused fires and process trespass actions when appropriate.
Superintendent	Provide advanced Fire Investigation training to law enforcement officers.
Law Enforcement	Participate with local cooperators in fireworks fire prevention. Activities will include the enforcement of existing restrictions.
Fire Management	Coordinate all fire restrictions and closures with cooperating agencies.
Fire Management Law Enforcement	Revise and issue Public Use Restriction/Closure orders/plan as needed.
Resource Man.	Review Fire Precaution criteria in all special use permits to ensure adequate Fire Safety considerations.

ADMINISTRATION TASKS:

DIVISION RESPONSIBLE	ACTION/ACTIVITY
Superintendent Fire Management	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 Draw-down), 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.
Fire Management	Participate with Interagency Fire Prevention Committees.
Fire Management Resource Man.	Review and maintain an updated Wildland Fire Prevention Plan for the Park.
Fire Management Law Enforcement	Maintain appropriate Fire Cause Information, Fire Location Maps, Fire Size Data and other pertinent information.
Fire Management GIS Technician	Develop a GIS mapping system and integrate mapping of fire prevention units and historical data.
Fire Management Resource Man. Interpretation	Integration of fire weather data into interpretive programs, public awareness and educational material as appropriate.
Fire Management Resource Man.	Continue hazard fuel reduction within the management ignited prescribed fire area (Red-Cockaded Woodpecker site). Review and update burning schedules and plans.

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Evaluation

This Wildland Fire Prevention Plan is to be evaluated annually to ensure compliance with the plan and effective implementation of the planned actions. (Effectiveness of the overall Wildland Fire prevention Program will involve different evaluation techniques over a longer period of time.)

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

- **Have the prevention areas or actions changed?** *If so, the WFPP must be amended to address changes in priority areas and/or the redefinition of the Wildland Fire Prevention Tasks.*
- **Are the task actions funded?** *If so, was the action completed? If not, the responsibilities must be reevaluated and redefined.*
- **Have the task actions been successful?** *If not, the actions and responsibilities must be reevaluated and redefined as appropriate.*

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