
Redwood National and State Parks Fire Management Plan 2010



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I. Introduction

Redwood National and State Parks (RNSP) cover approximately 131,983 acres of land in northwestern California reaching from the shoreline of the Pacific Ocean to the mountains of the Coast Range (see Figure 1.1). The parks include a mosaic of vegetation types that are susceptible to wildland fires to varying degrees. Old growth redwood forests, grasslands and oak woodlands, coastal strand and Sitka spruce forests, and dry pine woodlands are all represented in the parks, as well as about 50,000 acres of second growth forests in all stages of regrowth after being logged prior to park establishment. The parks are bordered by private property, including both rural and more urbanized residential and commercial properties, and industrial timberlands. Wildland fires in any of these vegetation types can endanger human life, damage park resources, and destroy private property.

Fire management includes all activities undertaken to prevent, control, suppress, and utilize fire for the protection of human safety, personal property, and irreplaceable natural and cultural resources. This Fire Management Plan (FMP) provides the operational guidance the National Park Service (NPS) will use to manage wildland fire in RNSP safely while protecting park resources and human life and property.

One purpose of managing fire in the parks is to reduce the threat to human life and property both within and outside park boundaries and to protect natural and cultural resources from wildfire. Prescribed fire and mechanical fuel reduction are tools to reduce fuels that have the potential to threaten developments, resources, or public safety. One of the primary purposes of a fire management plan is to develop an overall approach to fire management that focuses on the safety of firefighters and the public. To reduce threats from wildfire to property and resources, hazardous fuel buildups need to be reduced around park buildings and in areas where fire could either enter the parks or move beyond park boundaries, suppression tools such as water sources need to be identified and developed, and tactics need to be planned for safe and efficient actions in case of wildfire.

A major purpose of fire management in the national park is to preserve and restore natural and cultural resources that evolved in the presence of fire. Fire is needed as a tool for restoring or managing cultural landscapes that were created by intentional ignitions and to maintain native plants in grasslands that are threatened by invasive non-native plants and encroachment by woody species. Fires were set in northwestern California in and around the parks by American Indians for a variety of reasons, including increasing acorn production, providing basketry materials, and encouraging new growth of grasses and browse favored by deer and elk that were hunted for food. The Euro-Americans who came into the area after 1850 also set fires to create pastures for livestock and to encourage growth of browse for elk. When fire suppression became a national policy and priority in the 1930s, ecological conditions were fundamentally changed and cultural landscapes that had developed through centuries of natural and human-caused ignitions were altered.

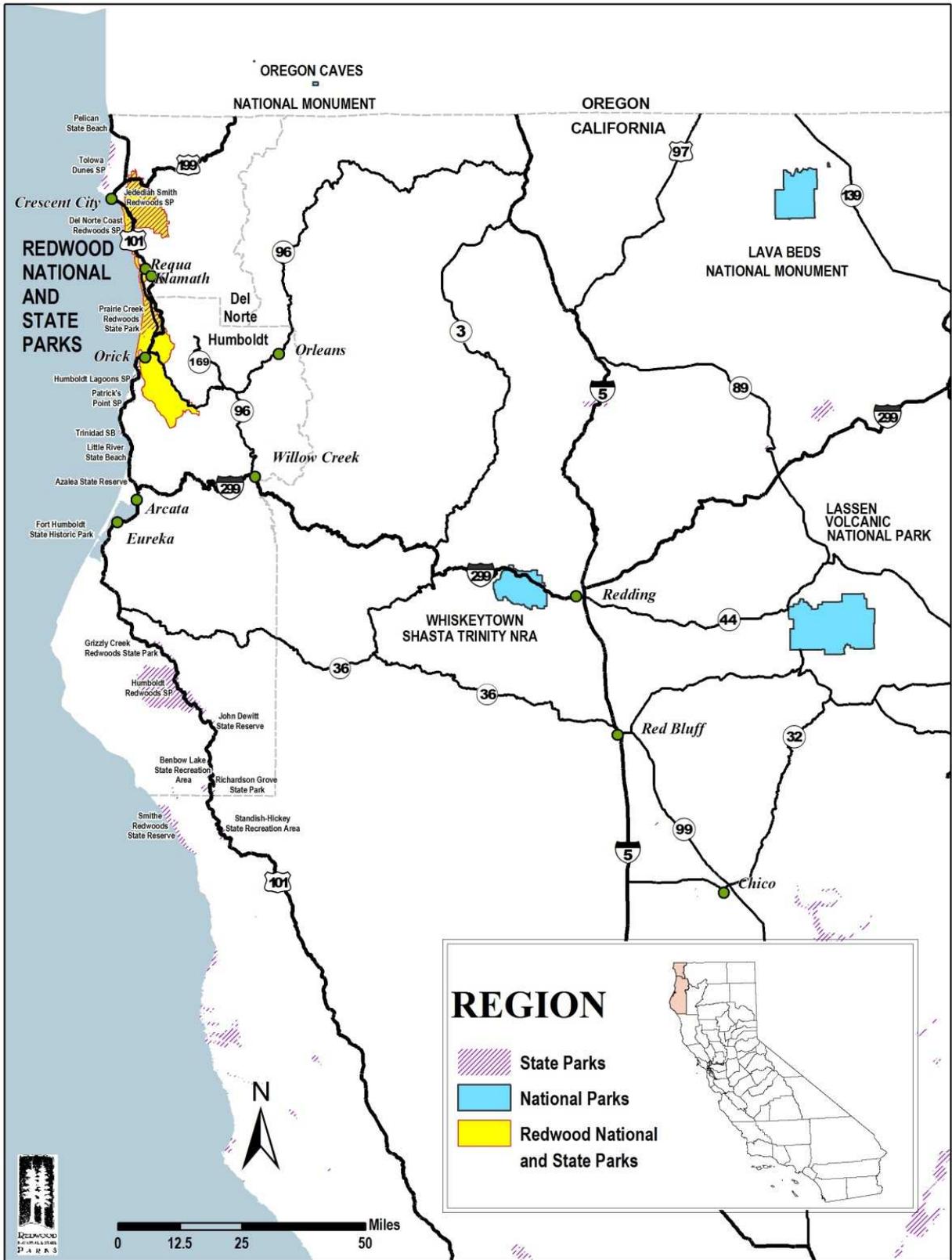


Figure 1.1 General Location Map

Through collaboration with the American Indians who have lived in the area for thousands of years, particularly the Yurok Tribe, the NPS is seeking to understand the history, effects, and cultural uses of fire in park ecosystems to prepare for use of fire in a traditional context.

A history of fire suppression, along with the development of effective fire suppression techniques, has interrupted the fire regimes that developed in the different RNSP vegetation types and ecosystems for many centuries. A better understanding of these fire regimes is needed to determine the extent to which fire should be restored in RNSP ecosystems and how this would be accomplished. In particular, the NPS will explore the role of fire in old growth redwood forests to determine the importance of fire as an ecological process in those redwood forests that remain intact.

Fire management activities in RNSP include suppression of wildfires, prescribed fire, mechanical fuel reduction, fire ecology and fire effects monitoring, and fire operations planning. The FMP describes the major actions that will be taken to prepare for wildfires, to reduce the threat of wildfires to park resources, and to prepare for the use of fire to restore ecological conditions and cultural practices that have created the modern landscape of the parks. Despite these goals and any imminent threat to resources from wildfire, protecting human life and safety are the highest priority of all fire management actions. Protecting park resources and park and private property are secondary priorities to protecting human life and safety.

This Fire Management Plan (FMP) is accompanied by an environmental assessment (EA) that addresses proposed fire management actions and alternative actions in RNSP over the next five years. In compliance with the National Environmental Policy Act (NEPA), the EA analyzes the potential effects of these approaches to managing wildfire and prescribed fire in RNSP. Following public review of the FMP/EA, the NPS will select one of the alternatives which will become the final plan for fire management.

The FMP/EA has been prepared with input from an interdisciplinary team from Redwood National Park with additional input from the California Department of Parks and Recreation (CDPR).

The proposed actions were developed in consultation with the US Fish and Wildlife Service (USFWS) and NOAA Fisheries (formerly the National Marine Fisheries Service). The NPS prepared biological assessments (BAs) of effects of proposed actions on listed, proposed, and candidate threatened and endangered species and designated critical habitat under the requirements of Section 7 of the federal Endangered Species Act on 1973, as amended, for consultation with the USFWS and NOAA Fisheries and received concurrence. The USFWS and NOAA Fisheries issued biological opinions (BO) on whether the fire management actions proposed by the NPS have the potential to jeopardize the continued existence of listed threatened or endangered species. All required consultations will be completed prior to implementing actions described in the FMP.

All proposed fire management actions that can be anticipated have been designed to avoid or minimize adverse effects on listed, proposed or candidate threatened or endangered species. The effects on sensitive species from fire suppression preparations including installing water tanks, preparing access roads, and removing hazardous fuels have been considered and analyzed. The NPS has developed guidelines to reduce or eliminate potential adverse effects on sensitive species from fire suppression in RNSP. The guidelines are not proposed actions because the unpredictability of wildfires and associated threats to human safety and significant resources could require suppression actions that are not entirely consistent with the guidelines. Therefore, all specific wildfire suppression tactics and activities would be analyzed through emergency consultation with the USFWS or NOAA Fisheries after the fire is suppressed.

Federal land managing agencies are required to consider the effects proposed actions have on properties listed in, or eligible for inclusion in, the National Register of Historic Places (i.e., Historic Properties) and allow the Advisory Council on Historic Preservation a reasonable opportunity to comment as required by Section 106 of the National Historic Preservation Act of 1966, as amended. Agencies are required to consult with Federal, state, local, and tribal governments or organizations, identify historic properties, assess adverse effects to historic properties, and negate, minimize, or mitigate adverse effects to historic properties while engaged in any Federal or federally assisted undertaking (36 CFR Part 800). The FMP/EA will be reviewed by the California State Historic Preservation Officer (SHPO) and by affected American Indian tribes and groups including Yurok, Tolowa, Hoopa/Chilula. Any actions that would occur within the boundary of the Yurok Indian Reservation would require consultation with the Yurok Tribal Heritage Preservation Officer, in addition to the SHPO as per 36 CFR 800.2(c). All required consultations will be completed prior to implementing actions described in the FMP.

Collaboration and Cooperation

RNSP includes three state parks—Jedediah Smith Redwoods State Park, Del Norte Coast Redwoods State Park, and Prairie Creek Redwoods State Park—within the national park boundary established by Congress in 1968. Fire management in the state parks is the responsibility of the California Department of Forestry (CAL FIRE or CalFire).

This FMP is based on policies and plans developed for a broad range of fire management activities throughout the U.S., including the National Fire Plan, the Federal Wildland Fire Management Policy, and NPS fire management policies.

The National Fire Plan (NFP) was developed in August of 2000, following a landmark fire season. The plan outlines a comprehensive strategy for an interagency approach to fire management to reduce the short and long term impacts from wildfire.

The NFP addresses five key points:

- Firefighting—fight fires during the fire season and prepare adequately for the next fire season

- Rehabilitation and Restoration—restore landscapes and rebuild communities damaged by wildfire
- Hazardous Fuel Reduction—invest in projects to reduce fire risk
- Community Assistance—work directly with communities to ensure adequate protection
- Accountability—be accountable for actions and establish adequate oversight, coordination, program development, and monitoring for performance

The NPS is a member of the California Fire Alliance, which is coordinating the implementation of the National Fire Plan in California. The Alliance is a cooperative membership dedicated to supporting pre-fire principles and activities and ensuring that pre-fire management provides for public and community safety, minimizes costs and losses, and maintains and improves the quality of the environment. CAL FIRE is also a member agency of the California Fire Alliance. CAL FIRE is responsible for fire management in California, including rural and urban areas. CAL FIRE has the primary responsibility for fire management in the three state parks that are part of RNSP. This plan is consistent with the policies of CAL FIRE that relate to fire management in the state parks.

The NPS works in partnership with the California Department of Parks and Recreation (CDPR) under March 15, 2004 Management Policy Memorandum 02-02. The NPS and CDPR cooperate and collaborate in a government-to-government relationship with the Yurok Tribe under the 1996 Memorandum of Understanding and subsequent renewals to manage park lands that are within the Yurok ancestral territory. The NPS will continue to collaborate and cooperate with these agencies, as well as with CAL FIRE, the U.S. Forest Service (primarily Six Rivers National Forest), the Orick Community Services District and the Humboldt and Del Norte Counties' Fire Safe Councils, to plan for and manage wildfire in and around the parks.

The NPS will plan for and manage wildland fire in the national park under the authority of 16 USC 1-4, and as outlined in NPS 2006 *Management Policies*, Chapter 4.5 and further described in Director's Order #18: Wildland Fire Management, and its accompanying Reference Manual.

The Federal Wildland Fire Management Policy provides a common approach to wildland fire management, including the use of prescribed fire and fuels reduction, for all federal wildland fire agencies. This FMP will implement fire management policies and help achieve resource management and fire management goals as defined in: 1) Federal Wildland Fire Management Policy and Program Review including the 2009 Modification of the Federal Wildland Fire Management Policy (see below); 2) Managing Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire Adapted Ecosystems – A Cohesive Strategy; and 3) A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan.

2009 Modification of the Federal Wildland Fire Management Policy

In January 2009, the National Wildfire Coordinating Group Executive Board released a memorandum (Reference: NWCG#001-2009) in which they revised the 2003 Implementation Guidance in order to reduce confusion and provide a more flexible approach to wildland fire management that promotes the goal of managing fire to meet safety, protection, and natural and cultural resource management goals. The change eliminates the three types of fire in the 2003 guidance and replaces them with just two types of fire, planned (prescribed fire) and unplanned (wildfire). The revision allows fire managers to manage a fire for multiple objectives and increase managers' flexibility to respond to changing incident conditions and firefighting capability while strengthening strategic and tactical decision implementation supporting public safety and resource management objectives.

Key changes to the policy include:

- Wildland fires can be managed for one or more objective(s) based on the Land and Resource Management Plan and Fire Management Plan direction.
- When two or more wildland fires burn together they will be handled as a single wildland fire and may be managed for one or more objectives based on the Land and Resource Management Plan direction as an event moves across the landscape and fuels and weather conditions change.
- Every wildland fire will be assessed following a decision support process that examines the full range of responses. The system currently being developed and prototyped is known as Wildland Fire Decision Support System (WFDSS).
- Once a prescribed fire is no longer meeting those resources objectives stated specifically in the prescribed fire plan or project level NEPA and is declared a wildfire, it receives the same reassessment and selection of response objectives as any other wildfire event given the location, current conditions (fuels, weather, etc.) and identified management considerations.

II. Relationship to Land Management Planning and Fire Policy

This FMP includes actions that are consistent with other RNSP plans and projects for protecting and managing resources, and ensuring that park visitors are able to enjoy the parks.

NPS fire management policy (2006 *Management Policies*, Chapter 4.5) requires that each NPS unit with vegetation capable of burning prepare a fire management plan. This plan

meets the requirements of NPS policies, directives, and guidelines relating to management of fire to protect human lives, park resources, and property. NPS policy requires that each park prepare a plan that responds to natural and cultural resource objectives; provides for safety considerations for park visitors, employees, neighbors, and developed facilities; and addresses potential impacts to public and private property adjacent to the park. All fires burning in natural or landscaped vegetation in parks will be classified as either wildland fires or prescribed fires. All wildland fires will be effectively managed through application of the appropriate strategic and tactical management options. These options will be selected after comprehensive consideration of the resource values to be protected, firefighter and public safety, and costs. Prescribed fires are those fires ignited by park managers to achieve resource management and fuel treatment objectives. Prescribed fire activities will include monitoring programs that record fire behavior, smoke behavior, fire decisions, and fire effects to provide information on whether specific objectives are met. All parks will use a systematic decision-making process to determine the most appropriate management strategies for all unplanned ignitions, and for any prescribed fires that are no longer meeting resource management objectives.

Redwood National Park was established by Congress “to preserve significant examples of the primeval coastal redwood (*Sequoia sempervirens*) forests and the streams and seashores with which they are associated, for purposes of public inspiration, enjoyment, and scientific study” (Public Law 90-245, October 2, 1968). The park was expanded in 1978 to “protect existing irreplaceable ... resources from damaging up slope and upstream land uses, to provide a land base sufficient to insure preservation of significant examples of the coastal redwood in accordance with the original intent of Congress, and to establish a more meaningful Redwood National Park for the use and enjoyment of visitors” (PL 95-250, March 27, 1978).

The 2000 Redwood National and State Parks *General Management Plan/General Plan* (GMP/GP) focuses on why the parks were established and what resource conditions and visitor experiences should be achieved and retained over time. The GMP/GP provides overall guidance for managing the parks for a period of ten to fifteen years, and constitutes the first phase of tiered planning and decision-making. The plan includes objectives listed below for natural and cultural resource protection, visitor use and enjoyment, and the relationship between the parks and adjacent communities.

Natural Resource Management Objectives

- Ensure that all resource management efforts are consistent with and supportive of the perpetuation of the redwood forest ecosystem as the prime resource of the parks.
- Restore and maintain the RNSP ecosystems as they would have evolved without human influences since 1850 and perpetuate ongoing natural processes.
- Cooperate with the timber industry, private landowners, and other government agencies to accomplish long-range resource management planning and reduce threats to the RNSP resources.

- Acquire and analyze baseline inventory data to determine the nature and status of the natural resources under RNSP stewardship.
- Monitor selected resources and environmental factors to detect change and to distinguish natural variation from local and bioregional human-induced resource threats.

The GMP/GP provides more specific direction for achieving the above objectives for two of the vegetation communities in the parks—second growth forests, and prairies and oak woodlands. Fire management is a separate topic in the GMP/GP for which this FMP provides the detail on management actions to achieve GMP/GP objectives.

Second-Growth Forest Management —Second-growth forests will be managed to restore old-growth conditions in the shortest time period possible using a variety of methods and techniques. The emphasis will be on managing those second-growth stands that are critical to ecosystem restoration. Silvicultural methods such as thinning, replanting, and burning would be considered for use in second-growth forests to reduce the time in which the forests regain characteristics and processes found in mature, naturally occurring forests. Some second growth stands are a potential fire hazard that will be managed with techniques described in the FMP. Dense stands of second growth are susceptible to fires because of high dead and down fuel loading, dense ladder fuels, and dry conditions not typically found in uncut forests. This FMP does not propose that prescribed fire be used as a primary tool to manage second growth or to reduce fuel loading in second growth. There are some proposals for mechanical treatments in dense second growth stands to reduce high fuel loads in areas where human safety and property are at risk from wildfires in second growth stands or where second growth adjacent to prescribed fire units represents an additional fire hazard because of an abrupt change in fuel types.

Bald Hills Woodlands and Prairie Restoration — The 1992 *Bald Hills Vegetation Management Plan* describes management techniques for preserving the oak woodlands and grasslands that give the Bald Hills their name. The grasslands, also called prairies, are identified as a significant resource in RNSP. One threat to the native vegetation community is encroachment by Douglas-fir (*Pseudotsuga menziesii* var. *menziesii*). Native plant diversity is reduced by encroaching fir that can grow in dense stands that crowd out Oregon white oak (*Quercus garryana* var. *garryana*) and reduce the extent of the grasslands. Prescribed fire has been used as a tool to kill small Douglas-fir. Prescribed fires generally do not burn at high enough temperatures to kill larger Douglas-fir. Larger Douglas-fir must be cut and the trees removed to reduce fuels. The prairies and oak woodlands exhibit both natural and cultural values. The current program of conifer removal and prescribed burning emphasizes restoring and preserving prairies and oak woodlands in the Bald Hills. The Bald Hills also possess significant cultural values that have developed from thousands of years of human occupation. The Bald Hills management program will integrate other natural and cultural values into a more ambitious restoration approach that addresses historic natural and cultural processes and practices, and effects on wildlife, cultural landscapes, and traditional American Indian uses in the prairies.

Prairie Management—Although the Bald Hills prairies are the largest grasslands in the parks, there are other naturally occurring prairies and forest openings. These naturally occurring prairies would be restored and maintained by reestablishing a historic fire regime. Certain forest openings would be restored and/or maintained where appropriate for the resource values present (e.g., wildlife habitat, cultural landscapes, or aesthetics).

Port-Orford-cedar management—Port Orford cedar or POC (*Chamaecyparis lawsoniana*) is an ecologically valuable species in the Pacific Northwest that is currently threatened by an introduced pathogen, *Phytophthora lateralis*, which causes Port Orford cedar root disease. There are some individuals and small stands of POC in the northern part of the parks that are infected with root disease and are dead or dying. The naturally occurring POC in the parks are concentrated in the Little Bald Hills area. The soils and plant communities in the Little Bald Hills are unique in the parks, prompting this area to be managed as a separate fire management unit (FMU).

While the majority of POC occur outside the parks, the NPS is cooperating with the U.S. Forest Service to manage the park stands to reduce the chances of spreading root disease beyond the currently infected area. There are no proposals to use fire as a tool for managing POC to control root disease. However, the spores that cause root disease can be carried into uninfected areas through movements of humans and vehicles that have passed through infected areas. Fire management activities including wildfire suppression and mechanical fuel reduction will be conducted using techniques known to reduce the chance of transporting the disease to uninfected areas. These techniques are covered in the proposals for managing fire in the Little Bald Hills FMU.

Cultural Resource Management Objectives

- Recognize the past and present existence of peoples in the region and the traces of their use as an important part of the environment to be preserved and interpreted.
- Expand the cultural resource program from one that is project and compliance based to one that includes comprehensive study.
- Integrate more closely the NPS and CDPR cultural resources management programs for the parks.
- Provide for more active integration of the cultural resources and interpretation functions. For example, explain the interplay through time between human activity and the environment and the effects of changes in technology on this interplay.
- Emphasize the development of publications for visitors that present the results of cultural resource studies.
- Ensure the participation of American Indian tribes and groups in managing the parks' natural and cultural resources of interest and concern to them.
- Support the continuation of traditional American Indian activities on RNSP and aboriginal lands, to the extent allowed by applicable laws and regulations.

Cultural Landscape Management— A cultural landscape is a geographic area whose elements and appearance have developed as a result of human-caused actions or intervention. A cultural landscape management plan will outline areas of cultural

significance to American Indian tribes where fire was used traditionally to manage vegetation resources for food, basket materials, and other culturally significant products. Several cultural landscapes in RNSP are closely tied to fire management, especially the Lyons Ranches Rural Historic District and the Bald Hills Archeological District. NPS management of the complex landscape of the Bald Hills is influenced by the interrelationship between watershed and landform restoration, vegetation management programs, and the concerns of American Indians.

Pending the completion of a cultural landscape report for the Bald Hills, the primary guidance for this area is the 1992 Bald Hills Vegetation Management Plan. The FMP provides operational support for implementing the Bald Hills Vegetation Management Plan. See Appendix N: Cultural Resources for more information.

Fire in Relation to Management Objectives

The fire management program will be planned and implemented in support of the RNSP natural and cultural resource management strategies outlined above. The program is based on sound risk management, economic feasibility, the best science available, cooperation with other agencies and tribes, and consideration for public health and environmental quality. Fire management activities in RNSP include suppression of wildfires, prescribed fire for resource benefits, fuels reduction primarily through mechanical removal with prescribed fire used for disposal of fuel debris with limited broadcast burning, fire effects monitoring, and fire operations planning.

Restoration of fire as a natural process in prairies, oak woodlands, coastal shrub, and pine woodland vegetation communities, including the role of fire in coniferous forest ecosystems and especially old growth redwood forests, will be considered in relation to management objectives for protecting human safety and personal property.

III. Wildland Fire Management Strategies

A. General Management Considerations

Current RNSP management plans, NPS policies, directives, and guidelines, and the National Fire Plan were reviewed to ensure consistency between the FMP and other guidance.

RNSP fire management personnel initiated planning in 2008. The overarching goals, the plan outline, and all required elements are taken from NPS Director's Order 18, Wildland Fire Management (DO-18) and its implementation guidelines, Reference Manual 18: Wildland Fire. DO-18 was most recently reissued on January 16, 2008.

B. Wildland Fire Management Goals

The wildland fire management goals for the RNSP fire program were developed by an interdisciplinary team which included representatives from RNSP, CDPR, and CAL FIRE. The goals for the fire management program incorporate the goals outlined in the RNSP GMP/GP and are consistent with the goals and core principles outlined in the National Fire Plan's 10-year Comprehensive Strategy and Implementation Plan.

The goals for the RNSP Fire Management Program include:

Ensure safety to firefighter and public is the highest priority in every fire management action

Protect the public, private property, and the natural and cultural resources of the parks utilizing strategies and tactics commensurate with the values at risk

Use fire as a management tool to meet resource objectives where deemed appropriate and identified risk is both manageable and acceptable

Manage wildland fuel complexes in order to protect resources at risk and minimize unacceptable impacts from fire

Cooperate with adjacent landowners and land management agencies in the full range of fire management activities, respecting the jurisdiction, interests and legal mandates of each participant

Increase the understanding of the role and function of fire in the parks

Restore fire as an ecosystem process in the park's biotic communities to the fullest extent practical

C. Wildland Fire Management Options

The goals and objectives for the fire management program at Redwood National Park will be accomplished using five primary components. These components include:

Preparedness

Response to Wildland Fire

Prescribed Fire

Mechanical Fuel Treatment

Public Information and Education

Monitoring and Fire Research

Each of these components is broken down in detail in section IV: *Wildland Fire Management Program Components*.

D. Description of Wildland Fire Management Strategies by Fire Management Unit

A Fire Management Unit (FMU) is an area that has common fire management objectives and strategies. Redwood National and State Parks have been divided into six different Fire Management Units for planning purposes. Four of the units are defined ecologically and the remaining two units are distinguished by political boundaries (see Figures 3.1 and 3.2).

CONIFEROUS FOREST FMU

The coniferous forest of RNSP include areas of old growth redwood forest, second growth forests (naturally regenerated, aeri ally regenerated, dry forest, red alder dominated, riparian), and Sitka spruce forests occurring throughout the parks (see Figure 3.3). This FMU comprises a significant portion of the southern area of the park, mainly in the Redwood Creek drainage, where it occurs as a contiguous forest. Scattered pockets of this FMU occur between the three state parks north of Prairie Creek State Park (PCSP). This FMU occupies approximately 67,980 discontinuous acres within the park. The following details more specifically the vegetation found in this FMU:

Old Growth Redwood Forest (19,537 acres)

The old growth redwood forest is dominated by coast redwood (*Sequoia sempervirens*). Associated species depend on local conditions such as whether a site is upland, riparian (streamside), alluvial (along a floodplain), or close to the ocean. Other coniferous trees include Douglas-fir (*Pseudotsuga menziesii* var. *menziesii*), grand fir (*Abies grandis*), Sitka spruce (*Picea sitchensis*) in lowland and coastal areas, and western hemlock (*Tsuga heterophylla*) in moist habitats. Conifers other than redwood may be the dominant species in some forest stands where soil, temperature, moisture, and ocean salt-spray do not favor redwoods. Old-growth forests occupy about 19,640 acres in this FMU.

Hardwood species are generally overtopped by conifers in redwood forests but occasionally dominate a stand. Major hardwoods are tan oak (*Lithocarpus densiflora* var. *densiflorus*), madrone (*Arbutus menziesii*), big-leaf maple (*Acer macrophyllum*), California bay or laurel (*Umbellularia californica*), and red alder (*Alnus rubra*). All these hardwoods occur in both riparian and upland areas.

Moist lower slopes have the most lush understory found in redwood forest communities. The dominant understory species of the redwood forest are oxalis (*Oxalis oregana*) and sword fern (*Polystichum munitum*). Other common understory plants are rhododendron (*Rhododendron macrophyllum*), huckleberry (*Vaccinium* spp.), salal (*Gaultheria shallon*), azalea (*Rhododendron occidentale*), and several types of berry (*Rubus* spp. and *Ribes* spp.). Middle and upper slope positions are characterized by evergreen shrubs (salal, rhododendron, and huckleberry).

Second Growth Forest (46,582 acres)

The majority of second-growth forests in RNSP can be uniquely described as being dominated by Douglas-fir. This tree species, a native component of the redwood forest, was seeded into many logged areas after harvest. The seed mix contained primarily off-site Douglas-fir and, in some cases, included other exotic conifers. The seeding of Douglas-fir into open clearcuts allowed this species to take full advantage of available growing conditions. Although redwood trees often stump sprout or seed into moist areas, the sheer number of Douglas-fir seeded into clearcut areas subordinates redwood and its

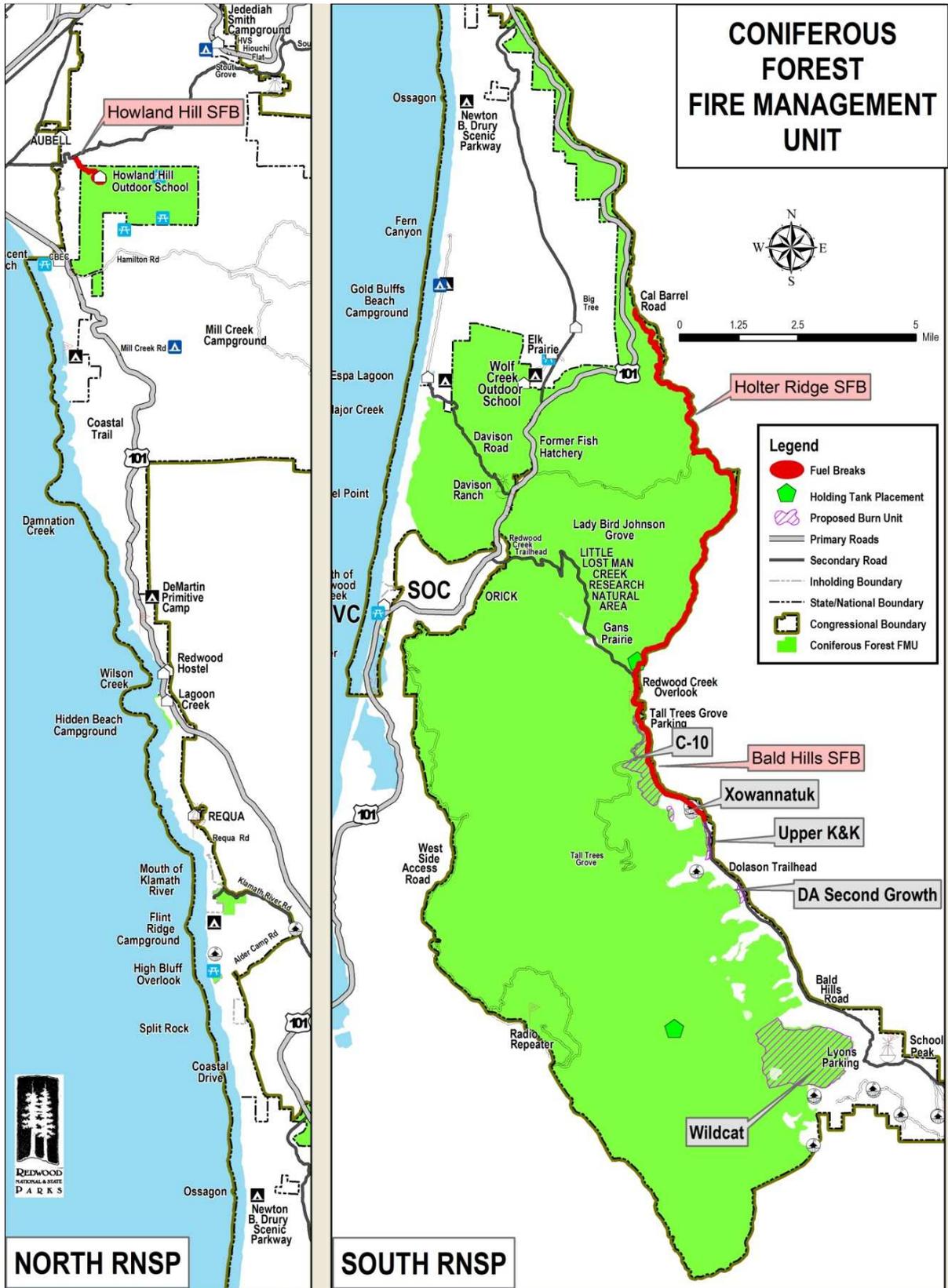


Figure 3.3 Coniferous Forest Fire Management Unit

natural dominance. Even in stands that were not aerially seeded after logging, there are differences in species composition that did not exist previous to logging. Douglas-fir and grand fir seedlings survive much better on dry, open sites than do redwood seedlings. Fir pioneers in forest openings, whether they are natural openings or large areas drastically disturbed by logging operations.

Dry Forest (44,987 acres)

Dry forests include mixed evergreen forests in the Redwood Creek basin and occur along ridges from Slide Creek to Coyote Creek. This forest is dominated by Douglas-fir, tan oak, and madrone. California bay, big-leaf maple, chinquapin (*Chrysolepis chrysophylla* var. *chrysophylla*), canyon live oak (*Quercus chrysolepis*), and poison oak (*Toxicodendron diversilobum*) are also common in this forest type. The shrub understory can be thick and impenetrable in certain locations.

Alder forest (263 acres)

Alder forests are found primarily on coastal facing slopes and in more mesic second growth forest locations. Red alder is the dominant overstory tree with big-leaf maple, cascara (*Rhamnus purshiana*), willow (*Salix* spp.) and coniferous trees interspersed. The shrub layer is dominated by berry species including salmonberry (*Rubus spectabilis*), thimbleberry (*Rubus parviflorus*), blackberry (*Rubus* spp.), red elderberry (*Sambucus racemosa*), and twinberry (*Lonicera involucrata* var. *ledebourii*). The herbaceous layer typically includes sword fern, lady fern (*Athyrium filix-femina*), colt's foot (*Petasites frigidus* var. *palmatus*) and false lily of the valley (*Maianthemum dilatatum*).

Riparian (731 acres)

Riparian vegetation is restricted to alluvial bottoms and stream banks subject to frequent flooding and having perennial water sources. Riparian vegetation is widespread throughout the parks, forming extensive stands along the lower Klamath River, Smith River, Mill Creek, along Redwood Creek and Prairie Creek. This vegetation is usually dominated by big-leaf maple, black cottonwood (*Populus balsamifera* spp. *trichocarpa*), California bay, red alder and various willow species.

Sitka spruce forest (1125 acres)

This forest type is located between the redwood forest and the Pacific Ocean. It is distinguished by the dominance of Sitka spruce in the overstory, usually with some western hemlock and redwood. Older spruce has a variable understory. It includes evergreen huckleberry (*Vaccinium ovatum*) and salal on drier sites. On wetter sites sword fern, lady fern, false lily of the valley and skunk cabbage (*Lysichiton californicum*) may be found.

Values to be protected in the Coniferous Forest include:

- Old growth trees and associated biota
- Little Lost Man Research Natural Area

- Riparian corridors, especially around streams with habitat for threatened or endangered anadromous salmonid fish species
- Habitat for threatened forest-dwelling bird species (northern spotted owl, marbled murrelet)
- Visual quality

Management considerations include:

- Dense fuels in second growth forest stands
- Protection of private timberlands adjacent to park boundaries.

Response to Wildland Fire

Fires within this FMU may be managed for resource benefit.

Preparedness activities in the FMU will include the following projects:

Water Source Development and Improvement

Sources of water for suppression support are limited throughout the Coniferous Forest FMU. Several strategies were evaluated in an effort to deal with the shortage within the FMU of accessible water sources with adequate quantities of water. Two strategies were determined to be the most effective at providing water while minimizing ground disturbance and the impacts on wildlife and fisheries: existing man-made ponds and water storage.

Pond Access Improvement and Maintenance:

M-line pond: The M-line pond was determined to be of strategic importance to suppression efforts within the FMU. It is the only year round water source on the southwest side of the park that could potentially be used as a dip site by helicopters. Clearing around the pond was initiated in 2006. By removing existing vegetation between the eastern edge of the pond and the M-Line road, a flight path will be created for helicopters using the pond for bucket operations. All trees up to fourteen inches in diameter would be removed between the pond and the M-Line road. Disposal of debris may include one or more of the following: cut and piled, chipped, lopped and scattered or hauled off site. Located project area: ½ acre.

Water Storage Development

Three portable 2,500-gallon tanks will be strategically placed to provide water for filling fire engines and/or water tenders during fire suppression activities. Tanks are black, made from polyplastic and would be self-filling from either rain or stream water. Tank site preparation will require leveling an area ten feet in diameter and, where appropriate, applying a two inch base of crushed rock. If crushed rock is not an option for a particular site, a platform made from milled redwood would be built to hold the tank. The redwood platform would be no more than two feet tall and built to conform to appropriate engineering specifications. Tanks will be placed adjacent to roads as to not interfere with normal road maintenance.

Tanks identified for self-filling from stream water will use a two to three inch diameter PVC pipe that will be placed in the stream channel above the tank to allow for gravity filling. Some rocks within the stream channel may be moved to secure the inlet pipe and maximize flow to the tank. A shutoff valve installed in the waterline near the tank will regulate the flow of water into the tank. If needed, an overflow pipe will be installed in the top of tank to direct water back into stream channel. For tanks identified for self-filling by rainwater, a collection system will be built around the top of the tank. All wildlife restrictions regarding the use power tools will be adhered to during construction and setup.

Water Tank sites for this FMU include:

Bridge Creek Ridge Road, Mile 3.5	Rain filled
Holter Ridge Road South (A-170 Road, 0.1 mile N.)	Rain filled

Road Improvement

Several roads have been identified by an interdisciplinary park team as being critical to the fire management program. These roads will serve as access to remote fire prone areas, historic structures, and water sources or act as prescribed fire unit boundaries.

The following roads identified within this FMU may now, or in the future, require additional maintenance to bring the road up to standards allowing for:

- Access for Type 3 engines
- Wet weather access
- Service as a burn unit boundary with adequate holding attributes

Road	Treatment	Length
A-170	brushing	¾ mile
A-121	brushing	1 mile
C-6-2	brushing, grading	1.2 miles
M-Line	brushing	as needed
G-Line Deck	brushing	3 acres
M-2 ^{1/2}	brushing, grading, rocking	5 miles
Y-Line Rock pit	brushing	as needed

Prescribed Fire

This FMP defines six FMUs based primarily on vegetation types, ownership (state parks), or political boundaries (WUIs). The 1995 Redwood National Park Fire Management Plan defined 19 fire management units throughout the parks based on vegetation, ownership (three state parks), topography, and road access. Two of the 1995 FMUs contained patches of old growth forest where prescribed fire or prescribed natural fire was considered feasible, the Little Lost Man Creek Research Natural Area (about 2,100 acres of old growth redwood) and small areas of old growth on the east side of Redwood Creek in the vicinity of the Tall Trees and Emerald Ridge trails (no acreage given).

Prescribed fire in old growth redwoods forests in the coniferous forest FMU is not proposed in this FMP but park ecologists will continue to research the role of fire in old growth redwood forests.

The Park has a mandate to expedite the development of old growth characteristics within our vast second growth stands. One application for doing so is the use of prescribed fire. In 2006 the Park burned its first exclusively second growth unit in a second growth stand located between Dolason and Airstrip prairies, named D-A Second Growth. The Park proposes three additional second growth units in this FMP.

C-10: Unit size 339 acres

Upper K&K: Unit size 40 acres

Wildcat: Unit size 1378 acres

** For a complete list of units see Appendix E

Mechanical Fuels Reduction

Holter Ridge Fuel Break (formerly known as the East Side Fuel Break): This multi-year project would create a shaded fuel break along the eastern edge of the park beginning in the south near the intersection of Bald Hills Road and Holter Ridge Road, and continuing along Holter Ridge Road to the B-Line, and ending at the US Highway 101 park bypass. The project will focus on the removal of a large percentage of down, dead, and standing live vegetation less than 18" diameter at breast height (DBH) up to 100' on either side of the road. Mechanical equipment used may include chainsaws, chippers, feller bunchers, harvesters, self-loaders, or similar equipment as deemed most appropriate. Cut vegetation may be chipped, piled and burned, lopped and scattered, or hauled off-site.

Bald Hills Fuel Break: This multi-year project would create a shaded fuel break along the eastern edge of the park beginning in the south near the CAL FIRE Elk Camp Fire Station at the intersection of Johnson's Road and the Bald Hills Road, northwest along Bald Hills Road to Holter Ridge Road. The project will focus on the removal of a large percentage of down, dead, and standing live vegetation less than 18" DBH up to 100' on either side of the road. Mechanical equipment used may include chainsaws, chippers, feller bunchers, harvesters, self-loaders, or similar equipment as deemed most appropriate. Cut vegetation may be chipped, piled and burned, lopped and scattered, or hauled off-site.

Howland Hill School Shaded Fuel Break: The project will reduce fuel loadings and ladder fuels 50-100' around the structures at the school site. The target fuels will include live and dead branches within 7' of the ground and suppressed trees less than 18" DBH. The road from the gate to the school site will also be treated up to 100' on either side with a shaded fuel break of the same prescription. Mechanical equipment used may include chainsaws, chippers, feller bunchers, harvesters, self-loaders, or similar equipment as deemed most appropriate. Cut

vegetation may be chipped, piled and burned, lopped and scattered, or hauled off-site.

COASTAL FMU

The coastal vegetation of RNSP includes dunemat vegetation, dense shrub vegetation growing on slopes immediately adjacent to the coastal plain, and coastal grassland intermixed with the scrub. This FMU can be found along the entire length of the coastal strip of RNSP excluding areas designated in the State Park FMU (see Figure 3.4). This FMU occupies approximately 6,237 acres in the national park in four disjunct areas. The following details more specifically the vegetation found in this FMU:

Coastal Strand and Scrub (2273 acres)

Coastal vegetation types include dunemat vegetation and coastal scrub. Coastal vegetation is subject to wind and salt spray. The sandy soils are well drained and may not be stable. Some areas exhibit wind pruning because of strong, constant winds. One rare plant occurs along the coastal strand, the federally endangered beach layia (*Layia carnosa*).

Coastal strand is dominated by low-growing salt-tolerant plants like sand verbena (*Abronia latifolia*) with the invasive alien European beachgrass (*Amophila arnensis*) scattered throughout the sandy areas. This vegetation may be washed by storm waves during winter high tides.

Sand dunes may occur at Crescent Beach but are more common at Freshwater Lagoon beach. The vegetation that grows on dunes along the ocean is subject to incessant desiccating, salt-bearing breezes. Shifting sands around alien European beach grass are invaded by species tolerant of sand cover, which are then able to spread over larger areas and stabilize those areas. This creates suitable habitat for species that are not tolerant of sand burial — first low-growing or herbaceous vegetation and then shrubs and trees. In some coastal areas, succession is visible as beach grass on dunes facing the ocean are being invaded by lupine (*Lupinus* spp.), coyote brush (*Baccharis pilularis*) and Sitka spruce on the back dunes.

Coastal scrub generally occurs on a narrow strip between dunes and coastal coniferous forest. Similar to coastal strand vegetation, coastal scrub vegetation can exhibit wind pruning and may take on a low or prostrate form. Coastal scrub includes areas dominated by evergreen shrub species, wind-pruned trees, or low-growing shrubs intermixed with herbaceous species and grasses. Coyote brush, salal, salmonberry, lupine, and oceanspray (*Holodiscus discolor*) are common species. The most common wind-pruned trees are Sitka spruce and red alder.

Coastal Grasslands (547 acres)

Coastal grasslands in this FMU typically occur within one mile of the ocean. The coastal grassland has not been thoroughly studied, nor have specific management

strategies been developed for most of these areas. Grasslands or prairies occur at Major Creek, Ossagon, Flint, Lincoln, DeMartin, Crescent Beach, and Deer Meadow. Some of these grasslands may be native in that they were maintained or expanded by periodic burning by indigenous people, and others may have originated when early settlers cleared conifer forests for settlement or mining. Many of these grasslands have diminished in size as disturbance and the lack of fire have accelerated succession processes that favor woody species establishment. The dominant species in the open grasslands are perennial grasses with shrubs and/or hardwood/coniferous forest extending beyond the open grass. Ossagon, Lincoln, and Deer Meadow are in the State Park FMU; restoration of the cultural landscape associated with the Yurok village of Osegen is addressed under that FMU.

Values to be protected include:

- Cultural resources and cultural landscapes
- Sensitive plant species
- Wildlife habitat
- Visual quality

Management considerations include:

- Sensitive cultural features
- Safety along the Highway 101 corridor
- Smoke
- Effects on visitors
- Aesthetics including vistas
- Effects of fire on exotic species

Response to Wildland Fire

Fires within this FMU may be managed for resource benefit.

Prescribed Fire

The reintroduction of fire into the coastal prairies is needed to maintain natural resources associated with cultural practices and significant cultural landscapes and to maintain plant species diversity. Four prescribed burn units are proposed in the Coastal FMU at DeMartin Prairie (38 acres), Enderts (110 acres), Lagoon Creek (68 acres), and Major Creek (7 acres)

Mechanical Fuels Reduction

Extensive mechanical treatments may occur within the Enderts and Lagoon Creek prescribed fire units to reduce fuel loadings along unit perimeters and reduce vegetative densities within interior portions of the unit in preparation for prescribed fire.

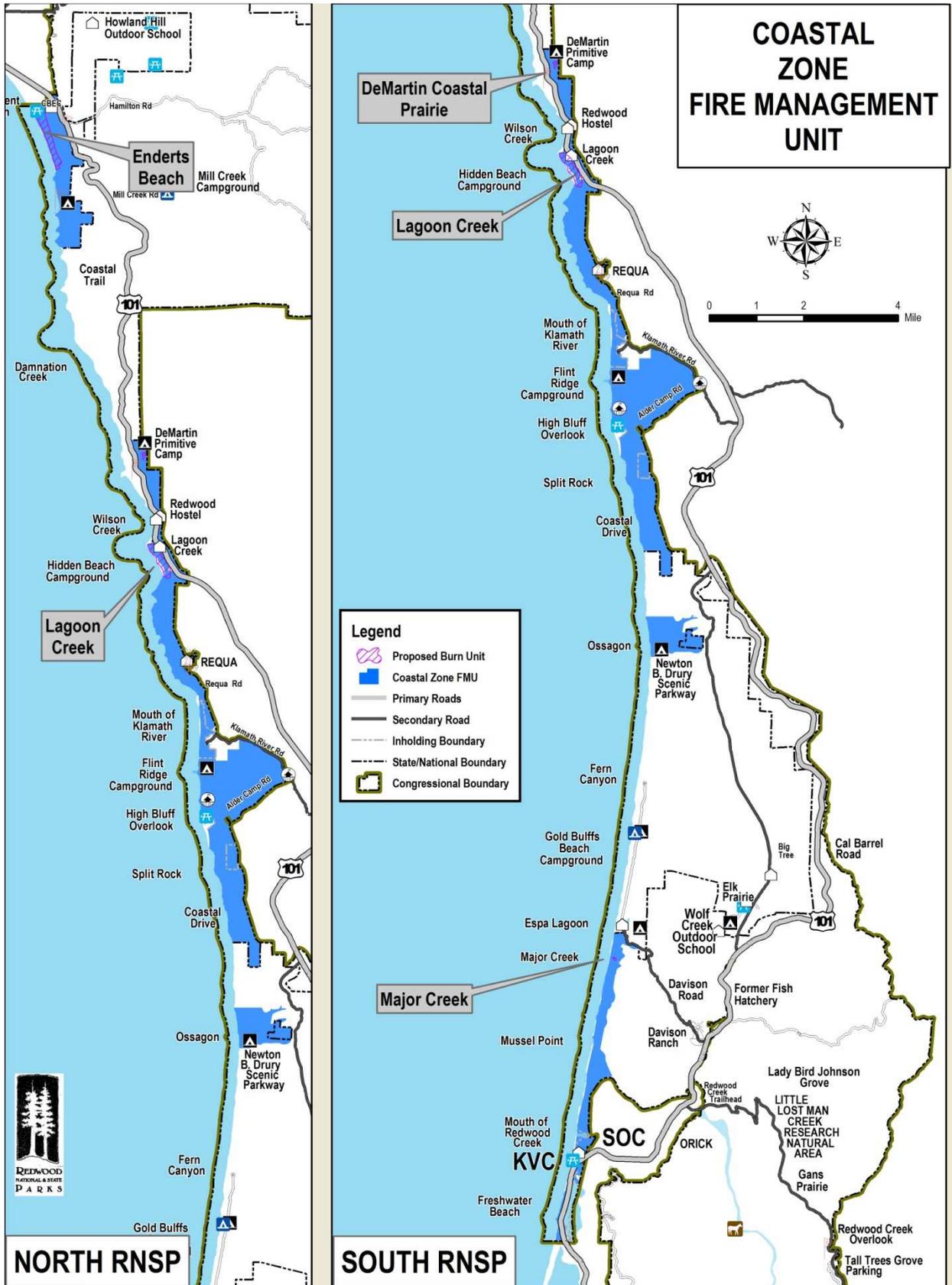


Figure 3.4 Coastal Zone Fire Management Unit

BALD HILLS FMU

The Bald Hills area of RNSP includes open grassland and Oregon white oak woodland, and areas of encroaching conifers that invaded the edges of the grasslands and oak woodlands after intentional burning by Native Americans and livestock ranchers ceased by the early 1900s. This FMU can be found in the southeast corner of the park along the major ridge divide between the Klamath River and Redwood Creek (see Figure 3.5). The area is approximately 10 to 20 miles from the ocean and occupies approximately 5043 acres within the park. The following details more specifically describe the vegetation found in this FMU:

Bald Hills Grassland/Oak woodland (4200 acres)

The most extensive grassland/woodland vegetation type in the parks is located in the Bald Hills, on and below the eastern watershed divide of Redwood Creek. Balds are a distinct vegetation type as identified by Holland (1986) but the term "Bald Hills" in the national park includes a complex mosaic of vegetation types including grassland, Oregon white oak (*Quercus garryana* var. *garryana*) woodlands, and coniferous forest. The Bald Hills include about 1,700 acres of Oregon white oak woodland and 2,500 acres of grassland. Based on historical information and published sources, park botanists believe that prairies and oak woodlands existed in the Bald Hills prior to the arrival of American Indians 5000 years ago, although the extent and distribution of the prairies and woodlands are unknown. The contemporary extent of the Bald Hills grasslands is likely determined by a number of factors, including soil type, slope, aspect, landform position, present and past climate, plant succession processes, and fire history.

The Oregon white oak is the dominant oak species in the Bald Hills with scattered individuals of California black oak (*Quercus kelloggii*). Seven plant associations have been described in these oak woodlands (USDI 1987). In general these woodlands can be associated with California bay, madrone, and big-leaf maple near rock outcrops and stream channels. Shrubs can also be found growing in rockier sites, while in most other areas, the understory is typically herbaceous and dominated by grasses and forbs. Oregon white oaks can be found from 3000' elevation at Schoolhouse Peak to 700' elevation along Redwood Creek. These woodlands are vulnerable to encroachment by woody species and prescribed burning has been one of the primary tools used by park staff to manage the area since the mid 1980s.

Native grasses and forbs make up half of the species in the grasslands of the Bald Hills, but non-native grasses predominate in cover. Three native species are common: a sedge (*Carex tumicola*), California oatgrass (*Danthonia californica*), and blue wildrye (*Elymus glaucus*). The most common non-native species are tall oatgrass (*Arrhenatherum elatius*), sweet vernal grass (*Anthoxanthum odoratum*), velvet grass (*Holcus lanatus*), dogtail (*Cynosurus echinatus*), soft chess (*Bromus hordeaceus*), plantain (*Plantago lanceolata*), and sheep sorrel (*Rumex acetosella*). The most westerly grassland in the Bald Hills is Gans Prairie, roughly 5 miles from the coast, and the most easterly is upper Coyote Creek Prairie, approximately 15 miles from the coast. These grasslands are also vulnerable to

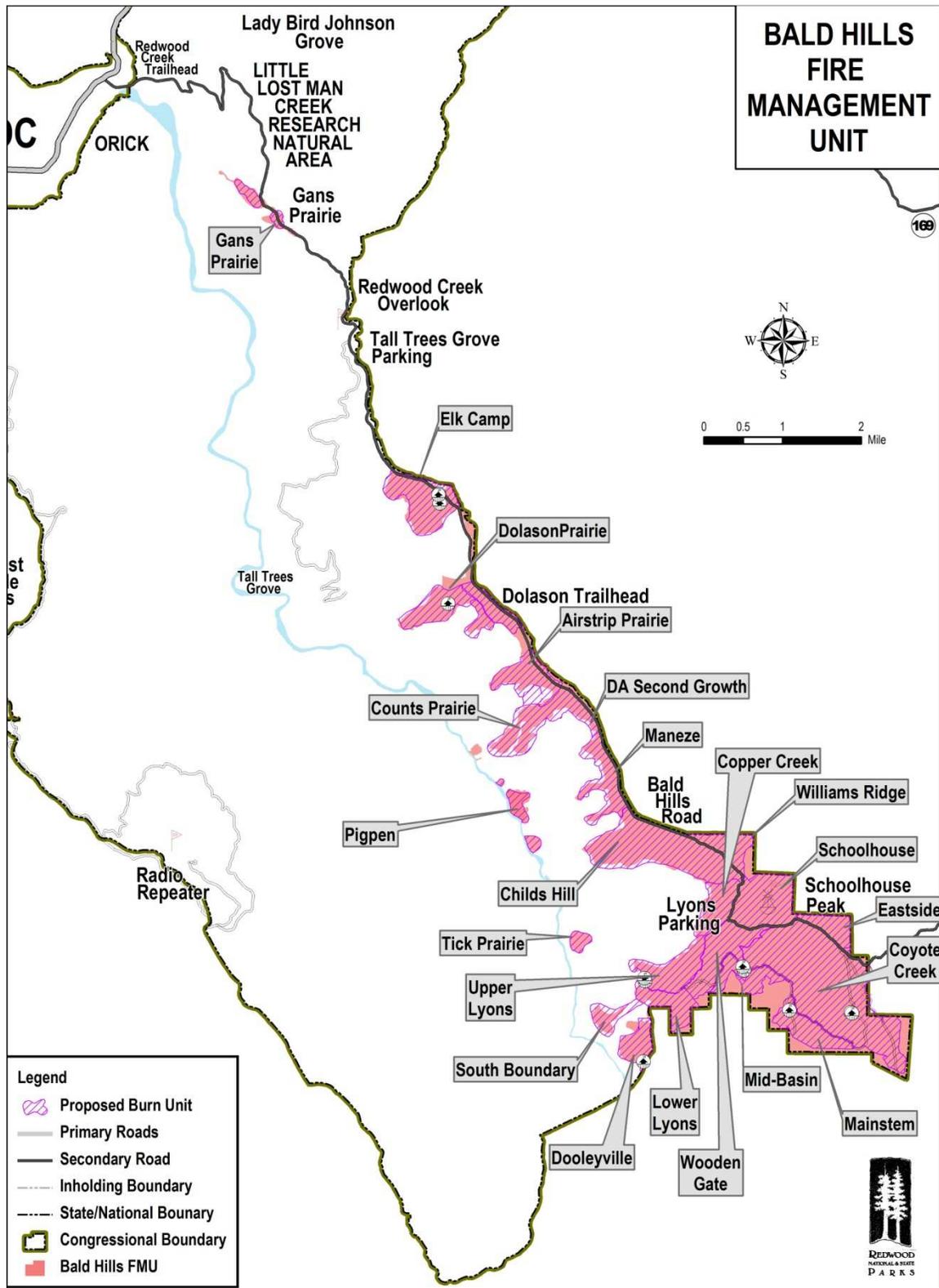


Figure 3.5 Bald Hills Fire Management Unit

encroachment by woody species. Prescribed burning has been one of the primary tools for managing these grasslands since 1980.

Humans have had a profound influence on the ecological processes thought to have perpetuated the Bald Hills grasslands over thousands of years (Popenoe et al. 1992). Before the arrival of Euro-Americans around 1850, American Indians traditionally used fire to increase the amount of acorns and seeds, basket making materials, and forage for deer and elk. Euro-Americans brought livestock and non-native pasture plants and built roads. These disturbances along with the cessation of burning created wholesale changes to the ecosystem, including the unchecked establishment of woody species in the Bald Hills. Douglas-fir, held in check for millennia by frequent fire and low intensity anthropogenic impact, was able to establish in increasing numbers under a regime of high intensity anthropogenic impact and lack of fire. Douglas-fir has taken over large areas of prairie and oak woodland since the settlement period. RNSP staff instituted a program of prescribed fires (planned ignitions) and cutting to remove encroaching Douglas-fir and restore fire as an ecosystem process.

Values to be protected include:

- Historic structures
- Cultural landscapes
- Native grasses and oak woodlands and plant species diversity

Management considerations include:

- Cultural resources, particularly historic structures
- Prescribed fire planning – spatial and frequency distribution
- Invasive plant species
- Migratory bird nesting habitat
- Safety on Bald Hills Road corridor

Response to Wildland Fire

Fires within this FMU may be managed for resource benefit.

Preparedness activities in the FMU will include the following projects:

Annual Fuels Reduction around Historic Structures

An annual maintenance schedule will be set up in the Fire Management Program to reduce the hazard fuels around historic structures within the Bald Hills FMU. Mowers, weed eaters and hand tools will be used to cut grass and other vegetation around the structures after grass has cured (June-July), and work will be limited to within a 40' radius of the structure. Handline up to four feet wide will be constructed down to mineral soil. Handline will be built using hand tools and located just outside of the roof drip line.

All wildlife restrictions regarding the use of power tools will be adhered to.

The historic structures to be protected include:

Elk Camp Barn: 9.7 miles up Bald Hills Road.

Dolason Barn: 11.5 miles up Bald Hills Road to Dolason Prairie Trailhead, 2 miles to barn from trailhead.

Lyons Ranch Barn, Bunkhouse and cemetery: 17 miles up Bald Hills Road to Lyons Ranch Trailhead, 2 miles to barn and bunkhouse from trailhead.

Dooleyville Line Shack: 17 miles up Bald Hills Road to Lyons Ranch Trailhead, 1.8 miles down Lyons Ranch Trail (road), .7 miles down slope of trail.

Long Ridge Sheep Shed: 17 miles up Bald Hills Road to Long Ridge Road, 1 mile on Long Ridge Road to barn.

Coyote Creek Barn: 17 miles up Bald Hills Road to Long Ridge Road, 1 mile on Long Ridge Road to Ranch Road, 1.3 miles East on Ranch Road to Barn.

Coyote Creek Cabin and shed: 18.75 miles up Bald Hills Road to Rock Fork Road, 1 mile down Rock Fork Road to Cabin.

Water Source Development and Improvement

Sources of water for suppression support are limited within the Bald Hills FMU. Several strategies were evaluated in an effort to deal with the shortage of water within the FMU. Two strategies were determined to be the most effective at providing accessible adequate water supplies while minimizing ground disturbance and the effects on wildlife and fisheries.

Pond Access Improvement and Maintenance

Three ponds were determined to be of strategic importance to suppression efforts within the FMU. Many of these ponds have become overgrown with brush and are no longer readily available for use. All work on the three ponds will be done with chainsaws and hand tools. A chipper may be used to dispose of branch wood where appropriate. All saw cuts will be flush to the ground. Any site requiring the disposal of debris through pile burning will follow all protocols outlined in a debris pile burn plan. All burn sites will be rehabilitated with cut vegetation or leaf litter obtained locally. All wildlife restrictions regarding the use of power tools will apply.

Ponds within this FMU include:

Elk Camp Pond (Upper/ Lower)

Upper: Located at milepost 9.7 on Bald Hills Road, below the ranger residence. This pond is of strategic importance as a water source because it can be made accessible to portable pumps to fill engines and water tenders. Access has become increasingly difficult due to uncontrolled growth of live vegetation around the pond. Removal of selected trees and shrubs up to 12" in diameter from pond edge and out 30" will allow unrestricted use for pump operations. Debris will be disposed of by pile burning. The project area is 1 acre.

Lower: Located at milepost 9.7 on Bald Hills Road, 500' below the upper pond. This pond would be a good water source for portable pump operations. Dense Douglas-fir has encroached along the earthen dam. These trees will eventually

compromise the dam's ability to hold water either because the roots will weaken the dam or because the trees are susceptible to windfall. The removal of 20 trees up to 12" in diameter along the earthen dam will maintain the dam's integrity. Debris will be disposed of by pile burning. The project area is ½ acre.

Coyote Pond: Located up Bald Hills Road, at milepost 18.75 to Rock Fork Road at milepost 1. This pond is critical to the prescribed fire and wildland fire suppression programs. It provides easy access for fire engines and water tenders. Removal of down debris within the pond will improve access for drafting. Debris will be removed by hand or winch, cut into manageable lengths and scattered in the surrounding forest. The project area is ½ acre.

Water Storage Development

A polyplastic 2,500-gallon tank will be placed within the FMU to provide water for filling fire engines and/or water tenders during fire suppression activities. Tank site preparation will require leveling an area 10' in diameter and, where appropriate, applying a two inch base of crushed rock. If crushed rock were not an option for a particular site, a platform made from milled redwood would be built to hold tank. The redwood platform would be no more than two feet tall and built to conform to appropriate engineering specifications. Tanks will be placed adjacent to roads as to not interfere with normal road maintenance.

The tank will be self-filling from stream water using a two to three inch diameter PVC pipe that will be placed in the stream channel above the tank to allow for gravity filling. Some rocks within the stream channel may need to be moved to secure the inlet pipe and maximize flow to tank. A shutoff valve installed in the waterline near the tank will regulate the flow of water into the tank. If needed, an overflow pipe will be installed in the top of tank to direct water back into stream channel. A collection system will be built around the top of the tank. All wildlife restrictions regarding the use power tools will be adhered to during construction and setup.

Water Tank sites for this FMU include:

Ranch Road

Stream filled

Road Improvement

Several roads have been identified by an interdisciplinary team as being critical to the RNSP Fire Management Program. These roads serve as access to remote fire prone areas, historic structures, and water sources or act as prescribed fire unit boundaries.

The following roads identified within this FMU may require additional maintenance to bring the road up to standards allowing for:

- * Access for Type 3 engines
- * Wet weather access
- * Serve as a burn unit boundary with adequate holding attributes

Roads to be treated within this FMU include:

Road	Treatment	Length
Elk Camp Barn	brushing, rocking	0.1 mile
Maneze	brushing	0.5 mile
Lyons Ranch	grading, rocking	2 miles
Lookout	culverts, grading	0.75 mile
Ranch	brushing, rocking, grading	2 miles
Rock Fork	brushing, rocking, grading	2 miles

Prescribed Fire

Ethnographic research and historic records indicate that American Indians routinely burned the prairies in the Bald Hills in the fall. Fire was reintroduced into the Bald Hills by NPS resource managers to maintain plant species diversity. Fire has recently been used to maintain significant cultural landscapes and plant materials associated with traditional cultural practices.

Mechanical Fuels Reduction

There are no mechanical fuels reduction treatments proposed for this plan within this FMU.

LITTLE BALD HILLS FMU

The Little Bald Hills area of RNSP includes open grassland, woodland, shrubland, and coniferous forest. This FMU can be found east of Jedediah Smith Redwoods State Park on steep slopes and broad ridges ranging in elevation from 500—1200' elevation (see Figure 3.6). The area is approximately 10 miles from the ocean. This FMU occupies approximately 1,500 acres within the national park. The following details more specifically the vegetation found in this FMU:

Serpentine Vegetation (1492 acres)

The Jeffrey pine/chaparral/knobcone pine vegetation community includes several distinct vegetation types localized in the Little Bald Hills. Despite almost 100" of annual precipitation, this area has sparse vegetation due to serpentine soils, which have high concentrations of heavy metals such as magnesium and few nutrients available for plants because of high pH and poor water holding capacity. These harsh growing conditions have resulted in the development of specialized plant communities with many unique plant species.

The driest ridgetops are occupied by widely scattered Jeffrey pine (*Pinus jeffreyi*), with an understory of Idaho fescue (*Festuca idahoensis*). The fringes of this area are being rapidly encroached by Douglas-fir. Openings in the driest areas are diminishing due to regeneration of Jeffrey pine. A chaparral vegetation type is located downslope of the Jeffrey pine and is dominated by manzanita (*Arctostaphylos* spp.), bush chinquapin

(*Chrysolepis chrysophylla* var. *minor*), rhododendron, huckleberry oak (*Quercus vaccinifolia*), a shrubby form of tan oak (*Lithocarpus densiflorus* var. *echinoides*), and other evergreen shrubs interspersed with stands of knobcone pine (*Pinus attenuata*). Port Orford cedar (*Chamaecyparis lawsoniana*) can be found here.

The knobcone pine vegetation type in the parks is a dense forest of small-diameter, mostly even-aged pines. Knobcone pines may be restricted to serpentine soils and are subject to frequent fires because of their association with other fire-dependent vegetation, xeric growing conditions, and early senescence, which adds to the fuel layer. Knobcone forest is a successional stage that in the absence of fire gives way to Douglas-fir, madrone, and tanoak. Based on tree fire scar examination and post-fire regeneration, the last known fire in the knobcone pine vegetation type was about 1940.

On the lower slopes of the western portion of this FMU, second growth redwood and Douglas-fir forests dominate the vegetation. This area was logged around 1955. Redwood, Douglas-fir, Port Orford cedar, and tan oak dominate the overstory with rhododendron, huckleberry, and salal dominating the understory. A few small stands of old growth redwood forest extend into the unit from the west and south, but are mostly restricted to drainages.

Values to be protected include:

- Rare plants and unique habitat
- Vegetation type that is unique in the parks and is thought to be fire-dependent

Management Considerations in this unit include:

- Adjacent U.S. Forest Service land
- Shallow soils susceptible to disturbance from suppression actions
- Port Orford cedar root disease

Response to Wildland Fire

Fires within this FMU may be managed for resource benefit.

Preparedness activities in the FMU will include the following project:

Water Storage Development

A polyplastic 2,500-gallon tank will be placed within the FMU to provide a reliable water source during suppression and prescribed fire incidents. Tank site preparation will be minimized by using an already established foundation where the old repeater was located. If that is not a suitable site then a platform made from milled redwood would be built to hold the tank. The redwood platform would be no more than two feet tall and built to conform to appropriate engineering specifications.

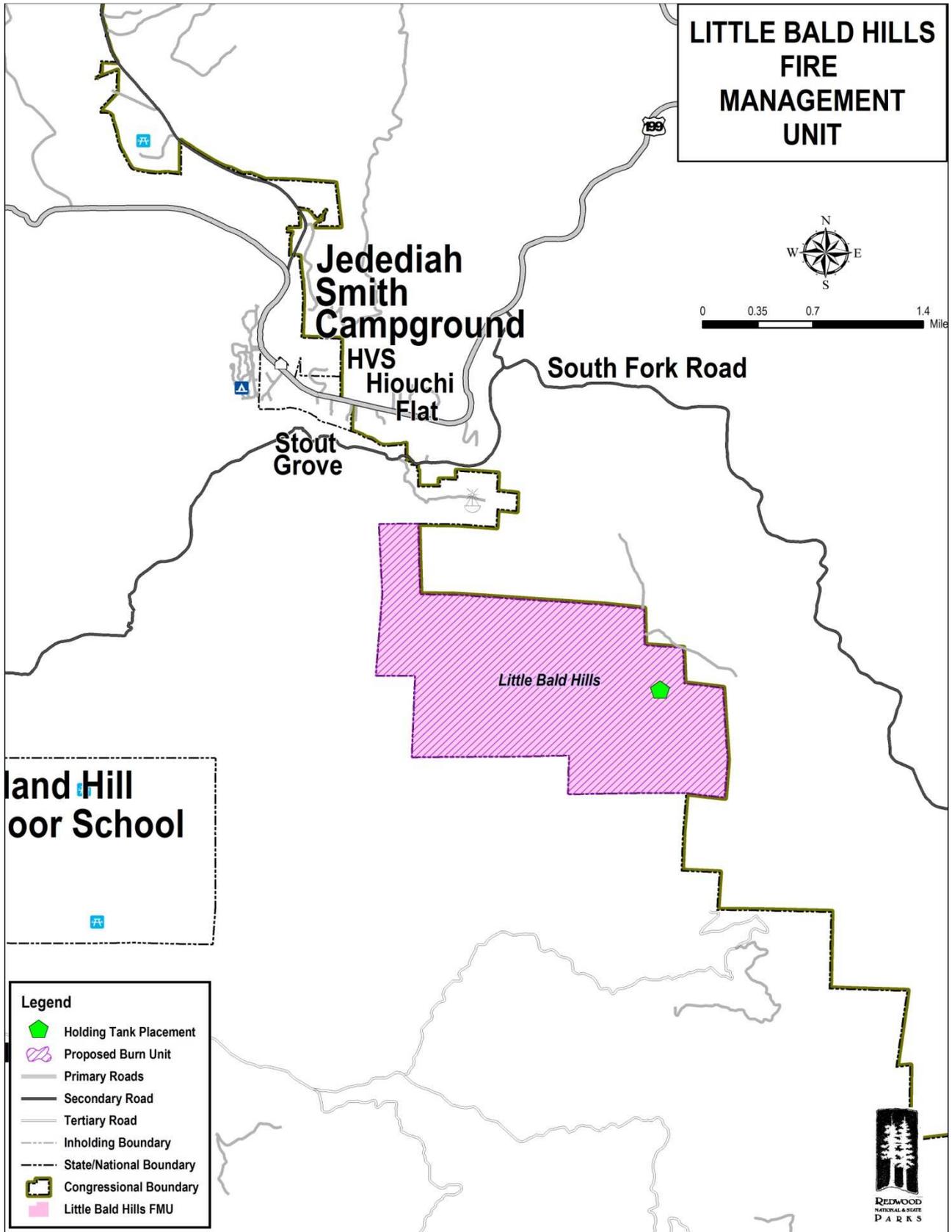


Figure 3.6 Little Bald Hills Fire Management Unit

Water Tank sites for this FMU include:

Little Bald Hills

Rain Filled

Prescribed Fire

Little Bald Hills Unit: The entire 1470 acre Fire Management Unit will become the Little Bald Hills Prescribed Fire Unit, with the goal of not treating more than 50 acres every two years.

Mechanical Fuels Reduction

Little Bald Hills Unit Mechanical Preparation: This project will reduce fuel loadings along unit perimeter and reduce stand densities within interior portions of the unit in preparation for later prescribed fire.

WILDLAND-URBAN INTERFACE (WUI) FMU

The WUI FMU includes all of the areas within Redwood National and State Parks that border or where a wildfire could affect Communities at Risk as defined by the National Fire Plan (see Figure 3.7). WUIs in California identified in the Federal Register (Vol. 66, No. 160, Friday, August 17, 2001, pages 43387-43390) and located immediately adjacent to parklands include Orick, Berry Glen, Klamath, Hiouchi, and Douglas Park. Douglas Park is located along Douglas Park Road, which becomes Howland Hill Road when it enters Jedediah Smith Redwoods State Park.

Values to be protected include:

- Human health and safety
- Personal property
- Park developments

Management considerations include:

- Threatened and endangered species habitat
- Adjacent vegetation types
- Invasive plant species
- Visual quality
- Highway safety
- Smoke

Response to Wildland Fire

A full suppression policy will be implemented within the WUI FMU with a target of controlling 95% (or better) of all unwanted fires during initial attack, in accordance with NPS policy.

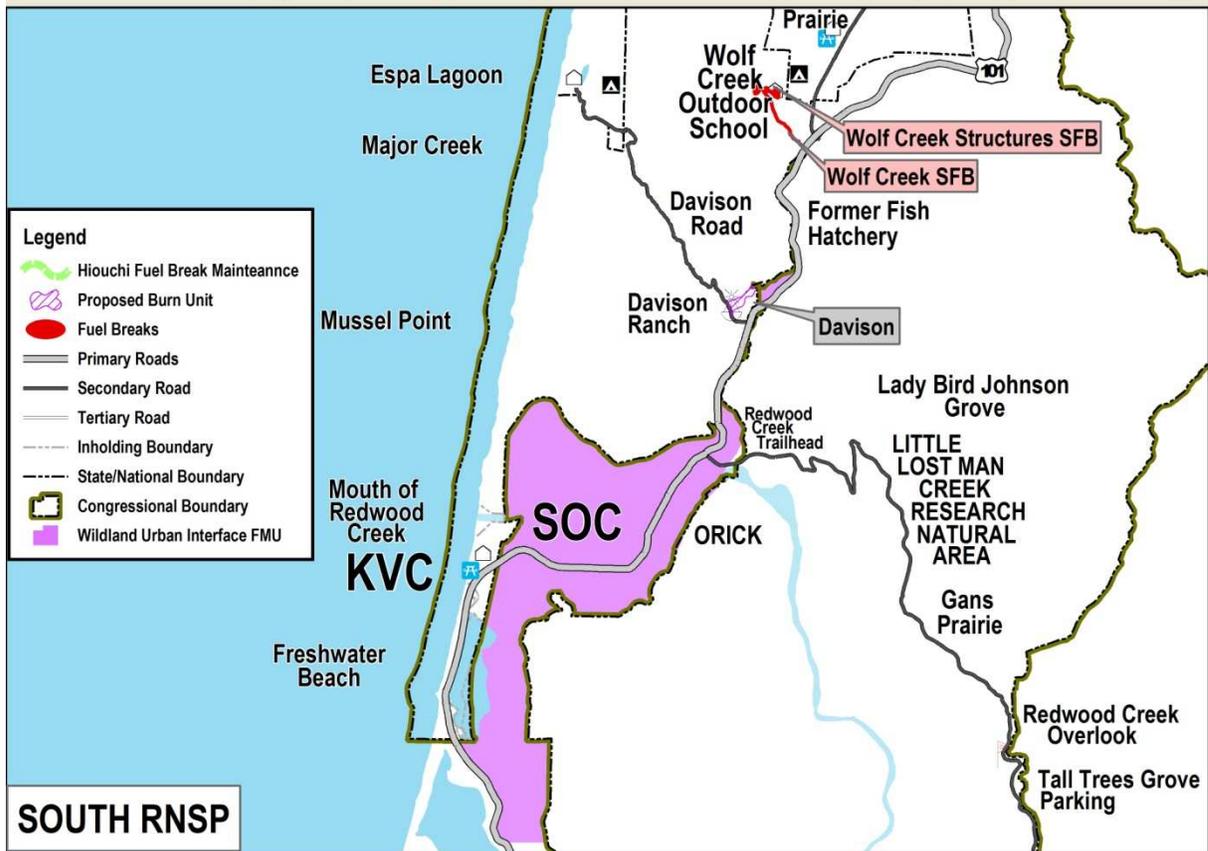
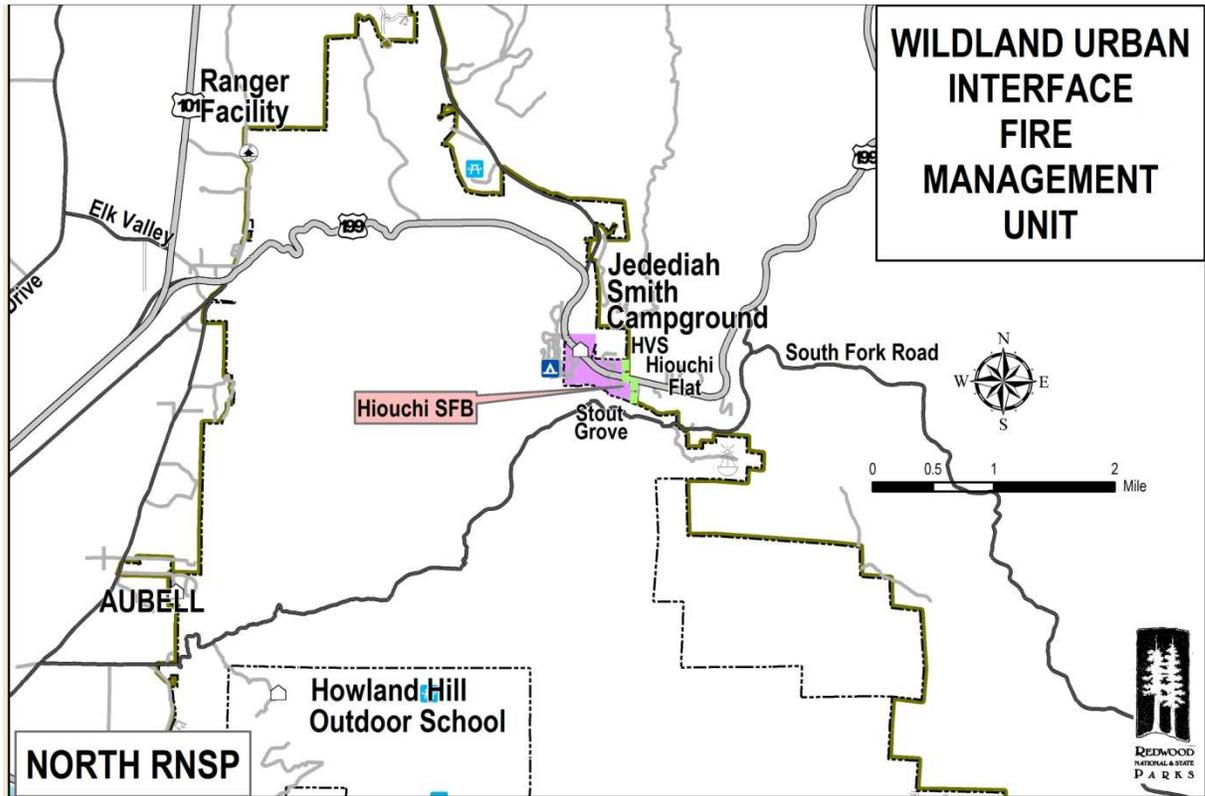


Figure 3.7 Wildland Urban Interface Fire Management Unit

Prescribed Fire

There is one prescribed fire treatment proposed within this FMU for this plan. The only other direct application of fire will be burning of slash piles created during the mechanical fuel reduction projects.

Davison: A low intensity prescribed burn would be conducted in a ten acre unit bounded by Prairie Creek, Davison Road, the bike path, and a small handline from the bike path back to Prairie Creek (see attached map). We would avoid burning in any areas with developments. Preparation for burning may affect a 50' wide strip alongside the bike path, which would likely include piling and burning of woody debris. This project will not burn any vegetation on the southeast side of Prairie Creek. The objective of this project is to determine the presence of California globe mallow (*Iliamna latibracteata*), a rare plant with fire-stimulated germination. This plant has been discovered growing in burned areas where none had been noted prior to burning. Humboldt State University has voucher specimens of this plant collected adjacent to the Davison Ranch.

Mechanical Fuel Reduction

Wolf Creek Structures Shaded Fuel Break (SFB): The project will reduce fuel loadings and ladder fuels 50—100' around the structures in the Wolf Creek area, including the Wolf Creek School, Wolf Creek Housing, and the Wolf Creek Fire Cache. The target fuels include live and dead branches within seven feet of the ground, suppressed trees less than 18" DBH, brush, and surface fuels less than 18" in diameter. There will be very little impact to the overall canopy cover in the treated area as the majority of the target fuels are in the understory.

Wolf Creek Road Shaded Fuel Break: The Wolf Creek shaded fuel break was created in 2006 to reduce the chance of fire spreading between the Wolf Creek area of the national park and the residences along US Highway 101. It extends from the southern end of the US Highway 101 park bypass to the private residence at Berry Glen. It will be maintained as needed for the life of this plan.

Hiouchi Fuel Break maintenance: The Hiouchi Fuel Break was created in 2002-2003 to reduce the chance of fire spreading between the community of Hiouchi and RNSP. This fuel break will be maintained as needed for the life of this plan.

STATE PARKS FMU

Fire management in the three state parks (see Figure 3.8) is the responsibility of CAL FIRE. Preparation and pre-planning for wildfires will continue, with CAL FIRE taking the lead on fuels reduction where needed to protect lives and property. All wildfires will be aggressively suppressed. The NPS will continue to take part in planning and implementing prescribed fires in Boyes Prairie in Prairie Creek Redwoods State Park.

Values to be protected:

- Old growth trees
- Historic structures
- Visual quality

Management considerations include:

- CAL FIRE policies
- Safety in highway corridors, including the Newton B. Drury Scenic Parkway
- Campgrounds
- State wilderness areas
- Interagency cooperation
- Invasive plant species

Response to Wildland Fire

A full suppression policy will be implemented within the State Parks FMU with a target of controlling 90% (or better) of all unwanted fires during initial attack, in accordance with CAL FIRE Policy.

Prescribed Fire

Boyes Prairie: Boyes Prairie in Prairie Creek Redwoods State Park has been burned several times as part of the RNSP fire program. Prescribed fires at Boyes Prairie are planned and implemented as a collaborative effort among the national park fire program and vegetation management staff, the state park resource management staff from the Eureka North Coast District Office, and CAL FIRE. It is the only prescribed burn unit within the three state parks included within RNSP. The unit size is 123 acres.

Mechanical Fuels Reduction

There are no mechanical fuels reduction treatments proposed for this plan within this FMU.

IV. Wildland Fire Management Program Components

a. Preparedness

Preparedness includes all preplanned actions that lead to effective prevention of unwanted fires and the appropriate response to all fire ignitions. The parks work hard to “sharpen” their preparedness activities since many other tools in the toolbox depend on training, fire prevention, fire readiness, etc. Some preparedness actions happen once each year, while others are ongoing.

Fire Prevention

An active fire prevention program will be conducted in conjunction with other agencies to protect human life and property, and prevent damage to cultural resources or park facilities. A program of internal and external education regarding potential fire danger will be implemented. Visitor contacts, bulletin board materials, handouts and interpretative programs may be utilized to increase visitor awareness of fire hazards.

Fire prevention activities will include continued participation in interagency fire prevention programs at local schools and community events. Trained employees will relate to the public the beneficial effects of natural and management ignited fires as opposed to unwanted human-caused fires, with emphasis on information essential to understanding the potential severity of unwanted human-caused wildland fires and how to prevent them. The Fire Management staff in conjunction with the Division of Interpretation will continue to discuss the role of fire within park ecosystems and the mission of the parks' prescribed fire program.

It is essential that employees be well informed about fire prevention and the objectives of the parks' fire management program. Further, employees must be kept informed about changes in conditions throughout fire season. This will be done in part through the implementation of the park's Fire Prevention Plan (Appendix K). The Fire Prevention Plan will be reviewed and updated annually.

Fire Qualifications

All personnel involved in wildland fire suppression, prescribed fire, or fire monitoring will meet national standards as determined by the National Wildfire Coordinating Group (NWCG). All personnel involved in fire management operations will have their qualifications, training, and experience entered into the Incident Qualifications and Certification System. Training records will be updated annually and a master list of park personnel and their qualifications will be available in the fire management office for mobilization and dispatch purposes.

Training

Fire training is the responsibility of the Fire Management Officer who will ensure that all fire related training meets the requirements of the NWCG and National Interagency Incident Management System (NIIMS). Red cards will be mandatory for all personnel engaged in fire suppression and prescribed burning. RNSP Fire Monitors will utilize the NPS Fire Monitoring Handbook.

The wildland fire training program, developed by the fire management staff, is reviewed annually to prioritize training opportunities, budget training funding, nominate specific individuals for courses, and develop the annual park training schedule. Training

information will be made available to all park employees. Nominations for these courses will be submitted for personnel who have met the prerequisites and have identified these courses in their annual Employee Development Plan. Fire training, at various levels, will be available to all NPS personnel. The Basic Firefighter (S-130) and Basic Fire Behavior (S-190) courses will be offered in the spring (if a need is determined) to all interested personnel to qualify at the firefighter level. The fire staff at Redwood NP will host many lower level courses such as standards for survival, pump and engine operation, power saws, fire weather, fire business management and other courses as needed. Extensive on-the-job training is encouraged and conducted at the field level. The NPS will participate in training opportunities hosted by cooperators as appropriate. Additional courses will be offered in-park as the need arises and permanent personnel will be nominated to 300 and higher level courses at the regional and national level, based on park needs.

The NPS supports the development of individual Type I and II overhead personnel from among qualified and experienced park staff for assignment to interagency overhead teams at the local, regional, and national level.

Current wildland fire training requirements are outlined in the NWCG Wildland and Prescribed Fire Qualification System Guide (PMS 310-1) which describes necessary training and qualifications to become qualified to perform the various fire management positions. Task books will be utilized to document trainee assignments.

Physical Fitness

Fire management is an arduous duty. Poor physical condition of crew members can endanger safety and lives during critical situations. Personnel expected to perform fire management duties will maintain a high level of physical fitness. Testing, as a condition of employment or assignment, has been approved under DO-18: Wildland Fire Management. In addition, the Department of the Interior (DOI) has implemented the DOI Federal Interagency Wildland Firefighter Medical Qualification Standards as a requirement for all arduous positions. All records associated with the DOI Federal Interagency Wildland Firefighter Medical Qualification Standards will be kept by the RNSP Personnel Office.

All red carded employees will be required to pass the Work Capacity Test at the appropriate level as required by the NWCG (PMS 310-1) for their red carded position. The three levels include:

- Arduous (Pack Test)** - a three mile hike with a 45 lb pack in 45 minutes
- Moderate (Field Test)** - a two mile hike with a 25 lb pack in 30 minutes
- Light (Walk Test)** - a one mile hike with no pack in 16 minutes

All personnel who are expected to perform fire management duties are encouraged to take advantage of 30 minutes per day of official time to participate in a personal physical fitness exercise program.

Annual Inspection of Fire Equipment and Supplies

All fire apparatus will be inspected regularly. All engines will have annual servicing during which a thorough inspection will ensure the longevity of the apparatus. If during the annual inspection it is determined that something needs to be repaired, it will be done prior to fire season.

All portable pumps will be tested regularly throughout the fire season to ensure their readiness. If there is something wrong with the pump, it will be repaired or taken out of service the necessary repairs are made.

All fire tools, including hand tools and chainsaws, will be winterized and stored properly at either the Wolf Creek Fire Cache or the Hiouchi Fire Station. All fire supplies in both locations will be inventoried annually.

Schoolhouse Peak Lookout will be winterized after the fall prescribed burn season has ended. It will be set up again prior to the fire season the following spring, regardless of whether or not it is funded to be staffed for the fire season.

Weather Observations

Redwood NP currently has two Remote Automated Weather Stations (RAWS) one located on Schoolhouse Peak and the other located on the A-9 Deck. Schoolhouse, due to its location on the extreme southeast corner of the park, often shows the extreme end of fire weather for the park. To obtain more representative data for the entire park, the NPS currently uses readings from both Schoolhouse RAWS and the Six Rivers National Forest Gasquet RAWS station for its National Fire Danger Rating System indices (see Table 1).

Table 1. Remote Automated Weather Station (RAWS) information for Redwood National Park's National Fire Danger Rating System indices.

Station	NWS ID Number	Latitude	Longitude	Elevation
Gasquet	40102	41 °50 ' 45 " N	123 °58 ' 45 " W	50 0
Schoolhouse	40425	41 °08 ' 18 " N	123 °54 ' 20 " W	2640

The Park also has an additional RAWS station located on the A-9 Deck to capture weather observations on the west side of the Park. The Westside RAWS station is not currently used in the development of the fire indices.

Table 2. Information for the Westside RAWS.

Station	NWS ID Number	Latitude	Longitude	Elevation
Westside	40428	41 °13 ' 24 " N	124 °03 ' 09 " W	1 290

Fire weather information is provided for the park through the Eureka Office of the National Weather Service. It can be located on the Internet at:

<http://www.wrh.noaa.gov/eka/firewx/>

Additional fire weather information, including smoke forecasts, spot weather requests, and long range predictions can be accessed through Redding Fire Weather Center, located on the web at:

<http://gacc.nifc.gov/oncc/predictive/weather/index.htm>

Fire Danger Predictions and NFDRS

RNSP uses the National Fire Danger Rating System (NFDRS), which provides daily fire danger indices relating to potential and expected fire behavior for fires that begin or are burning on any particular day. The NFDRS indices provide a broad planning estimate of "worst case" fire potential and are used as a broad preparedness tool, focusing on the Burning Index (BI), Energy Release Component (ERC), 1000-hour time lag fuel moisture content, and Lightning Activity Level (LAL). The system addresses fire danger and potential, with the components and indices being structured so that they are linearly related to the particular aspect of the fire being rated. Fire danger is rated for a worst-case scenario by fire weather observations that are taken during the heat of the day. The NFDRS does not predict how every fire will behave, but is intended to provide guidance for long-range planning. It is the basis for daily fire planning in the RNSP fire management program. It evaluates the near upper limit of the behavior of fires expected in a rated area during the rated period.

Common NFDRS Indices mentioned above include:

The Burning Index (BI): An index derived from the rate of spread or spread component (SC) and the energy released (ERC) in the flaming zone. This provides a rating on the predicted difficulty of containing a wildfire. The BI is linearly related to the length of flames at the head of the fire. It is calculated from the SC and ERC using the relationships developed by Byram (Byram 1959) for calculating flame length (Deeming et. al. 1978). The BI is very sensitive to wind and often over-predicts daily fire danger. Wind is the critical and necessary factor in large fire spread, and the BI is a good indicator of probable worst-case conditions 24 hours in advance of an expected fire situation.

The Energy Release Component (ERC): Related to the available energy as measured in British Thermal Units (BTU) per unit area (square foot) within the flaming front at the head of a surface fire. This is a widely used indicator of fire danger. The ERC calculations do not consider wind as a factor and can be used as a

cross-reference indicator along with the BI. Since wind is not a factor in ERC calculations, the daily variation will be small. ERC numbers become relatively stable and may be used for planning decisions 24—72 hours ahead of an expected fire situation. The ERC is also a good indicator of drought conditions or long-term drying as dead and live fuel moisture are factors in the calculations.

The Redwood NP Park Preparedness Staffing Plan (see *Step-up Staffing Plan* section) defines daily staffing classes and fire management actions as directed by NPS-18 and is tied to the NFDRS Energy Release Component output. ERC was chosen for the Park Preparedness Staffing Plan because it fluctuates less than BI. The staffing classes are determined by graphing all ERC predictions that have been archived in WIMS for the weather stations listed in table 4.1 under fuel model 7G3P3 (NFDRS fuel model G, slope class 3, herbaceous class perennial, climate class 3). The staffing class levels are noted with the 90th percentile and an ERC of 51 (see Appendix A) as the cutoff point for high fire danger. The normal funding for the fire management program is predetermined; it is calculated to be adequate for managing fire activity during 90 percent of the fire season, the remaining 10 percent of the fire season days are classified in the very high to extreme fire danger range. Extra measures are taken to be prepared for fire activity during these periods (those actions are outlined in the Park Preparedness Staffing Plan). Historically, human-caused fires originating within RNSP have not burned significant acreage while lightning-caused fires often start in remote locations making them difficult to access, giving them the greatest chance of burning large numbers of acres. Therefore, the Lightning Activity Level (LAL) will also be used as a factor in the Park Preparedness Staffing Plan.

Emergency Pre-suppression

Emergency pre-suppression describes actions taken to provide additional protection during times of extreme or unusual fire danger caused by weather. Examples of this are strong and/or dry winds, dry thunderstorms, or prolonged local or regional drought. These unusual occurrences will be addressed by planned use of emergency pre-suppression funds linked to the National Fire Danger Rating System (NFDRS) Energy Release Component Index as described in the Park Preparedness Plan (see Appendix A). The authority for the RNSP Fire Management Program to expend emergency pre-suppression funds is detailed in DO-18. Appropriate activities for use of emergency pre-suppression funds include: hiring of temporary emergency firefighters, placing existing staff on extended tours of duty, increasing or initiating special detection operations, and hiring fixed-wing or rotary aircraft. These actions are designed to ensure prompt response with adequate forces should fires occur. Authorization to expend funds beyond the expenditures pre-identified in the Park Preparedness Staffing Plan will be obtained from the Regional Fire Management Officer.

Park Preparedness Staffing Plan and Fire Use Restrictions and Emergency Closure Plan

As predicted fire indices are determined, park staff will implement the Park Preparedness Plan (Appendix A) and/or Fire Use Restrictions and Emergency Closure Plan (Appendix G) as appropriate.

The Preparedness Staffing Plan ensures that an adequate amount of fire staff are on duty for during periods of high fire danger. The plan sets guidelines to increase or decrease daily hours worked, numbers of people on duty, etc. The plan also provides a list of actions necessary as fire danger rises. These actions will be implemented in conjunction with the Division of Visitor and Resource Protection when the plan reaches levels 4 and 5.

In general the plan calls for the following staffing:

- Staffing levels 1, 2, and 3: Normal tours of duty and number of personnel.
- Staffing levels 4 and 5: The FMO or acting Duty Officer may authorize extended hours and increased staffing for fire crews. The Fire Management Program Assistant will activate a preparedness account to cover the costs.
- The superintendent or FMO has the authority to raise the staffing level by one for unusual events, such as holiday weekends, that may increase the potential for wildland fire.

Pre-Attack Plan

The pre-attack plan includes a compilation of essential fire management information that fire staff can use for quick reference as incidents occur. The plan contents include the following information:

- Sensitive resource information references
- Evaluations of structures, improvements, and other values at risk
- Criteria for closures

For the NPS, a Pre-Attack Planning Checklist is included in the Wildland Fire Management Reference Manual (RM-18). As items on this checklist are completed or updated, they will be appended to this Plan.

b. Response to Wildland Fire

Response to wildland fire is the mobilization of the necessary services and responders to a fire based on ecological, social, and legal consequences, the circumstances under which a fire occurs, and the likely consequences on firefighter and public safety and welfare,

natural and cultural resources, and values to be protected. Fire managers may choose from a wide array of objectives, strategies, and tactics that range from monitoring to aggressive suppression actions providing that the response is consistent with federal policies and laws (i.e., the National Fire Plan) and park level plans and policy (i.e., Redwood National and State Parks General Management Plan). When viable (after considering values, hazards, and risks), the park will manage unplanned lightning fires as the preferred means to accomplish specific resource management objectives where it is determined appropriate. If unnatural fuel loads exist, it may be necessary to use fuels management techniques initially to restore an area to a natural range of conditions before using fire as a tool. Utilization of natural ignitions to restore and maintain natural fire regimes was formerly referred to as wildland fire use or simply fire use. Changes in national fire policy in 2008/2009 have eliminated this term. Instead, use of wildland fire is the chosen response when objectives are based on ecosystem restoration and maintenance where wildfire is the primary tool.

A course of action based on the parks' strategic fire management objectives, incident specific objectives, and management requirements will be developed for all wildfires. The process outlining management of an unplanned ignition is found in Appendix B of the 2009 *Guidance for Implementation of Federal Wildland Fire Management Policy*. The Wildland Fire Decision Support System (WFDSS) Response Levels (RL-1 through 3 based upon complexity) will be used to document the course of action for all unplanned ignitions. WFDSS provides a framework for assessing preplanned response, data gathering and situation analysis (i.e. firefighter and public safety, internal and external values which are enhanced or require protection, management objectives, safety, climatology and weather, fuel conditions, and fire behavior) consistent with the parks' Land/ Resource Management Plans and the Fire Management Plan. The *response to wildland fire* ranges from monitoring with minimal on-the-ground disturbance to intense suppression actions on some or all perimeters of the fire. The response will vary from fire to fire and even along the perimeter of a fire.

Detection

All initial sightings of fires will immediately be reported via radio to the FMO or acting Duty Officer or directly to Fortuna Emergency Communications Center (ECC) after normal Fire Management Office hours. All pertinent information, such as location, size, fire behavior, fuel type, and proximity to structures or roads will be reported. All reported fires will be verified and investigated. The following detection methods will be used:

Fire Lookouts. Redwood NP will operate one traditional lookout on Schoolhouse Peak from July 1 until September 30 as needed, weather conditions permitting. This operational period may be extended depending on fire season severity and/or prescribed fire needs.

Aerial Detection Flights. These flights will be scheduled after periods of severe lightning when the fire danger is in the "Extreme" category or when normal visibility

from the lookouts is hindered by smoke. These will be requested and coordinated through Fortuna ECC.

Fire Detection Patrols. Park Rangers on road patrol or foot will look for new fire starts as part of their normal patrol routine. These rangers are instructed to take fire reports from visitors and relay the pertinent information to the Fire Management Office. In addition, any other trained park staff, including resource management and maintenance personnel engaged in routine duties in the field, will look for and report new fire starts. In times of extreme fire potential, patrol trucks staffed by fire personnel may be sent to patrol and look for new fire starts.

Dispatch

Dispatching involves the receiving of a fire report, gathering pertinent information, assessing and analyzing the situation, and assigning fire management personnel to carry out the desired control action under the direction of the Duty Officer. The Duty Officer will monitor suppression progress, relay information to fire management staff and the superintendent (as needed), process requests for additional resources and supplies, and order aircraft support as needed. Suppression personnel will remain in radio contact with the Duty Officer during all phases of the suppression operations and report any significant events or fire status change.

Redwood National Park currently uses four different radio systems with two different emergency communications centers. All law enforcement radio traffic goes through the California State Parks NORCOM ECC out of Folsom California, while Redwood Fire Management uses the Six Rivers National Forest Fortuna ECC for its dispatch needs. RNSP also has an internal radio system that is used for non-emergency radio traffic, and is often used as a source for tactical frequencies during wildland and prescribed fire incidents. The Humboldt-Del Norte CAL FIRE unit is collocated with the Six Rivers at the Fortuna ECC and is also used as a secondary dispatch center for some fire and non-fire dispatch needs.

Requests for all support resources needed in fire and other emergency operations will be processed by Fortuna ECC through the FMO or designated Duty Officer following guidelines outlined in the Redwood NP Dispatch Procedures for Off-Park Assignments (Appendix L). Staff availability will be updated regularly in the NWCG's Resource Ordering and Staffing System (ROSS) regularly. A current list of red-carded personnel, pre-approved for dispatch by the FMO, will be maintained by all potential Duty Officers. Requests for interagency assistance will be processed through Fortuna ECC, which includes completing a resource order form. Dispatching requested resources for out-of-park assignment will be approved by the Duty Officer. It is the responsibility of the requested individual to seek approval from their immediate supervisor and/or respective Division Chief prior to committing to any fire assignment.

Unplanned fire is reported: What do we do?

When a fire is reported, the park will immediately notify the Fire duty officer.

Information should include:

- a. Location
- b. Time reported
- c. Reporting party

The Duty Officer will then initiate the response, size-up the fire, and determine cause. Initial response will be based on values at risk, known hazards, and forecasted fire danger.

If the fire is determined to be a human caused ignition: Initial action on human caused fire will be to suppress the fire at the lowest cost with the fewest negative consequences with respect to firefighter and public safety. Confine/contain/control strategies will be considered. If the initial actions are unsuccessful, then a RL-2 or RL-3 WDFSS will be completed to document the selected course of action.

If the fire is determined to be a natural ignition: Initial actions for natural ignitions will be determined based upon potential complexity, climatology and projected fire behavior, and natural and cultural resource effects. Fire, as a critical natural process, has been integrated into land and resource management plans and activities on a landscape scale. Response to wildland fire is based on ecological, social, and legal consequences of fire. The circumstances under which a fire occurs and the likely consequences for firefighter and public safety and welfare, natural and cultural resources, and values to be protected dictate the appropriate course of action.

A wildland fire may be concurrently managed for one or more objectives and objectives can change as the fire spreads across the landscape (over space and time). Objectives are affected by changes in fuels, weather, and topography; varying social understanding and tolerance; concerns of private landholders; and involvement of other governmental jurisdictions having different missions and objectives.

Firefighter and public safety is the first priority in every fire management activity. Sound risk management is the foundation of all fire management activities. Risks and uncertainties relating to fire management activities must be understood, analyzed, communicated, and managed as they relate to the cost of either doing or not doing an activity. Net gains to the public benefit will be an important component of decisions. For example, a fire that poses unacceptable risks to firefighter safety during a direct suppression response may be managed under confine/contain strategies to address firefighter safety regardless of fire size. Conversely, a fire may be suppressed at the smallest size to limit risks to firefighters, to limit smoke production for public health, or because natural or cultural resources are threatened.

All fires will be re-assessed and changes to objectives, strategies and tactics will be made as needed recognizing that the fire's behavior can change geospatially and temporally (over space and time). The rationale for changes in the course of actions will be documented through WFDSS. The course of action will be recommended by the park Fire Management Officer or their designee (duty officer), approved by the superintendent, and documented in the WFDSS RL-1-3.

Staffing Needs and Responsibilities

A Duty Officer will be designated every day during fire season. Additional park staff serving as subject matter experts or Resource Advisors (READs) will be involved in planning as conditions, issues, and fire location dictate. Fire complexity and risk will determine staffing needs. WFDSS RL-1, RL-2 or RL-3 will be used to document the selected course of action and projected cost. If the management complexity of the fire exceeds the capabilities of local resources, the park will manage the incident through delegation to an Incident Management Team. All wildland fires will be assigned a qualified incident commander with the appropriate skills given the incident's complexity. NPS regional staff will be consulted in the development of the selected course of action during national preparedness level 4/5.

Notify the public about the chosen management response.

If a designated Public Information Officer (PIO) is not assigned to an incident, then the IC will coordinate through the Division of Interpretation to get Public Service Announcements (PSAs) out to local media outlets.

Cost Containment

All selected courses of action will consider cost containment efforts while also weighing potential risks and benefits. The lowest cost option may not always be the preferred alternative if long-term, cost-effective benefits can be achieved under the selected course of action. Regional director approval is required if the cost for the selected course of action is expected to exceed \$2,000,000. NPS Director approval is required if the cost for the selected course of action is expected to exceed \$10,000,000.

Continue to reassess the fire situation – During the fire, the park must perform periodic fire assessments. The superintendent must validate that the fire is managed appropriately and will assess if there is a need to change objectives, strategies, or tactics. The frequency of the periodic fire assessment will be indicated on the signature page of the 'Periodic Assessment' form attached to the WFDSS. Signature frequency can range from daily (high complexity, high-risk fires) to weekly or longer (low complexity, low risk fires).

Continue with the course of action until the fire is declared out according to monitoring intensity and frequency guidelines indicated in the WFDSS. If strategic

objectives, incident objectives or management requirements are not being achieved, then a new course of action will be developed and implemented. The rationale for the new course of action will be documented using the WFDSS process.

Fire Investigation

Fire personnel will protect the probable point of origin and record any pertinent information to determine fire cause. They will be alert for possible evidence, protect the scene and report findings to the fireline supervisor. The FMO or Designated Duty Officer will promptly notify the Chief Ranger of all fires of unknown or suspicious origin.

Prompt and efficient investigation of all suspicious fires will be carried out. However, fire personnel should not question suspects or pursue the fire investigation unless they are currently law enforcement commission qualified, and instructed to do so by the Chief Ranger.

Personnel and services of other agencies may be utilized to investigate wildfire arson or fire incidents involving structures, providing such activities are approved by the Chief Ranger and are in compliance with NPS Law Enforcement Guidelines (DO-9).

Minimum Impact Suppression Techniques (MIST)

In accordance with RM-18, MIST will be applied to all wildland fires. MIST is defined as the aggressive application of those strategies and tactics that effectively meet management objectives with the least cultural and environmental impact. However, at no time should MIST be applied if they compromise firefighter safety or suppression objectives. A complete list of MIST Guidelines for Redwood National Park is located in Appendix D.

Post- fire: What do we do?

Emergency Rehabilitation and Restoration

Burned Area Emergency Rehabilitation (BAER) and/or Burned Area Restoration (BAR) programs may be used after a wildfire to minimize additional adverse impacts that can continue to threaten natural and cultural resources following a wildfire, or that result from suppression actions needed to control or extinguish a fire. The RNSP wildfire rehabilitation guidelines focus on soil erosion and associated sedimentation of streams in sensitive habitats for listed threatened and endangered fish species. Forest habitats for sensitive birds and mammals are less likely to be affected by wildfires than streams due to the natural occurrence and role of fire in the redwood forests and the general resiliency of forests and vegetation communities on the North Coast. The exception to low impact wildfires in forests would be various areas of dense second growth forests that were logged prior to park establishment and expansion but were not thinned after replanting.

These particular second growth forests have the potential for severe impacts from a stand-replacing wildfire that would be unlikely in uncut forests. A severe wildfire or stand-replacing fire event on soils susceptible to high rates of surface erosion could result in adverse impacts to aquatic resources downslope, especially if a wildfire crosses or is adjacent to a stream channel.

The objective of the short-term rehabilitation efforts is to minimize sediment input to stream systems caused by fire suppression efforts. In general, the emergency restoration program will focus on stabilizing disturbed soils by removing fill from unstable former logging roads near streams, remediating concentrated flows created by suppression activities, or providing protection against surface erosion by covering bare soil until natural or assisted revegetation can take place.

The various RNSP vegetation communities have an extensive history of natural and anthropogenic fire activity. Except in extreme circumstances to be identified by resource or BAER personnel, long-term rehabilitation will emphasize natural processes for ecosystem recovery. For example, ground and understory vegetation in most RNSP vegetation communities recovers quickly after ground disturbance because of the plants' sprouting abilities, abundant seedbank and rainfall, and a long growing season. Invasion by alien plants is a greater short-term threat in most areas of the parks than lack of vegetation regrowth. Current BAER prescriptions are rapidly evolving to achieve beneficial, cost effective treatments. The anticipated BAER recommendations would include relevant, up to date information of the most current practices and Best Management Practices (BMPs) available at the time.

Additional guidelines to minimize adverse effects on fish from the use of water or chemicals for aerial suppression have been developed by NOAA Fisheries. Chemical drops would be kept away from streams and ponds where feasible, and exposure of a stream to a drop would be minimized by dumping perpendicular to the stream channel rather than parallel to the length of a stream. A complete set of BAER guidelines is included in Appendix D.

Anticipated impacts of wildland fire suppression activities that are not covered by BAER or BAR programs include:

- Handline
- Water drafting site or water hole development
- Helispots
- Staging areas
- Safety zones
- Spike camps

Documentation and Cost Tracking

All documentation associated with incidents will be kept in an incident file. The file will include all planning documents (WFDSS and amendments), delegations of authority,

monitoring data and summary reports, revalidation and certification documents, fire time reports, maps, photos, and DOI-1202s. All expenditures (personnel, aircraft, supplies, and equipment) will be tracked and reported according to the standards established in the Department of the Interior Individual Fire Occurrence Form (DOI-1202). All fire projects will have an appropriate fire management accounting code.

Fire Reports

It will be the responsibility of the fire management officer, or the designated duty officer to ensure fire report completion. The report is a valuable tool as it provides an historical record of fire activity in the parks.

d. Prescribed Fire

Prescribed Fire

Management-ignited prescribed fires are used as a tool to achieve management strategies described in the 2000 GMP/GP. Prescribed fires will reflect and support resource management objectives as stated in the Resource Management Plan. Prescribed fires may also be used in conjunction with mechanical reduction of hazard fuels in order to reduce or remove fuels that accumulate from these fuel reduction operations. Research burning may also be conducted when it is determined necessary for accomplishment of research project objectives. Prescribed fire may be used in all six of Redwood NP's FMUs in order to achieve resource management objectives as outlined in this plan. However, all prescribed fires conducted within the State Park FMU will be implemented under the supervision of CAL FIRE.

Actions included in the prescribed fire program include the selection and prioritization of prescribed burns to be carried out during the year, prescribed burn plans, development of burn objectives and burn prescriptions, burn operations, documentation and reporting, and burn critiques. Measures to ensure successful implementation of prescribed burns will include:

- Burn plans reviewed by a qualified Prescribed Fire Manager/Prescribed Burn Boss to verify the proposal with regard to fire behavior, fuel conditions, and safety
- Preburn monitoring completed to enable assessment of burn objectives
- Prescribed burns conducted by a qualified Prescribed Burn Boss with qualified support personnel to ensure success
- Adequate number of holding crew personnel on hand to monitor, chase hot spots, mop-up, and serve as the initial attack crew in case of the fire's escape
- Burn plans approved and signed by the park Superintendent.

Annual Management-Ignited Prescribed Fire Program

The FMO is responsible for the implementation of the annual prescribed burning program. The FMO, along with the Supervisory Botanist (or other Resource Management and Science Vegetation Branch Chief) the RNSP Fuels Technician and the Fire Ecologist will meet each winter to review the RNSP Five Year Prescribed Fire Treatment Plan. The plan will establish a projected five year burning rotation for all prescribed burn units. The plan will then be reviewed by the Resource Management and Science Division Chief before going to the Superintendent for final approval. The Five Year Prescribed Fire Treatment Plan will set priorities for funding requests and provide the guidance for the annual prescribed fire and fuel treatments on the park. The site-specific project clearance required for NEPA and NHPA compliance under RM-12 for the prescribed burn program will be prepared by the FMO as part of the planning for annual prescribed fire operations.

The FMO will assign a Prescribed Burn Boss for each planned burn. The Prescribed Burn Boss may conduct a field reconnaissance of the proposed burn locations with interested members of the park staff and cooperators to discuss objectives and special concerns and gather all the necessary information required to write the burn plan.

Prescribed Burn Plan

The prescribed burn plan (see Appendix F) is a site specific action plan which describes the purpose, objectives, prescription, and operational procedures needed to prepare and safely conduct the burn. The treatment area, objectives, constraints, and alternatives will be clearly outlined, and no burn will be ignited unless all prescriptions of the plan are met. The factors to be considered in preparing a prescribed burn plan are contained in RM-18, Section III, Chapter 5, Exhibit 3.

Prescribed Fire Objectives

The overall prescribed fire management program objectives in RNSP include:

- 1) The return of fire as an ecological process within the parks
- 2) Improve or at a minimum maintain native plant species within RNSP
- 3) Reduce the conifer encroachment within the grasslands and woodlands in the parks

Prescribed Burn Operations

The FMO will designate a qualified Prescribed Burn Boss and other necessary burn team members to conduct the burn. Redwood NP will maintain on its staff the qualified personnel necessary to conduct the planned prescribed burns. This will be accomplished through training, experience, and recruitment.

The Prescribed Burn Boss will fill all required positions necessary to conduct the burn with qualified personnel including Holding Boss and Ignition Boss. All personnel listed in the burn plan must be available for the duration of the burn or the burn cannot be carried out.

Weather and fuel moisture conditions must be monitored closely near the planned burn units to determine when the prescription criteria are met. Weather data will be gathered at least 30 days prior to conducting the burn so that accurate calculations of the 100- and 1000-hour time lag fuel moistures, energy release component, ignition component, spread component, and burning index can be obtained.

When all prescription criteria are within the acceptable range, the Prescribed Burn Boss (PBB) will select an ignition date based on current and predicted weather forecasts. All personnel and equipment will be assembled the morning of the planned ignition. A thorough briefing will be given by the PBB, and specific assignments and placement of personnel will be discussed. A current spot weather forecast will be obtained on the day of or day prior to ignition, and all prescription elements will be rechecked to determine if all elements are still within the approved ranges. If all prescription elements are met, a test fire will be ignited to determine on-site fire behavior conditions as affected by current weather. If conditions are not satisfactory, the test fire will be suppressed, and the burn will be rescheduled. If conditions are satisfactory the burn will continue as planned.

A predetermined IC will be designated. The IC will be introduced in the pre-burn briefing and listed in the Incident Action Plan in the event of an escaped prescribed burn. If the prescribed burn escapes the predetermined burn area, all further ignitions will be halted and suppression efforts, as discussed in the pre-burn briefing, will be initiated. The FMO will be notified immediately of any control actions on a prescribed burn. If the burn exceeds the initial suppression efforts and suppression efforts extend into a second working shift, the burn will be declared a wildfire and be completely suppressed. Additional personnel and resources as determined by the IC will be ordered. If the fire continues to burn out of control, a fire complexity rating will be completed and an Incident Management Team may be requested to assume command of the fire.

Documentation and Reporting

All prescribed burn forms will be completed as outlined by the Prescribed Burn Boss. A fire monitoring team will be assigned to collect all predetermined information and complete all necessary forms prior to, during, and after the burn. All records will be archived in the RNSP fire records and stored with the FMO for future use and reference.

The Prescribed Burn Boss will prepare a final report on the burn for the FMO. Information will include a narrative of the burn operation, a determination as to whether or not the objectives were met, weather and fire behavior data, a map of the burn area, photographs of the burn, number of hours worked, and final cost of the burn.

Prescribed Burn Critique

All members of the prescribed burn team will meet immediately following the burn for an After Action Review (AAR). Notes will be taken during AAR and these will be filed with the burn records. A post-season critique of the prescribed fire program will be held each year. Participants will include the fire management staff and representatives from the vegetation management staff with other park divisions included as needed.

e. Mechanical Fuel Treatment

Mechanical fuels treatment is a term used to describe the application of various tools and equipment by fire and resource management staff to reduce fuels and to achieve fire and resource management goals. Specifically, mechanical treatments can be used to reduce fuels, to restore the historic composition and structure of plant communities, to reduce risks associated with large-scale, high severity fire events, and to construct shaded fuel breaks or fire control lines.

Mechanical treatment is an effective tool to meet fire management objectives in areas where the accumulation and arrangement of fuels prohibits the safe or cost effective application of prescribed fire, and in areas where fire use is otherwise inappropriate due to undesirable resource impacts and operational or other constraints. Mechanical treatment is used to reduce standing or down fuels, such as brush, small and weakened or diseased trees, and the lower limbs of large trees. Certain areas within the park would be excluded from mechanical treatment. This includes areas with sensitive soils, steep slopes, sensitive species habitat, sensitive cultural resource sites, sacred sites, visually sensitive sites, and riparian areas. The removal of this live and dead vegetation reduces overall fuel levels and alters the horizontal and vertical continuity and distribution of vegetation. Fire managers and natural resource staff may target particular species of plants for retention or removal to create vegetation communities that reflect a desired species composition and structure to reduce fire risk while promoting ecological health. These treatments effectively alter fire behavior by reducing crown bulk density, increasing crown base height, and changing species composition to favor fire-adapted species. Such treatments can reduce the severity and intensity of wildland fires for a given set of physical and weather variables.

Annual Mechanical Fuels Treatment Program

The RNSP Supervisory Botanist (or Resource Management and Science Vegetation Branch Chief), the Fuels Technician, the Fire Ecologist and the FMO will meet each winter to update the 5-year Mechanical Fuels Treatment Plan. Mechanical treatment units will be established in strategically important areas along or adjacent to ridges and roads, next to prescribed unit boundaries, and in other areas where defensible space is needed. Mechanical treatment projects will be assessed at the site-specific level by

qualified park staff for the presence of special status species, for significant cultural resources, and for any other resource concerns. Site-specific recommendations for protection of sensitive resources will be incorporated into project work plans and implementation.

Mechanical Fuels Treatment Objectives

A site-specific prescription will be developed for each mechanical treatment project. This prescription informs workers what species should be removed or retained, and what the percent cover of removal or retention should be. In general, larger trees would be left, with most brush cleared. Tree limbs would be removed up to a set height to reduce ladder fuels. In dense second growth stands, mechanical treatment will favor the development of the dominant and co-dominant trees where they exist by removing intermediate and suppressed trees and understory brush. This level of treatment would remove small-sized trees, up to 18" DBH, from the lower canopy, leaving large trees to occupy the site. Where larger trees are not present, smaller trees would be maintained. Treatments across all areas can vary significantly in relation to site specifics and also to the thinning method employed.

Special Considerations

Sudden Oak Death is caused by an introduced pathogen, *Phytophthora ramorum*, and is inducing widespread mortality to forests in California and Oregon. Sudden oak death would have devastating effects to plant communities in the park because tan oak, a major understory component of these forests, is perhaps the most susceptible species to this fungus. Although this pathogen is not presently known to occur within the park or on neighboring lands, an infection of tan oak within the park would have severe effects on plant communities and wildlife, and would create a tremendous fire hazard. Ensuring the use of clean equipment and crews and monitoring for the early stages of infection are the only actions that can be taken to prevent introduction and limit its spread in case of infection.

Another potential consequence from thinning is that portions of the removed vegetation would contribute to surface fuels (slash) if the cut portions are left on the forest floor. These fuels may increase the expected fire intensities depending on where and how they are treated. Thinned materials may be dealt with by one or many of the following: lop and scatter, chip and spread, extract from site, or pile and burn on or off-site.

Shaded Fuel Breaks

Shaded fuel breaks are linear areas that are cleared of woody vegetation with the exception of selected overstory trees, and brush in areas where trees are not present. The width of shaded fuels breaks will vary depending on slope, vegetation, and elevation, but

generally speaking will range between 50-150' in RNSP. Mature trees provide shade, which helps keep surface fuels at a lower temperature than in fuel breaks where no canopy is present. The shade also slows the rapid resprouting of understory vegetation such as tan oak. Retained vegetation also serves to reduce erosion and provide an annual litter source to protect soil where an herbaceous cover is absent.

Shaded fuel breaks are designed to alter horizontal and vertical fuel arrangement by greatly reducing ladder fuels (brush, small trees and low tree limbs). This increases crown base height, the gap between surface and ladder fuels, and reduces crown bulk density. This alteration is designed to reduce the rate of spread of fire across the shaded fuel break. Under certain conditions, an approaching crown fire would drop down to a ground fire when it encounters a shaded fuel break. This improves firefighter safety and increases the likelihood that a wildland fire may be successfully suppressed or confined, plus provides more options to employ MIST during unplanned fire events.

Shaded fuel breaks are not intended to stop an approaching fire alone, but are designed to facilitate rapid firefighter access so that an approaching wildland fire may be more safely and effectively suppressed or confined. Shaded fuel breaks can also serve as prescribed burn unit boundaries in support of management-ignited fires.

Each shaded fuel break is designed to fulfill one or more of the following purposes: Public Safety and Evacuation; Firefighter Safety; Access for Suppression Actions; Burn Unit Boundary; and/or Park Boundary Protection.

Documentation and Reporting

Monitoring of mechanical treatment projects occurs to determine success and assess ecological effects. This includes documenting site conditions before and after project activity with photo-points as needed and vegetation sampling.

f. Public Information and Education

Community Education

There is a need to develop a comprehensive Public Information and Education strategy plan for the Redwood Fire Management program. The Public Information and Education strategy plan will be incorporated into this Fire Management Plan in one of the subsequent annual updates. In the meantime, Redwood Fire Management staff will continue to work with cooperators and local community groups such as Fire Safe Councils to promote the Firewise message. Fire Management staff will also participate in community emergency planning.

g. Monitoring and Fire Research

See Appendix M: Fire Monitoring Plan, to learn more about our monitoring and research programs.

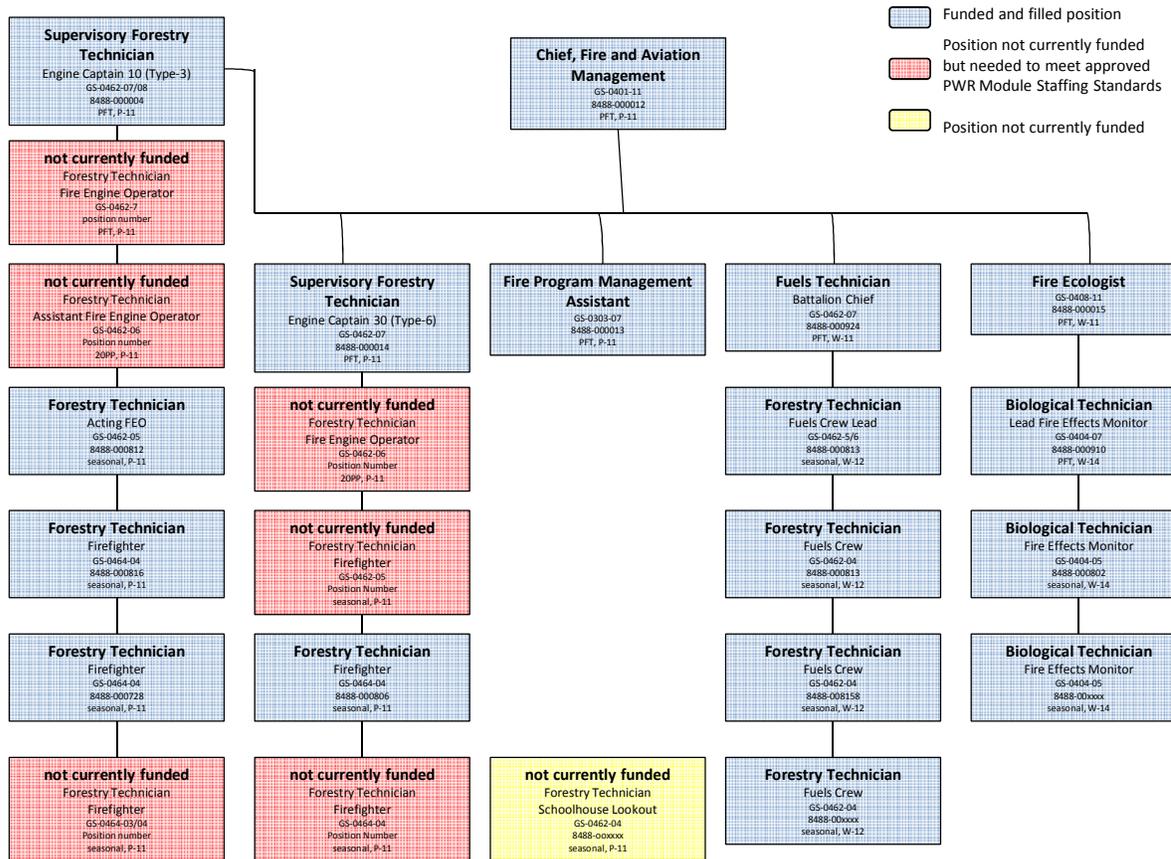
V. Organization and Budget

Funding

The Park Service is currently transitioning from the FIREPRO budgeting program to the interagency Fire Program Analysis system. DO-18 establishes the appropriate use of fire funds and additional information concerning the use of National Park Service fire funds can be found in Chapter 17 of RM-18. Determination regarding the appropriateness of the funding sources will be made by the FMO and by the RNSP Administrative Officer.

During the 2009 annual field review it was brought to the attention of the Regional Fire staff that the Redwood NP Engine 10 and Engine 30 modules are both underfunded, according to NPS staffing standards. Critical positions not currently funded on Engine 10 include a permanent Fire Engine Operator (FEO) and Assistant Fire Engine Operator (AFEO). Unfunded critical positions on Engine 30 include a permanent Fire Engine Operator. A further analysis of the situation determined that even if staff from both modules were combined the program would still be short the AFEO position needed to meet the NPS minimum standard for WCF funded Type 3 engines. Park Fire Staff is currently waiting to hear from the Regional and/or National Fire Staff on how to remedy the funding shortfall and subsequent staffing deficiency.

Fire Management Organization



Fire Management Program - Position Responsibilities

Superintendent: Overall responsibility for the management of all park operations and activities. Supervises Management Team members, including Chief, Division of Resources Management & Science, and Chief, Division of Visitor Services & Resource Protection. Responsible for implementation of the RNSP General Management Plan and identifying goals. Approves all project plans (Prescribed Fire Plans, Fuels Reduction Plans, etc.) and project clearances for activities undertaken within the park, approves decision documents in extended wildland fire management actions, such as Wildland Fire Situation Analyses, and Delegations of Authority.

Chief, Resource Management & Science: Overall program responsibility for the Division (RM&S). Supervises branch chiefs within division, including Vegetation Management (Supervisory Botanist) and Fire Management. Responsible for updating the Resources Management Plan, defining resource objectives for the park and recommending the use of fire to meet these objectives

where appropriate. Recommends approval/disapproval to the Superintendent on all Prescribed Fire Plans. Coordinates the work plans of staff specialists to ensure review and NEPA and NHPA compliance are completed on project and programmatic plans.

Chief, Visitor Services & Resource Protection: Overall program responsibility for the Division (VS&RP). Coordinates the entire program of emergency services for RNSP (with the exception of wildland fire), including law enforcement, structural fire, EMS, and SAR. Implements evacuations and visitor notification procedures as needed.

Supervisory Botanist: Helps coordinate fire research efforts, reviews fire management plan, reviews prescribed burn plans, provides resource management objectives to prescribed burn plans, and serves as a resource advisor in the event of a project fire. Serves as lead in fire rehabilitation needs and fire rehabilitation completion.

Fire Management Officer: Responsible for overall fire program management for the parks. Supervises Fire Program Assistant, Engine Captains, Fuels Technician and Fire Ecologist. Develops annual budget request, coordinates the development of prescribed fire plans, and implementation of prescribed fire projects. Leads Red Card committee -approves qualifications “Red Cards” for all fire qualified park employees and initiates and certifies all position taskbooks. Rotational on-call contact for park resource mobilization.

Fire Program Management Assistant: Provides administrative support to the entire fire management program at RNSP. Tracks annual budgets and expenditures, completes personnel actions, travel paperwork, and payroll for fire personnel in both RM&S and VS&RP divisions. Point of contact with local interagency emergency coordination center (Fortuna ECC). Park fire training officer (conducts needs analysis, coordinates nominations, and instructs and coordinates training as needed). Member of Red Card committee, SME on interagency qualifications. Rotational on-call contact for park resource mobilization.

Engine Captain, (Wolf Creek): Staffs a Type III engine, supervises seasonal engine crew. Cache manager of fire equipment for south end of RNSP. Rotational on-call contact for park resource mobilization.

Engine Captain, (Hiouchi): Staffs an ICS Type VI wildland fire engine and supervises seasonal engine crew. Cache manager of fire equipment for north end of RNSP. Rotational on-call contact for park resource mobilization.

Engine Crew: Staffs an ICS Type III or Type VI wildland engine for park fire program, completes assigned fire project work and fills resource orders for out of park assignments as available.

Fuels Technician: Implements the fuels management program. Responsible for preparation work on annual prescribed fire units and assists in unit planning efforts. Maintains parks remote automated weather station (RAWS). Hires, directs, and supervises the seasonal Fuels Management Crew and Schoolhouse lookout. Rotational on-call contact for park resource mobilization.

Fuels Management Crew: Completes fuels management project work as outlined in project plans and as directed by the Fuels Technician.

Schoolhouse Lookout: Staffs Schoolhouse lookout as needed, not currently funded.

Fire Ecologist: Serves as the fire ecology subject matter expert for RNSP, Whiskeytown NRA, and Oregon Caves NM. Develops, prioritizes, and implements monitoring program. Assists with the development of prescribed fire and other fuels management plans. Manages the Resource Advisor (READ) program. Coordinates fire research proposal development and project implementation. Supervises the Fire Effects Crew Leader.

Fire Effects Crew Leader: Responsible for fire effects monitoring at RNSP, Whiskeytown NRA, and Oregon Caves NM. Supervises seasonal fire effects monitoring crew. Coordinates workload among the assigned parks' prescribed fire needs and develops annual work plan for approval by fire ecologist. Manages data collection, input, and data quality.

Fire Effects Crewmembers: Perform field work involved in the installation and sampling of fire effect monitoring plots. Complete data entry gathered from field work.

Fire Management Organization in Relation to Park Organization

The Fire Management Organization at Redwood National Park is under the supervision of the Chief of Resources Management and Science.

Interagency Coordination

Interagency coordination and cooperation is integral to successful implementation of the fire management program at Redwood NP. Only small, slow-moving wildland fires can be managed within the current capabilities of the Redwood NP fire organization. All other wildland and prescribed fires will require external support by interagency cooperators. Annual review of cooperative agreements will ensure successful coordination.

Interagency Contacts

See Appendix I.

Agreements

Redwood National Park currently uses Emergency Equipment Rental Agreements (EERA) that are established by the Six Rivers National Forest. Any equipment needs under an EERA will be ordered through Fortuna ECC.

VI. Monitoring and Evaluation

Monitoring of prescribed fires at RNSP provides information for quantifying and predicting fire behavior and its ecological effects on park resources while building a historical record of fire effects. Monitoring measures the parameters common to all fires: fuels, topography, weather and fire behavior. In addition, ecological changes such as species composition and structural changes are monitored using long-term plots for many years after a fire. This information is very useful in fine-tuning the prescribed fire program.

During prescribed burning, monitoring includes mapping, weather, site and fuel measurements and direct observation of fire characteristics such as flame length, rate of spread and fire intensity. Operational monitoring provides a check to insure that the fire remains in prescription and serves as a basis for evaluation and comparison of management actions in response to measured, changing fire conditions, and changes such as fuel conditions and species composition.

All wildland fires will be appropriately suppressed. However, monitoring wildland fires may be appropriate and potentially valuable in mapping and documenting the growth of the fire, measuring on-site weather and fuel loading to provide the fire management staff with present and expected fire behavior information. All fires may be monitored regardless of size. The FMO will establish specific fire information guidelines for each fire to update intelligence about the fire. Highest priority for monitoring will be assigned to large fires or fires which threaten to leave the park boundary.

The FMO will assure that assigned qualified personnel are dispatched to monitor fires. Personnel will be dispatched for the length of time there is a need for onsite information on the fire's status. By being able to suppress the fire, assess its potential, characterize and quantify its effects and determine if it is within prescription, an efficient and flexible monitoring program will result.

RNSP Fire Monitors will utilize the NPS Fire Monitoring Handbook. Long-term monitoring of ecological change caused by prescribed fire is conducted the RNSP fire

ecology program. Monitoring guidelines specific to RNSP can be found in Appendix M: Redwood National and State Parks Fire Monitoring Plan.

Glossary

Appropriate Suppression: Selecting and implementing a prudent suppression option to avoid unacceptable impacts and provide for cost-effective action.

Burn Plan: see *Prescribed Fire Plan*.

Class of Fire (as to size of wildland fires):

- Class A - ¼ acre or less
- Class B - more than ¼ but less than 10 acres
- Class C - 10 acres to 100 acres
- Class D - 100 to 300 acres
- Class E - 300 to 1,000 acres
- Class F - 1,000 to 5,000 acres
- Class G - 5,000 acres or more

Energy Release Component (ERC): A number related to the available energy (BTU) per unit area (square foot) within the flaming front at the head of a fire. It is generated by the National Fire Danger Rating System, a computer model of fire weather and its effect on fuels. The ERC incorporates thousand hour dead fuel moistures and live fuel moistures; day to day variations are caused by changes in the moisture content of the various fuel classes. The ERC is derived from predictions of (1) the rate of heat release per unit area during flaming combustion and (2) the duration of flaming.

Extended attack: A fire on which initial attack forces are reinforced by additional forces.

Fire management: All activities related to the prudent management of people and equipment to prevent or suppress wildland fire and to use fire under prescribed conditions to achieve land and resource management objectives.

Fire effects: Any consequences to the vegetation or the environment resulting from fire, whether neutral, detrimental, or beneficial.

Fire intensity: The amount of heat produced by a fire. Usually compared by reference to the length of the flames.

Fire prescription: A written direction for the use of fire to treat a specific piece of land, including limits and conditions of temperature, humidity, wind direction and speed, fuel moisture, soil moisture, etc., under which a fire will be allowed to burn, generally expressed as acceptable range of the various fire-related indices, and the limit of the area to be burned.

Fuels: Materials that are burned in a fire; primarily grass, surface litter, duff, logs, stumps, brush, foliage, and live trees.

Fuel loadings: Amount of burnable fuel on a site, usually given as tons/acre.

Hazard fuels: Those vegetative fuels which, when ignited, threaten public safety, structures and facilities, cultural resources, natural resources, natural processes, or to permit the spread of wildland fires across administrative boundaries except as authorized by agreement.

Initial Attack: An aggressive suppression action consistent with firefighter and public safety and values to be protected.

Maintenance burn: A fire set by agency personnel to remove debris; i.e., leaves from drainage ditches or cuttings from tree pruning. Such a fire does not have a resource management objective.

Minimum Impact Suppression Techniques (MIST): The application of strategy and tactics that effectively meet suppression and resource objectives with the least environmental, cultural, and social impacts.

Natural fire: A fire of natural origin, caused by lightning or volcanic activity.

NFDRS Fuel Model: One of 20 mathematical models used by the National Fire Danger Rating System to predict fire danger. The models were developed by the U.S. Forest Service and are general in nature rather than site specific.

NFFL Fuel Model: One of 13 mathematical models used to predict fire behavior within the conditions of their validity. The models were developed by U.S. Forest Service personnel at the Northern Forest Fire Laboratory, Missoula, Montana.

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

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

Prescribed Fire: Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition. This term replaces management ignited prescribed fire.

Prescribed Fire Plan: a plan required for each fire application ignited by managers. It must be prepared by qualified personnel and approved by the appropriate Agency Administrator prior to implementation. Each plan will follow specific agency direction and must include critical elements described in agency manuals. Formats for plan development vary among agencies, although content is the same.

Prescription: Measurable criteria which define conditions under which a prescribed fire may be ignited, guide selection of appropriate management responses, and indicate other required actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social or legal considerations.

Prescribed fire: A fire ignited by agency personnel in accord with an approved plan and under prescribed conditions, designed to achieve measurable resource management objectives. Such a fire is designed to produce the intensities and rates of spread needed to achieve one or more planned benefits to natural resources as defined in objectives. Its purpose is to employ fire scientifically to realize maximize net benefits at minimum impact and acceptable cost.

Preparedness: Actions taken seasonally in preparation to suppress wildland fires, consisting of hiring and training personnel, making ready vehicles, equipment, and facilities, acquiring supplies, and updating agreements and contracts.

Prevention: Activities directed at reducing the number or the intensity of fires that occur, primarily by reducing the risk of human-caused fires.

Rehabilitation: (1) Actions to limit the adverse effects of suppression on soils, watershed, or other values, or (2) actions to mitigate adverse effects of a wildland fire on the vegetation-soil complex, watershed, and other damages.

Resource Advisor (READ): The READ is primarily responsible for identifying and evaluating potential impacts and benefits of fire operations (wildland or prescribed) on natural and cultural resources.

Suppression: Actions taken to extinguish or limit the spread of a wildland fire, regardless of the strategies and tactics employed.

Wildland and Prescribed Fire Complexity Analysis: The formal process to determine the full complexity rating for wildland and prescribed fires. It utilizes 12 variables having numerically weighted importance combined with user identified complexity values.

Wildland Fire: Any non-structure fire, other than prescribed fire, that occurs in the wildland. This term encompasses fires previously called both wildfires and prescribed natural fires.

Wildland Fire Decision Support System (WFDSS): This system is intended to assist fire managers and analysts in making strategic and tactical decisions for fire incidents. It is

the replacement for the WFSA (Wildland Fire Situation Analysis) and WFIP (Wildland Fire Implementation Plan), and is a single process that is easier to use, more intuitive, linear, scaleable, and progressively responsive to changing fire complexity.

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

Wildland Fire Management Program: The full range of activities and functions necessary for planning, preparedness, emergency suppression operations, and emergency rehabilitation of wildland fires, and prescribed fire operations, including non-activity fuels management to reduce risks to public safety and to restore and sustain ecosystem health.

Wildland Fire Situation Analysis (WFSA): A decision-making process that evaluates alternative management strategies against selected safety, environmental, social, economic, political, and resource management objectives.

Wildland Fire Suppression: An appropriate management response to wildland fire that results in curtailment of fire spread and eliminates all identified threats from the particular fire. All wildland fire suppression activities provide for firefighter and public safety as the highest consideration, but minimize loss of resource values, economic expenditures, and/or the use of critical firefighting resources.

Wildland Fire Use: The management of naturally ignited wildland fires to accomplish specific pre-stated resource management objectives in pre-defined geographic areas outlined in Fire Management Plans. Operational management is described in the Wildland Fire Decision Support System (WFDSS) decision. Wildland fire use is not to be confused with "fire use," which is a broader term encompassing more than just wildland fires.

Appendix A: Redwood National Park Preparedness Plan

Redwood National Park Preparedness Plan

(updated May 26, 2009)

Station Information for Redwood Special Interest Group (SIG) Schoolhouse (50%) + Gasquet (50%) Remote Automated Weather Stations (1995-2008) Climate Class 3, Herbaceous Class A, Slope Class 3, Fuel Model G			
Energy Release Component (ERC)	Staffing Class (Adjective Rating)		Actions
0-12	I	Low	Normal tours of duty for fire staff (see below). All facilities open. No restrictions.
13-24	II	Moderate	Normal tours of duty for fire staff (see below). All facilities open. No restrictions.
25-50	III	High	Normal tours of duty for fire staff (see below). One staffed engine (T6 minimum) remains in park. All facilities open. No restrictions.
When ERC is at 37-47, and if local fuel conditions warrant, a predicted lightning activity level (LAL) of 4-6 or a "Red Flag Warning" will automatically increase Staffing Class to IV.			
51-57	IV	Very High	All fire staff on-duty (lieu days may be cancelled), OT authorized to extend tours of duty. Initial attack modules will consist of at least one qualified Initial Attack Incident Commander (ICT4) on duty through the burning period. One staffed engine (T6 minimum) remains in park. Fire qualified personnel from all Divisions alerted. A fire detection flight (fixed or rotor wing) may be requested from an adjacent cooperator. If cooperating aircraft are not available, a fixed wing aircraft may be hired for a detection flight. Backcountry camping restricted, no open fires. Equipment use may be restricted.
When ERC is at 48-55, and if local fuel conditions warrant, a predicted lightning activity level (LAL) of 4-6 or a "Red Flag Warning" will automatically increase Staffing Class to V.			
58+	V	Extreme	All SC IV actions in addition to the following. Fire staff lieu days cancelled, off-duty fire qualified personnel authorized OT. 2 engines staffed in park (T6 minimum). All fires restricted, backcountry campgrounds closed. Trails into high fire risk areas may be closed. Smoking is prohibited in all backcountry areas and is permitted only in vehicles with ashtrays, designated buildings, and developed areas cleared of burnable vegetation.
Additional costs above regular budgeted staffing in Classes IV and V authorized through the establishment of emergency pre-suppression accounts (PWE E11) as per RM-18, <u>Wildland Fire Management, Chapter 7 – Preparedness</u> .			
Lightning Activity Levels and Red Flag Warnings are issued by the Redding Interagency Fire Forecast Warning Unit and must cover the Redwood National & State Park predictive service area.			
Actions (activity restrictions and area closures) and incident response coverage will be closely coordinated with local interagency cooperators, (California Department of Forestry & Fire Protection, and Six Rivers National Forest) and reported to the Fortuna Interagency Emergency Coordination Center. Upon reaching SC IV and V the Duty Officer will ensure notifications are made to park staff and external cooperators and any restrictions on public use or activities are coordinated through the Superintendent.			
2009 REDW Fire Staff Engine 10 (ICS Type 3) Captain + 3 Engine 30 (ICS Type 6) Captain + 1 Fire Lookout Fire Management Officer Fuels Management Crew Fuels Technician Fire Program Management Assistant Fire Effects Crew Patrol 11		Regular Tour of Duty FRI – TUE 0930-1800 WED – SUN 0930-1800 as needed MON – THU 0730-1800 (Maxiflex) TUE – FRI 0700-1730 TUE – FRI 0700-1730 MON– FRI 0700-1530 (Maxiflex) TUE – FRI 0700-1730 as needed	

Appendix B: Delegation of Authority

DELEGATION OF AUTHORITY

_____ is assigned as Incident Commander on the _____ Fire. You have full authority and responsibility for managing the fire suppression activities within the framework of law, Agency policy and direction provided in the Overhead Briefing and Wildland Fire Decision Support System.

Your primary responsibility is to organize and direct your assigned and ordered resources for efficient and effective suppression of the fire. You are accountable to the _____ or their designated representative listed below. A Resource Advisor, _____ will be assigned to the incident to advise you on any park specific questions that may arise. Financial limitations will be consistent with the best approach to the values at risk.

Specific direction for the _____ Fire covering management and environmental concerns is listed:

Constraints:

_____ will represent me on any occasion that I am not immediately available. This authority is effective _____

_____ Date/Time

_____ Date/Time

_____ Date/Time

Appendix C: Fire Complexity Analysis

Fire Complexity Analysis

The following questions are presented as a guide to assist the Superintendent and staff in analyzing the complexity or predicted complexity of a fire situation. Because of the time required to assemble and move an Incident Management Team to a fire, this checklist should be completed when a fire escapes initial attack and be kept as part of the fire records. This document is prepared concurrently with the creation of a new incident in the Wildland Fire Decision Support System (WFDSS).

USE OF THE GUIDE

Analyze each element and determine if it is true for your fire.

1. If there are more positive responses than negative, the fire is predicted to become more complex.
2. If any of the major headings are totally positive, the fire is predicted to become more complex.
3. If a review of the factors causes you to become uncertain as to the current management of the fire

If any of the above is true, you should call for assistance.

Fire Complexity Analysis Guide

FIRE BEHAVIOR

YES NO

- | | | |
|---|-----|-----|
| 1. Burning Index (From on –site measurement of weather conditions)
Predicted to be above the 90% level using major fuel model in which the fire is burning | ___ | ___ |
| 2. Potential exists for “blowup” conditions (fuel moisture, winds, etc.) | ___ | ___ |
| 3. Crowning, profuse or long range spotting | ___ | ___ |
| 4. Weather forecast indicating no significant relief or worsening conditions | ___ | ___ |
| Total | ___ | ___ |

RESOURCES COMMITTED

- | | | |
|--|-----|-----|
| 1. 200 or more personnel assigned | ___ | ___ |
| 2. Increasing number and variety of support personnel and/or equipment | ___ | ___ |
| 3. Substantial air operation which is not properly staffed | ___ | ___ |
| 4. Majority of park <u>initial attack</u> resources committed | ___ | ___ |
| Total | ___ | ___ |

PARK RESOURCES THREATENED

YES NO

1. Urban Interface	___	___
2. Park developments and facilities	___	___
3. Cultural sites	___	___
4. Restricted, threatened or endangered species habitat	___	___
5. Unique natural resources, special designation zones, wilderness	___	___
Total	___	___

SAFETY

1. Unusually hazardous fireline conditions	___	___
2. Serious accidents or fatalities	___	___
3. Threat to safety of park visitors from fire and related operations	___	___
4. Park restrictions and/or closures are being considered	___	___
5. No night operations in place for safety reasons	___	___
Total	___	___

JURISDICTION

1. Fire burning or threatening more than one jurisdiction	___	___
2. Potential for claims (damages)	___	___
3. Different or conflicting management objectives	___	___
4. Disputes over suppression responsibility	___	___
5. Potential for unified command	___	___
Total	___	___

EXTERNAL INFLUENCES

1. Controversial fire policy	___	___
2. Pre-existing controversies/relationships	___	___
3. Sensitive media relationships	___	___
4. Smoke management problems	___	___
5. Sensitive political interests	___	___
Total	___	___

CHANGE IN STRATEGY

1. Change in strategy to control from confine to contain	___	___
2. Large amounts of unburned fuel with planned perimeter	___	___
3. WFDSS decision invalid or requires updating	___	___
Total	___	___

Appendix D: M.I.S.T. Minimum Impact Suppression Tactics Guidelines

Redwood National and State Parks

MINIMUM IMPACT SUPPRESSION TACTICS GUIDELINES

CONCEPT

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

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

Suppression actions on all wildfires within Redwood National and State Parks will be those having a minimum impact on the physical resources associated with each site. In so doing, the principle of fighting fire aggressively but providing for safety first will not be compromised.

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

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

GOAL

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

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

SUPPRESSION RESPONSIBILITY

As stated previously, safety is the highest priority. All action will be anchored to the standard fire orders and watch out situations. Safety will remain the responsibility of each person involved with the incident.

Initial/Extended Attack

Incident Commander – Understand and carry out an appropriate suppression response that will best meet land management objectives of the area at the least cost plus loss. Ensure all forces used on the fire understand the plan for suppressing the fire in conjunction with MIST. Remain in communication with responsible fire management or line officer to ensure understanding and support of tactics being used on the fire. Evaluate and provide feedback as to the tactical effectiveness of MIST during and after fire incident.

Project Fire

Type 1/ Type 2 Incident Commander – Carry out instructions given by the responsible line officer both verbally and through the WFDSS decision. Establish and nurture a close dialogue with the Resource Advisor assigned to the fire team. Review actions on site and evaluate for compliance with land line officer direction and effectiveness at meeting fire management protection objectives.

Superintendent – Transmit land management objectives for the fire area to the fire team and define specific fire management protection objectives. Periodically review for compliance.

Resource Advisor – Ensure the interpretation and implementation of WFDSS decision and other oral or written direction is adequately carried out. Provide specific direction and guidelines as needed. Participate in fire team planning sessions, review incident action plans and attend daily briefings to emphasize resource concerns and management's expectations. Provide assistance in updating WFDSS decisions when necessary. Participate in incident management team debriefing and assist in evaluation of team performance related to MIST.

A wildlife biologist or fish and wildlife biologist (preferably one with local knowledge) should serve as a Resource Advisor with the incident command team (ICT). The biologist(s) will coordinate with the ICT about listed terrestrial species and their critical habitat and incorporate recommendations within the Incident Action Plan to minimize adverse effects. If a wildlife biologist or fish and wildlife biologist is not available, the

Lead Resource Advisor will obtain local wildlife knowledge and provide the ICT with information about the location of listed species habitats, nest or den sites, critical habitat, and recommendations to minimize adverse effects summarized below.

GUIDELINES

Following is a list of considerations for each fire situation.

Hot-Line/Ground Fuels

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

Hot-Line/Aerial Fuels

- Limb vegetation adjacent to fireline only as needed to prevent additional fire spread.
- During fireline construction, cut shrubs or small trees only when necessary. Make all cuts flush with the ground.
- Minimize felling of trees and snags unless they threaten the fireline or seriously endanger workers. In lieu of felling, identify hazard trees with a lookout or flagging.
- Scrape around tree bases near fireline if it is likely they will ignite.
- When fire is found in the canopy of single or multiple isolated large (>36" diameter at breast height or DBH) old growth trees, it is always preferable to extinguish the fire with a "bucket drop" from a helicopter and to avoid, if at all possible, felling the tree or letting it continue to burn. All trees larger than 36" DBH will require the approval of the IC prior to falling, unless it poses an imminent threat to personnel on the ground.
- Where possible, expedient and fire fighter safety will not be compromised or fire suppression activities significantly hindered, avoid felling trees larger than 18" DBH when constructing fire lines, particularly trees with broken or deformed tops.
- Where possible, expedient and fire fighter safety will not be compromised or fire suppression activities significantly hindered, avoid felling snags greater than 24" DBH.

Mopup/Ground Fuels

- Do minimal spading; restrict spading to hot areas near fireline.
- Cold-trail charred logs near fireline; do minimal tool scarring.
- Minimize bucking of logs to extinguish fire or to check for hotspots; roll logs instead if possible.
- Return logs to original position after checking and when ground is cool.
- Refrain from making bone yards; burned and partially burned fuels that were moved should be returned to a natural arrangement.
- Consider allowing large logs to burnout. Use a lever rather than bucking to manage large logs which must be extinguished.
- Consider using infrared detection devices along perimeter to reduce risk.
- Personnel should avoid using rehabilitated firelines as travel corridors whenever possible because of potential soil compaction and possible detrimental impacts to rehab work, i.e. water bars.

Mopup/Aerial Fuels

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

Anadromous Fish and Other Aquatic Species Protection Measures

1) General Guidelines -

A fishery biologist or fish and wildlife biologist (preferably one with local knowledge) should serve as a Resource Advisor with the ICT. The biologist(s) should coordinate with the ICT about listed salmon and trout and their critical habitat and incorporate recommendations within the Incident Action Plan to minimize adverse effects. If a fishery biologist or fish and wildlife biologist is not available, assure that the Lead Resource Advisor obtains local fisheries knowledge and provides the ICT with information about the location of listed salmon and trout, their critical habitat, and recommendations to minimize adverse effects listed below.

- Use untreated water to suppress wildland fire within or near riparian habitat where feasible. If fire retardant or foam is used, follow the “Guidelines for Aerial Delivery of Retardant or Foam near Lakes, Rivers, Streams and Ponds” detailed below.
- Avoid or minimize disturbance of ground cover and vegetation that exposes mineral soil within riparian areas, including:
 - fire line construction by dozers
 - grading activities
 - road reconstruction
 - stream crossings
 - ignition of backfires
 - staging areas, helispots, base camps, drop-off points, etc.
- Use water sources designated by a Resource Advisor for dipping and drafting. If not available, minimize using water sources where there is a risk of entraining listed salmon or trout or reducing in-stream flows, both on and off site. Use “Water Drafting Guidelines” detailed below.
- Avoid or minimize dam construction to pond water for drafting in streams where listed salmonids or their critical habitat are known or believed to be present.
- Avoid or minimize road and stream crossing construction where possible. If road construction is unavoidable, do so in a manner that prevents or minimizes erosion, sediment delivery to stream channels, and modification of the natural drainage patterns. Minimize the number of crossings, amount of fill, diversion potential, and maintain approaches that are perpendicular to the stream channel.

2) Guidelines for Drafting Water from Streams Containing Federally Listed Salmon and Trout

- Drafting will be restricted to one hour after sunrise to one hour before sunset to avoid attracting fish to the draft hose.
- Pumping rate will not exceed 350 gallons per minute.
- Pumping rate will not exceed 10% of estimated stream flow.
- Use streams and pools where water is deep and flowing, as opposed to streams with low flow and small isolated pools.
- Pumping will be terminated when the tank is full. The effect of single pumping operations, or multiple pumping operations at the same location, should not result in obvious draw-down of either upstream or downstream pools.
- Each pumping operation will use a fish screen (design standards described below). The screen should be oriented parallel to flow for best screening performance. The screen will be designed and used so that it can be submerged with at least one-screen-height-clearance above and below the screen.
- Pump operators will maintain a logbook containing the following information: operator’s name, date, time, pump rate, filling time, screen cleaned (yes or no), screen condition, comments. These guidelines should be included as instructions in the logbook and made easily available to every operator.

Fish Screen Construction Criteria

Surface Area – The total, unobstructed surface area of the screen will be at least 2.5 square feet, based on the upper limit of pumping of 350 gallons per minute. Larger surface areas are recommended where debris buildup is anticipated and where stream depth is adequate to keep the screen submerged at approximately mid-depth.

Screen Mesh – Screen mesh must be in good repair and present a sealed, positive barrier that effectively prevents the entry of immature (20-30 mm) salmon or trout fry. The screen mesh will be round openings a maximum 3/32 inch diameter, square openings a maximum 3/32 diagonal, or slotted openings a maximum 1/16 inch width.

Screen Design – Water drafting screens may be off the shelf products, but they can be custom made devices appropriate to the scale and duration of the operation. To keep the screen supported and correctly positioned in the water column, adjustable support legs are advised. Screen geometry can be configured either as rectangular or cylindrical. The intake structure must be designed to promote uniform velocity distribution at all external mesh surfaces. This can be accomplished with a simple internal baffle device that distributes the flow evenly across the entire surface of the screen. In order to accomplish this, the designer needs to understand the hydraulic characteristics of these devices. There is a tendency for most of the intake water to enter the screen near the hose end, so a typical internal baffle would consist of a pipe (or manifold set of pipes) which has variable porosity holes at predetermined spacing. It is recommended to start near the hose end with approximately 5-10% average open area and gradually increase the porosity toward the length of the screen. At a point where screen length exceeds three times the diameter of the suction hose, the baffling effect tends to diminish rapidly. At this point the baffle porosity may approach 100%. A successful baffle system will functionally distribute flow areas to all areas of the screen. A poorly designed screen may result in high velocity “hot spots” which could lead to fish impingement on the screen face. Hydraulic testing of prototype screen designs is recommended where the screen use is on going and extensive.

Screen Structure – The screen frame must be strong enough to withstand the hydraulic forces it will experience. However, structural frames, braces, and other elements that block the flow, change flow direction, or otherwise decrease the screen surface area should be minimized.

Screen Cleaning – The screen must be cleaned as often as necessary to prevent approach velocity from exceeding 0.33 feet per second. Operators should withdraw the screen and clean it after each use or as necessary to keep screen face free of debris. Pumping should stop for screen cleaning when approximately 15% or more of the screen area is occluded by debris. A suitable brush shall be on board the truck for this cleaning operation.

LOGISTICS

Campsite Considerations

- Coordinate with the Resource Advisor in choosing a site with the most reasonable qualities of resource protection and safety concerns.
- Evaluate short-term low impact camps such as coyote or spike versus use of longer-term higher impact camps.
- Use commercial portable toilet facilities where available. If these cannot be used a latrine hole should be utilized.
- Select latrine sites a minimum of 200 feet from water sources with natural screening.
- Constantly evaluate the impacts which will occur, both short and long term.

**Avoid placing fire camps within 0.25 miles of suitable spotted owl and marbled murrelet habitat between February 1st and September 15th. This period would extend to January 1st near known bald eagle nest sites. Where possible, expedient and where fire fighter safety will not be compromised or fire fighting suppression activities significantly hindered, avoid placing spike camps and staging areas within 0.25 miles of suitable spotted owl and marbled murrelet habitat between February 1st and September 15th. This period would extend to January 1st near known bald eagle nest sites. Consult with the assigned ICT biologist or Lead Resource Advisor for information on known active eagle nest locations.

Personal Camp Conduct

- Inform all fire fighting field staff to always pack out all food waste and to never feed any wildlife.
- Use “leave no trace” camping techniques.
- Minimize disturbance to land when preparing bedding site. Do not clear vegetation or trench to create bedding sites.
- Don’t burn plastics or aluminum – “pack it out” with other garbage.
- Keep a clean camp and store food and garbage so it is unavailable to bears. Ensure items such as empty food containers are clean and odor free, never bury them.
- Select travel routes between camp and fire and define clearly.
- Carry water and bathe away from streams. Personnel must not introduce soaps, shampoos or other personal grooming chemicals into waterways.

AVIATION MANAGEMENT

***PLEASE NOTE!** These guidelines are for aircraft flying over RNSP lands away from any active wildfire location and are not intended to influence approach or exit flight lines during aerial water/retardant drops or low elevation reconnaissance of fire activity. At no time should the helicopter or airtanker pilot-in-command fly in such a way as to endanger the aircraft, other aircraft, or structures, or compromise ground personnel safety in order to implement these guidelines.

Aviation Use Guidelines

- Maximize back haul flights as much as possible.
- Use long line remote hook in lieu of constructed helispots for delivery or retrieval of supplies and gear.
- Take precautions to insure noxious weeds are not inadvertently spread through the deployment of cargo nets and other external loads
- Use natural openings for helispots and paracargo landing zones as far as practical. If construction is necessary, avoid high visitor use areas.
- Consider maintenance of existing helispots over creating new sites.
- Obtain specific instructions for appropriate helispot construction prior to the commencement of any ground work.
- Consider directional falling of trees and snags so they will be in a natural appearing arrangement.
- Buck and limb only what is necessary to achieve safe/practical operating space in and around the landing pad area.
- When flying over forested regions of RNSP between January 1st and September 15th, restrict flight elevations to at least 500', preferably 1000', above the canopy of suitable marbled murrelet and spotted owl habitat.
- When flying over known active spotted owl nests between February 1st and July 9th, restrict flight elevations to at least 1000' above the canopy within 0.25 miles of the nest site. Consult with the assigned ICT biologist or Lead Resource Advisor for information on known active owl nest locations.
- When flying over known active bald nests between January 1st and August 31st, restrict flight elevations to at least 500' above the canopy within 0.5 miles of the nest site. Consult with the assigned ICT biologist or Lead Resource Advisor for information on known active eagle nest locations.
- When flying over the Steller's sea lion colony during any time of the year, restrict flight elevations to at least 1000' above sea level with 0.25 miles of the colony.
- When flying over ocean beaches and offshore rocks between March 1st and September 30th, restrict flight elevations to at least 500' (preferably 1000') above sea level. If the aircraft appears to cause seabirds or marine mammals to flush, gain elevation by at least 500' during future passes.
- When flying within 1000' of known active peregrine falcon eyries, restrict flight elevations to at least 500'. Consult with the assigned ICT biologist or Lead Resource Advisor for information on known active peregrine falcon eyrie locations.

Retardant Use

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

then the manager might consider retardant use even in sensitive areas. This decision must take into account all values at risk and the consequences of larger firefighting forces' impact on the land.

- Consider impacts of water drops versus use of foam/retardant. If foam/retardant is deemed necessary, consider use of foam before retardant use.
- Avoid aerial application of retardant or foam within 300' of waterways. To meet the 300' buffer zone guideline, implement the following:

Airtankers: When approaching a waterway visible to the pilot, the pilot should terminate the application of retardant approximately 300' before reaching the waterway. When flying over a waterway, pilots should wait one second after crossing the far bank or shore of a waterway before applying retardant. Pilots should make adjustments for airspeed and ambient conditions such as wind to avoid the application of retardant within the 300' buffer zone.

Helicopters: When approaching a waterway visible to the pilot, the pilot should terminate the application of retardant or foams 300' before reaching the waterway. When flying over a waterway, pilots should wait five seconds after crossing the far bank or shore before applying the retardant or foam. Pilots should make adjustments for airspeed and ambient conditions such as wind to avoid the application of retardant or foam within the 300' buffer zone

** When alternative line construction tactics are not available due to terrain constraints, congested area, life and property concerns, or lack of ground personnel, it is acceptable to anchor the foam or retardant application to the waterway. When anchoring a retardant or foam line to a waterway, use the most accurate method of delivery in order to minimize placement of retardant or foam in the waterway (e.g., a helicopter rather than a heavy airtanker).

When potential damage to natural resources outweighs possible loss of aquatic life, the unit administrator may approve a deviation from these guidelines.

HAZARDOUS MATERIALS

Flammable/Combustible Liquids

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

Flammable Solids

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

FIRE REHABILITATION

Guidelines for Wildland Fire Rehabilitation Actions -

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

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

Rehabilitation Guidelines:

- Pick up and remove all flagging, garbage, litter, and equipment. Dispose of trash appropriately.
- Discourage use of newly established trails created during the suppression effort by covering with brush, limbs, small diameter poles, and rotten logs in a naturally appearing arrangement.
- Replace dug-out soil and/or duff and obliterate any berms created during the suppression effort.
- Where soil has been exposed and compacted, such as in camps, on user-trails, at helispots and pump sites, scarify the top 2-4 inches and scatter with needles, twigs, rocks, and dead branches.
- Where trees were cut or limbed, cut stumps flush with ground, scatter limbs and boles, out of sight in unburned area.

If impacted trails have developed on slopes greater than six percent and it has been determined by the Resource Advisor that waterbars are necessary, they will be spaced according to the following guidelines:

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

This section provides recommendations for avoiding and minimizing adverse effects on listed salmon and trout and their critical habitat from wildland fire rehabilitation activities. There are two types of emergency rehabilitation associated with wildland fires: fire suppression rehabilitation and burned area emergency rehabilitation (BAER). Fire suppression rehabilitation is any action that minimizes the effects of wildland fire suppression activities. BAER activities are implemented to reduce the effects of the wildland fire prior to the onset of winter precipitation.

- Remove woody debris or slash from stream channels only if it may cause an imminent threat of damage to life or property (e.g., above a culvert inlet that could potentially plug).
- Implement erosion control measures to restore natural drainage patterns and minimize the amount of exposed mineral soil, thereby reducing sediment delivery to stream channels.
- Decommission roads and stream crossings constructed for fire suppression actions.
- Decommission dams at drafting sites developed for the Actions.

Include a fisheries biologist with local knowledge on the wildland fire suppression rehabilitation and BAER teams for identifying activities that benefit listed salmonids and their critical habitat.

Appendix E: Redwood National and State Parks Prescribed Burn Units

RNSP Burn Units

Burn Unit Name	Total Area (acres)	Vegetation Type	FMU
Airstrip, Upper	102	Grassland and Oak Woodland	Bald Hills
Airstrip, Lower	111	Grassland and Oak Woodland	Bald Hills
Boyes	123	Grassland	State Park
C-10	339	Second Growth Conifer	Coniferous
Child's Hill	561	Grassland and Oak Woodland	Bald Hills
Copper Creek	148	Grassland and Oak Woodland	Bald Hills
Counts, Lower	180	Grassland and Oak Woodland	Bald Hills
Counts, Upper	118	Grassland and Oak Woodland	Bald Hills
Coyote Creek	1063	Grassland and Oak Woodland	Bald Hills
D-A Second Growth	40	Second Growth Conifer	Bald Hills
Davison	10	Grassland and Conifer	Coniferous
DeMartin	38	Grassland	Coastal
Dolason, Lower	220	Grassland and Oak Woodland	Bald Hills
Dolason, Upper	94	Grassland and Oak Woodland	Bald Hills
Dooleyville	111	Grassland and Oak Woodland	Bald Hills
Eastside	107	Grassland and Oak Woodland	Bald Hills
Elk Camp, Lower	244	Grassland and Oak Woodland	Bald Hills
Elk Camp, Upper	37	Grassland and Oak Woodland	Bald Hills
Enderts	110	Coastal Shrub	Coastal
Flint Ridge	13	Grassland	Coastal
Ganns Prairie, Lower	32	Grassland and Oak Woodland	Coniferous
Ganns Prairie, Upper	17	Grassland and Conifer	Coniferous
Lagoon Creek	68	Coastal Shrub	Coastal
Leiffer Loop	93	Old Growth Redwood	State Park
Little Bald Hills	1470	Grassland and Pine Woodland	LBH
Lyons, Lower	143	Grassland and Oak Woodland	Bald Hills
Lyons, Upper	208	Grassland and Oak Woodland	Bald Hills
Mainstem	166	Grassland and Oak Woodland	Bald Hills
Major Creek	7	Grassland	Coastal
Maneze	191	Grassland and Oak Woodland	Bald Hills
Mid Basin East	72	Grassland and Oak Woodland	Bald Hills
Mid Basin West	57	Grassland and Oak Woodland	Bald Hills
Pig Pen	69	Grassland and Oak Woodland	Bald Hills
Schoolhouse	300	Grassland and Oak Woodland	Bald Hills

Burn Unit Name	Total Area (acres)	Vegetation Type	FMU
South Boundary	86	Grassland and Oak Woodland	Bald Hills
Tick	34	Grassland and Oak Woodland	Bald Hills
Upper K&K	40	Second Growth Conifer	Coniferous
Wildcat	1378	Second Growth Conifer	Coniferous
Williams Ridge West	76	Grassland and Oak Woodland	Bald Hills
Williams Ridge East	42	Grassland and Oak Woodland	Bald Hills
Wooden Gate	243	Grassland and Oak Woodland	Bald Hills
Xowannutuk	20	Old Growth Redwood	Bald Hills

Appendix F: Prescribed Burn Plan

PRESCRIBED FIRE PLAN

ADMINISTRATIVE UNIT(S): Redwood National and State Parks

PRESCRIBED FIRE NAME: _____

PREPARED BY: _____ **DATE:** _____
RXB2

REVIEWED BY: _____ **DATE:** _____
RXB2

REVIEWED BY: _____ **DATE:** _____
FMO/RXB2

REVIEWED BY: _____ **DATE:** _____
Supervisory Botanist

REVIEWED BY: _____ **DATE:** _____
Chief RM & S

TECHNICAL REVIEW BY: _____ **DATE:** _____
Name & Qualification

COMPLEXITY RATING: MODERATE

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

APPROVED BY: _____ **DATE:** _____
Superintendent

**ELEMENT 1: AGENCY ADMINISTRATOR GO/NO-GO PRE-IGNITION
APPROVAL CHECKLIST**

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

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

Recommended by: _____ Date: _____
FMO/Prescribed Fire Burn Boss

Approved by: _____ Date: _____
Agency Administrator

Approval expires (date): _____

ELEMENT 2: PRESCRIBED FIRE GO/NO-GO CHECKLIST

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

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

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

Burn Boss

Date

ELEMENT 3 COMPLEXITY ANALYSIS SUMMARY

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

COMPLEXITY RATING SUMMARY	
	OVERALL RATING
RISK	
CONSEQUENCES	
TECHNICAL DIFFICULTY	
SUMMARY COMPLEXITY DETERMINATION	
<p>RATIONALE: The issues with this project that rate moderate and cannot be successfully mitigated are the potential consequences of an escape onto the private lands, an off-site value. As this is the first entry into this unit, it should rate as a moderate.</p>	

ELEMENT 4: DESCRIPTION OF PRESCRIBED FIRE AREA

A. Physical Description:

Township:

Latitude

Longitude

UTM Zone

Northing

Easting

1. *Size:*

2. *Topography:*

3. *Project Boundary:*

B. Vegetation/Fuels Description:

C. Description of Unique Features:

ELEMENT 5: GOALS AND OBJECTIVES

A. Goals:

B. Objectives: Objectives will be measured by the REDW Fire Ecology Program and/or RNSP Vegetation Management staff within two years of ignition.

RESOURCE OBJECTIVES:	HOW MEASURED	ACTUAL RESULTS

ELEMENT 6: FUNDING:

A. Cost:

B. Funding source:

ELEMENT 7: PRESCRIPTION

A. Environmental Prescription:

Environmental Prescription	Range
Temperature (°F)	
Relative Humidity (%)	
Wind Direction, clockwise	
Mid Flame Wind Speed (mph)	
Fuel Moisture-1 hour (%)	

B. Fire Behavior Prescription:

Fire prescription Fuel Model 3	Range
Rate of Spread (chains/hour)	
Flame Length (ft)	
Probability of Ignition (%)	

Fire prescription Fuel Model 8	Range
Rate of Spread (chains/hour)	
Flame Length (ft)	
Probability of Ignition (%)	

* A wide range of weather and fuels parameters has been prescribed for this project. While no values may be exceeded, the probability of ignition (POI) predicted for the day and the predicted rate of spread (ROS) for a slopover that is established and burning away from the unit are the fire characteristics that will be utilized each day of burning to determine whether or not the unit is “in” or “out” of prescription. *Any combination of predicted weather and fuel elements within the above specified range that do not exceed **POI of 50%** or **ROS of 60 ch/hr in grass fuels** or **ROS of 5 ch/hr in forest fuels** for a slopover burning away from the unit will be considered “in” prescription and valid. On scene resources and mitigations are valid considerations when determining acceptability of conditions for burning.*

ELEMENT 8: SCHEDULING

A. Ignition Time Frames/Season(s):

B. Projected Duration:

C. Constraints:

Dates when burn will not be conducted include:

1. No-burn day as determined by North Coast Air Quality Management District, unless a variance is requested and granted.
2. National or Regional Preparedness Levels preclude new prescribed fires.
3. Management concerns preclude ignition of any portion of this project.

ELEMENT 9: PRE-BURN CONSIDERATIONS

A. Considerations:

1. On Site:

PRE-BURN

- Remove fuel accumulations along firelines, mowlines or roadways where spotting or radiant heat may be a problem.
- Spot weather forecasts will be requested at least one day prior to and each consecutive day of the burn.
- Confirm prescription parameters.
- Check water sources and drafting locations for contingency planning.

DAY OF BURN:

- Complete and sign "Prescribed Fire Operations GO/NO GO Checklist".
- Post RX signs along BHR.
- Stage or set up any equipment as directed by the burn boss or holding specialist.

2. Off Site:

PRE-BURN

- Complete PEPC according to established standards and timeframes.
- Complete necessary pre-work including review and signature of "Agency Administrator GO/NO GO Pre-Ignition Approval".

- Initiate “Notification Checklist” according to established schedule.
- Notify Fortuna ECC of scheduled burns and provide location map.
- Notify adjoining landowners of the planned ignition operations.

PRIOR TO BURN

- Post informational bulletins at Park Visitor Centers .
- Develop IAP for upcoming operational period.

Special Precautions/Regulations:

- Archeological clearance will be obtained from FIREPRO archeological staff. We will adhere to all mitigation measures prescribed by the staff.
- An air quality burn permit will be obtained and burn clearance will be coordinated with CA Air Resources Board and North Coast Air Quality Management District.
- Adjacent private property boundary will be identified to holding resources prior to ignition.
- Where possible, large snags (> 36” DBH) and large downed logs (> 36” diameter on long end and > 10’ long) will be protected at prairie edge and within oak woodlands during prescribed fire operations to protect mammal, bat, and cavity nesting bird habitat.

B. Method and Frequency for Obtaining Weather and Smoke Management

Forecast(s): Local weather patterns will be monitored daily from RAWS stations prior to burn day. On site weather will be collected as needed and on the day prior to burn day and submitted to Eureka NWS for spot forecast.

C. Notifications: Park staff will prepare a press release outlining all planned prescribed fires for the season at least one week prior to conducting the first prescribed fire in the park for the season. The press release will be sent to area newspapers and radio stations at least one day prior to conducting the burn.

Fire management staff will prepare a prescribed fire notice with general map identifying the burn location. These notices will be posted at least one day prior to the burn at the following locations and campgrounds within vicinity of the burn.

- Orick Post Office
- Prairie Creek State Park
- Kuchel Visitor Center
- Crescent City Information Center

Fire management staff will notify the following at least one week prior to the proposed ignition date:

- Park Superintendent & Management Team

- CAL FIRE
- Humboldt-Del Norte Ranger Unit
- North Coast Air Quality Management District
- Property owners adjacent to burn unit

Fire management staff will notify the following (via telephone or electronic media), at least two days prior to the proposed ignition date:

- Fortuna Emergency Coordination Center
- Hoopa Fire Department
- Park Staff
- Regional Office and Northern California sub-cluster NPS Fire Management staff

Fire management staff will attempt to submit a “Fire News” briefing of the project on www.nps.gov/fire after project completion.

ELEMENT 10: BRIEFING

Briefing Checklist:

Burn Organization

Burn Objectives

Description of Burn Area

Expected Weather & Fire Behavior

Communications

Ignition plan

Holding Plan

Contingency Plan

Wildfire Conversion

Safety

ELEMENT 11: ORGANIZATION AND EQUIPMENT

A. Positions:

#	Position	Minimum ICS Qualification
	Burn Boss/Incident Commander	
	Firing Boss	
	Holding Specialist	
	Ignition Crew (2 persons)	
	12-person handcrew	
	Fire Effects Monitor	
	Traffic Control	

B. Equipment:

#	Type of Equipment	Minimum ICS Standard
	Type 3, 4, 5 or 6 engines	ICS T6 engine, w/ crew of 3

C. Supplies: Additional supplies, if needed, will be determined by the Burn Boss prior to ignition.

ELEMENT 12: COMMUNICATION

A. Radio Frequencies

1. Command Frequency(s): 165.1625Rx/164.425Tx (NPS). Use SRF Forest Net to communicate with FECC. The frequency will be identified in the IAP.
2. Tactical Frequency(s): 168.350 Tx/Rx
3. Air Operations Frequency(s): N/A

B. Telephone Numbers:

Who	Phone Number
Fortuna ECC	
FMO	
Park Superintendent	

ELEMENT 13: PUBLIC AND PERSONNEL SAFETY, MEDICAL

- A. Safety Hazards:** Safety hazards are identified through the Job Hazard Analysis and communicated at the briefing.
- B. Measures Taken to Reduce the Hazards:** Other mitigation of hazards are identified in the Job Hazard Analysis.
- C. Emergency Medical Procedures:** First aid will be given by EMT or other qualified personnel. If higher care is needed it will be ordered through Fortuna ECC.

Emergency Evacuation Methods: If ground transportation does not meet the needs of the emergency, School House Peak (N 41° 09' 06.7" x W 123° 52' 58.3") or Lyons Ranch parking area (N41° 08' 51.0" X W123° 53' 39.7") can be used as a helispot.

- D. Emergency facilities:** Mad River Community Hospital, Arcata, CA 707-822-3621

ELEMENT 14 TEST FIRE

- A. Planned location:** The test fire will be at the top of the unit. Wind patterns the day of the burn will determine the final location.
- B. Test Fire Documentation:** The results of the test fire and weather during the ignition phase of this project will be included in the Fire Effects Monitor (FEMO) report.

ELEMENT 15: IGNITION PLAN

- A. Firing Methods:** Combinations of strip head, flanking, spot, and backing ignition patterns will be used to ignite the unit.
- B. Devices:** Handheld devices such as fusees, drip torches, and veri pistols.
- C. Techniques:** The head and flanks will be black lined prior to igniting the interior.
- D. Sequences:** The firing boss will coordinate the sequence of the firing crew to ensure safety and that the firing operation does not exceed the capabilities of the holding crew.

- E. Patterns:** The pattern of firing will be determined by the firing boss, depending on weather the day of the burn and communicated at the briefing. The pattern may change depending on weather and/or fuels during ignition operations.
- F. Ignition Staffing:** A FIRB and a two person crew.

ELEMENT 16: HOLDING PLAN

- A. General Procedures for Holding:** Holding will be accomplished by crew personnel. Firing will not exceed the holding forces capacity to hold the line. Minimum Impact Tactics (MIT) will be used by holding forces.
- B. Critical Holding Points and Actions:**
- C. Minimum Organization or Capabilities Needed:**

ELEMENT 17: CONTINGENCY PLAN

- A. Trigger Points:** If any spot fire and/or slopover cannot be contained within 20 minutes of discovery, or if there are too many spot fires outside of the unit at one point that each cannot be staffed immediately following discovery by on-site resources all ignitions will cease and operations postponed until more favorable conditions exist.
- B. Actions Needed:** The holding specialist will determine what actions are needed and inform the burn boss. If actions are taken on private lands, CAL FIRE will be informed.
- C. Additional Resources and Maximum Response Time(s):** The burn boss will determine the need for additional resources and order through Fortuna ECC.

ELEMENT 18: WILDFIRE CONVERSION

- A. Wildfire Declared By:** The burn boss will make the declaration.
- B. IC Assignment:** The burn boss will assume the role of Incident Commander. If the wildfire exceeds the qualifications of the on scene IC, an IC will be ordered through Fortuna ECC.
- C. Notifications:** Should a prescribed fire be converted to a wildland fire all resources on the incident will be notified. Also, the park superintendent and fire management

officer will be notified. The agency administrator or designee will create a WFDSS incident.

- D. Extended Attack Actions and Opportunities to Aid in Fire Suppression:** Other actions and opportunities will be addressed in the briefing.

ELEMENT 19: SMOKE MANAGEMENT AND AIR QUALITY

- A. Compliance:** The burn boss and/or designee will monitor compliance with the “Burn Day” regulations. If the NCAQMD declares a “No Burn Day” there will be no new ignitions unless a waiver is requested and granted.
- B. Permits to be obtained:** A smoke management plan and request for a burn permit will be made by the burn boss or designee to the North Coast Air Quality Management District. The smoke plan is generalized and will cover all units burned in the Bald Hills area during the prescribed burn season of 201x. The burn permit will be obtained specifically for each burn unit ignited and will address site specific conditions related to smoke production anticipated during and after ignitions are completed.
- C. Smoke Sensitive Areas:** Hoopa
Orick
Prairie Creek State Park
- D. Impacted Areas:**
- E. Mitigation Strategies and Techniques to Reduce Smoke Impacts:**

ELEMENT 20: MONITORING

- A. Fuels Information (forecast and observed) Required and Procedures:** No fuel information is required from the FEMOs.
- B. Weather Monitoring Required and Procedures:** Spot forecast will be requested prior to the burn. During ignition FEMOs will record weather hourly, unless requested more often by the burn boss or significant events occur. The information collected and its interpretation and correlation to burning conditions observed on the unit will be documented in the FEMO post burn report.
- C. Fire Behavior Monitoring Required and Procedures:** FEMOs will record fire behavior during the ignition phase of this project. This will be recorded hourly at a minimum and will be incorporated into the FEMO post burn report.

D. Monitoring Required To Ensure That Prescribed Fire Plan Objectives Are Met:

The Fire Effects Monitoring crew, in coordination with the Fire Ecologist and Vegetation Management staff, will collect pre- and post-burn data. The Fire Ecologist will perform analysis to determine whether burn objectives were met. The interim and final results will be summarized in an annual report and attached as a separate document to this plan. The Fire Management Officer and Vegetation Branch Chief are responsible for ensuring the reports are developed in a timely manner.

E. Smoke Dispersal Monitoring Required and Procedures: The FEMO assigned to this project will monitor the smoke column and direction at least hourly during the ignition phase of the project. The information collected will be summarized and incorporated into their post burn report.

ELEMENT 21: POST-BURN ACTIVITIES

Post-burn Activities that must be completed:

- The Burn Boss, Firing Boss and Holding Specialist will maintain ICS-214 Unit Logs.
- The Lead FEMO will prepare and submit an individual report that summarizes weather, fire behavior, and smoke observation data within two weeks after the fire.
- The Burn Boss or designee will prepare an Individual Fire Report within ten days after declaring the fire out.
- Project accomplishments will be updated in the National Fire Plan Operational Reporting System (NFPORS) within 5 days of project completion.
- Fire Management staff will maintain a project file that includes the Prescribed Fire Plan, spot weather forecasts, and all required reports.

APPENDICES

A. Maps: Vicinity and Project

B. Technical Review Checklist

C. Complexity Analysis

D. Job Hazard Analysis

E. Fire Behavior Modeling Documentation or Empirical Documentation (unless it is included in the fire behavior narrative in Element 7; Prescription)

1. Vicinity Map:

A: MAPS

2. Project Map:

B: TECHNICAL REVIEWER CHECKLIST

PRESCRIBED FIRE PLAN ELEMENTS:	S /U	COMMENTS
1. Signature page		
2. GO/NO-GO Checklists		
3. Complexity Analysis Summary		
4. Description of the Prescribed Fire Area		
5. Goals and Objectives		
6. Funding		
7. Prescription		
8. Scheduling		
9. Pre-burn Considerations		
10. Briefing		
11. Organization and Equipment		
12. Communication		
13. Public and Personnel Safety, Medical		
14. Test Fire		
15. Ignition Plan		
16. Holding Plan		
17. Contingency Plan		
18. Wildfire Conversion		
19. Smoke Management and Air Quality		
20. Monitoring		
21. Post-burn Activities		
Appendix A: Maps		
Appendix B: Complexity Analysis		
Appendix C: JHA		
Appendix D: Fire Prediction Modeling Runs		
Other		

S = Satisfactory

U = Unsatisfactory

Recommended for Approval:

Not Recommended for Approval:

 Technical Reviewer

 Qualification and currency (Y/N)

 Date

€ Approval is recommended subject to the completion of all requirements listed in the comments section, or on the Prescribed Fire Plan.

C: Prescribed Fire Complexity Rating System Guide Worksheet

Instructions: This worksheet is designed to be used with the Prescribed Fire Complexity Rating System Guide NFES 2474 (www.nwccg.gov/pms/RxFire/rxfire.htm)

Project Name _____ Number _____

Complexity elements:

1. Potential for Escape

Risk	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Potential Consequences	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Technical Difficulty	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	

2. The Number and Dependency of Activities

Risk	Rationale

Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Potential Consequences	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Technical Difficulty	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	

3. Off-Site Values

Risk	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Potential Consequences	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Technical Difficulty	Rationale

Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	

4. On-Site Values

Risk	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Potential Consequences	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Technical Difficulty	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	

5. Fire Behavior

Risk	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Potential Consequences	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Technical Difficulty	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	

6. Management Organization

Risk	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Potential Consequences	Rationale
Preliminary Rating: <i>Low Moderate High</i>	

Final Rating: <i>Low Moderate High</i>	
Technical Difficulty	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	

7. Public and Political Interest

Risk	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	

Potential Consequences	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Technical Difficulty	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	

8. Fire Treatment Objectives

Risk	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Potential Consequences	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Technical Difficulty	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	

9. Constraints

Risk	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Potential Consequences	Rationale
Preliminary Rating: <i>Low Moderate High</i>	

Final Rating: <i>Low Moderate High</i>	
Technical Difficulty	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	

10. Safety

Risk	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Potential Consequences	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Technical Difficulty	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	

11. Ignition Procedures/Methods

Risk	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Potential Consequences	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Technical Difficulty	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	

12. Interagency Coordination

Risk	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Potential Consequences	Rationale
Preliminary Rating: <i>Low Moderate High</i>	

Final Rating: <i>Low Moderate High</i>	
Technical Difficulty	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	

13. Project Logistics

Risk	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Potential Consequences	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Technical Difficulty	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	

14. Smoke Management

Risk	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Potential Consequences	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	
Technical Difficulty	Rationale
Preliminary Rating: <i>Low Moderate High</i>	
Final Rating: <i>Low Moderate High</i>	

COMPLEXITY RATING SUMMARY

RISK

OVERALL RATING

POTENTIAL CONSEQUENCES

OVERALL RATING

TECHNICAL DIFFICULTY

OVERALL RATING

SUMMARY COMPLEXITY RATING

RATIONALE: Management organization, interagency cooperation, public and political interest are rated moderate for all Rx fires in the Bald Hills. The issues with this project that rate moderate and can not be successfully mitigated are the potential consequences of an escape onto the private lands, an off-site value. As this is the first entry into this unit, it should rate as a moderate.

Prepared by: _____ Date: _____

Approved by: _____ Date: _____
_____ (Agency Administrator)

D. JOB HAZARD ANALYSIS

REDWOOD NATIONAL PARK	1. WORK PROJECT/ACTIVITY Prescribed Fire	2. LOCATION RWP	3. UNIT FIRE
JOB HAZARD ANALYSIS (JHA)	4. NAME OF ANALYST Jeff Ayers	5. JOB TITLE Forestry Tech	6. DATE PREPARED 01/08/08
7. TASKS/PROCEDURES	8. HAZARDS	9. ABATEMENT ACTIONS Engineering Controls * Substitution * Administrative Controls * PPE	
<p>*Travel to, from and on Project.</p> <p>*Qualifications For assigned Position</p> <p>*Briefing</p> <p>*Protective Clothing and equipment</p> <p>*Lighters</p>	<p>Motor vehicle accidents Slippery road surfaces,soft shoulders,unimproved and narrow roadways. Weather darkness,smoke. Lack of Experience Injuries</p> <p>Lack of communications</p> <p>Injuries,burns and death</p> <p>Injuries and death falls,snags,bees, snakes,smoke, burns, rolling</p>	<p>Driving Defensively. Use seat belts. Identify road conditions during briefings. Post Road Guards. Mark hazards. Use Headlights. Perform preuse inspections on equipment. Scout roads and identify turnouts before ignition of project. Maintain communications. Provide road system map for project. Use Backers and chock vehicle tires. Have vehicles facing out.</p> <p>Workers recruited for burn assignments shall meet age,health, and physical requirements established for regular firefighting duties. Also meet Prescribed Burn qualifications. Provide project briefing before burning will clarify firing order, organization responsibilities, communications, hazards, weather, and expected fire behavior. Wear Hard hat with chin strap, safety glasses, Nomex Fire resistant pants and shirts NFPA compliant. Keep sleeves rolled down. Wear leather,lace type, boots with skid resistant soles, and tops at least 8 inches high. Carry drinking water and fire shelter. Wear OSHA approved firefighting gloves. wear hearing protection when working around equipment where noise level exceeds 90 dba. Wear additional protective equipment as dictated by local conditions and exposure to special equipment. Always have an escape route . Maintain LCES. Follow the Standard Fire Orders and Watch Out Situations. Maintain communications with other Lighters and RX FIRB. Hand held radios shall be provided to all lighters. Do not fill drip</p>	

<p>*Fuel Mixing</p> <p>*Holding/Mop Up/Patrol Crews</p> <p>*Emergency Evacuation Procedures (EEP)</p>	<p>material.</p> <p>Burns, spills, fuel saturated clothing and boots.</p> <p>Smoke,burns,Falls, back injuries, bees, posion oak,snags, rolling material,eye injuries. Heat Stress. Dehydration CO Poisoning</p> <p>Serious illness injuries</p>	<p>torches near ignition sources. Do not spill burn mix on clothing.</p> <p>No smoking within 25 feet of mixing and filling area. Do not fill or mix in pick up beds with bed liners. Avoid the use of cellular telephones in and around fill or mixing area. Avoid fuel contact with bare hands, clothing and boots. Provide pour spouts. Use only approved fuel containers.</p> <p>Wear PPE's listed above. LCES, Follow Standard Fire Orders and Watch out Situations. Receive briefing from Holding and Mop Up Boss. Identify hazards in work area. Flag hazards for others. Use warning lights and provide traffic control on roadways during smoky and nights operations. Maintaining a high level of aerobic fitness is one of the best ways to protect yourself against heat stress. Drink lots of fluids before,during and after work. Periodically rotate crews from work sites with high smoke levels to areas of less smoke or smoke free areas. Protective clothing and equipment shall be the same as required for firefighting. Crews shall follow all guidelines in the NWCG Fireline Handbook Chapter 1 Firefighting Safety (Rev.2004) Maintain communications with the Fortuna ECC.</p> <p>Notify Fortuna ECC, request medical response from the responsible medical first responders. Provide type of injury,location,access, number of patients. Follow EMS protocol. On site RWP engines shall have BLS equipment to initiate basic life support until responsible medical first responders arrive. Identify EMT's and available medical equipment on project during briefing.</p>
<p>10. LINE OFFICER SIGNATURE</p>	<p>11. TITLE</p>	<p>12. DATE</p>

Emergency Evacuation Instructions

Work supervisors and crew members are responsible for developing and discussing field emergency evacuation procedures (EEP) and alternatives in the event a person(s) becomes seriously ill or injured at the worksite.

Be prepared to provide the following information:

- a. Nature of the accident or injury (avoid using victim's name).
- b. Type of assistance needed, if any (ground, air, or water evacuation)
- c. Location of accident or injury, best access route into the worksite (road name/number), identifiable ground/air landmarks.
- d. Radio frequency(s).
- e. Contact person.
- f. Local hazards to ground vehicles or aviation.
- g. Weather conditions (wind speed & direction, visibility, temp).
- h. Topography.
- i. Number of person(s) to be transported
- j. Estimated weight of passengers for air/water evacuation.

The items listed above serve only as guidelines for the development of emergency evacuation procedures.

JHA and Emergency Evacuation Procedures Acknowledgment

We, the undersigned work leader and crew members, acknowledge participation in the development of this JHA (as applicable) and accompanying emergency evacuation procedures. We have thoroughly discussed and understand the provisions of each of these documents:

SIGNATURE

DATE

SIGNATURE

DATE

Work Leader

**E: FIRE BEHAVIOR MODELING DOCUMENTATION OR EMPIRICAL
DOCUMENTATION**

ADEQUATE HOLDING RESOURCES WORKSHEET

Appendix G: Fire Use Restrictions and Emergency Closure Plan

Redwood National and State Parks

Fire Use Restrictions and Emergency Closure Plan

Introduction

Enforceable fire use restrictions and emergency closures can reduce the possibility of human caused wildland fires occurring during periods of seasonal drought, when wildfires can cause serious damage to park resources and threaten the safety of park visitors and employees. It is highly unlikely that park areas would need to be closed to public entry because of fire danger reasons alone, although it could become necessary if there is substantial fire activity in the area and park management decides that new fire starts must be prevented. Emergency closures for public safety reasons may be implemented for areas within the park affected by ongoing fire operations.

Objectives

- A. To restrict the use of fire by the public in defined areas of the parks during periods of very high and extreme fire danger.
- B. To provide park administrative staff with a procedure for making emergency closures for fire prevention and public safety reasons.
- C. To ensure fire use restrictions and emergency closures comply with the requirements set forth in 36 Code of Federal Regulations, Part 1, section 1.5.

Authority

Fire use restrictions and emergency closures shall be in compliance with the requirements set forth in 36 Code of Federal Regulations, sections 1.5 and 2.13(c). This plan serves as the written determination for enforcing fire use restrictions as required in section 1.5(c). A decision memorandum will be approved by the superintendent when fire use restrictions are enforced. When enforcing emergency closures for fire prevention or public safety reasons a Special Order must be approved by the superintendent and given wide distribution. Whenever fire use restrictions or area closures are enforced, public notice must be given in compliance with 36 CFR, section 1.7.

Procedure for Enforcement of Fire Use Restrictions

The Fire Management Officer shall have the responsibility to identify areas of the parks where fire use restrictions and emergency procedures for fire prevention purposes should be implemented. The Fire Management Officer will consider:

- Weather Data
- Fuels Data
- Visitor use trends
- On-park fire situation (Number of going fires and their potential, probability of new starts, and on-park suppression resource draw-down)
- Current adjoining National Forest and/or California Department of Forestry fire use restrictions and emergency closure enforcement - - SRF, HUU
- Regional and national preparedness plan levels

The Fire Management Officer will consult with the Redwood National and State Park Rangers.

The Fire Management Officer and the Division Chief of Resources Management and Science will recommend to the Superintendent the appropriate Stage Level that should go into effect. A decision memorandum will be approved by the superintendent.

Once restrictions have been approved, the Fire Management Officer will coordinate the following in order to place Stage I, Stage II, or Stage III restrictions or closures into effect.

1. Notification of Supervisory Interpretative Staff so that information can be forwarded on to all park visitor information centers.
2. Notification to all park staff.
3. Make available to all visitor centers a fire use restriction and emergency closure handout for the public and park employees.
4. Notification of Fortuna ECC.
5. In addition a press release may be issued announcing any closures as needed.

Procedure for Lifting Fire Use Restrictions

When fire danger and fire occurrence moderates the Fire Management Officer shall recommend a reduction of fire use restrictions and emergency closures for fire prevention purposes. The Fire Management Officer will consider:

- Weather Data
- Fuels Data
- Visitor use trends
- On-park fire situation (number of going fires and their potential, probability of new starts, and on-park suppression resource draw-down)
- Current adjoining National Forest and/or California Department of Forestry fire use restrictions and emergency closure enforcement - - SRF, HUU
- Regional and national preparedness plan levels

The Fire Management Officer will consult with the Redwood National and State Park Rangers.

The Fire Management Officer will recommend to the Chief Rangers and Superintendent the appropriate level of restrictions/closures or lifting of restrictions/closures. A decision memorandum will be approved by the superintendent.

Once the lifting of restrictions/closures has been approved the Fire Management Officer will coordinate the following in order to lift Stage I, Stage II, or Stage III restrictions/closures:

1. Work with designated Public Information Officer and issue a press release announcing the lifting of the stage level(s).
2. Notification of Supervisory Interpretative Staff so that information can be forwarded on to all park visitor information centers.
3. Notification to all park staff.
4. Coordinate the removal and storage of signs.
5. Notification of Fortuna ECC.

Special Signage During 4th of July

Special “No Fireworks” signs will be posted throughout the Parks seven days prior to and seven days after the 4th of July holiday. The Fire Management Officer will coordinate the posting of signs with Park Rangers.

Stage I

Stage I Trigger Conditions

1. National Fire Danger Rating System Energy Release Component (ERC) of 25-47.
2. Fire use restrictions implemented on adjoining Forest Service or California Department of Forestry Lands (SRF, HUU).

Stage I Scope

Stage I does not implement any closures or restrictions. It requires the posting of signs reminding visitors of the parks’ policy on campfire use.

Stage I Signage

Signs should be posted in all designated high use areas including backcountry trailheads, campgrounds, and day use areas. The signs will state:

High Fire Danger

- ***Campfires are permitted in park-provided grills or designated sites in all campgrounds, picnic areas and backcountry campsites. Holders of a valid backcountry camping permit for Redwood Creek may build a fire only on the gravel bars, per conditions of the permit.***
- ***Fires may be built on beach wave slopes, but not on vegetation or within, or in close proximity to, driftwood piles.***
- ***Moving a grill or fire ring from its original location is prohibited.***
- ***Where grills are provided, all burning material must be fully contained within the grill.***
- ***The burning of trash or food waste is prohibited within the park.***

Stage II

Stage II Trigger Conditions

1. National Fire Danger Rating System ERC of 51-57.
2. Fire use restrictions implemented on adjoining Forest Service or California Department of Forestry Lands (SRF, HUU).

Stage II Scope

Backcountry camping will be restricted. No open fires within the boundary of the parks. Equipment use may be restricted within the parks.

Stage II Signage

Signs should be posted in all designated high use areas including backcountry trailheads, campgrounds, and day use areas. The signs will state:

Very High Fire Danger

- *Backcountry camping restricted.*
- *Absolutely no fires outside of designated areas within campgrounds and/or day use areas.*

Stage III

Stage III Trigger Conditions

1. National Fire Danger Rating System ERC of 58+.
2. Fire use restrictions implemented on adjoining Forest Service or California Department of Forestry Lands (SRF, HUU).

Stage III Scope

Backcountry camping will be prohibited. No open fires within the boundary of the parks. Equipment use may be restricted within the parks.

Stage III Signage

Signs should be posted in all designated high use areas including backcountry trailheads, campgrounds, and day use areas. The signs will state:

Extreme Fire Danger

- *No fires allowed.*
- *Backcountry camping prohibited.*
- *No smoking, except within vehicles equipped with ashtrays or in developed areas cleared of burnable vegetation.*

Appendix H: 5 Year Prescribed Fire and Fuels Treatment Plan

5 Year Prescribed Fire and Fuels Treatment Plan

Project Name	WUI or HF	Fiscal Year	Activity Type	Treatment Type	NEPA	Target Acres	Notes
Lower Airstrip	HF	FY10	Treatment	Fire	FMP	86	October
Eastside	HF	FY10	Treatment	Fire	FMP	110	October
Upper Counts	HF	FY10	Treatment	Fire	FMP	165	October
Lower Counts	HF	FY10	Treatment	Fire	FMP	166	October
Coyote	HF	FY10	Treatment	Fire	FMP	1,063	September
Childs Hill	HF	FY10	Prep	Mechanical	FMP	561	
Lower Dolason	HF	FY10	Prep	Mechanical	FMP	220	
Wildcat Prep	HF	FY10	Prep	Mechanical	FMP	1,254	
REDW CK. Units	HF	FY10	Treatment	Mechanical	FMP	70	
Lower Ganns	HF	FY10	Hand Pile	Mechanical	BHVMP	32	

South Boundary	HF	FY11	Treatment	Fire	FMP	86	October
Maneze	HF	FY11	Treatment	Fire	FMP	191	October
Upper Dolason	HF	FY11	Treatment	Fire	FMP	94	October
Lower Dolason	HF	FY11	Treatment	Fire	FMP	220	October
Lower Lyons	HF	FY11	Treatment	Fire	FMP	143	October
Wildcat prep	HF	FY11	Prep	Mechanical	FMP	1,254	
Upper K&K prep	HF	FY11	Prep	Mechanical	FMP	40	
Enderts prep	WUI	FY11	Prep	Mechanical	FMP	109	
Upper Lyons prep	HF	FY11	Prep	Mechanical	FMP	188	
Tick prep	HF	FY11	Prep	Mechanical	FMP	34	
DeMartin prep	HF	FY11	Prep	Mechanical	FMP	5	
Holter Ridge SFB	HF	FY11	Treatment	Mechanical	FMP	???	
Mid-Basin	HF	FY11	Treatment	Mechanical	FMP	129	

Upper K&K Rx	HF	FY12	Treatment	Fire	FMP	???	October
Williams Ridge Rx	HF	FY12	Treatment	Fire	FMP	118	October
Enderts Rx	HF	FY12	Treatment	Fire	FMP	109	October
Mainstem Rx	HF	FY12	Treatment	Fire	FMP	166	October
LBH Rx	HF	FY12	Treatment	Fire	FMP	???	October
DeMartin Rx	HF	FY12	Treatment	Fire	FMP	5	October
Wildcat Prep	HF	FY12	Prep	Mechanical	FMP	1,254	
South Boundary	HF	FY12	Treatment	Mechanical	FMP	86	
Dooleyville	HF	FY12	Treatment	Mechanical	FMP	111	
Maneze	HF	FY12	Treatment	Mechanical	FMP	191	
Holter Ridge SFB	HF	FY12	Treatment	Mechanical	FMP	???	

Project Name	WUI or HF	Fiscal Year	Activity Type	Treatment Type	NEPA	Target Acres	Notes
Schoolhouse Rx	HF	FY13	Treatment	Fire	FMP	299	October
Childs Hill Rx	HF	FY13	Treatment	Fire	FMP	561	October
Copper Creek Rx	HF	FY13	Treatment	Fire	FMP	148	October
Upper Lyons Rx	HF	FY13	Treatment	Fire	FMP	208	October
Wildcat Rx	HF	FY13	Treatment	Fire	FMP	1,254	October
Upper K&K	HF	FY13	Prep	Mechanical	FMP	40	
Holter Ridge SFB	HF	FY13	Treatment	Mechanical	FMP	???	

Upper Elk Camp	HF	FY14	Treatment	Fire	FMP	37	October
Lower Elk Rx	HF	FY14	Treatment	Fire	FMP	244	October
Lagoon Creek Rx	WUI	FY14	Treatment	Fire	FMP	68	October
Davison Rx	WUI	FY14	Treatment	Fire	FMP	10	October
Ganns (Upper)	HF	FY14	Treatment	Fire	FMP	17	October
Redwood Crk Units	HF	FY14	Treatment	Fire	FMP	70	October
C-10 prep	HF	FY14	Prep	Mechanical	FMP	339	
Bald Hills SFB	HF	FY14	Treatment	Mechanical	FMP	???	

C-10 Rx	HF	FY15	Treatment	Fire	FMP	339	September
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Appendix I: Interagency Contacts

On file in the RNSP Fire Management Office.

Appendix J: Pre-Attack Plan

The Pre-Attack Plan is scheduled to be completed in the spring of 2010.

Appendix K: Fire Prevention Plan

Fire Prevention Plan

GENERAL ACTIONS

Redwood National and State Parks will implement this plan in an effort to minimize the number of human-caused fires. The following general action items are part of the wildland fire prevention plan, designed to address the most probable sources of wildfire, abandoned campfires and smoking. This plan will be reviewed and amended annually.

1. The current fire danger rating will be posted at all park visitor centers, campgrounds and trailheads throughout fire season. **Responsible person: Interpretive staff**
2. “Fireworks prohibited” signs are posted at all park visitor centers, campgrounds and trailheads during the July 4th holiday period. **Responsible person: FMO or Acting Duty Officer**
3. A human-caused fire prevention sign will be procured for use on general public information bulletin boards and other appropriate locations. **Responsible person: Fire Management Officer**
4. Implementation of the park step-up staffing plan for increased staffing levels during periods of high fire danger. **Responsible person: FMO or Acting Duty Officer**
5. A press release will be issued for public notification during periods of extreme fire danger. **Responsible person: Public Information Officer**
6. Implementation of the Fire Use Restrictions and Emergency Closure Plan during periods of High, Very High, or Extreme Fire Danger. **Responsible person: Park Superintendent**

Appendix L: Dispatch Procedures for Off-Park Assignments

Redwood National Park

Dispatch Procedures for Off-Park Assignments

Policy for Wildland Fire Management, found in 910 DM 1, requires all parks to "...work closely with the NPS Branch of Fire and Aviation and their regional dispatch coordinators to ensure that those qualified personnel are furnished in a timely manner".

Redwood National Park is dispatched through:

Fortuna Interagency ECC

118 Fortuna Blvd
Fortuna, CA 95540
(707) 726-1266

All resource orders originate and are coordinated through this center.

AVAILABILITY

The availability of all resources will be updated regularly in ROSS by the Fire Management staff. It is the responsibility of each employee to acquire supervisor approval prior to making themselves available for off-park assignments and to immediately inform the FMO or Duty Officer of any change in availability status.

When a resource order is initiated by Fortuna ECC, they will contact the FMO or Duty Officer who will then contact the requested resource(s) with the dispatch information. Once the FMO or Duty Officer has confirmed with the resource, Fortuna ECC will be informed and the order will be filled.

All resources will not leave for the assignment until the following are in place*

- The resource order has been received by the FMO or Duty Officer.
- A travel authorization is issued by their divisional timekeeper.
- The mode of travel has been established (e.g. GOV, POV, flight, etc.)

* There may be a Type I or II Team member call-out, which would come verbally through Fortuna ECC. It is permissible that this individual may leave the park before their resource order is faxed to the Park. This should only occur with established team members and not other single resources.

The supervisor of the affected employee(s) understands that no further approval is necessary of him/her once the employee is made available.

It is the responsibility of the dispatched resource to notify their supervisor that they have been dispatched.

RESOURCE ORDERS

1. Orders for resources originate from Northern California Geographic Area Coordination Center (ONC) through Fortuna ECC. The dispatchers at Fortuna ECC will fax to the Duty Officer a resource order with the following information:

- A) Position requested and resource order number
- B) Location of fire
- C) Date and time they are needed
- D) Travel method
- E) Special logistical considerations
- F) Name and number of requester

2. Filling of Resource Order

- A) Any person listed as available within ROSS can be contacted directly. If that person cannot be contacted by telephone, radio, or messenger in a brief time frame, an alternate person will be contacted and offered the assignment.
- B) If the list of available personnel is exhausted without filling the order, qualified personnel can be contacted after first obtaining permission from the employee's direct supervisor.

3. Notification to Fortuna ECC of ATF or UTF

- A) Upon notification to Fortuna ECC that the park will fill the order, Fortuna ECC will fax the resource order to the duty officer.
- B) Upon receiving the resource order the Duty Officer will make two copies, one for the employee's timekeeper and one for the fire management files. The original will be given to the dispatched employee.

4. Transportation

- A) All flight arrangements should be made by Fortuna ECC. In the event that flight arrangements need to be made by the dispatched employee they will be made through: GovTrip online <http://www.govtrip.com/govtrip/site/index.jsp> or by calling (866) 486-6135
- B) Driving arrangements to and from the airport will be made by the Duty Officer. All work/rest guidelines will be followed.

5. Travel Authorization

During regular business hours, the employees Program Clerk can assign a TA number.

6. Chief of Party

A party leader or firefighter with squad boss or higher qualification will be dispatched with each squad, or when more than one single resource is requested

for the same fire to be sent out of the park. The following paperwork will be given to the party leader, some of which will be presented to appropriate supervisor or personnel at the incident.

- A) Copy of the Resource Order
- B) Two completed *Emergency Firefighter Time Reports* for each individual
- C) A completed manifest form with names, weights and SSN's for all personnel in party
- D) Park/FMO phone numbers and contact procedures for emergencies
- E) Vehicle travel logs will be kept by firefighters

7. Notification messages. The following individuals will be notified by E-mail, telephone, or directly by duty officer.

- FMO
- Division timekeepers
- When time permits the immediate supervisor of personnel sent to the incident. Immediate supervisors are responsible for notifying their Division Chiefs.

8. Upon return from the assignment, all personnel will complete the following:

- A) Original 288 fire time report will be turned into their timekeeper
- B) Travel logs will be turned into their timekeeper
- C) Vehicles used for fire assignments will be cleaned and fueled before personnel go off duty
- D) Report and damaged or broken equipment to the FMO
- E) Notify Fortuna ECC and direct supervisor of their return home