

GREAT SMOKY MOUNTAINS NATIONAL PARK



FIRE MANAGEMENT PLAN

Prepared By:

N. Sevel
Fire Management Specialist
Great Smoky Mountains NP

6/29/10
Date

Recommended By:

M. A. R.
Fire Management Officer
Great Smoky Mountains NP

6/29/10
Date

Recommended By:

Cathleen Cook
Acting Chief, Resource Management & Science
Great Smoky Mountains NP

7/22/10
Date

Recommended By:

Star Kloba
Acting Chief, Resource and Visitor Protection
Great Smoky Mountains NP

7/21/10
Date

Reviewed By:

[Signature]
Regional Fire Management Officer
Southeast Region, NPS

8/4/10
Date

Approved By:

[Signature]
Acting Superintendent
Great Smoky Mountains NP

8/16/10
Date

Table of Contents

Chapter	Title	Page
1	Introduction	5
1.1	GRSM Wildland Fire Management Goals	6
1.2	Strategy to Achieve Wildland Fire Management Goals	6
2	Policy, Land Management Planning and Partnership	10
2.1	Fire Policy	10
2.2	Resource Management Planning	11
2.3	Partnerships	12
3	Fire Management Unit Characteristics	13
3.1	Area-Wide Characteristics	13
3.2	Area-Wide Management Considerations	19
3.2.1	Elements of the Fire Environment Affecting Management	19
3.2.2	Air Quality and Smoke Management	21
3.2.3	Park Resources at Risk from Wildfire	22
3.3	Fire Management Unit Specific Descriptions	24
3.3.1	Interface Fire Management Unit (FMU1)	24
3.3.2	Natural Zone Fire Management Unit (FMU2)	27
4	Wildland Fire Operational Guidance	29
4.1	Management of Unplanned Ignitions	29
4.1.1	Preparedness	31
4.1.2	Initial Action	44
4.1.3	Incident Management	47
4.2	Burned Area Emergency Response Program	49
4.2.1	Emergency Stabilization	50
4.2.2	Burned Area Rehabilitation	50

4.3	Management of Planned Fuels Treatments	51
4.4	Prevention, Mitigation and Education	54
5	Monitoring and Evaluation	58
5.1	Short and Long-Term Monitoring	58
5.2	Fire Program Evaluation	59

Appendices

(A)	NEPA Documents	69
(B)	Sample Delegations	70
(C)	Pocket Safety Cards	72
(D)	Agreements	74
(E)	Values at Risk	76
(F)	Federally Threatened and Endangered Species	77
(G)	Minimum Tool Worksheet	79
(H)	5-Year Prescribed Fire Treatment Plan	82
(I)	FMP Annual Review	86

Figures

(1)	Great Smoky Mountains NP Vicinity	9
(2)	Fire Management Units	26
(3)	GRSM Fire Management Organization	37

Tables

(1)	Fuel Model Parameters	17
(2)	Representative Fire Behavior	18
(3)	Weather Stations	32
(4)	Fire Danger Thresholds	33
(5)	Step-Up Plan	34
(6)	Park Staff Roles and Responsibilities	38
(7)	Fire Staff Roles and Responsibilities	41
(8)	Required Wildland Fire Qualifications	43
(9)	Preplanned Wildfire Response	44
(10)	Checklist of Wildland Fire Documentation	48
(11)	BAER Components	49
(12)	Annual Prescribed Fire Planning Process	51
(13)	Mitigations for Public Safety Issues	55
(14)	Wildland Fire Reviews	59
(15)	FMP and EA Reviews and Updates	60

Glossary	61
Works Cited/References	66

1 Introduction

This plan revision updates and supersedes the 2004 version of the Great Smoky Mountains National Park (GRSM) Fire Management Plan (FMP). This update is necessary due to recent changes in both national interagency fire policy and National Park Service fire policy. This plan outlines a comprehensive fire program including wildland fire response, fire prevention and fuels management utilizing prescribed fire and mechanical treatments.

This Fire Management Plan provides long-term direction for achieving park goals related to human safety and ecosystem management. The plan also satisfies the requirements and direction provided in policy, legislative authority, park purpose statements, higher-level planning documents, and natural and cultural resource management objectives.

This plan outlines those actions that will be taken by Great Smoky Mountains National Park in meeting the fire management goals for the park including the requirement as stated in Director's Order 18 (DO18), that:

“As an important part of fulfilling its mission, the National Park Service manages wildland fire to protect the public; park communities and infrastructure; conserve natural and cultural resources; and maintain and restore natural ecosystems and processes. The risks and expenses associated with planning and implementing fire management activities require exceptional skill and attention to detail. The highest priority under all circumstances is firefighter and public safety. All plans, project implementation, and responses to wildland fire must demonstrate this commitment.”

DO18 goes on to state that

“Each park with burnable vegetation must have an approved Fire Management Plan that will address the need for adequate funding and staffing to support its fire management program. Parks having an approved Fire Management Plan and accompanying National Environmental Policy Act (NEPA) compliance may utilize wildland fire to achieve resource benefits in predetermined fire management units. Parks lacking an approved Fire Management Plan may not use resource benefits as a primary consideration influencing the selection of a suppression strategy, but they must consider the resource impacts of suppression alternatives in their decisions.”

Finally, this plan will help achieve resource management objectives as defined in the Resources Management Plan (RMP). Specifically, the RMP calls for the development and implementation of a fire management plan. The RMP also raises issues and concerns of adverse impacts of total fire suppression, the need to develop prescriptions for the use of fire to meet resource objectives, assessment of hazardous fuel loadings, and the need to integrate fire as a natural process in the Park.

1.1 GRSM Wildland Fire Management Goals

The Park's fire management goals are to:

- A. Protect human life, communities, and resources from the adverse effects of wildfire without compromising safety.
- B. Maintain and restore fire adapted ecosystems using appropriate tools and techniques in a manner that will provide sustainable, ecological and social benefits.
- C. Integrate knowledge generated through fire and natural resource research into fire management priorities, decisions and actions.
- D. Integrate fire as a natural process into the Park's ecosystem to the fullest extent possible.
- E. Communicate and coordinate with interagency organizations and other stakeholders to pursue common goals, programs and projects.
- F. Build and promote organizational effectiveness by building program capacity, leadership, and effective management practices.

1.2 Strategy to Achieve Wildland Fire Management Goals

The goals described above will be achieved through the Park's preparedness, wildfire response, prescribed fire, prevention, interpretive programs, and cooperative research efforts. These programs are briefly discussed below as they relate to the goals; however, each is also discussed in more detail in later chapters.

Goal A. - Protect human life, communities, and resources from the adverse effects of wildfire without compromising safety.

- Ensure that firefighter and public safety is the first priority in every fire management action.
- Manage an efficient wildland fire preparedness organization according to established plans, protocols, and guidelines to prevent, detect, and take effective management action on all wildland fires.
- Use pre-treatment and suppression-oriented actions to reduce risk from fire to identified resource values at risk, private lands, developed areas and infrastructure.
- Simulate the effects of natural fires and/or reduce fuel loading in areas of the park where a fire escape may threaten lives and/or property of employees, visitors and neighbors.

Goal B. - Maintain and restore fire adapted ecosystems using appropriate tools and techniques in a manner that will provide sustainable, ecological and social benefits.

- Support the park by providing fire management tools to restore and perpetuate a structural and compositional vegetation mosaic.
- Mimic natural fire regimes as directed by resource management objectives.

- Improve ecosystem health and resilience, thereby reducing the probability of unacceptable impacts due to unusually large-scale disturbances such as disease and insect epidemics or large, high severity fires.
- Manage fires using the full range of management strategies to protect, restore, or maintain resources and developments within and adjacent to the park.

Goal C. - Integrate knowledge generated through fire and natural resource research into fire management priorities, decisions and actions.

- Improve fire prescriptions for management ignited fires (through fire effects monitoring) that will be safe and capable of restoring and maintaining park ecosystems and meet resource objectives.
- Ensure fire management program activities are integrated into land and resource management planning alternatives, goals, and objectives to fully complement one another in support of an ecological approach to resource management.
- Insure the program is responsive to input from resource management research efforts, interagency partners and the public.

Goal D. - Integrate fire as a natural process into Park ecosystem to the fullest extent possible.

- Evaluate every naturally occurring ignition for strategic fire response. For those ignitions which have been determined to be beneficial to the resource, the fire should be managed to achieve resource objectives. Fires may be managed to meet multiple objectives.
- Manage natural fire as a dynamic ecosystem process to the maximum extent feasible.

Goal E. - Communicate and coordinate with interagency organizations and other stakeholders to pursue common goals, programs and projects.

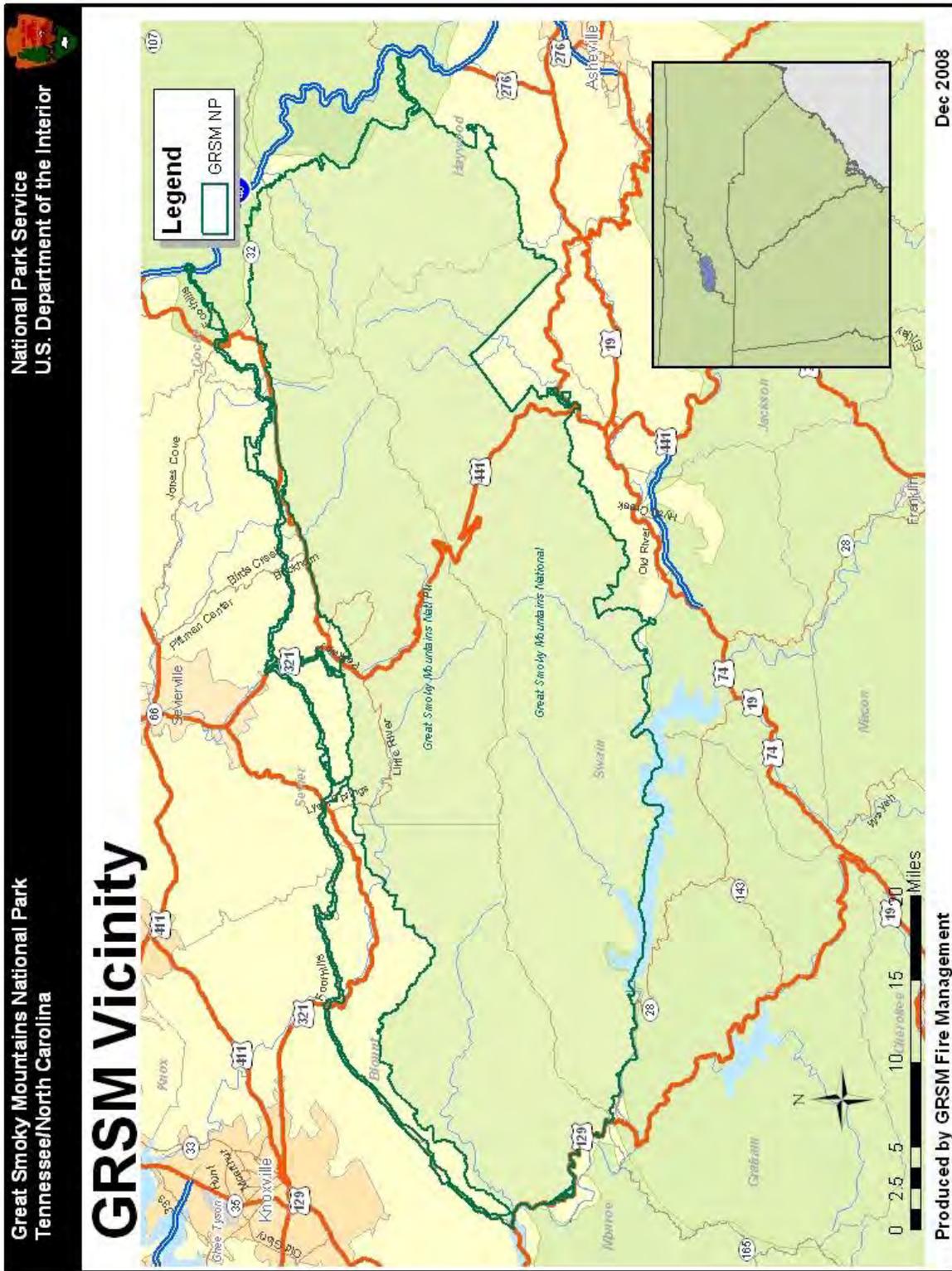
- Maintain an interagency fire program that provides for safe, cost effective, efficient and ecologically sound fire management addressing resource goals and reducing threats to life, property and other resource values across boundaries.
- Foster understanding, appreciation and support among park staff, visitors and neighbors for the wildland fire, prescribed fire, fuels, and aviation programs through park interpretation, public information, media, and inviting the media, private landowners, public officials, park visitors, etc., to observe fire management operations.
- Conduct educational outreach programs.
- Conduct a fire prevention program in cooperation with other agencies to reduce risks to human life, physical facilities and cultural resources; decrease modification of park ecosystems by excessive human-caused wildland fires.

Goal F. - Build and promote organizational effectiveness by building program capacity, leadership, and effective management practices.

- Implement a safe and objectives-oriented fire management program by identifying fire program skill requirements and responsibilities; actively recruiting, retaining, and training staff; and maintaining qualifications and developing employees through assignments.
- Promote teamwork and leadership development.
- Effectively manage fire actions commensurate with values at risk and meet incident objectives while employing fiscal responsibility.

- Reduce unnecessary financial burden to the park by managing fires using the full range of options to protect, enhance, and restore resources and developments within and adjacent to the park.

Figure 1. Great Smoky Mountains National Park and Vicinity.



2 Policy, Land Management Planning and Partnerships

Authority for carrying out a fire and fuels management program originates with the Organic Act of the National Park System, August 25, 1916. This Act states that the primary goal of the National Park Service is to preserve and protect the natural and cultural resources found on lands under its management in such manner as will leave them unimpaired for future generations. Additional authorities for fire management activities include: 31 U.S. Code 665 (E) (1) (B) which provides the authority to exceed appropriations due to wildland fire management activities; Section 302 (c) (2) of the Federal Property Administration Services Act of 1949, as amended; and Chapter VIII of the 1983 Supplemental Appropriations Act (P.L. 97- 257) which deals with contracting for fire protection; and The Reciprocal Fire Protection Act, Act of May 27, 1955 (42 U.S.C. 1856) that authorizes reciprocal agreements with federal, state, and other wildland fire protection organizations.

2.1 Fire Policy

This plan implements fire management policies and helps achieve resource management and fire management goals as defined in:

1. Federal Wildland Fire Management Policy and Program Review, 2001.
2. Guidance for Implementation of Federal Wildland Fire Management Policy, Feb 2009.
3. Managing Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire Adapted Ecosystems – A Cohesive Strategy (USDOI/USDA).
4. A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan.

This plan meets all National Environmental Policy Act and National Historic Preservation Act requirements. An Environmental Assessment has been completed and a Finding of No Significant Impact issued. The plan complies with Section 106 of the National Historic Preservation Act of 1966 and Section 7 of the Endangered Species Act (as amended in 1973).

Authorities for the management of wildland fire on National Park Service lands:

1. United States Department of the Interior, Departmental Manual
2. The National Park Service Management Policies, August 31, 2006
3. Director's Order 18 / Reference Manual 18, Fire and Aviation Management, 1 Jan 08.
4. Review and Update of the 1995 Federal Wildland Fire Policy, January 2001
5. Guidance for Implementation of Federal Wildland Fire Management Policy, Feb. 2009
6. Interagency Standards for Fire and Fire Aviation Operations
7. National Interagency Mobilization Guide
8. Interagency Incident Business Management Handbook
9. Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide
10. Wildland Fire Use Implementation Procedures Reference Guide
11. Interagency Fire Program Management Qualifications Standards and Guide

2.2 Resource Management Planning

The Resource Management Plan (RMP) sets forth the Park's strategy to protect and preserve the natural and cultural resources of the Park. It states that lightning and Native American-caused fires have been important factors in "shaping the mosaic of vegetation throughout the eastern deciduous forests for centuries. It is documented that before European man entered the area, the American Indian was using fire as a tool in hunting, improving game habitat, improving lands for food gathering and clearing land for farming."

It goes on to state that lightning-caused fires are a normal environmental factor in Appalachian forests and that:

"The plant and animal species evolved with occasional lightning fires guiding their evolution, just as occasional drought, windstorms, and attacks of native insects also guided their evolution. Extinguishing lightning fires removes a natural ecological force whose importance is just beginning to be understood.

"Since the establishment of the Park in 1934, the practice has been to extinguish all fires. This has resulted in biological changes different from those that would have resulted from the presence of natural fire. This practice has been recognized by the National Park Service as a problem since completion of the Leopold Report in 1963."

The park General Management Plan states:

"Research into the natural role of fire in the Park will be conducted, and measures will be instituted to restore Park ecosystems as fully as possible to natural conditions, within the constraints of protection of human lives and property inside and outside the Park."

Implementation of the FMP will support Great Smoky Mountains National Park General Management Plan and RMP objectives by specifying an array of fire management strategies designed to help to reestablish natural fire regimes to the extent possible while providing for the prevention of undesirable effects to people and resources from wildfires.

As is evident from the above RMP information and other directives, there are several management objectives related to fire management in the Park. For example, the RMP states that fire was once an important factor in shaping the mosaic of the vegetation within the Park. Further, from a practical standpoint and due to policy, the Park would not be able to address objectives related to the use of fire, fire effects research, and prescribed fire if they were not addressed in the FMP. As a result, this plan outlines a comprehensive program of action to implement fire management policies and achieve objectives of the Park.

2.3 Partnerships

2.3.1 Southern Appalachian Fire Planning Unit

Great Smoky Mountains National Park is a member of the Southern Appalachian Fire Planning Unit (SAFPU). The SAFPU is an interagency partnership of federal land managers tasked with implementing Fire Program Analysis (FPA). The purpose of FPA is to support fire planning, inform budget development and implementation, and identify cost effective fire programs.

The SAFPU charter can be found at:

<http://inpgsrms01gis/fire/Shared%20Documents/Forms/AllItems.aspx>.

2.3.2 Interagency Coordination

The necessity of consulting and working with other agencies, organizations, towns, etc., is unquestioned. Fire suppression, hazard fuel reduction projects, and the writing of major fire management plans are examples of activities that must be done on a coordinated basis.

Great Smoky Mountains National Park is actively involved and committed to cooperative agreements and interagency coordination to ensure the fire management program is implemented in a timely, safe, cost efficient and professional manner. The Park actively cooperates with the states of Tennessee and North Carolina, counties and cities surrounding the Park, the Tennessee Valley Authority, and the Eastern Band of the Cherokee Tribe as well as National Forests in four states through coordination of fire training and the hosting of the GRSM Wildland Fire Module.

2.3.3 Interagency Contacts

The source for all interagency contacts is the Tennessee State Mobilization Plan that is a non-attached appendix of this plan. Additional contacts for Cooperating Volunteer Fire Departments, National Weather Service, and local law enforcement are found in the phone listing located in the Park's Fire Management office.

Occasionally the Park will need additional wildland fire resources; these will be ordered through the Tennessee Interagency Coordination Center that is part of the Cherokee National Forest.

2.3.4 Agreements

Agreements are listed in tabular form in the FMP Appendix D. This summary displays the name of agencies, purpose of agreement and expiration date. This table should be updated by the FMO as part of the annual FMP update. Copies of the agreements are located in the Park's Fire Management Office. It is the responsibility of the FMO and personnel of the Division of Resource and Visitor Protection to maintain these documents and to ensure that an open line of communication is maintained with cooperators.

Current GRSM agreements include: North Carolina Division of Forest Resources, U.S. Fish & Wildlife Service, Tennessee Department of Agriculture Division of Forestry, Bureau of Land Management, U.S. Department of Agriculture, Wears Valley VFD, Grassy Fork VFD, Pittman Center VFD, Pigeon Forge FD, Stecoah VFD, Bryson City VFD, Blount County #5 (Walland) FD, Townsend Area VFD, Jonathan Creek VFD, West Swain VFD, Gatlinburg FD, and Cosby Volunteer Fire Department.

3 Fire Management Unit Characteristics

3.1 Area-Wide Characteristics

Attributes identified within this section are consistent across the landscape and are applicable to both Fire Management Units identified in this Fire Management Plan.

3.1.1 Landscape Features

The park lies within the Southern Section of the Blue Ridge physiographic province, a region of geologically ancient mountains characterized by steep, rugged terrain, an abundance of clear running streams, and dense forests. Elevations in the park range from about 250m (820 ft) to 2,025m (6,640 ft), with sixteen peaks rising above 1830m (6000 ft). The geology of the park is dominated by sedimentary rock, with metamorphosed sandstones, siltstones, and shales comprising the most common formations. The dominant soil orders are Inceptisols and Ultisols, and the soil moisture regime is udic (USDA, 2009). The potential for erosion following soil disturbance (e.g. road-building) is generally high for the most common soils found in the park, while the potential for damage to soil by fire is low to moderate.

3.1.2 Major Vegetation/Fuel Types

Eight major vegetation/fuel types account for 95% of the park's land cover (Madden and others, 2004). Those major vegetation types and the relationship of each one to fire is briefly discussed below. In general, the park is dominated by deciduous forest, but contains significant inclusions of coniferous forest. Vegetation/fuel complexes in the park vary dramatically in terms of average fuel moisture, historical fire regime, and fire effects.

Spruce-Fir Forest- These forests have historically occupied elevations above 5000', and account for 6% of the park's land cover. High elevation communities have been beset by numerous maladies; most conspicuously, mature Fraser fir trees are nearly all dead. Due to the high amount of rainfall and frequent fog at this elevation, there is normally little chance of fire occurring. However, there are very high dead fuel loadings present which may burn under extreme drought conditions.

Northern Hardwood Forest – Mesic forests of American beech, yellow birch and white basswood co-occur with spruce-fir forests on slopes above 4500', accounting for 15% of land cover. Due to a high amount of annual rainfall and cool microclimate, fires are very infrequent.

High Elevation Northern Red Oak Forest – Forests dominated by northern red oak may be found on exposed ridges and slopes between 3500' and 5000' in elevation. This type accounts for only 4% of the park's land cover, but the exposed landscape positions and more receptive fuels result in a moderate frequency of low-intensity fires. There is a great deal of interest in using fire to maintain this vegetation in the southern Appalachians.

Cove Hardwood Forest – These rich forests are dominated by an admixture of primarily hardwood species, and make up 15% of the park's land cover. This type occurs in moist coves and on sheltered slopes, and has an inherently low fire frequency. Along with Northern Hardwood Forests, this community borders others that have regular fires and may tend to regulate the spread of wildfires.

Mesic Oak/Hardwood Forest – A large percentage of the park (21%) is covered by mature forests dominated by northern red, chestnut, and/or white oak, along with red maple and hickory. These forests occur on low or semi-sheltered slopes and ridgeline gaps at low

elevations. The chief fuel is hardwood litter, and the availability of these fuels is a function of site and of the ambient conditions during a fire event. Though somewhat controversial, it is widely believed that maintenance of oak dominance in these communities is dependent upon frequent to moderately-frequent low-intensity fires.

Xeric Oak/Pine Forest and Woodland – 24% of the park is covered by xeric to subxeric woodlands of oak and pine that have been highly altered by past fire exclusion practices. Community dominants vary from chestnut and scarlet oaks to pitch, Virginia, white, shortleaf, and Table Mountain pines. Elevations vary from around 1000' to nearly 4000', but landscape position is almost always exposed to partially-exposed ridgetops and upper slopes. These woodlands and forests represent the most clearly fire-adapted vegetation within the park, and are involved in the vast majority of fire occurrences. Fuels range from open oak litter to heavy volumes of beetle-killed pine to highly flammable evergreen shrubs, with fire behavior that varies from creeping surface fires to moderate-intensity surface fires with occasional torching. Crown fires are extremely rare, limited by the small patch size of pure evergreen stands. The historic fire regime was one of frequent (MFI <35 years), low- to mixed-intensity fires.

Hemlock Forest – Evergreen forests dominated principally by Eastern hemlock can be found along streams, moist acidic coves, and sheltered slopes. Such forests make up about 3% of the park's vegetation cover, though hemlocks have been in steep decline since the hemlock woolly adelgid was first discovered in the park in 2002. These stands were historically protected from fire by moist site conditions and compact, heavily shaded fuels, but canopy openings and heavy fuel loadings associated with high tree mortality could alter the fire behavior in these sites, particularly during extended droughts.

Successional Hardwood Forest – Areas of past heavy settlement, agriculture, and/or logging are currently dominated by young forests of tulip poplar, with red maple, white pine and Virginia pine co-occurring on some sites. These stands account for 7% of vegetation cover, and occur on lower slopes and flats below 3000'. Moist site conditions and compact fuels result in extremely low fire frequency and behavior.

Other (Alluvial forest, Heath balds, grassy balds, fields, etc) – The park contains small inclusions of several plant communities that are, overall, scarcely impacted by contemporary fire. Two of these, heath balds and grassy balds, are suspected to have been created or partially maintained by fire, but currently have a very low probability of fire occurrence. Wildfires in fields are likewise uncommon, though the fields in Cades Cove have been managed with prescribed fire for a decade. Alluvial forest is a rich community type that is rare within the park, and limited to the floodplains and terraces of larger streams. The wet-mesic nature of these sites makes them very resistant to fire spread, though there are concerns with impacts to these areas during fire operations.

3.1.3 Historic Role of Fire:

Fire has long been a part of the Appalachian landscape. The legacy of fire is evident in the fossil pollen record, tree-ring scars, and written accounts. Perhaps the most compelling evidence is the contemporary vegetation of the region, which exhibits traits that have evolved over millions of years with naturally occurring fire. Adaptations to fire such as sprouting, cone serotiny, thick bark, pyrogenic foliage, and nitrogen fixation are common features of species found throughout the region. Evidence suggests that natural communities dominated by oak and pine have been maintained on the landscape for thousands of years by a regime of frequent, low to moderate intensity fire (Fesenmyer and Christensen 2010, Delcourt and Delcourt 1998, Van Lear and Waldrop 1989). It should be noted that fire does not currently

appear to be ubiquitous on the Appalachian landscape. Mesophytic forests currently occupy over half of the park's land base, and it is unlikely that these perennially moist or sheltered parts of the landscape have experienced any regular fire, at least during historic times. Under recent climatic conditions, these sites and the fuels that are produced there are typically too moist and compact to burn under all but extreme conditions.

Lightning and humans have both served as important ignition sources for fires in the region, but their respective roles have changed over time. Lightning has provided a consistent source of ignition for millions of years, driving the evolution of plant and animal populations throughout the continent before the arrival of modern humans. Under the current climate and conditions of wildland fuels, lightning still provides a source of ignition, though it is of limited significance as a landscape-scale disturbance (Barden and Woods 1973, but see Cohen and others 2007). Since the advent of the park's "Fire-Use" policy for lightning ignitions in 1997, 13 lightning-caused fires have combined to burn nearly 2300 acres (209 ac/yr).

In contrast to the ancient history of lightning, the earliest known human habitation in the park occurred only 8000 years ago, though human occupation and disturbance have been more or less continuous since that time (Bass, 1977). Prehistoric human populations are known to have used fire for multiple purposes, and it is reasonable to deduce that such use of fire over thousands of years had profound impacts to vegetation and natural communities, particularly in areas adjacent to human use. It is also reasonable to assume that at least some percentage of these fires would have consistently burned beyond these adjacent areas, constrained only by ambient weather conditions, fuels and topography.

Several studies have provided more specific information about the frequency and seasonality of fires in the park, particularly those occurring since European settlement. A dendrochronology study by Harmon (1982) established a mean fire-free interval of 12.7 years for pine-oak forests in the western end of the park during the years 1856-1940, with most ignitions attributed to humans. Ongoing research by Grissino-Mayer and others (unpublished data) has pointed to a 4-5 year mean fire-free interval for similar forest types, with most fires found to have occurred during the dormant season. Both studies found a significant decrease in fire frequency during the years following the establishment of the National Park, as Federal policies for full exclusion and suppression were implemented.

3.1.4 Fire Regime Alteration

The suppression and exclusion of fires in GRSM since the 1940's constitutes a substantial departure from the fire regime that likely exerted an overriding influence on vegetation dynamics over nearly half of the park's landscape for thousands of years. Prior to 1940, the fire regime on the more exposed parts of the landscape was primarily one of frequent, low to moderate intensity fire. In general, the mean fire-free interval necessary to maintain stands of pine and oak on the landscape is <35 years, with more frequent fires needed to maintain ridgetop pines and less frequent fires needed to maintain mesic oaks (Brown and others 2000, Frost 1998, Harrod and others 1998, Harmon 1982). The near absence of fire in the park between 1940 and 1997 (when the park began using fire) would suggest that the average pine stand has missed 2-5 fire events and the average mesic oak stand has missed 2-3 fires.

The impacts of this alteration are well documented by Harrod and others (2000, 1998). In general, these researchers found that the average canopy density in xeric pine and oak stands had more than doubled between 1936 and 1995, with the largest increases occurring among fire and drought-intolerant species such as red maple, white pine, black gum, eastern hemlock, and flammable evergreen shrubs such as mountain laurel. As a result of changing

stand conditions, these forests lack regeneration of the historically-dominant yellow pine and oak species and show decreases in abundance and diversity among herbaceous species.

Partially as a result of competitive stress on mature pines, the loss of ridgetop yellow pine forests has been accelerated by large-scale outbreaks of Southern pine beetle during the last 20-30 years. In the short term, these alterations to the fire regime can lead to increased risk of wildfires that are very resistant to control, especially on sites with large accumulations of beetle-killed pine fuel and/or heavy growth of evergreen shrubs. In the longer term, continued succession to closed forest will result in widespread dominance by species that are poorly adapted to drought, fire, and changing climatic conditions. These changes over such a substantial portion of the park's land base are believed to pose a serious threat to the park's ability to achieve its goal for preservation of a diverse and resilient ecosystem.

3.1.5 Historic Weather Analysis

The climate zone for the park is classified as Humid Subtropical, with hot and humid summertime conditions and mild winters. Average temperatures and precipitation, however, vary considerably by location and elevation within the park. The average annual high/low temperatures at nearby Gatlinburg, TN (elevation 1289') are 70°F/43°F, and the average annual precipitation is 54 inches. By comparison, the average high/low temperatures at Clingman's Dome (elevation 6,640') are 50°F and 36°F, with average annual precipitation of 82 inches.

Precipitation is largely uniform throughout the year for a given site, though some important seasonal trends do exist. On average, the peak of rainfall occurs during the summer months of June, July, and August, while the lowest average rainfall occurs during the fall months of September, October, and November. Thunderstorms occur throughout the year, and lightning has ignited fires in most months; however the vast majority of lightning ignitions occur between the months of April and August.

The annual fire weather cycle is more a function of seasonality and temperature than precipitation. Warm temperatures and exposed fuels during the dormant seasons of spring and fall condition the fuels for easy ignition and spread. In contrast, during the winter, cold temperatures prolong the wetting effect of the precipitation, and in the summer, heavy sheltering of fuels by tree foliage (coupled with high humidity) makes for poor ignition conditions under normal circumstances. Exceptions to the norm have occurred. Atypical dry spells in any season can result in more fires and/or unusually higher fire intensities. In 1987, and again in 2007, extreme summer-time droughts made the normally fire-resistant hardwood forest susceptible to fire. Numerous lightning- and human-caused fires in and near the Park burned thousands of acres during summer months in those years.

The Keetch-Byram Drought Index (KBDI) is calculated from ongoing weather measurements taken at two remote fire weather stations within the park. The KBDI uses daily temperature, daily precipitation, antecedent precipitation and annual precipitation to produce a number between 0 (no drought) to 800 (extreme drought) to describe moisture conditions in deep duff and soil. KBDI has been shown to follow predictable annual cycles (Keetch and Byram 1968, NPS/USFS Fire Weather Data), and can be used to understand the availability of heavy fuels through an average year in the southern Appalachians. Though fires will readily spread in fine fuels at virtually any KBDI value, the persistence and severity of fire on the landscape are strongly related to the drought index. Generally, the lowest annual values for KBDI (<50) occur in late winter, and availability and consumption of heavy fuels is typically minimal. A steady increase in the index begins by mid-spring, and a broad annual maximum (250-450) occurs between August to November. During an average year, fall fires can thus be more resistant to

control. Deviations from the annual cycle can also be useful for understanding atypical fire weather patterns.

3.1.6 Fire Season

Fires can occur at virtually any time of year in the park, with the lowest probability of occurrence in December and January. With that said, the Park has two primary fire seasons, late winter/early spring and late summer/fall. Increasing temperatures and day length combine with exposed fuels to create a relatively predictable spring fire season. As green-up occurs and the forest closes, typical moist and humid summer conditions develop and effectively end the spring fire season. The peak in the annual cycle of water deficit and accumulated impacts of drought can create conditions for severe fires in the late summer and fall. Under average conditions, the timing of the late fire season is much less predictable than the spring season.

Note: These fire seasons should be monitored by tracking weather conditions and NFDRS indices, not by calendar dates.

3.1.7 Fire Behavior Associated with Area Fuels

Fuels in the park can generally be divided into three broad categories: hardwood timber litter, shrubs and grasses. By far, the dominant fuel type is hardwood timber litter. Hardwoods in various associations interspersed with pockets of short-needle pine make up over 80% of park lands. Heavy growth of shrubs such as rhododendron and mountain laurel can occur under hardwoods or conifers throughout the park. This understory layer under typical conditions is relied upon to dampen fire activity and check fire spread due to shading and higher humidity. During extended periods of dry and/or windy conditions, these shrubs can burn in short duration crown runs that can transition to individual and group tree torching, exasperating control efforts. Grass fuels are a localized and minor component of the park but are interspersed with numerous cultural values at risk from the effects of wildfire.

The fuel models described below are a subset of those available in Behave Plus. Fuel models are models only and provide approximate fire behavior associated with those fuels under given consistent conditions. Observed fire behavior must be used to verify and fine tune predicted fire behavior outputs.

Table 1. Fuel Model Parameters

Fuel Model	Fuel Load (tons / acre)					Model Type	Fuel Bed Depth (ft)	Moisture of Extinction (%)
	1 hr	10 hr	100 hr	herb	woody			
TL4	0.5	1.5	4.2	0.0	0.0	static	0.4	25
TL6	2.4	1.2	1.2	0.0	0.0	static	0.3	25
TL9	6.7	3.3	4.2	0.0	0.0	static	0.6	35
TU2	.9	1.8	1.3	0.0	0.2	static	1.0	30
GR2	0.1	0.0	0.0	1.0	0.0	dynamic	1.0	15
GR5	0.4	0.0	0.0	2.5	0.0	dynamic	1.5	40

Table 2. Representative Fire Behavior

(Rate Of Spread in Chains Per Hour, Flame Length in Feet)												
Wind Speed (mph)	0		2		4		6		8		10	
	ROS	FL										
TL4	0.4	0.5	0.9	0.8	1.7	1.1	2.7	1.3	3.8	1.6	4.4	1.7
TL6	0.8	1.0	1.9	1.5	4.0	2.1	6.6	2.7	9.8	3.2	13.4	3.7
TL9	1.4	1.9	3.1	2.8	6.1	3.8	9.7	4.7	14.0	5.6	18.7	6.4
TU2	1.2	1.2	3.6	2.0	7.7	2.8	12.8	3.5	18.7	4.2	25.3	4.8
GR2	0.6	0.4	2.3	0.8	4.8	1.1	4.8	1.1	4.8	1.1	4.8	1.1
GR5	2.7	2.4	9.7	4.2	20.7	6.0	34.0	7.6	49.1	9.0	65.7	10.3

A. Timber Litter

Fire behavior fuel models TL4, TL6 and TL9 represent fire behavior associated with timber litter fuels in the park. Choosing which model to use depends on the type of leaf litter present, how much litter is present, and how compact or fluffy the litter is. The primary carrier of fire in TL4 is broadleaf (hardwood) litter. TL4 represents a moderate load of fine and coarse fuels, compact litter. Spread rate is low; flame length low. The primary carrier of fire in TL6 is moderate load broadleaf litter, less compact than TL4. Spread rate is moderate; flame length low to moderate. The primary carrier of fire in TL9 is very high load, fluffy broadleaf litter. TL9 can also be used to represent heavy needle-drape. Spread rate is moderate; flame length quickly exceeds that which can be addressed by direct attack by hand.

B. Timber Understory

Fire behavior fuel model TU2 represents tall shrubs such as rhododendron and mountain laurel. A week of dry, windy conditions can turn these shrubs from a natural fire break into a volatile complex of fuel capable of sustaining short duration crown runs. These shrubs, particularly mountain laurel, frequently occur under a pine canopy, posing a risk of mid-story tree torching. Additionally, these fuels are of particular concern because they pose the greatest risk in the wildland urban interface where private structures are located. The primary carrier of fire in TU2 is a moderate litter load with a shrub component. Low to moderate shrub and litter load, possibly with pine over-story, fuel bed depth about 1 foot. Spread rate is moderate; flame length low to moderate.

C. Grass

Fire behavior fuel models GR2 and GR5 represent the grass fuels found in areas such as Cades Cove. GR2 can be used to model sparser or previously mowed fields while GR5 models fields with taller grass and heavier fuel loads. The primary carrier of fire in GR2 is grass, though small amounts of fine dead fuel may be present. Load is greater than GR1, and fuel bed may be more continuous. Shrubs, if present, do not affect fire behavior. The primary carrier of fire in GR5 is humid-climate grass. Load is greater than GR2 but depth is lower, and grass height averages about 2 feet.

3.2 Area-wide Management Considerations

National Park Service policy requires the perpetuation of Park resources using natural forces whenever possible. Park directives instruct managers to preserve the exceptionally diverse resources of GRSM. It is believed that the native biological diversity throughout the fire-adapted portion of the Park landscape has already decreased for many reasons, but primarily because of fire exclusion and associated plant community succession.

Minimum impact suppression tactics are required policy for all fire management activities taking place on National Park Service lands. Fire management activities within the Park will be carried out in a manner that minimizes impacts to the Park's natural and cultural resources. Interdisciplinary teams will meet to address potential impacts to park resources resulting from either wildfire or suppression activities.

3.2.1 Elements of the Fire Environment Affecting Management

Further discussion of the elements listed here is found elsewhere in this plan as well as other Park resource management plans and have been documented in the Environmental Assessment for the FMP. They are highlighted here for summary purposes. A complete listing of Park facilities can be found in Appendix E.

- **Recreation and Visitation:** Great Smoky Mountains National Park, being centrally located in the eastern United States, is convenient for a major part of the country's population. It is the most heavily visited national Park in the nation attracting approximately 9 - 10 million visitors annually. The Park is open year-round. Major visitation months are June, July, August and October (fall colors).
- **Wildland-Urban Interface:** The wildland-urban interface presents a sprawling tangle of developments, scattered individual summer and year-round homes, and resort areas. A systematic assessment of the Park boundary to identify structures at risk during normal fire years was completed in 1995. There were 277 structures identified valued at 22 million dollars. To date approximately six miles of boundary adjacent to Gatlinburg has had hazard fuel treatments. It is estimated that another 50 structures have been built on the boundary since the surveys of the 1990s.
- **Developments and Facilities:** Non-historic buildings make up the largest number of facilities. Examples being storage sheds, warehouses, shop buildings, comfort stations, equipment buildings, horse barns and information kiosks. There are approximately 290 non-historic structures.
- **Air Quality:** The Park has been designated as a Class I area by the Clean Air Act. The Clean Air Act also identified National Ambient Air Quality Standards (NAAQS) for a number of common pollutants. Portions of the park have been identified as falling in counties which have been designated as non-attainment for PM2.5 and or ozone. The park is working with state regulators to address non-attainment. Refer to section 3.2.2 of this plan.
- **Cultural Resources:** The Park has a wealth of archeological and historic resources. There are 150 plus historic structures. Refer to section 3.2.3 of this plan.

- **Natural Resources:** There are many resources of concern in Great Smoky Mountains National Park, including 11 federally threatened and endangered species. Refer to section 3.2.3 of this plan for information concerning the protection of natural resources.
- **Wilderness:** Lacking formal Wilderness designation, NPS policy dictates that all areas of potential Wilderness be managed as de facto Wilderness. The Great Smoky Mountains NP Wilderness Recommendation published in 1974 stated that under the Wilderness Act, lands so designated are to be preserved and protected "in their natural condition" so as to retain their "primeval character and influence, without permanent improvements or habitation." The GMP calls for de facto Wilderness of these same areas. The revised FMP is consistent with that direction and sets forth procedures to reestablish some aspects of the Park's former primeval character (mosaic of natural communities) and influence (fire as a natural force).
- **Local Economics:** Providing services and a base for visitors to the Park are developed areas on two sides of the Park. Gatlinburg and Townsend are located on the north side and Cherokee and Bryson City are located on the south side. All have economies dependent on tourism. Several smaller towns are also present at various points adjacent to the Park boundary. The principal areas provide a wide range of services to the visitor, including lodging, restaurants, grocery stores, crafts and curio shops, and many amusement and sporting activities.
- **The Tennessee Valley Authority** has several power transmission lines that pass through the western and southern sections of the Park. These are the Fontana-Alcoa Number 1 and 2 transmission lines and the Fontana-Santeelah transmission line.
- **Adjacent Ownership Issues:** The trend toward development adjacent to the Park has accelerated in recent years, resulting in diminished amounts of privately-owned open space surrounding the Park. The Park has no control over this development. However, the development dictates to a large degree the kinds of management programs, policies, and hazards that the Park must address.
- **Other Agencies:** The fact that the Park lies in two states and numerous counties means that it must coordinate its fire program with many agencies, each of which has somewhat different charges, goals, and resources.

3.2.2 Air Quality and Smoke Management

A. Pertinent Air Quality Issues

Air quality in the Great Smoky Mountains National Park is an important environmental issue. Air pollution affects visitor health and impacts Park resources. It significantly reduces visibility, acidifies streams, and injures plants within the Park. Locally, Blount County has been designated as “non-attainment” for both PM_{2.5} and ozone while Sevier County is in “non-attainment” status for ozone.

Great Smoky Mountains National Park is a Class I air shed. Congress passed the Clean Air Act to create a national policy for the protection, preservation, and enhancement of air quality. The Clean Air Act designated all national Parks over 6000 acres as Class I areas and set a national goal for visibility as “the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which results from manmade air pollution.” Amendments to the Act gave federal land managers the affirmative responsibility to assure that air quality and air quality related values do not deteriorate and to take aggressive action in protecting, preserving and enhancing the Park’s resources.

Park staff maintain a network of air quality monitoring sites. These sites measure gaseous pollutants including: ozone (O₃), sulfur dioxide (SO₂), nitrogen oxides (NO_x), fine particle matter (PM₁₀ and PM_{2.5}), meteorology (temperature, precipitation, winds), atmospheric deposition of sulfates, nitrates and mercury. Also, cameras record visibility every fifteen minutes from the Look Rock Tower and Purchase Knob.

The Park Air Resources Specialist issues an air pollution advisory on days when air pollution values exceed or are expected to exceed the National Ambient Air Quality Standards (NAAQS) for ozone and/or particulate matter.

B. Program Actions to Manage Smoke

Smoke management is a major concern of the Park. While fire is an important natural process and a critical component of resource management, it is also a safety hazard to motorists, a source of air pollution, a public health concern, and contributes to visibility impairment, from particulate matter.

To ensure safety, smoke will be monitored on roadways and appropriate traffic control measures will be taken. Smoke generated by prescribed fires will be managed in compliance with air pollution regulations of TN and NC, refer to the GRSM Smoke Management Plan.

The Park has an air pollution advisory system in place during days that exceed the National Ambient Air Quality Standards for ozone and/or particulate matter. These advisories must be taken into consideration when planning and implementing each prescribed fire. Under some advisories, large landscape-sized fires may be unacceptable while those of a smaller size might be allowed. Some fires may be remotely located and exposure to visitors and employees mitigated.

Prescribed fire managers must consider fuel loading, fuel moisture, anticipated consumption, anticipated smoke production, and smoke dispersal when planning a prescribed fire. Smoke production and dispersal are key elements considered when

obtaining a burn permit. Smoke management mitigation measures are implemented as required on every burn conducted in the Park. These mitigations may include: burning smaller units, burning under higher duff moisture contents, determining acceptable/unacceptable wind directions, burning under higher ventilation rate values, refining prescription parameters, utilizing traffic control, rotating fire staff out of smoky conditions, or not implementing fires under adverse atmospheric conditions. It is widely accepted that there are fewer pollutants released into the atmosphere during prescribed fires versus wildfires. This is due to the mitigation measures mentioned above. Wildfires often occur under more extreme, drier conditions when more fuels are available and more consumption of heavy fuels, stumps and duff occur. These types of fuels often smolder for many hours producing air pollutants over-night when stagnant air conditions occur.

Fire staff will meet with the park air resources specialist when unplanned ignitions occur. Air quality is one factor considered when determining whether a fire should be monitored for resource benefit rather than aggressively suppressed.

The proximity of federally listed Indiana Bat hibernacula is considered and determines whether or when prescribed fire operations are allowed. This mitigates harmful smoke from entering caves being used by bat colonies. Fire staff will routinely consult with park wildlife biologists when planning prescribed fires or evaluating wildfires.

The governors of NC and TN have recommended that the Great Smoky Mountains National Park be a CAA non-attainment area for the current 8-hour ozone standard (>75 ppb) . EPA will make a final determination on the designation recommendations in the near future. Both states will be required to monitor ozone, develop a State Implementation Plan to mitigate and reduce the sources of air pollution if the park continues to exceed the standard. Each plan could lead to increased monitoring of smoke and more stringent regulations.

3.2.3 Park Resources at Risk from Wildfire

A. Cultural Resources

The Park maintains an excellent collection (150 plus) of historic structures of log, framed, and mixed construction. A listing of these structures is included in Appendix E. They date from about 1840 to the 1920s. Included among the building types are dwellings, outbuildings, churches, gristmills and schoolhouses. Most of these structures are built of logs or hewn timbers and have wooden shingled roofs. These structures, made of highly flammable materials, are highly valued and thus warrant protection from wildland fires. Their needs will be addressed in future years as part of the Park's hazard fuel management program.

Maintenance of historical landscapes in Cades Cove and Cataloochee requires control of natural plant succession within historic boundaries. Both fire exclusion and prescribed fire are of value in the maintenance of these areas. Especially noteworthy are those areas in which fire may be needed to reestablish native communities that include prairie grasses.

Actions to prevent or mitigate negative impacts to these resources include their inclusion in the Interface FMU and the measures found in the section on Minimum Impact Suppression. In addition, there is an archeologist on staff who reviews all prescribed fire plans and is

actively involved in monitoring wildland fire suppression activities to ensure they are not damaging to cultural resources.

In addition, fire fighters on any fire must be alert for the four basic sources of damage to cultural resources. These include fire intensity, duration of the heat source, heat penetration into the soil matrix, and the use of fire suppression and fire rehabilitation equipment. Above ground historic structures (log cabins, wooden bridges, etc.) are particularly vulnerable to both natural and prescribed fire. Below ground archaeological deposits are most vulnerable to the displacement of artifacts and destruction of features during suppression and rehabilitation efforts and are usually not directly impacted by the fire itself. Protection of these fragile and irreplaceable resources will be accomplished through a hazard fuel reduction program and coordination of suppression and rehabilitation efforts with cultural resource specialists.

B. Natural Resources

The park contains numerous resources of concern with respect to wildfire. These resources are typically small-scale occurrences of rare species, natural communities, or habitat. Some of these resources are likely to benefit from natural disturbances such as fire, while the impact on others may depend upon severity or seasonality of a fire. The fact that these resources are irregularly distributed throughout the park implies that each fire occurrence will have site-specific concerns. It is thus beyond the scope of this plan to provide a list and locations of all potential resources of concern. Fire managers must consult with Park Resource Managers on an individual-case basis to determine resource concerns associated with any given fire.

The following sections address the resources that require protection through either federal or state law or NPS policy.

C. Federally Listed Threatened and Endangered Species

All federal agencies proposing to make significant changes to their management of natural areas must consider what impacts their actions would have on any federally threatened or endangered species. If the agencies discover that a listed species may be affected by the proposed actions, they are required to consult with the U.S. Fish and Wildlife Service. Appendix F lists the known federally threatened and endangered species of Great Smoky Mountains National Park. In addition to these T & E species, the park contains fourteen Federal Species of Concern.

D. State Listed Plant and Animal Species

National Park Service policy directs parks to also consider state-listed animals and plants in planning efforts. Currently, the Park contains 25 state-listed animals and 68 state-listed plants from the states of Tennessee and North Carolina. Lists and known occurrences for these species are maintained by the Park's Inventory and Monitoring program. As stated above, consideration of these species must be done on a case-by-case basis during the assessment of an appropriate fire response.

E. Aquatic Resources

National Park Service policy directs fire managers to utilize minimum impact suppression tactics for all fire management activities on NPS lands. The Preparedness Plan (see section 4.1.1) addresses considerations with respect to aquatic resources during wildland fire operations. In general, the Plan states that chemical retardant is not to be used within 200 yards of any stream or lake. Additionally, the Plan identifies sites that require a greater level of protection from the use of retardant.

3.3 Fire Management Unit Specific Descriptions

The park is divided into two fire management zones: FMU1 is the interface zone and is generally contiguous with the park boundary and Foothills Parkway, developed areas within the park are also included in this FMU. FMU2 is the natural zone, this FMU makes up the preponderance of park lands. Within FMU2, naturally occurring wildfires will generally be allowed to play their role in the eco-system. Refer to the following sections for specific FMU guidance.

3.3.1 Interface Fire Management Unit (FMU1)

FMU 1 (Figure 2) has been established to address this plan's objective to protect human life, property, and sensitive natural and cultural resources within and adjacent to Park boundaries. It is approximately 77,643 acres in size within the Park proper, plus an additional 9,457 acres of the Foothills Parkway, totaling 87,100 acres. This represents approximately 17 percent of the area administered by the Park.

A. Physical and Biotic Characteristics

FMU 1 is contiguous with the park boundary and developed areas. FMU1 is comprised of developed park infrastructure, historical, cultural, and sensitive natural resources. The introduction to Chapter 3 accurately depicts the physical and biotic attributes of fire management unit 1.

B. Fire Management Objectives

Strategic Objectives:

- The management objective during initial action on all wildfires regardless of cause in FMU 1 will be to suppress the fire at the lowest cost with the fewest negative consequences with respect to firefighter and public safety.
- A strategic fire response with supporting decision documentation will be initiated on each wildfire occurrence. Strategic fire response will consider firefighter and public health and safety, fire cause, current and predicted weather, current and potential fire behavior and effects, values to be protected, resource availability, cumulative effects of fire and cost effectiveness.
- Prescribed fires will be used to reach natural and cultural resource management objectives and for hazard fuel reduction activities.
- Mechanical fuel treatment methods may be used for hazard fuels reduction in areas where safe and effective prescribed fire treatment is precluded by fuel loads, or is otherwise unfeasible. Mechanical treatments may range from use of hand tools to using specialized equipment such as gyro-tracks if and as approved in treatment plans.

Resource benefit from fire is not a consideration during the initial action response process in FMU1. The effects of suppression may be considered during the assessment process. Documentation of the decision process will be accomplished using the WFDSS program.

Measurable Objectives:

- All wildfires are managed with the strategic fire response as directed by this fire management plan and analysis of the specific situation with the goal of using

available resources to manage the fire for the most effective, most efficient and safest means available.

- All wildland fire operations are conducted so that no lost time injuries occur to firefighters or the public.
- No natural communities or rare species are lost due to either lack of prescribed fire or the destructive effects of wildfire.
- Hazard fuel reduction efforts within FMU1 show an average incremental increase in acres treated each year over the life of this plan.
- Increase the average annual acreage of mechanical fuel treatments in areas where safe and effective prescribed fire treatment is precluded by fuel loads, or is otherwise unfeasible.

C. Fire Management Considerations

- Firefighter and public safety is the first priority in all fire management activities.
- Minimum Impact Suppression Tactics will be employed.
- Protection mitigation measures for known historic and cultural resource sites in or near the project area must be assured before a prescribed fire project is initiated.
- Park neighbors, Park visitors and local residents will be notified of all planned and unplanned fire management activities that have the potential to impact them.
- All personnel involved in fire management operations will receive a safety briefing describing known hazards and mitigating actions, current fire season conditions and current and predicted fire weather and behavior.
- Only properly trained and qualified personnel will carry out fire management operations. Trainees must be supervised by fully qualified personnel.

D. FMU 1 Fire Management Situation

Historic Role of Fire By and large, most documented wildfires have occurred inside FMU 1. Wildfires have not occurred in a random, evenly spaced manner throughout this unit. Locations such as the Lakeshore Drive, the Park boundary adjacent to NC Highway 129, TN Highway 73 where it enters the Park adjacent to Townsend, Katy Holler, and the Cosby area have historically been areas of high human caused fire occurrence.

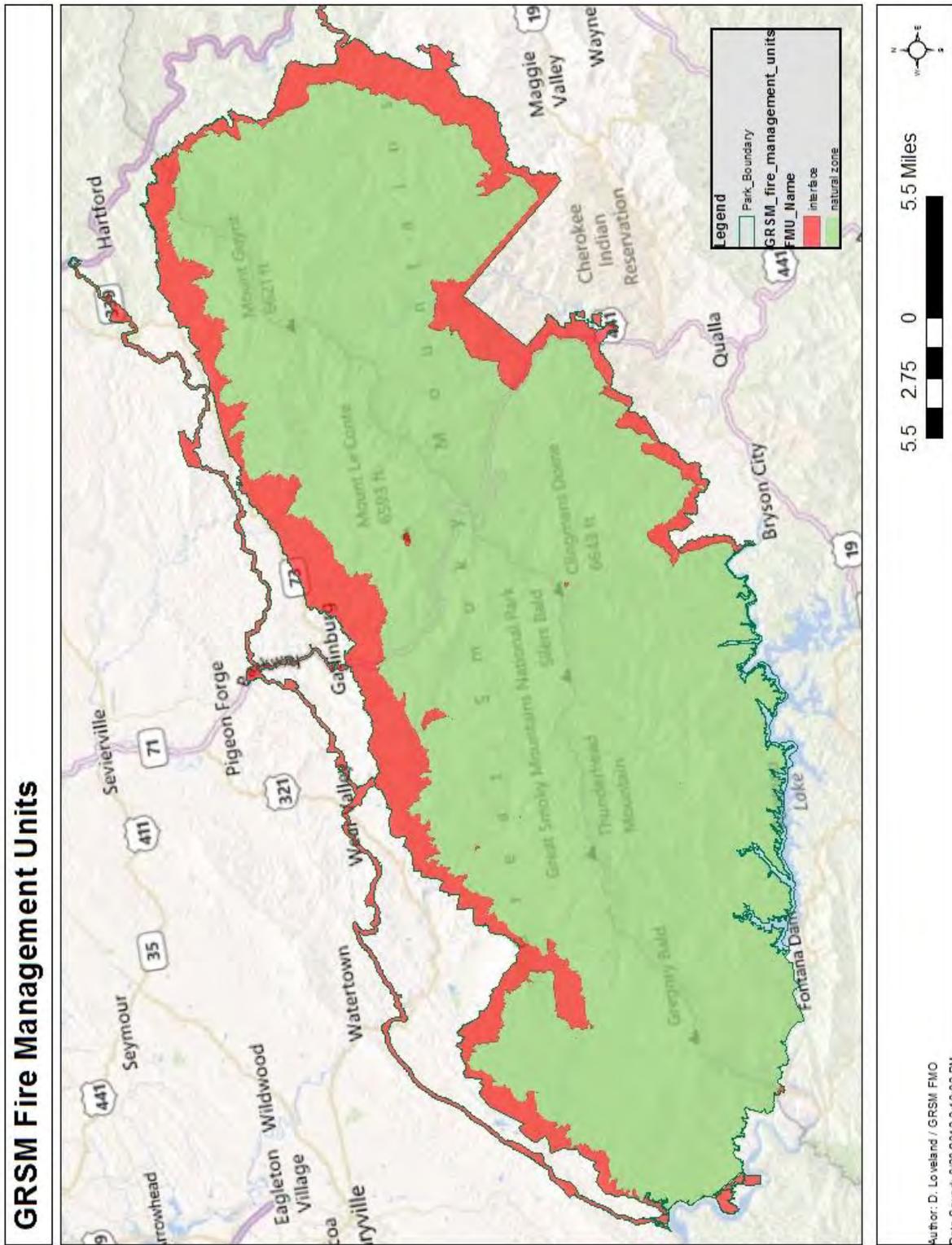
Historical Weather Analysis See Area Wide Characteristics (Ch. 3.1).

Fire Season See Area Wide Characteristics (Ch. 3.1).

Fuel characteristics See Area Wide Characteristics (Ch. 3.1).

Control problems and dominant topographic features Normal fire behavior associated with fuels found in Cades Cove and Cataloochee Valley does not pose a control problem. Many areas are flat and have relatively light fuel loads. However, areas with uncut old fields may pose control problems under extreme conditions. The area above Park Headquarters (and smaller areas like it), represented by fuel models SH4 and TL6, can pose control problems even under normal circumstances. For example, the Park was not in a significant drought in the fall of 1991 but torching and crowning in the understory did occur in an area with similar fuels. Under drought conditions, torching and spotting of 0.5 miles have been documented.

Figure 2. Fire Management Units



Values at Risk Park-owned facilities at risk in this FMU have been sorted by major drainages established by Parker and Pipes (1990) within Appendix E. Since fire suppression strategy and tactics are fundamentally based on drainages, this sorting will greatly facilitate identification and protection of values in the event of wildfire. The drainage classification system used does not include the GRSM administered Parkways, so the Look Rock facilities are not sorted by drainage. However, they are included in the Appendix E. In addition, the Tennessee Valley Authority has several power transmission lines that pass through the western and southern sections of the Park. These are the Fontana-Alcoa Number 1 and 2 transmission lines and the Fontana-Santeelah transmission line.

Project sites where mechanical hazardous fuel reduction projects have previously been completed reflect areas where wildland urban interface communities at risk are concentrated. These include Ski Mountain, Bypass and Highlands, all areas on the boundary in the wildland-urban interface with Gatlinburg. The Ace Gap project area is located in the northwest corner of the Park in Townsend.

Sensitive natural resource areas, such as treated hemlock stands, White Oak Sink, Abrams Creek, the Sinks, Bull Cave area, Gum Swamp, Houston Chambers Pond, and Big Spring Cove have special fire retardant restrictions placed on them.

3.3.2 Natural Zone Fire Management Unit (FMU2)

FMU 2 (Figure 2) is approximately 429,933 acres in size. This represents approximately 83 percent of the area administered by the Park. Within this zone, natural processes shall be allowed to function wherever and whenever possible. As such, SFR will default to using naturally occurring wildfire to achieve resource benefit whenever conditions allow.

A. Physical and Biotic Characteristics

The introduction to Chapter 3 accurately depicts the physical and biotic attributes of fire management unit 2. FMU2 makes up the bulk of park lands interior of the boundary (Interface Zone FMU).

B. Fire Management Objectives

Strategic Objectives:

- The initial action to all human caused wildfires in FMU 2 will be to suppress the fire at the lowest cost with the fewest negative consequences with respect to firefighter and public safety.
- Every naturally occurring fire will be evaluated for suitability for using wildfire to the benefit of the resource. A wildfire may be concurrently managed for one or more objectives and objectives can change as the fire spreads across the landscape. Objectives are affected by changes in fuels, weather, topography; varying social understanding and tolerance.
- Prescribed fires will be used to reach natural and cultural resource management objectives and for hazard fuel reduction activities.
- Every wildfire will be assessed following a decision support process that examines the full range of responses. Wildland fire response strategies and tactics will consider firefighter and public health and safety, fire cause, current and predicted weather, current and potential fire behavior and effects, values to be protected,

resource availability, cumulative effects of fire and cost effectiveness. Documentation of the decision process will be accomplished using the WFDSS program.

Measurable Objectives:

- All wildfires are managed with the strategic fire response as directed by this fire management plan and analysis of the specific situation with the goal of using available resources to manage the fire for the most effective, most efficient and safest means available.
- All wildfire operations are conducted so that no lost time injuries occur to firefighters or the public.
- No natural communities or rare species are lost due to either lack of prescribed fire or the destructive effects of wildfire.
- Hazard fuel reduction efforts within FMU2 show an average incremental increase in acres treated each year over the life of this plan.

C. Management Considerations

- Firefighter and public safety is the first priority in all fire management activities.
- Minimum Impact Suppression Tactics will be employed.
- Protection mitigation measures for known historic and cultural resource sites in or near the project area must be assured before a prescribed fire project is initiated.
- Park neighbors, Park visitors and local residents will be notified of all planned and unplanned fire management activities that have the potential to impact them.
- All personnel involved in fire management operations will receive a safety briefing describing known hazards and mitigating actions, current fire season conditions and current and predicted fire weather and behavior.
- Only properly trained and qualified personnel will carry out fire management operations. Trainees must be supervised by fully qualified personnel.

D. FMU2 Fire Management Situation

Historic Role of Fire See Area Wide Characteristics (Ch. 3.1).

Historical Weather Analysis See Area Wide Characteristics (Ch. 3.1).

Fire Season See Area Wide Characteristics (Ch. 3.1).

Fire Characteristics See Area Wide Characteristics (Ch. 3.1).

Fire Regime Alteration See Area Wide Characteristics (Ch. 3.1).

Control Problems Suppression efforts undertaken within FMU2 will typically focus on confinement tactics using natural barriers. Whenever possible, fires within FMU2 will be managed for the benefit to the resource.

Values at Risk Efforts are underway to pre-identify all known values that can be adversely impacted by wildfire. These values are being spatially depicted so that fire managers will have immediate access to all known values at the time of fire discovery. This information will be available to the Fire Duty Officer and accessible from any work station.

4 Wildland Fire Operational Guidance

All actions defined in this Fire Management Plan will conform to safety policies defined in agency and departmental policy, including, but not limited to:

- a. *Interagency Standards for Fire and Fire Aviation Operations (NFES 2724).*
- b. *NPS Director's Order 18, and Reference Manual 18, Standards for Operations and Safety chapter.*
- c. *NPS Directors Order 60, and Reference Manual 60, Aviation Management.*
- d. *NPS Directors Order 50B , and Reference Manual 50B, Occupational Safety and Health Program.*
- e. *Interagency Helicopter Operations Guide (NFES 1885).*

Firefighter and public safety is our first priority. This Fire Management Plan and activities defined within reflect this commitment. The commitment to and accountability for safety is a joint responsibility of all firefighters, managers, and administrators. Individuals must be responsible for their own performance and accountability. Every supervisor, employee, and volunteer is responsible for following safe work practices and procedures, as well as identifying and reporting unsafe conditions. All firefighters, fireline supervisors, fire managers, and agency administrators have the responsibility to ensure compliance with established safe firefighting practices.

4.1 Management of Unplanned Ignitions

The management of unplanned ignitions (wildfires) has two primary goals: the protection of communities and assets; and the conservation of natural resources.

Goal I – Protect Communities and Assets

1. **Each reported wildfire shall receive an effective response based on ecological, social, and legal consequences of the fire.**
The conditions and circumstances, under which a fire occurs, the likely consequences to firefighter and public safety, natural and cultural resources, in addition to the values to be protected, dictate the response and management strategy for the fire. Managers will use a decision support process to guide and document wildfire management decisions. The process will provide situational assessment, hazard and risk analysis, outline implementation actions, and document decisions and rationale for those decisions.
2. **Protect communities and assets, such as visitor facilities, cultural resources, housing areas, lodging, park and utility infrastructure from wildfire damage.**
The wildland fire program will collaborate with inter-divisional partners to identify, assess, and mitigate hazards to all NPS assets that could be impacted by wildfires. Fire staff will assist in interagency efforts to reduce human-caused ignition occurrence.

Goal II – Conservation of Natural Resources

1. **Use wildland fire to maintain and restore ecological integrity**

Wildland fire managers will collaborate with park staff to identify priority areas and opportunities to use prescribed fire, non-fire treatments and wildfires to meet ecological objectives.

2. Mitigate undesirable ecological consequences of wildfire

Fire staff will identify those areas where negative ecological consequences from wildfire, in terms of extent, frequency, severity or seasonality, are outside the levels needed to maintain a resilient landscape and the consequences are of failing to take action.

Beginning with the initial action to any wildfire, decisions will reflect the goal of using available firefighting resources to manage the fire in the safest, most effective, and most efficient means available while meeting identified fire management unit goals and objectives.

Strategies and tactics will consider firefighter and public health and safety, fire cause, current and predicted weather, current and potential fire behavior and fire effects, values to be protected from fire, management priorities, resource availability, cumulative effects of the fire, and cost effectiveness.

The initial action to human caused wildfires will be with the objective of suppressing the fire at the lowest cost with the fewest negative consequences with respect to firefighter and public safety.

When the objective is to put the fire out, wildfire managers may apply different strategies and tactics as part of the fire response. Aggressive suppression may be the preferred strategy for one portion of the perimeter, and on another portion of the perimeter point protection or monitoring may be the desired strategy. By taking into account the fire season, current and expected weather, current and anticipated fire behavior, fire managers can apply the best tactics to mitigate risks to the public and firefighters, meet protection priorities, while also meeting cultural/natural resource management objectives.

Wildfire Decision Support System (WFDSS, or equivalent) will be used on each wildland fire to document the decision making process and outline strategy and tactics employed. The level of decision support documentation required will depend on the fire response level.

Minimum impact suppression tactics (MIST) are required policy for all fire management activities on National Park Service lands. Fire management activities within the Park will be carried out in a manner that minimizes negative impacts to the Park's natural and cultural resources. Interdisciplinary teams will meet to address potential impacts to park resources resulting from either wildfire or suppression activities. Incident facilities, when practical, will be located outside of natural and historic zones. Suppression forces will choose methods and equipment commensurate with suppression needs and a strategy that will least alter the landscape or disturb Park resources. General MIST guidelines are found in the Incident Response Pocket Guide (IRPG). Park specific MIST guidelines can be found in the Wildfire Preparedness Plan.

4.1.1 Preparedness

As stated in NPS policy, preparedness planning is the foundation of an effective fire management program. It includes activities conducted before fire occurrence to ensure the ability of the Park's fire management organization to initiate effective action.

The Preparedness Plan is a comprehensive set of documents that provide management direction for wildfire operations, including initial action and incident management activities. These actions are based on the goals, objectives, and wildfire management strategies identified in the Fire Management Plan, as well as established local level procedures for wildland fire operations. The Preparedness Plan will be reviewed annually and is available at:

<http://www.grsm.nps.gov/offices/showOffice.cfm?grp=fire>

or at:

<http://inpgsrms01gis/fire/Shared%20Documents/Forms/AllItems.aspx>

A. Annual Training

Annual fireline safety refresher training, firefighter physicals and work capacity tests are required for all personnel participating in fire management actions or prescribed fire activities that are subject to assignments on the fireline. This training is generally scheduled in early to mid-January annually. This training will include National Park Service requirements and meet NWCG standards.

The Fire Management Officer will assure that an annual training program is established that:

- Meets the needs of the park's Step-up Plan and fire management staffing.
- Meets Interagency Fire Program Management (IFPM) qualification standards for fire program personnel.

Unless delegated, the fire management officer is designated as the Training Officer and is responsible for facilitating the aforementioned training needs and overseeing the management of the Incident Qualification and Certification System (IQCS). The Training Officer will establish a Training and Qualifications Committee to assist in all aspects of the training and qualifications program. This committee should meet in October to establish the training needs for the fiscal year. Annually, training is achieved through a combination of courses held locally or attended non-locally. Training will be obtained in the most cost-effective manner.

B. Readiness

Wildland fire preparedness reviews shall be conducted annually following the Annual Fire line Safety Refresher Training. This review will identify operational, procedural, personnel, or equipment deficiencies and recommend corrective actions. Standards for preparedness reviews are based on the Interagency Standards for Fire and Fire Aviation Operations and conducted according to the Fire Preparedness Review Guide. The Fire Management Officer or his designee will ensure completion of this task.

Bi-annual meetings with all park incident commanders will be held per the following schedule:

Fall Fire Season: ICs meet by September 15th
Spring Fire Season: ICs meet by March 1st

The purpose of these meetings is to brief ICs on recent fire policy updates, long-term weather forecasts, fuels conditions and resource availability. This meeting will be chaired by either the AFMO Operations or the FMO if the AFMO position has not been filled. Attendance of all park incident commanders is mandatory.

C. Fire Weather and Fire Danger

Fire Weather and Fire Danger Indices are tracked via the Weather Information Management System (WIMS). WIMS can be accessed via the internet at: <http://fam.nwcg.gov/fam-web/>

It is the parks responsibility to access WIMS several times each day. Daily access at a minimum must include:

- Entering fire weather observations. It is critical that these observations be entered into WIMS by the time requested by the National Weather Service forecaster.
- Retrieving and interpreting fire danger indices for the area and adjacent stations. The indices may then be used to determine daily observed and predicted staffing classes for use in the Parks Step-up Staffing Plan.

Current and recent weather activities are monitored via National Weather Service radar website and other public websites. Lightning strike data is available through the Bureau of Land Management and can be accessed via the internet at: <https://www.nifc.blm.gov/cgi/nsdu/Lightning.cgi>

Weather Stations: Great Smoky Mountains National Park maintains two permanent automated fire weather stations: one on the North Carolina side of the Park (Cherokee RAWS) and one on the Tennessee side (Indian Grave RAWS). Temporary stations may be set up as needed in advance of prescribed fire projects.

Table 3. Weather Stations

Station ID	Station Name	Elevation	Aspect	Slope	Climate	NFDRS Fuel Model
313902	Cherokee	3400	South	2	3	E/R
407603	Indian Grave	2700	South	2	3	E/R

National Fire Danger Rating System (NFDRS): GRSM monitors both short-term fire danger and long-term drought conditions. Short term fire danger is tracked using 1988 NFDRS Burning Index (BI) which represents the difficulty suppression forces will have in controlling a fire should one start on that day. During spring and fall fire seasons, fuel model E (Hardwood litter – fall) is monitored and during the summer season, fuel model R (Hardwood litter – summer) is monitored. Longer-term drought conditions are tracked using the Keetch-Byram Index (KDBI), a measure of soil moisture and thus is considered a good drought indicator. It ranges from 0, when the ground is saturated, to a maximum of 800 which is reached after protracted drought.

Table 4. Short-term fire danger thresholds for Great Smoky Mountains National Park (from analysis 8/2012)

INDEX	90TH PERCENTILE	97TH PERCENTILE
BI (Fuel Model E)	31	38
BI (Fuel Model R)	15	18

Fire Danger “pocket cards” have been developed which display critical thresholds of fire danger to both local and out of area fire suppression resources to make them aware of local trends. (See Appendix C).

D. Step-up Staffing Plan

Emergency preparedness involves actions taken to provide extra protection during very high or extreme fire danger when staffing classes IV or V are in effect.

Appropriate activities for use of emergency preparedness funds include hiring of emergency temporary firefighters, placing existing staff on extended tours of duty, pre-positioning resources, increasing or initiating special detection operations, and leasing initial attack aircraft. All of these actions are aimed at ensuring prompt responses should fires occur.

The Park’s authority to spend emergency preparedness funds is tied to the NFDRS Burning Index (BI). The BI is designed to reflect the difficulty in controlling a new fire start. When a value equal to or greater than the 90th percentile is reached, funds can be expended as outlined in the approved Step-up Plan.

The Park typically has two fire seasons, spring and fall. These fire seasons occur first in the spring prior to green-up and then again in the fall after leaf drop prior to the onset of winter rain / snow events.

There are five staffing classes that describe escalations in preparedness responses to increased fire danger. Table 5 below shows the actions to be taken for each of the five staffing classes in the Park. The daily observed and predicted BI values are obtained via WIMS. When obtaining BI, use either fuel model E or R based on over story foliage (leaf on / leaf off). Observed BI as well as tomorrow’s forecast BI can be accessed after the NWS fire forecaster has processed (usually by 1600), the 1200 fire weather observations entered by the park each day.

Table 5. Step – Up Plan

Staffing Class Step-Up Plan					
BI FM “E” Mid-Oct - Early May	0 - 7	8 - 15	16 - 30	31 - 37	38 +
BI FM “R” Early May – Mid-Oct	0 - 3	4 - 7	8 - 14	15 - 17	18 +
Staffing Class	SC 1	SC2	SC3	SC4	SC5
Fire Danger	Low	Moderate	High	Very High	Extreme
Open Preparedness Account for extended staffing and outside resources ordered as required	No	No	No	Contact regional office for preparedness account number.	Request severity funding if prolonged fire danger is anticipated.
Engines (T6: ENGB + FFT2) (T7: FFT1 + FFT2) Squads (FFT1/ICT5 + 3 FFT2)	1 T7 within 1 hour	1 T7 within 1 hour	1 T6	1 T6 1 Squad 7 day coverage <i>(if VH to Extreme fire danger is expected to continue)</i>	1 T6 1 Squad 7 day coverage
Overhead * ENGB can also function as ICT5 (if qualified) in SC 1 and SC2 only. At SC3 or above, a separate incident commander is required.	ICT5 *	ICT5 *	ICT4	ICT4 Designate daily Duty Officer ICT3 (available within 2 operational periods)	ICT4 Designate daily Duty Officer ICT3 <i>(if VH to Extreme fire danger is expected to continue)</i> Determine need for local T3 team

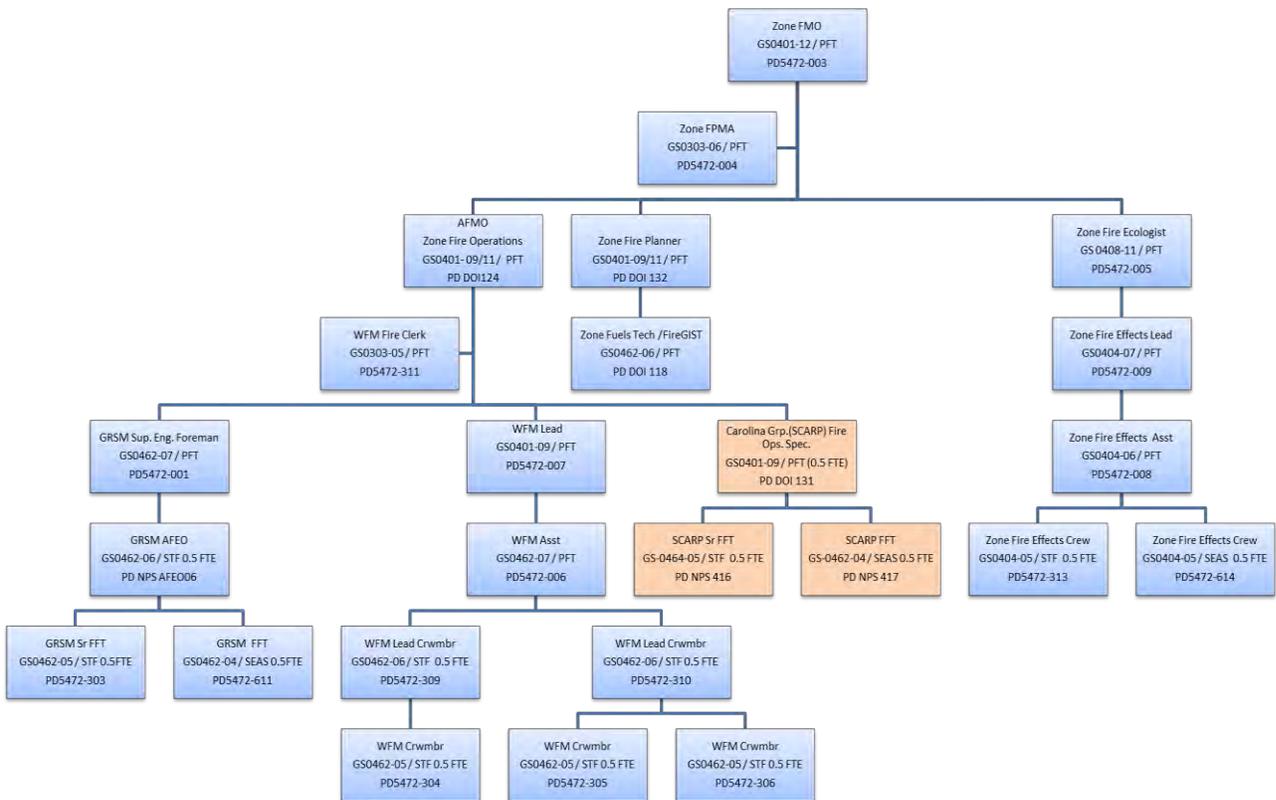
Staffing Class Step-Up Plan					
BI FM "E" Mid-Oct - Early May	0 - 7	8 - 15	16 - 30	31 - 37	38 +
BI FM "R" Early May – Mid-Oct	0 - 3	4 - 7	8 - 14	15 - 17	18 +
Staffing Class	SC 1	SC2	SC3	SC4	SC5
Fire Danger	Low	Moderate	High	Very High	Extreme
Support Function				Establish logistical support Determine availability/ status of collateral duty and AD employees	Establish expanded dispatch Expand logistical support Determine availability/ status of collateral duty and AD employees
Coordination			Daily verification of available resources with District Rangers	Daily coordination of available resources with division chiefs; TN/NC Division of Forestry, Cherokee BIA and Cherokee NF	Daily coordination of available resources with division chiefs; TN/NC Division of Forestry, Cherokee BIA and Cherokee NF
Management Actions				Duty Officer determines need for extended hours Evaluate need for expanded incident management functions	Duty Officer determines need for extended hours Initiate daily incident planning meeting
Prevention Activities				Superintendent may restrict campfires based on current activities and conditions	
			Increase patrols and visitor contacts in campgrounds, boundary areas and Parkways and other high use areas.		

Staffing Class Step-Up Plan					
BI FM "E" Mid-Oct - Early May	0 - 7	8 - 15	16 - 30	31 - 37	38 +
BI FM "R" Early May – Mid-Oct	0 - 3	4 - 7	8 - 14	15 - 17	18 +
Staffing Class	SC 1	SC2	SC3	SC4	SC5
Fire Danger	Low	Moderate	High	Very High	Extreme
Miscellaneous Requirements	Daily Weather entered into WIMS Verify / Relay NFDRS indices Situation Reporting	Daily Weather entered into WIMS Verify / Relay NFDRS indices Situation Reporting	Daily Weather entered into WIMS Verify / Relay NFDRS indices Situation Reporting	Daily Weather entered into WIMS Verify / Relay NFDRS indices Situation Reporting	Daily Weather entered into WIMS Verify / Relay NFDRS indices Situation Reporting

E. Fire Management Program Structure

The approved organizational structure for the Great Smoky Mountains National Park Fire Management Program is illustrated in Figure 3. This chart reflects the organization as determined during the fire re-alignment / reorganization, implemented beginning in 2015. The positions depicted in orange are remote located at Kings Mountain NMP. The organization supports multiple parks as the Appalachian-Piedmont Fire Management Zone. The organization will be periodically re-evaluated to ensure it is structured to meet zone needs.

Figure 3. Fire Management Organization Chart



Note: All designated IFPM positions are required to meet the IFPM Training and Qualifications Standards for a moderate complexity program. Refer to Interagency Fire Program Management guidance for a list of critical IFPM positions.

F. Organizational Roles and Responsibilities

Effective comprehensive fire management organizations require an interdisciplinary and interdivisional approach to the management of both planned and unplanned ignitions. The following tables depict those individuals or groups that play key roles in fire management within the park:

Table 6. Park Staff Roles and Responsibilities

Park Employee or Work Group		
Superintendent	Role	<p>The Park Superintendent is responsible to the Regional Director for the safe and efficient implementation of fire management activities within their unit, including cooperative activities with other agencies and landowners in accordance with delegations of authorities.</p> <p>The Park Superintendent will meet the required elements outlined in the <i>Management Performance Requirements for Fire Operations</i> found in Chapter 3 of the Interagency Standards for Fire and Fire Aviation Operations (Redbook).</p>
	Required Training	Fire Management Leadership Course (geographic or national) within two years of appointment.
	Recommended Training	WFDSS Line Officer Refresher http://wfdss.usgs.gov/wfdss/pdfs/line_officer_refresher_2014.pdf
Chief, Resource and Visitor Protection	Role	<ul style="list-style-type: none"> Serves as a member of the Fire Management Committee. Ensures that assigned Park staff are prepared and qualified to perform wildland fire duties. Coordinates with FMO for initial response to wildfires. Coordinates wildland fire-related issues with the Chief of Resource Management and Science. Prepares and revises cooperative fire agreements with adjacent federal, state and local agencies and municipalities. Coordinates public safety efforts (evacuations, traffic control, etc.) on behalf of the incident commander during wildfire and prescribed fire incidents. Recommends to the Superintendent and enforces area closures or fire-use restrictions when fire danger reaches critical levels. Serves as Alternate Mobilization Coordinator. Ensures that rental of OAS-approved contract aircraft for detection and incident over-flights is in accordance with provisions of NPS-60, Aviation Management Guideline. Ensures that Division personnel comply with arduous duty fitness standards for firefighter certification.
	Recommended Training	WFDSS Line Officer Refresher http://wfdss.usgs.gov/wfdss/pdfs/line_officer_refresher_2014.pdf
Chief, Resource Management and Science	Role	<ul style="list-style-type: none"> Serves as chair of the Fire Management Committee; presents committee recommendations to the Superintendent for review and approval. Coordinates and oversees all aspects of the prescribed fire program. Directs the staff functions of fire management through the Fire Management Officer (FMO). Briefs the Superintendent, Assistant Superintendent, and Chief Park Ranger on current fire management activity. Consults with Superintendent on any fire-related research proposals or recommendations. Evaluate the need for resource advisors for all fires, and assign as appropriate. Responsible for development of rehabilitation programs resulting from wildfires.
	Recommended	WFDSS Line Officer Refresher http://wfdss.usgs.gov/wfdss/pdfs/line_officer_refresher_2014.pdf

	Training	
District Rangers	Role	<ul style="list-style-type: none"> • Receive reports of wildfires in their districts, assess resource and fire situation. • Coordinate with FMO to assign a qualified initial action Incident Commander (ICT5 minimum), and resources required to provide an effective response to the wildfire. • Notify Chief Ranger in the event of a wildfire on their district. . • Ensure that district initial attack caches are maintained in compliance with established standards. • Ensure that fire reports and associated documents are prepared and received by the Fire Management Office in the prescribed period of time. • Ensure that, with few exceptions approved by the Chief Ranger, all protection rangers maintain the qualifications and equipment necessary to provide initial attack capability with minimal delay. • Assist in prescribed fire operations. • Provide for public safety and implement evacuations, if necessary. • Ensure that potential Incident Commanders are informed of policy and procedures to follow in regards to response to wildland fire. • Ensure that all ignitions are investigated. • Post "Area Closed...Emergency" signs when required by Step-Up Plan. • Administer physical fitness tests to firefighters within their districts.
	Required Training	Annual Fire Safety Refresher (RT-130)
Fire Management Committee	Role	<p>The purpose of the Fire Management Committee is to provide consistent and coordinated management of wildfires and prescribed fires. The Committee will consist of the Chief of Resource Management and Science, who shall chair the committee; the Chief of Resource and Visitor Protection; and the FMO. The committee may request technical expertise from other individuals at any time.</p> <p>Specifically, the role of the committee is to a) review all decision support documentation for ongoing wildfires for adherence to fire policy and goals stated in land and resource management plans; b) recommend WFDSS for superintendents approval and daily validation; c) meet annually to review the parks prescribed fire program including prior year accomplishments and current year proposed projects; d) participate in annual reviews of the Fire Management Program.</p>
Communications Center	Role	<ul style="list-style-type: none"> • Receives smoke reports and relays information to FMO/FDO and appropriate District Ranger. • Follows the mobilization guidelines within the Preparedness and Step-up Plans. • Maintains a current roster of fire-qualified resources. • Maintains Fire Duty Officer rotation list during periods of anticipated high fire danger.
Fire Management Officer	Role	<p>The Fire Management Officer is responsible and accountable for providing leadership for the wildland (wildfire and prescribed) fire program. The FMO determines program requirements to implement land use decisions through the fire management plan to meet land management objectives. The FMO negotiates interagency agreements and represents the Park Superintendent on local interagency fire and fire aviation groups. The FMO is required to meet the Unit Fire Program Manager standards of the Interagency Fire Program Management Qualifications Standards (IFPM) for a moderate complexity program.</p> <p>The FMO will meet the required elements outlined in the Fire Management Staff Performance Requirements for Fire Operations found in Chapter 3 of the Interagency Standards for Fire and Fire Aviation Operations (Redbook).</p>
	Required	M-581 Fire Program Management

	Training	
	Recommended Training	WFDSS 101 http://wfdss.usgs.gov/wfdss/WFDSS_Training.shtml
Fire Duty Officer	Role	<p>Fire Duty Officer coverage will be implemented during periods of anticipated prolonged increased fire danger (SC 4 or SC5). The Fire Management Officer is responsible for determining the need for and assignment of the Fire Duty Officer. The role of the Fire Duty Officer is to provide operational oversight during periods of increased incident activities. The Fire Duty Officer shall not fill any ICS incident command function connected to any incident. The following are duties of the FDO:</p> <ul style="list-style-type: none"> • Ensures fire weather updates are relayed to fire resources. • Verifies preparedness step-up actions are in place. • Monitors unit incident activities for compliance with NPS safety policies. • Evaluates incident complexity, ensuring appropriate level of IC is assigned. • Coordinates and sets priorities for unit suppression actions and resource allocation. • Assures compliance with FMP and fire policy and provides information to Incident Commanders. • Keeps agency administrators, suppression resources, communications and Information Officers informed of the current and expected situation. • Plans for and implements actions required for future needs. • Documents all decisions and actions. • Initiates WFDSS as required for each wildfire incident.
	Recommended Training	M-581 Fire Program Management WFDSS 101 http://wfdss.usgs.gov/wfdss/WFDSS_Training.shtml
Chief of Facilities Management	Role	<ul style="list-style-type: none"> • Actively promotes participation by employees in fire management operations as qualified, either operationally or logistically. • Ensure that all interested employees and those with assigned suppression responsibilities are available for fitness testing, annual firefighter refreshers and training to support the maximum potential firefighter roster. • Adjust schedules as needed to ensure that firefighters are readily available for in-Park assignments. • Provide supplies and equipment that may be needed in emergency fire suppression activities.
Chief of Resource Education	Role	<ul style="list-style-type: none"> • Actively promotes participation by employees in fire management operations as qualified, either operationally or logistically. • Ensure that all interested employees and those with assigned suppression responsibilities are available for fitness testing, annual firefighter refreshers and training to support the maximum potential firefighter roster. • Adjust schedules as needed to ensure that firefighters are readily available for in-Park assignments. • Promotes the effective communication of the “natural role of fire” to internal and external audiences, especially during ongoing fire incidents that may be visible to the public.
Management Assistant and Public Affairs	Role	<ul style="list-style-type: none"> • Maintains communications with the Incident Commander or members of the Incident Management Team. • Writes and disseminates daily press releases on incidents. • Gives interviews to media. • Escorts media employees around incidents in a safe manner. • Works closely with Fire Management Officer or Burn Boss to disseminate pre-burn press releases.
Resource Management	Role	<ul style="list-style-type: none"> • Provides the IC with known potential impacts to cultural and natural resources, especially rare species and habitats, as a result of the fire or suppression tactics.

and Science staff		<ul style="list-style-type: none"> Provides Interdisciplinary Team Members to support fire management activities as required.
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Table 7. Fire Staff Roles and Responsibilities

Position or Fire Resource	Supervisor	Roles and Responsibilities
Fire Program Management Assistant	FMO	The FPMA is the administrative assistant for the fire program. The FPMA is tasked with Budget tracking, timekeeping and payroll verification. The FPMA maintains administrative files and recordkeeping; processes personnel actions; manages travel; and supports logistics and dispatching of fire resources. The FPMA is the primary point of contact with the TN Interagency Coordination Center, filling and tracking all resource orders. The FPMA may fill an expanded dispatch capacity as needed.
AFMO Operations	FMO	The AFMO is responsible for overseeing day to day fire management activities including response to wildland fire, and implementation of prescribed fire and mechanical fuels treatments. This position supervises assigned operational resources including the engine crew, WFM and remote located resources. This position functions as the FDO during staffing class 4 or 5 as needed. This individual would function as either ICT3 or Operations Section Chief during wildland fire or all-risk incidents as qualified. This is identified as an IFPM critical position in a moderate complexity program.
Fire Planner	FMO	The Fire Planner is responsible for fire planning efforts including but not limited to: Fire Program Analysis (or equivalent), programmatic and project level planning efforts, Interdisciplinary Team Leader for fire management efforts. The Fire Planner oversees assessment and communication of fire and fuels situation (fuels conditions, fire situation, fire behavior, weather conditions) to all fire resources. Functions as FDO during staffing class 4 or 5 as needed. Serves as Planning Section Chief as required during fire or all-risk incidents.
Fire Ecologist	FMO	The Fire Ecologist is tasked with providing the scientific knowledge and applicable fire research required to continually evaluate and adapt as a learning organization. The ecologist supervises the fire effects team and oversees the vegetation monitoring and all supported parks. The ecologist is critical in the development of sound goals and objectives at both the programmatic and project level. The ecologist typically is the lead on all compliance efforts.
Fire Clerk	AFMO Operations	This position is an administrative assistant for the Fire Management organization with the primary role of supporting operational resources. Responsibilities of the clerk include: budget tracking and management; payroll and timekeeping; administrative files and recordkeeping; processing personnel actions; managing travel; fire support including logistics and dispatching. During incidents, the clerk may complete daily situation reports, transmits ICS 209's, fill and track resource orders. Incumbent may function in an expanded dispatch capacity as needed.
T6 Engine Crew	AFMO Operations	The engine crew staffs a Type 6 wildland fire engine and responds to wildland fire incidents as needed. The engine crew is composed of 4 wildland firefighters assigned to a type 6 fire engine. The crew is composed of an Supervisory Fire Engine Operator (ENGB, ICT4), an Assistant Fire Engine Operator (ENGB, ICT4) and two assigned firefighters. All positions are primary fire positions and subject to IFPM requirements.

Wildland Fire Module	AFMO Operations	The Wildland Fire Module provides skilled and mobile personnel for wildland fire or prescribed fire management. The module is self-contained and normally consists of 7 fire fighters. The module is a national resource assigned to support wildland fire activities within the Southeast Region. Based in the Great Smoky Mountains National Park, the module is often available locally when not committed elsewhere. The module is composed of the following personnel: Module Leader, Module Assistant, two Lead Crewmembers, and three crewmembers. The module lead is a secondary fire position, all other personnel are primary fire. These positions have been removed from IFPM requirements because the required minimum qualifications exceed those identified under IFPM, refer to the Wildland Fire Module Position Management Guide for minimum qualification requirements tied to these positions.
SCARP Fire Crew	AFMO Operations	Remote located at Kings Mountain NMP, the SCARP Fire Crew is identified in the FTO as being composed of a Fire Operations Specialist and two fire fighters. This module provides a forward deployed resource within the zone that is capable of initial attack as well as providing training and support capacity to parks in the area. All positions are IFPM primary fire positions.
Fuels Technician / Fire GIS	Fire Planner	The fuels technician is tasked with monitoring fuels conditions across the fire zone. Maintains assigned remote weather stations, and tracks daily observations and indices; disseminates NFDRS information to appropriate staff. The fuels tech. documents fire perimeters and maintains fire geodatabases. He/she may function as a Situation Unit Leader during extended fire incidents within the park.
Fire Effects Team	Fire Ecologist	The Fire Effects Team provides the intelligence required to implement the adaptive management process. The team monitors vegetative change associated with fire over time as well as fuel and weather conditions and fire behavior during operations. The team is composed of a team leader, an assistant, and two fire effects monitors. All positions are collateral duty fire positions and are not covered under IFPM.

G. Required Qualifications to Implement Plan

The following table reflects the fire qualifications required to safely and effectively implement a comprehensive, moderate complexity wildland fire program within Great Smoky Mountains National Park. The goal for the qualification requirements is to be able to field an in park Type 3 incident management team for extended attack wildfires and other all risk incidents / events as required. Under the strategic fire response framework, it is highly desirable to include a SOPL and LTAN in the management of these events. These qualifications are not tied to any specific program position unless specifically required for the performance of that position by policy or guidance.

Table 8. Target Wildland Fire Qualifications (as of June 2012)

ICS Functional Area	Qualification	Target #	Fully Qualified		Current Trainees		Δ Target vs. Qualified	Priority for Training
			Park Staff	Modules	Park Staff	Modules		
Command	ICT3	2	0	0	1	1	-2	High
	ICT4	4	3	2	1	0	+1	
	ICT5	6	4	6	0	0	+4	
	SOFR	1	0	0	0	1	-1	Mod.
	RXB1	1	0	0	0	0	-1	Mod.
	RXB2	3	1	1	0	0	-1	Mod.
	PIOF	1	0	0	2	1	-1	
Operations	DIVS	1	0	0	0	0	-1	Mod.
	TFLD	3	1	2	0	1	0	
	FIRB	3	2	2	1	1	+1	
	ENGB	4	4	2	0	2	+2	
	CRWB	2	1	3	0	1	+2	
	FALC	1	0	0	0	1	-1	Mod.
	FALB	4	4	3	0	1	+3	
	FFT1	10	3	5	0	1	-1	
FFT2	20	24	1	10	0	+5		
Air Ops.	HMGB	1	0	0	0	0	-1	Low
	HECM	4	2	4	1	2	+2	
	PLDO	2	1	1	0	0	0	
Planning	SOPL	1	1	0	0	0	0	
	FEMO	4	3	8	0	1	+7	
	FOBS	1	0	1	0	0	0	
	FBAN	1	0	0	0	0	-1	Low
	SITL	1	0	0	0	0	-1	Low
	RESL	1	1	0	1	0	0	
	READ	2	1	3	0	0	+2	
Finance	GISS	1	0	0	2	0	-1	
	PTRC	1	1	0	0	0	0	
Logistics	PROC	1	0	0	0	0	-1	
	SPUL	1	0	0	0	0	-1	Low

4.1.2 Initial Action

Upon report of a possible wildfire, park dispatch will contact the appropriate District Ranger and FMO to initiate a fire response per the following Table. Fire response is based on predicted fire behavior and Staffing Class for that day. Verify daily staffing class to determine appropriate response level.

Table 9. Preplanned Wildfire Response Card

Resource	Dispatch Action Based on Response Level*		
	Response Level 1 Staffing Class: ≤ 3	Response Level 2 Staffing Class: 4	Response Level 3 Staffing Class: 5
Engine(s) Type 7 **	Respond 1 T7 engine	Respond 1 T7 engine	Respond 1 T7 engine
Type 6	Notify E62 Notify E61	Respond E62 Notify E61	Respond E62 Respond E61 (if available)
Squad / Module WFM	Notify	Notify	Respond WFM (if available)
Incident Commander	Notify DR/FMO who will assign appropriate level IC	Notify DR/FMO (or FDO) who will assign appropriate level IC	Notify DR/FMO (or FDO) who will assign appropriate level IC
Required Preparedness Step-up Actions		District Rangers Pre-identify Engine Staffing to Park Dispatch and FMO/FDO.	Extended Staffing and 7 day coverage with engines.
Response Level:	*The response level is based on the Staffing Class. The Fire Management Officer or designee will document and distribute the staffing class each day with the Daily Briefing. If the staffing class has not been determined, the minimum wildfire response level is always Level 1.		
Resource Notes:	**Respond appropriate district T7 engine (Cosby E-74 or Oconaluftee E-75). District Ranger and FMO (or FDO if assigned) will coordinate to ensure appropriate IC is assigned and responds to each incident.		
Respond:	Automatic dispatch of resource initiated by Park Communications Dispatcher through the appropriate district ranger upon fire report.		
Notify:	Contact FMO (or FDO if assigned) who will notify resource for standby or assignment as needed.		

The Fire Management Officer will coordinate with the appropriate District Ranger to initiate wildfire response within Great Smoky Mountains National Park and adjacent mutual response zones where park resources may be threatened. District Rangers will ensure a qualified incident commander (ICT5 or higher) responds to each incident. If a qualified Initial Attack Incident Commander Type 5 (ICT5) is not available within the district, one will be requested through Park Dispatch and/or the FMO. The FMO/FDO shall ensure a complexity analysis has been performed and that the appropriate type (ICT5 / ICT4 / etc.) of incident commander is assigned.

The incident commander (IC) is responsible for performing a strategic fire size-up (refer to the Wildfire Preparedness Plan). The conditions and circumstance under which a fire occurs, the likely consequences to firefighter and public safety, natural and cultural resources, in addition to the values to be protected, dictate the response and management strategy for the fire. The size-up and planned strategy and tactics will be relayed to the FMO/FDO who will initiate the Wildland Fire Decision Support documentation process and notify the Fire Management Committee.

Where and when possible, wildfires should be managed to help restore and maintain fire resilient landscapes and ecological integrity while also mitigating undesirable consequences. Wildfires may be managed for multiple objectives and strategy and tactics can vary over space and time.

The IC will brief all incoming resources prior to engaging those resources. The briefing shall include at a minimum: the fire environment situation; the mission and execution; communications; logistics and support; and risk management. The *Initial Response Pocket Guide* (IRPG, NFES 1077), contains a briefing checklist which should be used to ensure all key topics are discussed. The on-scene IC shall remain in command of the incident through all phases of the incident from initial size – up through the de-mobilization process unless relieved by a more qualified incident commander. Any change of command will be documented and relayed to all assigned forces and to the park dispatch and fire management offices. The IC is responsible for ensuring the completion of all required fire documentation and mapping.

A. Information Used to Set Initial Action Priorities

Fires occurring in the Interface FMU will normally receive the highest priority. In addition, fires occurring within 1/2 mile of the Park boundary that have the potential to exit the Park will also receive high priority. Elsewhere, fires will be prioritized based on potential threats to Park resources and visitor safety.

B. Criteria for Determining Fire Response

The following criteria will be utilized in determining the strategic fire response:

- a. Public and firefighter safety
- b. Protection of cultural, historic, and natural resources
- c. Protection of improvements and private property
- d. Minimum Impact Suppression Tactics
- e. Available suppression resources and response times
- f. Long and short term fire danger
- g. Potential benefits to the ecosystem (*cannot be a primary consideration in FMU1 or on human caused fires*)

C. Confinement as an Initial Action Strategy

A confinement strategy may be selected for initial action as long as it is not being used solely to meet resource management objectives. Resource benefits may be a side benefit but the strategy must be based upon the criteria listed above. Confinement can also be an appropriate strategic selection when the fire is expected to exceed initial action capability or planned management capability.

D. Typical Fire Response Times

Response times vary depending on the fire's location and accessibility. Fires within the interface zone are typically within 45 to 60 minutes from most responding locations. Air tankers from the Chattanooga Tanker Base can respond in approximately 30 minutes when the base is staffed. Currently, the tanker base is only operational during periods of anticipated high fire activity as determined by the National Interagency Coordination Center.

E. Restrictions and special concerns by management area

Areas of special concern have been identified elsewhere in this plan through inclusion in the Interface FMU, FMU1. Appendix E, Values at Risk by Watershed, lists values that need to be protected by watershed. Since fires are suppressed by watersheds, this sorting will be helpful under emergency conditions.

F. Tribal relationships/local govt. issues

The Park cooperates with the Eastern Band of the Cherokee Indians when conducting annual fire fighter refresher training. In addition, it is not uncommon to assist one another during suppression and or prescribed fire operations. And, every few years, a fire burning in both jurisdictions is managed under a unified command strategy.

4.1.3 Incident Management

Extended attack occurs when objectives have not been met in the case of initial fire response, and/or where a fire managed for multiple objectives requires resources outside the immediate pool of available to sustain long term management objectives. Extended attack action requires a structured decision process (WFDSS) to guide the ongoing effectiveness and re-evaluation of suppression strategies. If the fire is being managed by park staff, the incident commander with assistance from the Fire Management Officer (FMO) and or the Fire Duty Officer (FDO) will perform and document this periodic assessment. If the fire has been delegated to an off park management team, the Incident Command and General Staff will complete the assessment and documentation as required with assistance, review and concurrence by park staff.

- A. Determining Extended Attack Needs** If a fire threatens to exceed the initial attack and extended attack capabilities of the Park and local cooperating agencies, an Incident Management Team will be requested through the Tennessee Interagency Coordination Center by the FMO or FDO utilizing the Resource Ordering and Status System. The Tennessee Interagency Coordination Center can typically fill T3 team positions within 24 hours.
- B. Implementation Plan Requirements** Preparation of the WFDSS for extended attack and large fire suppression shall be completed to document suppression responses to wildfires that have exceeded initial attack response or exceeded management capability. The FMO or FDO shall be responsible for initiating the WFDSS process. The parks Fire Management Committee shall review WFDSS documents for recommendation to the agency administrator for approval.
- C. Complexity Decision Process for Incident Management Transition** The Fire Complexity Analysis is a checklist intended to guide the agency administrator in determining when a transition from extended attack to a higher qualified incident management team is necessary. Before additional resources are ordered, an analysis must be completed and becomes part of the fire record. If the analysis indicates the fire complexity is or is expected to exceed capabilities of the current management, the FMO or FDO shall initiate a resource order for the appropriate resources required to manage the incident. The FMO or FDO shall brief the Fire Management Committee of the change in complexity and actions taken to order appropriate resources. Incoming fire managers shall receive a limited Delegation of Authority prepared by the FMO and signed by the Superintendent during the transition process.
- D. Delegation of Authority Letters for Incident Commander** Should fire activity and complexity warrant the ordering of an Incident Management Team as discussed above, a Delegation of Authority will be signed by the Superintendent and incoming Incident Commander giving the team authority to manage the incident. A sample of this delegation can be found in Appendix B.
- E. WFDSS Re-evaluation** Situations that could require selection of a new strategy through the WFDSS analysis include, but are not limited to:
 - Exceeding periodic assessment criteria, i.e. trigger points, air quality;
 - Unacceptable risk to firefighter safety, natural or cultural resources, improvements;
 - Fire leaving or threatening to leave the Maximum Manageable Area boundary or Park boundary;

- Fire exceeds prescribed fire plan;
- Increasing demand on local and/or national fire management situation;
- Agency administrator prerogative.

F. Records and Reporting

The Superintendent is ultimately responsible for fire reporting and fiscal accounting. Individual reporting assignments may be made by the Superintendent. The table below is a checklist of possible wildland fire documents and the individual usually responsible for completing them.

Time and filing deadlines are associated with each of these reports and will control scheduling and response times.

Table 10. Checklist of Wildland Fire Documentation

Checklist of Wildland Fire Documents and Reports		
<i>The Fire Management Officer shall ensure all appropriate documents are completed and filed as required.</i>		
Document	Revision or Preparation Frequency	Person Responsible for Completion (Filer, tracker)
DI-1202	Each incident, w/in 5 days of declared out	Incident Commander
ICS -201	Each incident	Incident Commander
ICS-214, w/narrative	Each incident, each operational period	IC and/or Unit Leaders
Resource Orders	Each incident	IC/Fire Duty Officer (FDO)/Fire Dispatcher
Fire Map	Each incident	IC/Fire Monitor (FEMO)
Archived Photographs	Each incident	All photos taken w/government equipment
WFDSS (Including periodic review)	As needed	IC and/or FMO/FDO
Spot Weather Forecast	Each operational period as needed	IC or FMO/FDO
Fire Monitoring Reports (includes smoke emission and transport observations)	Required for WFU and RX	FEMO
Incident Status Summary ICS-209	Each operational period as needed	IC and FMO/FDO entered by Fire Dispatcher
Fire Behavior Predictions	Each operational period as needed	IC, FMO/FDO
Incident Complexity Analysis	Each operational period as needed	IC, FMO/FDO
Incident Action Plan (IAP)	Each operational period as needed	IC or Plans Section Chief if assigned
After Action Review (AAR)	Each incident	IC
Cost Tracking	Each incident/daily as needed	IC/FMO/FPMA

4.2 Burned Area Emergency Response Program

Many fires occur naturally, and some ecosystems are adapted to fires, relying on them to maintain their health. However, wildland fires can sometimes leave behind a burned landscape that threatens human safety, property, and ecosystems.

The Burned Area Emergency Response (BAER) program is the NPS post-fire response program that implements Emergency Stabilization (ES) treatments to minimize threats to life or property resulting from the effects of a wildfire or to stabilize and prevent unacceptable degradation to natural and cultural resources resulting from the effects of a fire.

Damages resulting from wildfires are addressed through four activities:

- **Wildfire Suppression Activity Damage Repair** Planned actions taken to repair the damages to resources, lands, and facilities resulting from wildfire suppression actions and documented in the Incident Action Plan. These actions are usually implemented immediately after containment of the wildfire by the IMT before demobilization.
- **Emergency Stabilization** Planned actions to stabilize and prevent unacceptable degradation to natural and cultural resources, to minimize threats to life or property resulting from the effects of a wildfire, or to repair/replace/construct physical improvements necessary to prevent degradation of land or resources. Emergency stabilization actions must be taken within one year following containment of a wildfire and documented in a Burned Area Emergency Response Plan.
- **Rehabilitation** Efforts taken within three years of containment of a wildfire to repair or improve wildfire damaged lands unlikely to recover naturally to management approved conditions, or to repair or replace minor facilities damaged by wildfire. These efforts are documented in a separate Burned Area Rehabilitation Plan.
- **Restoration** Continuing the rehabilitation beyond the initial three years or the repair or replacement of major facilities damaged by the wildfire.

Table 11. Burned Area Emergency Response Components

	Suppression Rehabilitation	Emergency Stabilization	Rehabilitation	Restoration
Objective:	Repair Suppression Damages	Protect Life and Property	Repair Damages	Long Term Ecosystem Restoration
Damage Due To:	Suppression Activities	Post-Fire Events	Fire	Fire
Urgency:	Before Incident Close-out	1 – 12 Months	1 – 3 Years	3 + Years
Responsibility:	Incident Commander	Agency Administrator	Agency Administrator	Agency Administrator
Funding Type:	Suppression	Emergency Stabilization	Rehabilitation	Regular Program

4.2.1 Emergency Stabilization

Emergency stabilization is an extension of emergency actions. These actions may also include repair, replacement, or construction of physical improvements in order to prevent unacceptable degradation to natural and cultural resources. The objectives of emergency stabilization are to first determine the need for emergency treatments, and then to prescribe and implement the treatments. Life and property are the first priority. Cultural and natural resources treated through ES should be unique and immediately threatened. The Park Fire Coordinator and the Natural Resource Specialist will jointly assess and if necessary formulate a BAER emergency stabilization plan. The BAER plan will be submitted to the Regional BAER Coordinator through the Fire Management Officer for approval within 7 days from the date the fire is declared contained. BAER project requests totaling \$500,000 or less can be approved by the Regional Director. Submissions over this amount are reviewed at the regional level and forwarded to the NPS Fire Management Program Center for approval.

Burned areas will not be seeded; residual seed and sprouting from surviving rootstalks will provide natural re-vegetation. This method is superior even to introduction of "native" seeds. Seed-bearing materials cut along the lines can be scattered as mulch to guarantee indigenous seed. Consideration will also be given to the use of organic mats for controlling erosion in locations susceptible to erosion.

Rehabilitation of firelines and other efforts to control erosion will start as soon as possible, even before a fire is declared out. This is especially important if firefighting equipment and personnel are still available. Funding of the direct costs of rehabilitation will be through an emergency fire account.

4.2.2 Burned Area Rehabilitation

Post-fire Burned Area Rehabilitation (BAR) projects is the NPS post-fire response program that implements the types of long-term actions to repair or improve lands damaged directly by a wildland fire. Burned area rehabilitation consists of non-emergency efforts undertaken to repair or improve wildfire-damaged lands unlikely to recover naturally, or to repair or replace minor facilities damaged by wildfire. The objectives of burned area rehabilitation are to (1) evaluate actual and potential long-term post-wildfire impacts to critical cultural and natural resources and to identify those areas unlikely to recover naturally from severe wildfire damage; (2) to develop and implement cost-effective plans to emulate historical or pre-wildfire ecosystem structure, function, diversity, and dynamics consistent with approved land management plans, or if that is infeasible, to restore or establish a healthy, stable ecosystem in which native species are well represented; and (3) to repair or replace minor facilities damaged by wildfire. The Park Fire Management Committee and Natural Resource Specialists will jointly assess and if necessary formulate a non-emergency Burned Area Rehabilitation plan. BAR project requests are approved as part of a competitive process within the Department of Interior and project selections are made at the beginning of each fiscal year or after an approved appropriations bill, whichever is later. The BAR plan will be submitted to the Regional BAER Coordinator through the Fire Management Officer. Projects are reviewed at the regional level and forwarded to the NPS Fire Management Program Center for processing. It should be submitted by the end of the first fiscal year in order to be funded in the next fiscal year. Projects are eligible for BAR funding up to three years of the containment date of the fire.

Fire managers should ensure that rehabilitation activities do not result in the spread of invasive plant propagules. Vehicles, equipment, and firefighters should be cleaned before entering the rehabilitation area. Any materials brought in to prevent erosion, such as organic mats or lumber should be free of unwanted seeds. Before spreading any cut materials from the fire line check to be sure you will not be introducing invasive plant material to the newly burned area.

For detailed direction concerning Burned Area Emergency Rehabilitation refer to the Interagency Burned Area Rehabilitation Guidebook, Oct. 2006; and the Burned Area Emergency Response Treatments Catalog, December 2006.

4.3 Management of Planned Fuels Treatments

The strategy of the Fuels Management Program is to supplement natural fires role as an ecosystem process. Prescribed fire is also used to reduce hazard fuel accumulations, reduce threats to wildland urban interface from wildfires, and maintain fire dependent ecosystems.

4.3.1 Planning and Documentation

The following schedule describes the annual prescribed fire planning process:

Table 12. Annual Prescribed Fire Planning Process

Task	Completed by	Responsibility
Out-Year Planning Meeting	Jan 30th	AFMO Planning (or FMO if AFMO position not staffed)
Out-Year Project Proposals Submitted to NFPORS	March 23rd	AFMO Planning (or FMO if AFMO position not staffed)
Out-Year Project Verification	April 23rd	Superintendent
Prescribed Fire Seasonal AAR	May 15th	AFMO Operations (or FMO if AFMO position not staffed)
Annual Fuels Treatment Planning Meeting <ul style="list-style-type: none"> • Review burn unit objectives • Determine burn unit overhead • Assess compliance needs • Evaluate implementation needs 	July 15th	AFMO Planning (or Fire Ecologist if AFMO not staffed)
Bi-annual Prescribed Fire Operations Meeting <ul style="list-style-type: none"> • Assess preparation needs / progress • Verify organization / responsibilities • Set priorities / timelines 	Sept 15 th and Jan 15th	AFMO Operations (or FMO if AFMO position not staffed)
Annual Prescribed Fire briefing to IDT members (Fire Ecologist, Biologist, Archeologist, Forester, Resource	October 15th	AFMO Planning (or Fire Ecologist if AFMO

Education, Resource and Visitor Protection, Chief RM&S)		<i>not staffed)</i>
Submission of Plans to USFWS	November 30th	Fire Ecologist
Complete Draft Annual Burn Plans	October 15th	Fuels Technician
Review and Approve Burn Plans	As Required	Superintendent

- **March/April** – The AFMO Planning (FMO if position not staffed) submits prescribed burning project proposals and budgets for the next fiscal year via National Fire Plan Operations and Reporting System (NFPORS). Projects are designed on a landscape scale. Once projects are entered into NFPORS, a treatment verification form will be signed by the park superintendent or designee and forwarded to the regional FMO.
- **Fall** – The planning AFMO coordinates an annual meeting including fire management staff, burn bosses, and other interested park staff and cooperators to review the current year’s fuels treatment program and to finalize target areas, objectives, and concerns for the coming year’s fuels treatment program. After the annual meeting, the planning AFMO will group target areas into landscape projects to facilitate planning, prepare landscape burn plans, and coordinate planning and compliance with fire and park staff. The planning AFMO, FMO and Division Chiefs will review burn plans and make needed changes before presenting the plans to the superintendent for approval. The Fire Ecologist may need to coordinate additional review of the plans as needed with Resource Management staff and/or the US Fish and Wildlife Service.
- **Year-round** – Completion and implementation of Incident Action Plans according to overall planning. Burning can occur at anytime of year, but most burning will be targeted for the dormant or early growing season (October - May) to achieve the desired fire effects. It is anticipated that as fire effects progress, more emphasis may be placed on growing season burns to better mimic naturally occurring fires.

4.3.2 Long-term Prescribed Fire Strategy

Nearly half of the Great Smoky Mountains National Park landscape (approx. 200,000 acres) is covered by vegetation that is widely understood to be fire-adapted, if not fire-dependent (see section 3.1.2). With the vast majority of this landscape having fire excluded for the past 80 years, the workload for restoring sustainable fire-adapted vegetation in the Park is tremendous. Past needs/workload analysis has indicated that a minimum of 10-15,000 acres/year of prescribed burning would be required for meaningful restoration at the landscape scale; however, 13 years of prescribed burning the Park have shown that this minimum cannot be achieved with current staffing levels. Thus the long-term prescribed fire strategy consists of three points:

- Prioritize treatment of areas where restoration has already been initiated
- Creatively look for opportunities to add additional acreage to meet the greatest needs
- Continue to build support for expansion of planning/implementation staffing

The individual annual proposed projects support the Great Smoky Mountains National Park 5- Year Prescribed Fire Plan (see Appendix H). The 5 Year plan proposes an annual average of 3370 acres. This long-term management strategy will be assessed yearly and updated as required.

4.3.3 Personnel Requirements

Staffing for all fire management operations at Great Smoky Mountains National Park (GRSMNP) is integrated for greater efficiency. The scope of prescribed fire activities requires a considerable and highly qualified staff to fully implement all aspects of the fire management plan (refer to section 4.1.1.7 and 4.3.2).

Qualifications unique to prescribed fire which are necessary for a successful program include: Prescribed Burn Boss Type 1 (one required), Prescribed Burn Boss Type 2 (two required). Additionally, operational qualifications not specific to prescribed fire required for a successful program include: Firing Boss (three required), Fire Effect Monitors (four required), Helicopter Manager (one required), Helicopter Crewmember (four required), Plastic Sphere Dispenser Operator (two required). These qualifications are not tied to any one staff position.

4.3.4 Non-Fire Fuel Treatment Applications

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

- A. Preparedness Activities** Chainsaw training will be accomplished to ensure all chainsaw operators are qualified for the work they will be doing.
- B. Equipment Use Restrictions** Equipment use for non-fire applications will adhere to the same guidelines found in the section on Minimum Impact Suppression Techniques. Resource specialists will work with Fire Management on project plans where tracked or wheeled power equipment will be used to ensure that resource damage does not occur. Minimum Tool Analysis will be completed and approved for each project as required prior to implementation.
- C. Effects Monitoring** Due to the low-impact nature of the mechanical treatments to be utilized at Great Smoky Mountains National Park, monitoring effects will be primarily visual assessment of the success of the project in reducing the fuel hazard. Before and after photographs and dead-and-downed fuels transects (Brown's lines) may be used to document the effects and measure success.
- D. Critiques** Critiques of the mechanical treatment projects will occur as part of the annual fire management review process.
- E. Cost Accounting** The FMO will maintain cost records for all mechanical treatment projects. In many cases, treatment costs will be cost shared by the use of in-house preparedness resources during lower staffing level days.
- F. Documentation** All mechanical treatment projects will be documented using requirements found in NPS Wildland Fire Management Reference Manual -18.
- G. Annual Planned Project List** Fuels reduction efforts may be implemented around all Park improvements and inholdings that have been identified as requiring treatment. Projects will require treatment plans and those funded through hazardous fuels or wildland urban interface funding sources must be requested through the NFPORS process. These treatments will be included during annual treatment planning meetings with IDT members.

4.4 Prevention, Mitigation and Education

The objectives of the park's fire prevention program are to proactively mitigate damages and losses from unwanted wildfires; reduce human caused ignitions; reduce suppression costs; mitigate the risks of wildfire to private property and natural and cultural resources; and protect the lives of firefighters and the public. This is accomplished by working with cooperating agencies and educating park employees, the public and our neighbors, not only in fire prevention, but also the natural role of fire in the Appalachian Mountains.

4.4.1 Prevention

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4.4.2 Public Safety

Safety is the primary concern of the fire management program. All operational documents will address both public and employee safety. The potential effects of all projects on employees and public will be considered. Public Safety issues and concerns are described in detail in the Fire Management Plan Environmental Assessment. Key issues include:

A. Transportation Corridors

Fires have the potential to affect several transportation corridors. This includes the Highways 441, 321, 129, Interstate 40, the Foothills Parkway, and secondary surface roads in and adjacent to the park.

B. Urban interface and park infrastructure

Three Wildland Urban Interface Communities at Risk or of concern are adjacent to the park. These are the communities of Gatlinburg (particularly "Ski Mountain" area), Wear Cove, Top of the World, Happy Valley, Bryson City, and Big Cove. These communities are at risk from wildfires burning in natural fuels intermixed with homes. Other park infrastructure potentially at risk from wildfire is located in Cades Cove, Look Rock, Tremont, Elkmont, Smokemont and Oconaluftee.

C. Visitor Use

The primary high visitor use areas that are potentially impacted by fire include Cades Cove, and the Abrams Creek area. Great Smoky Mountains National Park also has an extensive backcountry area accessible by hikers. Fires in the wilderness pose potential risk to these park visitors.

D. Park Operations

Park Operations can be impacted by both wildfire and prescribed fire incidents. Impacts can include smoke, direct fire exposure and road or area closures.

E. Park Neighbors

Residents of numerous gateway and neighboring communities in both Tennessee and North Carolina can be impacted by ongoing fire operations, mainly due to smoke impacts. These impacts may be caused by both planned and unplanned fire events.

F. Mitigation

This section outline mitigation actions required to protect values at risk and to ensure the safety of park staff and visitors as well as the neighboring public.

Table 13. Mitigations for Public Safety Issues

Public Safety Issues	Mitigation
Transportation Corridors	<ul style="list-style-type: none"> • Smoke Screening Tools • Post Warning Signs/Notify visitors at park entrances • Implement appropriate level of traffic control or request assistance • Monitor smoke dispersal • Mop-up smoldering fuels
Urban Interface and Park Infrastructure	<ul style="list-style-type: none"> • Prescribed burns to reduce hazard fuel accumulation • Notify and update residents and employees of proposed and/or ongoing operations • Relocate at-risk residents or park staff • Respond to fires in the Mutual Response Zone • Pre-attack plans • Monitor urban expansion to identify new communities at risk • Suppress those fires or portions there of that threaten infrastructure
Visitor Use	<ul style="list-style-type: none"> • Post current fire information on websites as available • Time prescribed burns to minimize impacts to visitors • Provide and post fire information at backcountry permit stations, at visitor access points, and visitor centers • Close areas to the public during fire operations • Contact backcountry permit stations and ascertain if permits are issued for a fire area • Visually survey fires to ensure that no visitors are present • Suppress fires that threaten visitor use areas
Park Operations	<ul style="list-style-type: none"> • Post current fire information on websites as available • Send email notifications to park staff regarding current fire information • Close areas to administrative use during fire operations and/or limit access • Time prescribed burns to minimize impacts to park operations • Temporarily relocate at-risk park staff
Park Neighbors	<ul style="list-style-type: none"> • Use Smoke Screening Tools • Post current fire information on websites as available • Inform park neighbors of wildland fires • Use information officer and/or park public affairs to disseminate information • Suppress those fires or parts there of that threaten to burn off of park property or that adversely impact public health and safety

4.4.3 Information and Education

Disseminating information about fire's natural role and effects is an important step in establishing public support for such programs. GRSM's wildland fire management information program will be factual, straightforward, and aimed at many different audiences. The following guidelines will be followed:

- A. The Management Assistant (Public Information Officer) will be kept informed daily by the Fire Management Officer of management actions, and the status of fires in the Park.
- B. Ecological concepts upon which the wildland fire management program is based will be incorporated into interpretive and curriculum-based education programs, information handouts, selected books written about the Park, Park web page, and wayside and visitor center exhibits.
- C. Information handouts explaining the fire management program will be prepared and periodically updated. During periods when management fires are burning, these handouts will be distributed to visitors at Park information boxes and visitor centers, and by NPS field personnel during informal contacts out in the Park.
- D. The fire management program will be incorporated into appropriate interpretive talks, walks, automatic slide and/or video-taped programs, curriculum-based educational programs, the Park newspaper, the Park safety brochure, the Park camping and hiking brochure, Park web page, and wayside and visitor center exhibits. Particular attention will be given to these activities when fires are conspicuous from visitor centers and/or local communities.
- E. During ongoing fires, press releases will be written and distributed to local newspapers, radio, television stations and posted on the Park web site.
- F. Articles will also be written about GRSM's fire management program and released for publication in statewide, regional, and national periodicals.
- G. Public information outlets for neighboring land management agencies will be provided with fire management information, particularly when ongoing fires are burning in the Park.
- H. To effectively answer visitor questions, NPS, Great Smoky Mountains Association, Tremont and concession employees in the Park will be made aware of the wildland fire management program and the status of ongoing fires. Park volunteers and interns working in Resource Education will also be made aware of the program.
- I. The Great Smoky Mountains Natural History Association currently makes available relevant, factually accurate sales publications that address fire's role in natural areas to visitors at its sale outlets.
- J. The wildland fire management program will be discussed in informal contacts with all divisions, Park concessionaires, Great Smoky Mountains Association and Tremont staff, special use permittees, Park neighbors, and Park visitors.

- K. Signs notifying the public about ongoing wildfires and or prescribed fires, and unwanted wildland fires, area closures, dense smoke, or other special situations will be placed along roadways, and at visitor centers, boat launching ramps, trailheads, campsites, day use sites, cabin sites, and resorts.

5 Monitoring and Evaluation

5.1 Short and Long-Term Monitoring

All wildland fires and prescribed fires will be monitored for their effects on the eco-system. Information gathered during fire monitoring is needed to keep fires within predetermined criteria, know when to take suppression action, and protect human life and/or property. A fire monitoring team will observe the fire, assess its potential and provide a historical record. Monitoring will include documenting the fire environment (weather, fuels, topography), fire behavior (manner and rate of spread, flame length, etc.), and fire effects (percent of fuels consumed, changes in plant and animal community composition and structure, etc.). Photographs will be taken. Weather readings will be made periodically at the fire site. Forms for recording data will be supplied to monitors.

5.1.1 The Fire Monitoring Handbook

This handbook, developed by the National Park Service, outlines protocols for monitoring fire weather, behavior and effects, and describes in detail all aspects of a comprehensive, state-of-the-art monitoring program. These protocols have been adopted at Great Smoky Mountains National Park.

5.1.2 Fire Monitoring Plan

The Great Smoky Mountains National Park Fire Monitoring Plan is currently under development by the Fire Ecologist. It will define fire monitoring goals and objectives, minimum qualification standards for fire monitors, and monitoring levels and minimum acceptable standards for documenting fire weather, and behavior and effects. Monitoring protocols adhere to those described in the Fire Monitoring Handbook, the NPS's national standard. In brief, fire effects monitoring in the Park consists of sampling permanent vegetation plots, which includes measurements of canopy and pole-size trees, ground cover, dead and down fuels, and duff, and taking photographs. Plots are sampled pre-burn, immediately post-burn, and one, two, five, and ten years post-burn. Fire monitors are essential to the early detection and eradication of invasive species in burned areas. Data gathered on pre-burn invasive plant infestations can help prevent further spread during fire management activities as well as giving specific locations for future monitoring. Post-burn sampling is also critical as preventing invasive plants from becoming established is by far the most effective and least costly management approach. Annual fire effects monitoring information is provided to resource management staff to provide feedback on the success of fire use with respect to meeting Park vegetation management goals and to approaching the desired future condition of Park vegetation.

5.2 Fire Program Evaluation

All wildland fires and fire related incidents will be reviewed. Reviews are conducted for one or more of the following purposes:

- To examine the progress of an ongoing incident to confirm effective decisions or correct deficiencies.
- To identify new or approved procedures, techniques, or tactics.
- To compile consistent and complete information to improve or refine park, regional or national fire management programs.
- To examine anomalous fire related incidents in order to determine cause(s), contributing factors and where applicable, recommend corrective actions. If negligence is indicated, the circumstances will be reported and investigated in accordance with applicable regulations, policies, or guidelines.
- To determine the cost effectiveness of a fire operation.

Incident reviews will follow procedures outlined in RM-18, Chapter 13, as well as the Interagency Standards for Fire and Fire Aviation Operations.

Annual FMP reviews will follow standards and procedures outlined in RM-18, Chapter 4.

Table 14. *Wildland Fire Reviews*

Review	Responsible Party	Timeframe
Hotline Review	Fire Management Officer	During incident
IMT Closeout and Review	Park Superintendent	During transfer of command
Park Level Review	Park Superintendent or designee	After incident
Regional Level Review	Regional FMO	After incident
National Level Review	National FMO	After incident
Entrapment and Fire Shelter Deployment Review	Regional FMO	ASAP after incident or deployment
Fire Readiness Review	FMO	Annual
Prescribed Fire Plan Technical Review	Qualified Burn Boss	Each plan
After Action Review (AAR)	Incident Commander, Burn Boss, or Fire Use Manager	Immediately post event
Review of any fire requiring a WFSA	Park Superintendent or Regional Director	After incident
Escaped Prescribed Fire Review	FMO, Regional FMO, National Fire Director	After incident

Table 15. Fire Management Plan and Environmental Assessment reviews and updates:

Item	Responsible Party	Recommended Revision
Annual Revision Documents	Fire Planner	September - annually
Pre-attack Plan	AFMO Operations	September- annually
Step-Up Plan	AFMO Operations	September- annually
Long-term Fuel Treatment Plan	Fire Ecologist	October- annually
Fire Prevention Plan	AFMO Operations	January- annually
Cooperative Annual Operating Plan	FMO	February- annually
Fire Management Plan Review	FMO / Fire Planner	Review and Update annually June - July
FMP Update	FMO / Fire Planner	If and when required based on annual review or 7 years.
Initial Scoping FMP/EA Update	FMO/Planning and Compliance	If and when required based on annual review and need for FMP update.
EA Update	FMO/Planning and Compliance	If and when required based on annual review and need for FMP update.

Glossary

also see the Glossary of Wildland Fire Terminology at:

<http://www.nwcg.gov/pms/pubs/glossary/pms205.pdf>

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

Burning Index (BI) - A numerical index related to the contribution of fire behavior to the effort of containing a fire. BI divided by 10 roughly equates to anticipated flame length at the head of a fire.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Initial Action – The actions taken by the first resources to arrive at a wildfire. Initial Action may include the full spectrum of responses from monitoring to aggressive containment.

Initial Attack – The initial action focused on aggressive containment of the fire perimeter.

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

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

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

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

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

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

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

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

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

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

Strategic fire response (SFR) – the response to a wildland fire is based on an evaluation of risks to firefighter and public safety, the circumstances under which the fire occurs, including weather and fuel conditions, natural and cultural resource management objectives, protection priorities, and values to be protected. The evaluation must also include an analysis of the context of the specific fire within the overall local, geographic area, or national wildland fire situation. This evaluation process uses the WFDSS decision support system.

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

Unplanned Ignition – The initiation of a wildland fire by lightning, volcanoes, unauthorized human caused fires, and escaped prescribed fires where the objective is to protect values at risk while meeting resource objectives specified in resource management plans.

Use of Wildland Fire – Management of either wildfire or prescribed fire to meet objectives specified in resource management plans.

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

Wildfire – Any fire (natural or human caused) burning in wildland fuels. Synonymous with wildland fire.

Wildland Fire – Any non-structural fire that occurs in the wildland. Two distinct types of wildland fire have been defined and include wildfire (unplanned ignitions) and prescribed fire (planned ignitions).

Wildland Fire Decision Support System (WFDSS) – A strategic fire management assessment and documentation process (program) used to determine the appropriate response to wildfires. This process is replacing the previously used WIFP and WFSa analysis processes.

Wildland Fire Use – the management of naturally ignited wildland fires to accomplish specific pre-stated resource management objectives in predefined geographic areas outlined in fire management plans. Previously a separate program component, now one end of the fire management spectrum of responses. Currently referred to as “use of wildland fire”.

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Appendix A NEPA Compliance Documents

This page reserved for NEPA Documents

Appendix B Delegation of Authority Letters

a. Delegation of Authority to the Fire Management Officer

David A. Loveland, Fire Management Officer for Great Smoky Mountains National Park is delegated authority to act on my behalf for the following duties and actions:

1. Ensure the well being and safety of employees.
2. Represent Great Smoky Mountains National Park in the Tennessee and North Carolina Interagency Coordinating Groups in setting priorities and allocating resources for fire emergencies.
3. Assist and advise the Superintendent on all aspects of wildland fire incidents and fuels management projects.
4. Ensure all wildland fire incidents and fuels management projects are managed in a safe, environmentally responsible and cost-effective manner, commensurate with values to be protected.
5. Coordinate with park Resource Management and Science staff on incidents / projects.
6. Ensure Minimum Impact Suppression Tactics are employed on park lands and that wilderness values are protected.
7. Coordinate all prescribed fire activities in the park and suspending all prescribed fire when conditions warrant.
8. Ensure that only fully qualified personnel are used in wildland fire operations or that fully qualified personnel are assigned to mentor trainees.
9. Coordinate, preposition, send, and order fire and aviation resources in response to current and anticipated fire conditions.
10. Request and oversee distribution of severity funding for fire and fire aviation if and as needed.
11. Approve fire program requests of overtime, hazard pay, and other premium pay.
12. Coordinate and provide all fire and/or prevention information needs to GRSM Public Affairs Office so as to inform internal and external customers with necessary information.
13. Coordinate and manage all fire funding accounts to assure park and agency fiscal guidelines are adhered to and targets are met.
14. Initiate and certify wildland fire taskbooks, and approve Red Cards in accordance with National Wildland Fire Qualification and Systems Guide 310-1 and additional NPS guidance identified in the "Interagency Standards for Fire and Fire Aviation Operations".
15. Authorized to hire Emergency Firefighters in accordance with the Emergency Worker Pay Plan.

Fire Management Officer

Date

Deputy Superintendent

Date

b. Delegation of Authority to Incoming Incident Commander

DELEGATION OF AUTHORITY

As Line Officer in charge of Great Smoky Mountains National Park, I have the responsibility for protection of the resources and the lives of Park visitors and all employees. Your expertise in the area of fire management will assist me in fulfilling that responsibility during the present incident. By means of this memorandum on this day of _____ at _____ hours, I am delegating to you the authority to carry out the task of management of the _____ incident in accordance with the attached line officer's briefing statement.

The statement will provide you with my priorities in fire management, specific restraints which are necessary to protect cultural and natural resources and other guidelines for carrying out your overall task of fire suppression on this unit. In addition, the Line Officer's Briefing Statement will provide you with names of certain individuals who have been assigned to assist you in carrying out your duties and a list of facilities which may be available to you under the conditions stated. A fireline briefing will be conducted on site by the current local Incident Commander. Either I or my delegated representative will be available to you and your staff for advice and council.

(Park Superintendent)

Date

(Incident Commander – Incoming Team)

Date

Appendix C Pocket Safety Cards

Attached are Pocket Cards describing critical fire danger indices and conditions present during past large fire events at Great Smoky Mountains National Park. They are intended for use by firefighters from outside the Park who might be ordered to GRSM to assist in wildland fire use or suppression actions:

a. Fall Pocket Card

Fire Danger Area:

- Great Smoky Mountains NP
- TN/NC
- Cherokee / Indian Grave
- Meets NWCG Wx Station Standards

Fire Danger Interpretation:

- EXTREME** -- Use extreme caution
- CAUTION** -- Watch for change
- Moderate** -- Lower Potential, but always be aware

Remember what Fire Danger tells you:

- Burning Index gives day-to-day fluctuations calculated from: 2 pm temperature, humidity, wind, daily temperature & rh ranges, and precip duration.
- Wind is part of BI calculation.
- Watch local conditions and variations across the landscape -- Fuel, Weather, Topography.
- Listen to weather forecasts -- especially WIND.

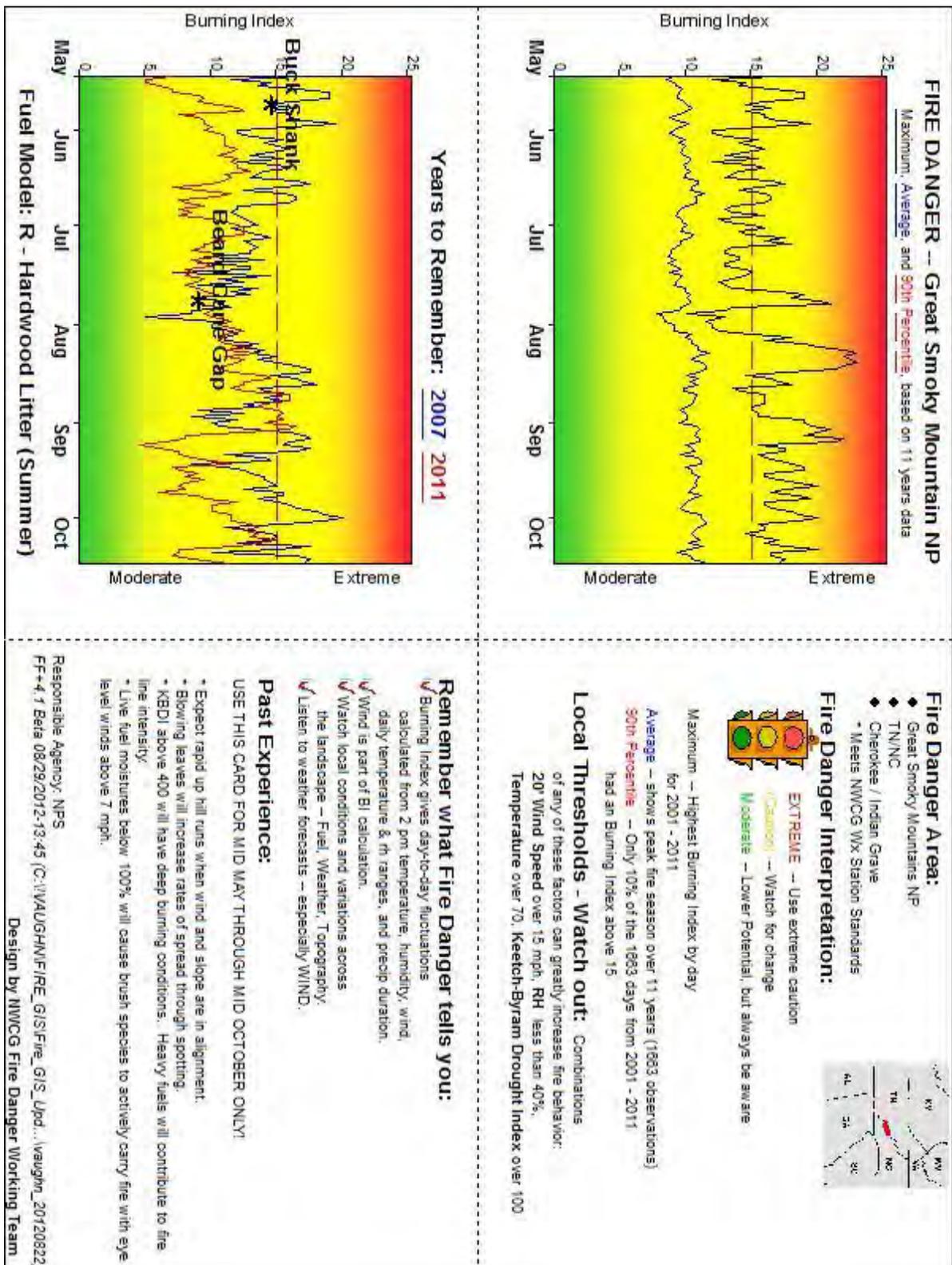
Past Experience:

USE THIS CARD FOR MID OCTOBER THROUGH MID MAY ONLY!

- Expect rapid up hill runs when wind and slope are in alignment.
- Blowing leaves will increase rates of spread through spotting.
- KBDI above 400 will have deep burning conditions. Heavy fuels will contribute to fire line intensity.
- Live fuel moistures below 100% will cause brush species to actively carry fire with eye level winds above 7 mph.

Responsible Agency: NPS
 FF-4.1 Beta 08/29/2012-13:38 (C:\VAUGHN\FIRE_GIS\Fire_GIS_Lpd\vaughn_20120822)
 Design by NWCG Fire Danger Working Team

b. Spring Pocket Card



Appendix D Reciprocal Fire Management Agreements

AGENCY(S)	OBJECTIVE	EXPIRATION DATE
North Carolina Division of Forest Resources, DOI, NPS, U.S. Fish & Wildlife Services	To coordinate efforts in the prevention, detection, suppression and investigation of wildfires in and adjacent to their areas of responsibility	July 1, 2018
National Park Service, Tennessee Department of Agriculture Division of Forestry	To establish a reciprocal fire protection agreement	January 1 2020
Great Smoky Mountains National Park and the Wears Valley Volunteer Fire Department	To establish the terms and conditions under which the parties will provide mutual assistance in wildland and structural fire suppression.	2019
Great Smoky Mountains National Park and the Grassy Fork Volunteer Fire Department	To establish the terms and conditions under which the parties will provide mutual assistance in wildland and structural fire suppression.	2019
Great Smoky Mountains National Park and the Pittman Center Volunteer Fire Department	To establish the terms and conditions under which the parties will provide mutual assistance in wildland and structural fire suppression.	2019
Great Smoky Mountains National Park and the Stecoah Volunteer Fire Department	To establish the terms and conditions under which the parties will provide mutual assistance in wildland and structural fire suppression.	2019
Great Smoky Mountains National Park and the Bryson City Volunteer Fire Department	To establish the terms and conditions under which the parties will provide mutual assistance in wildland and structural fire suppression.	2019
Great Smoky Mountains National Park and the Blount County #5 (Walland) Fire Department	To establish the terms and conditions under which the parties will provide mutual assistance in wildland and structural fire suppression.	2019
Great Smoky Mountains National Park and the Townsend Area Volunteer Fire Department	To establish the terms and conditions under which the parties will provide mutual assistance in wildland and structural fire suppression.	2019
Great Smoky Mountains National Park and the Jonathan Creek Volunteer Fire Department	To establish the terms and conditions under which the parties will provide mutual assistance in wildland and structural fire suppression.	2019
Great Smoky Mountains National Park and the Gatlinburg Fire Department	To establish the terms and conditions under which the parties will provide mutual assistance in wildland and structural fire suppression.	2019
Great Smoky Mountains National Park and the	To establish the terms and conditions under which the parties will provide mutual	Unsigned

AGENCY(S)	OBJECTIVE	EXPIRATION DATE
Cosby Volunteer Fire Department	assistance in wildland and structural fire suppression.	
Great Smoky Mountains National Park and the West Swain Volunteer Fire Department	To establish the terms and conditions under which the parties will provide mutual assistance in wildland and structural fire suppression.	2019
Great Smoky Mountains national Park and the Pigeon Forge Fire Department	To establish the terms and conditions under which the parties will provide mutual assistance in wildland and structural fire suppression.	2019

Appendix E Potential Values at Risk

This section has previously contained a tabular list of structures broken down by watershed until the June 2015 review / update. That tabular data will no longer be included in this appendix. The Great Smoky Mountains Fire Management Office and Resource Management and Science Division maintain Geographic databases containing up to date values (natural, cultural and infrastructure) information for the park as well as some adjoining private / state lands. The GIS data can be readily accessed by fire managers so that a thorough assessment of potential values at risk for any given fire location can be made. In addition to accessing the values geo-databases, fire managers will advise and consult with Resource Management and Science Inventory and Monitoring staff about the fire location, status and anticipated spread to verify no other values may be adversely impacted.

Appendix F Federally Threatened and Endangered Species

Common Name	Status	Location
Indiana bat	Endangered	Blowhole/Scott Gap Caves
Red-cockaded woodpecker*	Endangered	Mature pine forest
Carolina Northern flying squirrel	Endangered	High-elevation spruce-fir forest
Spotfin chub	Threatened	Abrams Creek-below Abrams Falls
Smoky madtom	Endangered	Abrams Creek-below Abrams Falls
Yellowfin madtom	Threatened	Abrams Creek-below Abrams Falls
Duskytail darter*	Endangered	Abrams Creek-below Abrams Falls
Spruce-Fir moss spider	Endangered	Mt. LeConte, High elevation spruce-fir forests
Spreading avens	Endangered	Mt. LeConte
Virginia spiraea	Threatened	Abrams Creek
Rock gnome lichen	Endangered	High-elevation rock outcrops and streams

* Possibly extirpated

INDIANA BAT (*Myotis sodalis*): These bats are found in the Park during both summer and winter months. Whiteoak Blowhole Cave provides a hibernaculum (winter) that has been designated as critical habitat for the bats. Both male and female Indiana bats have been mist-netted during summer months, and researchers have also identified maternity roost trees in the western part of the Park. Though these bats are highly mobile and very likely adapted to frequent-fire disturbance regimes, fires during certain times of year have the potential to negatively impact their populations. Specifically, fires burning during the maternity season (approximately May 15 – August 15) have the potential to stress or harm lactating females or non-volant young, which occupy large dead trees during this time. The Park has been engaged in consultation with the US Fish and Wildlife Service to help determine the appropriate mitigation measures to protect this species.

RED-COCKADED WOODPECKER (*Picoides borealis*): This woodpecker is a permanent resident in pinelands and was formerly known from scattered colonies throughout the west end of the Park. This species excavates nest cavities only in living old pines with heart rot and will stay in the colony only if underbrush stays below a height of 9 to 15 feet. The Park has lost all known nesting pairs, and the last confirmed sighting was in 1982. Concern over this decline and unconfirmed sightings at the last known colony prompted the Park to undertake a restoration of this site in 1990. It is probable that the Park's wildfire suppression program has caused the decline and possible extirpation of this rare species from the Park. Without the return of prescribed fire to keep undergrowth low, it is very doubtful that the red-cockaded woodpecker will ever be successfully reintroduced.

CAROLINA NORTHERN FLYING SQUIRREL (*Glaucomys sabrinus coloratus*): This mammal is found in high elevation stands (above 4500 feet) of spruce-fir and rich northern hardwoods. During a two-year study, squirrels were only found in the Indian Gap-Clingmans Dome area, but populations are thought to be more widespread. This mostly nocturnal animal may be adversely affected by fire, but it is at low risk due to the moist micro-climate of the preferred habitat and the resulting low fire frequency.

SMOKY MADTOM (*Noturus baileyi*), YELLOWFIN MADTOM (*Noturus flavipinnis*), SPOTFIN CHUB (*Cyprinella monacha*), DUSKYTAIL DARTER (*Etheostoma percnurum*): Each of these fish is known to have formerly inhabited Abrams Creek in the Park's western end. In 1957, these species (and others) were eliminated from the Park by fisheries management practices. Reintroduction of all four of these fish has been attempted and the project is considered an ongoing restoration. Abrams Creek is the Park's largest and most fire-active watershed. Low-intensity, frequent fire events probably do not place any of the four fish species in jeopardy, especially since they survived the pre-Park fire era. Adjacent large, high-intensity wildfires could pose a risk by sedimentation of cover and spawning sites. The intensity of such wildfires (e.g., Shop Fire of 1988) is believed to be directly related to the amount of resinous fuels that have accumulated since the full suppression of fires began about 60 years ago.

SPRUCE-FIR MOSS SPIDER (*Microhexura montivaga*): This extremely rare spider is found among moss covered rocks growing in the shade of high elevation forests. Fire would likely have an adverse impact on this species, but it is at low risk due to the moist micro-climate of the preferred habitat and the resulting low fire frequency.

SPREADING AVENS (*Geum radiatum*): This buttercup-like member of the rose family is known in the Park from a single high-elevation, moist cliff site. Fire does not pose any threat, and the population is carefully monitored.

VIRGINIA SPIRAEA (*Spiraea virginiana*): This shrub occurs in moist stream-side thickets along a single creek in the Park. It is dependent on disturbance by periodic floods to maintain a competitive edge over adjacent woody species. It is not at risk from effects of fire.

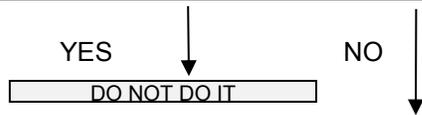
ROCK GNOME LICHEN (*Gymnoderma lineare*): This lichen occurs only in areas of high humidity, such as high elevation vertical rock faces or in mid-elevation high-gradient streams. Wildland fire is not considered a threat to this species.

APPENDIX G Minimum Tool Worksheet

This is a sample Minimum Requirement Analysis Worksheet (Minimum Tool Analysis). MTAs are completed for each project utilizing mechanized equipment in wilderness areas.

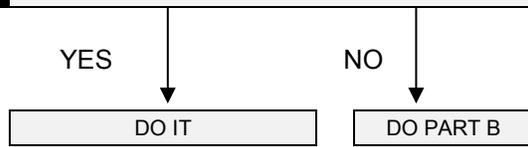
MINIMUM REQUIREMENT ANALYSIS WORKSHEET GREAT SMOKY MOUNTAINS NATIONAL PARK	
GRSM BC 01 (11/2009)	
PROPOSED ACTION:	<u>Fire Management Operations in Designated Wilderness and Proposed Wilderness</u>
LEAD PERSON(S): <u>Joe Firefighter</u>	WORK UNIT(S): <u>Smoking Pine Prescribed Burn</u>
PART A: Minimum Requirement: Is this action necessary to manage the area?	
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> 1 IS THIS AN EMERGENCY? <div style="display: flex; justify-content: space-around; margin-top: 10px;"> YES NO </div> <div style="margin-top: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 80%; margin: 0 auto;"> ACT ACCORDING TO APPROVED EMERGENCY MINIMUM TOOL CRITERIA </div> </div> </div>	<div style="border: 1px solid black; padding: 5px;"> Answer: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Explain: The proposed fire management operations are pre-planned methods for safely and efficiently managing fire operations within wilderness areas of Great Smoky Mountains National Park. Fire management operations include, but are not limited to; hazard fuel reduction, protection of species of special concern habitat, eradication of exotic species, management of wildland fires, prescribed fire operations, and fire effects monitoring activities. </div>
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> 2 IS THE PROPOSED ACTION ALLOWED BY LEGISLATION, POLICY, OR AN APPROVED MANAGEMENT PLAN <div style="display: flex; justify-content: space-around; margin-top: 10px;"> YES NO </div> <div style="margin-top: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 80%; margin: 0 auto;"> DO ACCORDING TO APPROVED CRITERIA </div> </div> </div>	<div style="border: 1px solid black; padding: 5px;"> Answer: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Explain: According to great Smoky Mountains National Park Fire Management Plan motorized equipment can be used in wilderness areas if the Superintendent or designee approves their use. The park's enabling legislation, the wilderness act, and Dept. of the Interior's 1974 interpretation of said act in relation to "controlled burning" (Question 4) give legal basis for allowing these intrusions (see attachment 3 and part B). </div>
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> 3 CAN THE OBJECTIVES BE ACCOMPLISHED THROUGH AN ACTION OUTSIDE OF WILDERNESS? <div style="display: flex; justify-content: space-around; margin-top: 10px;"> YES NO </div> <div style="margin-top: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 80%; margin: 0 auto;"> DO IT THERE </div> </div> </div>	<div style="border: 1px solid black; padding: 5px;"> Answer: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Explain: Since ecosystems requiring management and use of fire occur in wilderness areas, objectives cannot be accomplished outside of wilderness areas. </div>
<div style="border: 1px solid black; padding: 5px;"> DOES THIS ACTION CONFLICT WITH </div>	<div style="border: 1px solid black; padding: 5px;"> Answer: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No </div>

4 LONG-TERM WILDERNESS PLANNING GOALS, OBJECTIVES, OR DESIRED FUTURE RESOURCE CONDITIONS?



Explain: Management actions are routinely required to be implemented during natural fire events in the wilderness to protect endangered species habitat and other resources at risk, as well as to maintain fire dependent vegetation communities. Monitoring of these events is a required component.

5 CAN THE OBJECTIVES BE ACCOMPLISHED THROUGH AN ACTION THAT DOES NOT INVOLVE PROHIBITED USES?



Answer: Yes No

Explain: To safely manage fire within this fire-dependent ecosystem the use of mechanized equipment and motorized vehicles is required. The goal of this program is to minimize those practices that would be in conflict while allowing fire to play its role in the ecosystem and monitor its effects.

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

6 DESCRIBE, IN DETAIL, ALTERNATIVE WAYS TO ACCOMPLISH THE PROPOSED ACTION *
(These may include, primitive skill/tool, mechanized/motorized, and/or combination alternatives)

(Use addition pages if necessary)

- * Minimum questions to answer for each alternative:
- What is proposed?
 - Where will the action take place? (location)
 - When will the action take place? (dates/use periods)
 - How often will this activity take place (frequency)
 - How long will it take to complete the activity? (duration)
 - What design and standards will apply?
 - What methods and techniques will be used? (tools, etc.)
 - How many people are needed to complete the action?
 - Why is it being proposed in this manner?
 - If there are adverse impacts, how long will they persist?
 - What mitigation will take place to minimize action impacts?

GO TO NEXT STEP

7 EVALUATE WHICH ALTERNATIVE WOULD HAVE THE LEAST OVERALL IMPACT ON WILDERNESS RESOURCES, CHARACTER AND VISITOR EXPERIENCE WHILE ACHEIVING OBJECTIVE

- ** Minimum criteria used to evaluate each alternative:
- Biophysical effects (magnitude, duration, frequency)
 - Social/Recreational/Experiential effects
 - Societal/Political effects
 - Health/Safety concerns
 - Economical/Timing considerations

GO TO NEXT STEP

8 SELECT AN APPROPRIATE, PREFERRED ALTERNATIVE



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

Alternative 1: Limited use of aircraft, mechanized equipment, and motor vehicles in designated wilderness.
Under this alternative, motorized vehicles would be restricted to essential wilderness roads/trails unless specifically approved by the superintendent. Rotor wing aircraft would be allowed to land in unimproved sites but no improved helispots would be authorized. Specialized equipment would be allowed on a site-specific basis. Mechanized equipment would be permitted, however Minimum Impact Suppression Tactics must be adhered to.

Alternative 2: Limited use of aircraft and further restrictions on mechanized equipment and motor vehicles in designated wilderness.

Under this alternative, motorized vehicles would be limited to travel on non-wilderness roads; rotor wing operations would be permitted, but landings restricted to unimproved helispots; and only primitive hand tools would be authorized. Firefighter and public safety would be seriously compromised under this alternative. Fire threats to endangered species habitat could not be effectively mitigated.

List preferred alternative and give justification:

Meets NEPA requirements / Compliance Management Board

Date

Approved by Superintendent

Date

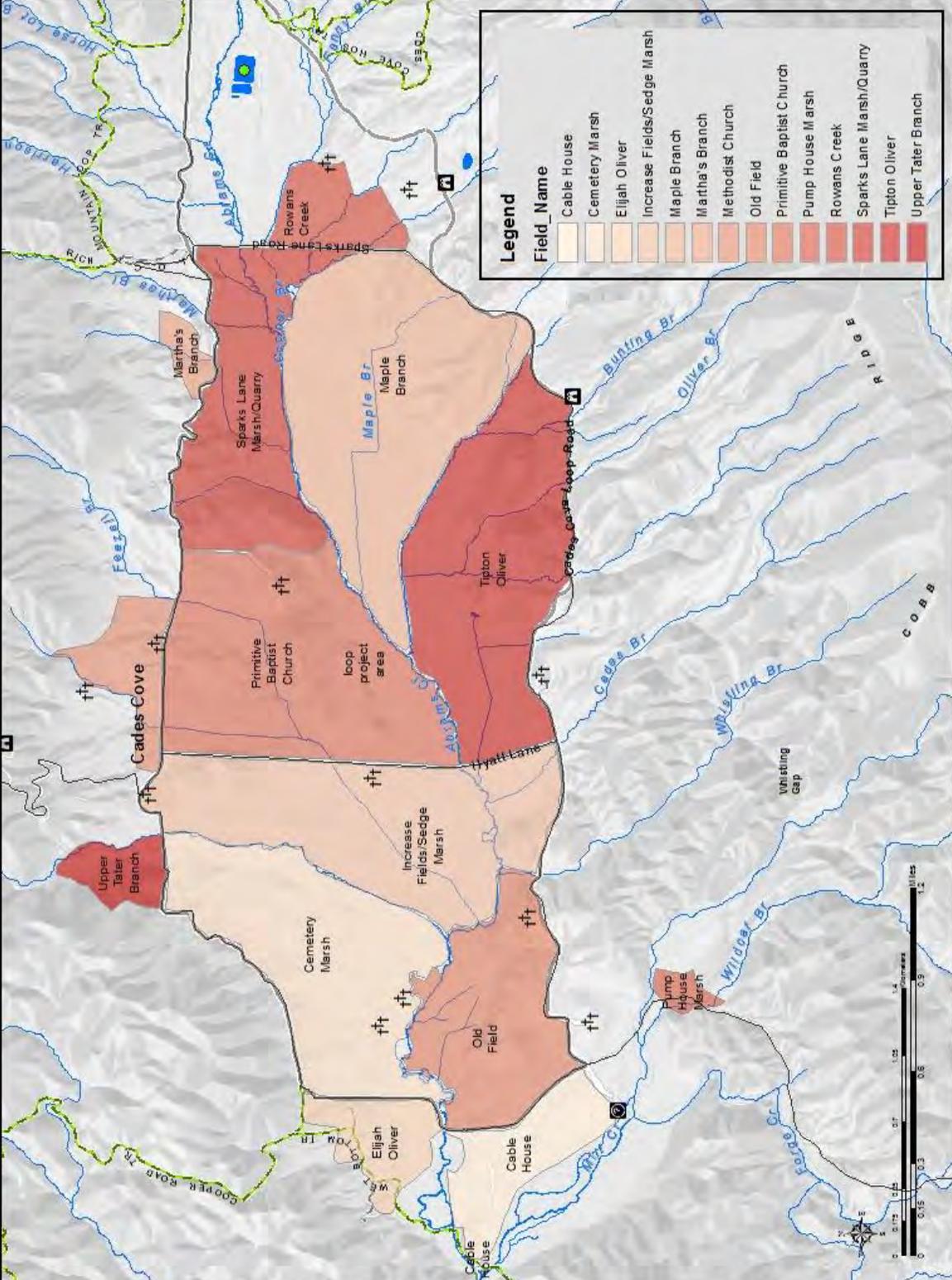
Appendix H. Five Year Fuels Treatment Plan

2015 FMP Review / Update

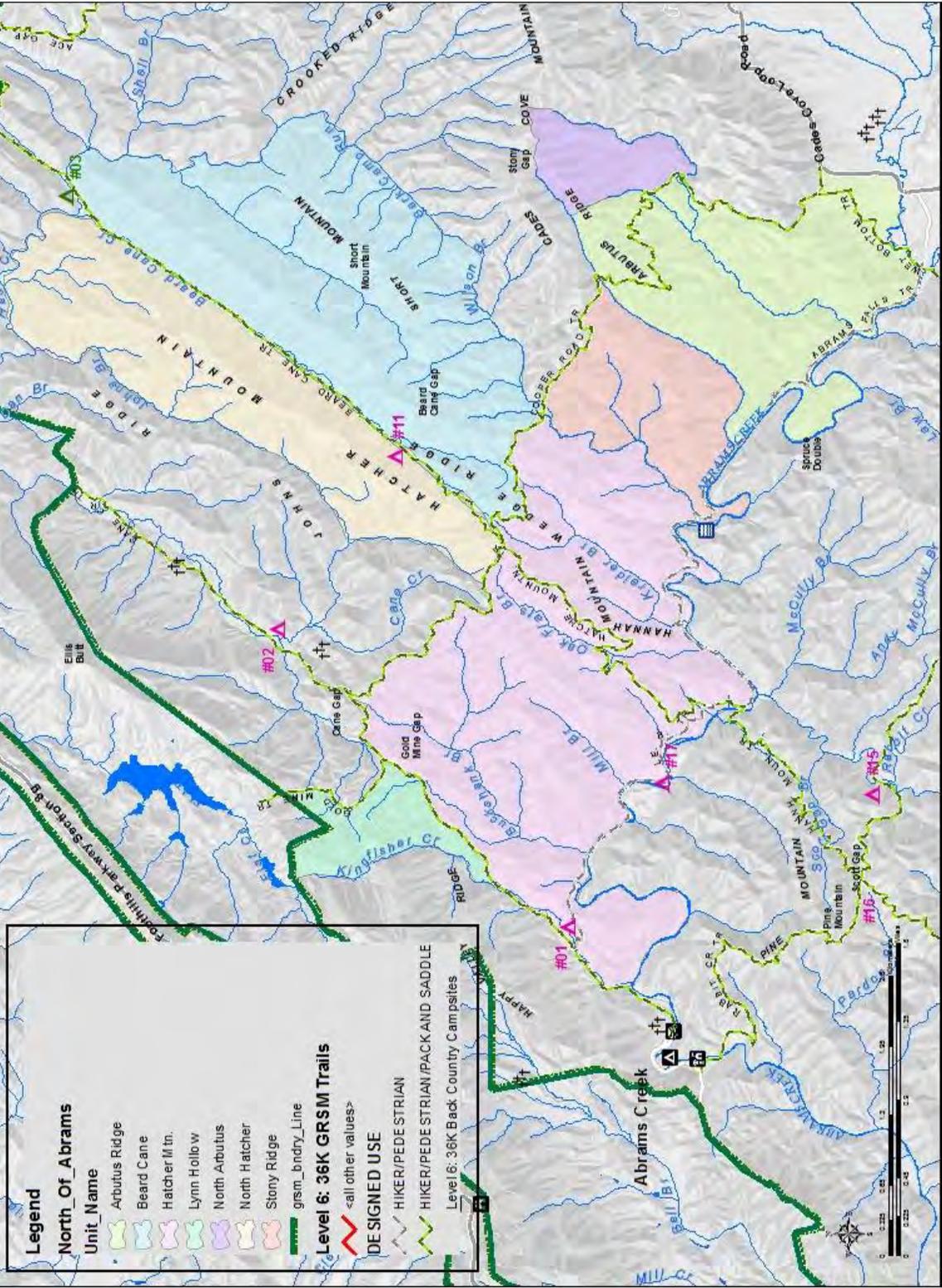
Project or Area	Project Leads (RXB2 / READ)	Treatment Unit(s)	Size	Priority	Implementation Timeframe
FY2016					
<i>Sevier Interface</i>	S. Paxton, Wood	Wear Cove Gap	200 ac	1	Nov - Mar
<i>North of Abrams</i>	Hartsburg, W. Paxton	Stony Ridge	500 ac	2	Nov - Mar
<i>Cataloochee</i>	S. Paxton, Wood	Canadian Top (Noland / Little Cat)	1200 ac	3	Oct - Apr
<i>North of Abrams</i>	Hartsburg, W. Paxton	Arbutus Ridge (east section)	200 ac	4	Nov - Mar
<i>Cades Cove</i>	Hartsburg, Klein,	Cable House, Prim. Baptist, Elijah Oliver, East ½ of T. Oliver, Pump House, Sparks Lane, Martha's Branch	600 ac	5	Early November (PBC may be March)
<i>Sevier Interface</i>	Hartsburg, Wood,	Ski Mtn Prep / Piles	< 30 ac	6	On Going
FY2017					
<i>North of Abrams</i>	Black, W. Paxton	Hatcher (Western sub-units) and Lynn Hollow	900 ac	1	Nov - Mar
<i>Cataloochee</i>	S. Paxton, Wood	Bald Top, Jesse Ridge	620 ac	2	Oct - Apr
<i>Cades Cove</i>	Hartsburg, Klein	½ Cemetery Marsh, Increase Field, Old Field, Maple Branch, Methodist Church	700 ac	3	Early November
FY2018					
<i>North of Abrams</i>	Black, W. Paxton	North Hatcher	1100	1	Nov - Mar
<i>Cataloochee</i>	S. Paxton, Wood	Short Bunk	750 ac	2	Oct - Apr
<i>Cades Cove</i>	Hartsburg, Klein	Elijah Oliver, Cable House, Tipton Oliver, Martha's Branch, ½ Cemetery Marsh	700 ac	3	Early November
FY2019					
<i>Sevier Interface</i>	S. Paxton, Wood	Wear Cove Gap	200 ac	1	Nov - Mar
<i>North of Abrams</i>	Black, W. Paxton	Arbutus	1000 ac	2	Nov - Mar
<i>Cataloochee</i>	S. Paxton, Wood	Noland, Little Cat	1000 ac	3	Oct - Apr
<i>Cades Cove</i>	Hartsburg, Klein	Increase Field, Upper Tator, Primitive Baptist Church, Sparks Lane, Rowen's Creek, Old Field	900 ac	4	Early Nov
FY2020					
<i>North of Abrams</i>	Black, W. Paxton	Stony Ridge	500 ac	1	Nov - Mar
<i>Cataloochee</i>	S. Paxton, Wood	Mathews, Wash Ridge	600 ac	2	Oct - Apr
<i>Cades Cove</i>	Hartsburg, Klein	Pump House Marsh, Upper Tator, Maple Branch, Sparks Lane, Martha's Branch, Elijah Oliver	650 ac	3	Early November
<i>Sevier Interface</i>	Hartsburg, Wood	Ski Mtn. Piles	< 30 ac	4	On Going

*This project list represents a best case workload should funding be available in that year. Burn units may be substituted either due to funding or environmental constraints. In the event of missed burn opportunities, treatments will be rolled over to the following year in order to minimize fire return interval departures. **Note:** Evolving research / restoration efforts within Cades Cove may effect rotation or timing of individual treatments.*

Cades Cove Prescribed Fire Project Map



North of Abrams Prescribed Fire Project Area



Legend

North_Of_Abrams

Unit_Name

- Arbutus Ridge
- Beard Cane
- Hatcher Mtn.
- Lynn Hollow
- North Arbutus
- North Hatcher
- Stony Ridge

grsm_bndry_Line

Level 6: 36K GRSM Trails

<<all other values>>

DESIGNED USE

- HIKER/PEDESTRIAN
- HIKER/PEDESTRIAN/PACK AND SADDLE
- Level 6: 36K Back Country Campsites

Appendix I. FMP Annual Review / Update

Annual Review	Agency Administrator Approval Date	Summary of Changes / Updates
2011	8/22/2011	<ul style="list-style-type: none"> • Updated 5 Year Fuels Treatment Plan.
2012	6/20/12	<ul style="list-style-type: none"> • Added FMO Delegation of Authority. • Updated 5 Year Fuels Treatment Plan. • Edited Step-Up plan clarifying use of Fuel Type “R” after green-up. • Modified FMU boundaries to reflect actual size-up and actions required to protect potential values at risk. • Updated Table 5. (Required Qualifications) based on current staffing.
2013	8/01/2013	<ul style="list-style-type: none"> • Updated 5 Year Fuels Treatment Plan.
2014	7/30/2014	<ul style="list-style-type: none"> • Edited language in sections 3.1.7, 4.1 and 4.1.2 to conform to Cohesive Strategy and clarify management of unplanned ignitions. • Added Table 9 (Preplanned Wildfire Response) to pre-identify dispatch, response actions as step-up increases. • Updated 5 Year Fuels Treatment Plan. • Updated local cooperators General Agreements (out for signature). • Reviewed Duty Officer roles and responsibilities and added delegation of authority.
2015	7/06/2015	<ul style="list-style-type: none"> • Updated Organization Chart to reflect approved Target Organization. • Edited Roles and Responsibilities section to conform to approved organization. • Referred to “Redbook” for specific roles of Superintendent and FMO. • Deleted duplicate paragraph in Air Quality section. • Simplified paragraph numbering scheme • Removed Table from Appendix E. Values (Infrastructure) at Risk by Watershed and referenced current values (natural, cultural and infrastructure) geo-databases. • Removed Sample Annual Review checklist from Appendix I and replaced it with a Review / Update change log. • Updated 5 Year Fuels Treatment Plan.
2016		
2017		