

OPERATIONAL STRATEGY FOR THE FIRE MANAGEMENT PLAN

Point Reyes National Seashore and Northern Lands of Golden Gate National Recreation Area

August 2006



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EXECUTIVE SUMMARY

This Fire Management Plan (FMP) for the Point Reyes National Seashore (PRNS) is an operational manual containing the standards, practices and guidelines in use by the Fire Management Division when conducting actions within their jurisdictional area. The jurisdictional area is comprised of the 70,046 acres of PRNS and the 19,265 acres in the northern district of Golden Gate National Recreation Area (GGNRA) that is managed by PRNS through an agreement with GGNRA. For the purposes of this FMP, the use of the acronym PRNS in reference to a geographic area will encompass the 90,311 acres managed by Point Reyes National Seashore including the northern lands of GGNRA.

The FMP provides a framework for the Division's fire prevention and fuels reduction programs and governs actions and strategies for the Division's response to wildland fires in the jurisdictional area. The FMP was built upon guidance provided by the fire management section of the National Park Service (NPS) Management Policies (2000) and current Federal Wildland Fire Management Policy (2001). Current federal wildland policy stresses the protection of firefighters and the public, protection of public and private property, and protection, restoration and rehabilitation of the natural and cultural resources on federally-managed lands.

The fire management strategy implemented by this FMP was the subject of an Environmental Impact Statement (EIS) prepared by the NPS and finalized through the adoption of a Record of Decision (ROD), as required by the National Environmental Policy Act (NEPA). As part of the NEPA process, conformance requirements for the Endangered Species Act and the National Historic Preservation Act were also met.

Goals and specific strategies included in this FMP were developed as part of the FMP NEPA process, which concluded with signature of the ROD by the Regional Director in October 2004. Mitigation measures developed for the programmatic FMP EIS are carried forward and incorporated into this operational FMP. These measures will be applied to FMP implementation projects as part of an interdisciplinary team review to ensure continued conformance of the fire management program with the findings of the NEPA process.

The FMP is organized to present the current strategies and tactics for the range of actions assigned to the PRNS Fire Management Division. Program operations addressed include preparedness, prevention, suppression, fuels management, rehabilitation, fire education and information, monitoring and fire and fuels research. The FMP is written to be understood and implemented by PRNS staff as they plan and implement fuel reduction and resource protection and rehabilitation projects and conduct suppression actions.

1. FOUNDATION OF THE FMP

1.1 INTRODUCTION

Agencies within the Department of Interior with vegetation capable of sustaining wildland fire are required to prepare FMPs that conform to federal wildland fire management policy and meet all federal regulatory requirements. The NPS recognized and acted on this policy direction.

The PRNS FMP is based on the implementation strategy selected by the NPS Pacific West Regional Director at the conclusion of a multi-year EIS process involving public and regulatory agency consultations. The Record of Decision (ROD) is Appendix C to this FMP; the Mitigation Measures adopted through the ROD are Appendix D. Together these documents record the analyses conducted on the selected strategy, mitigation measures developed to reduce or avoid potential impacts from implementing that strategy and the findings, decisions and commitments made by the Regional Director in signing the ROD on October 29, 2004.

The FMP provides a framework for all fire management activities and the management of wildland fire and prescribed fire as a tool to safely accomplish protection and resource management objectives on NPS lands. NPS lands in PRNS consisting of 71,046 acres of Point Reyes National Seashore and the northern lands of GGNRA (19,265 acres) are addressed by this FMP. The northern lands of GGNRA lands are on Bolinas Ridge, directly east of the Point Reyes peninsula and are managed by PRNS through an agreement with GGNRA.

1.2 RELATIONSHIP TO LAND MANAGEMENT PLANNING AND FIRE POLICY

NPS fire management actions must conform to adopted plans and policies of the Department of the Interior and the National Park Service. These include the Federal Wildland Management Policy, NPS Management Policies, Director's Order #18 and Reference Manual #18 (2005), the guidance documents for wildland fire management in the NPS, as well as the General Management Plan and resource management plans for PRNS and GGNRA.

1.2.1 Federal Wildland Fire Management Policy (2001)

In 2001, the Interagency Federal Wildland Fire Policy Review Working Group revised and updated the Federal Wildland Fire Management Policy (NIFC 2001), which applies to all federal land management agencies. The key element of the policy is that firefighter and public safety is the first priority. In addition, the policy states that fire, as a critical natural process, will be integrated into land and resource management plans and activities on a landscape scale, and across agency boundaries. The policy also directs that fire management plans and programs will be based on a foundation of sound science. Research will support ongoing efforts to increase our scientific knowledge of biological, physical, and sociological factors.

1.2.2 National Park Service Management Policies (2000)

NPS Management Policies (NPS 2000) is the agency-wide policy document for the NPS. Management policies for wildland fire management and more specific guidance on implementation are found in Director's Order 18 and the companion document Reference

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Manual 18. These documents provide detailed guidance to NPS staff in the development of Fire Management Plans and other companion plans, such as monitoring plans.

Management Policies, Section 4.5, Fire Management

Regarding Fire Management Plans: “Each park with vegetation capable of burning will prepare a fire management plan and will address the need for adequate funding and staffing to support its fire management program. The plan will be designed to guide a program that responds to the park’s 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. Preparation of the plan and environmental assessment will include collaboration with adjacent communities, interest groups, state and federal agencies, and tribal governments.”

Regarding Overall Strategy: “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.”

Regarding Wildland Fire Suppression: “Parks will use methods to suppress wildland fires that minimize impacts of the suppression action and the fire, and are commensurate with effective control, firefighter and public safety, and resource values to be protected.”

Regarding Fire Management in Wilderness: “Suppression activities conducted within wilderness, including the categories of designated, recommended, potential, proposed, and study areas, will be consistent with the ‘minimum requirement’ concept identified in Director’s Order #41: Wilderness Preservation and Management.”

1.2.3 Director’s Order #18, Wildland Fire Management (2005)

Director’s Order #18, Section 5(2)(a), builds on the requirement from the Federal Wildland Fire Management Policy and reiterated in the NPS Management Policies that, “Every park area with burnable vegetation must have a fire management plan approved by the Superintendent.”

Director’s Order #18 specifically addresses the direction and content expected in the FMPs prepared for NPS units. The FMPs will:

1. Reinforce the commitment that firefighter and public safety is the first priority.
2. Describe wildland fire management objectives that are derived from land, natural, and cultural resource management plans and address public health issues and values to be protected.
3. Address all potential wildland fire occurrences and consider the full range of wildland fire management actions.
4. Promote an interagency approach to managing fires on an ecosystem basis across agency boundaries and in conformance with the natural ecological processes and conditions characteristic of the ecosystem.

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5. Include a description of rehabilitation techniques and standards that comply with resource management plan objectives and mitigate immediate safety threats.
6. Be developed with internal and external interdisciplinary input and reviewed by appropriate subject matter experts and all pertinent interested parties, and approved by the park superintendent.
7. Comply with the National Environmental Policy Act (NEPA) and any other applicable regulatory requirements.
8. Include a wildland fire prevention analysis and plan.
9. Include a fuels management analysis and plan.
10. Include procedures for short and long term monitoring to document that overall programmatic objectives are being met and undesired effects are not occurring.

1.2.4 PRNS and GGNRA General Management Plan (NPS 1980)

In 1980, the two parks collaborated on a joint planning and NEPA process that produced a joint plan and Environmental Assessment. In addressing fire management strategy, the General Management Plan recognized the need to incorporate prescribed burning into research programs designed to improve and inform ecosystem management in the park. The Plan states: “Although the majority of the seashore is generally viewed as a wild area where natural processes are allowed to predominate, manipulation of those processes through methods such as selective thinning, burning and mowing will be cautiously pursued when necessary to protect its scenic, ecological and recreational values (NPS, 1980).” Both parks are in the midst of public processes to update their respective General Management Plans.

2. FIRE MANAGEMENT STRATEGIES

2.1 FIRE MANAGEMENT GOALS

As part of the NEPA process for the FMP, PRNS staff developed goals for the overall fire management program based on guidance from Federal Wildland Fire Management Policy, NPS Management Policies, Directors Orders, and other fire-related guidance documents in conjunction with public input from meetings and workshops. In the listing below, elements of the adopted FMP alternative are paired with the seven FMP goals to demonstrate how the selected alternative will help the park achieve the goals of the FMP.

Goal 1: Protect firefighters and the public.

- √ Because of the potential for risk to public and staff safety from an uncontrolled wildland fire at PRNS, the policy at PRNS is full suppression of all wildland fires, precluding the option of wildland fire use.
- √ Fuel reduction projects will focus on reducing fuel loading in strategic areas where the PORE fire management units fall within the Seashore's wildland urban interface boundary by 25% (NPS 2003c).
- √ Each spring, the fire management staff will conduct an assessment of the condition of roads and trails that serve as emergency evacuation routes. Fire staff will ensure that routes needing roadside vegetation reduction or overhead clearance will be treated prior to the fire season.

Goal 2: Protect private and public property.

- √ The fire management officer and staff will work cooperatively with fire agencies and other land managers to develop and maintain zones of reduced fuels in high priority areas to slow the rate of spread of a wildland fire.
- √ The fire management staff will maintain defensible space adequate to protect park structures, infrastructure and employee housing. Defensible space will either conform to or exceed the requirements of California Public Resource Code (PL-4290 and 4291).

Goal 3: Maintain or improve conditions of natural resources and protect these resources from adverse impacts of wildland fire and fire management practices.

- √ PRNS will suppress all wildland fires that occur in the park employing Minimum Impact Suppression Techniques to the greatest extent feasible to minimize impacts to natural resources while providing for public and firefighter safety and wildland fire control. The MIST Guidelines are in Appendix E, Section 9.
- √ Fire hazard reduction projects will incorporate natural resource protection and rehabilitation objectives especially to increase cover and improve habitat for native species.

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- √ Prescribed fire and non-fire treatments will be used to control non-native invasive species including, but not limited to, French broom, Scotch broom and eucalyptus.
 - √ Prescribed fire and non-fire treatments will be used to increase the abundance and distribution of T & E species.
- Goal 4: Maintain or improve conditions of cultural resources and maximize efforts to protect cultural resources from adverse effects of wildland fire and fire management practices.
- √ Prescribed burning and non-fire treatments will be used to protect cultural resources and restore or maintain cultural landscapes and viewsheds.
 - √ Adequate defensible space will be established and maintained to protect historic structures.
 - √ Use of MIST to the greatest extent feasible will minimize impacts to both cultural and natural resources by avoiding unnecessary ground disturbance to known or suspected locations of sensitive resources. The MIST Guidelines are in Appendix E, Section 9.
- Goal 5: Foster and maintain effective community and interagency fire management partnerships.
- √ PRNS staff will participate in the National Fire Plan working cooperatively with other local fire agencies, jurisdictions, land managers and homeowners to help them to secure federal funding and meet federal compliance requirements.
 - √ PRNS will continue to participate with the Marin County Fire Department on the development and implementation of the Community Wildfire Protection Plan (CWPP).
 - √ The NPS will work cooperatively with the Marin Municipal Water District to create a zone of reduced fuels along the shared boundary on Bolinas Ridge. (MMWD 1995).
 - √ The NPS will regularly attend the meetings and participate in relevant planning and projects of FireSafe Marin and its members.
- Goal 6: Foster a high degree of understanding of fire and fuels management among park employees, neighbors, and visitors.
- √ PRNS will implement a comprehensive public information and education program to address fire safety and prevention, fuels management, the role of fire in the ecosystem, prehistoric and historic fire history in Marin, and fire research programs and opportunities.
 - √ Fire management facilities, offices and equipment will be moved to the main administration area in order to decrease response time and facilitate communication between park fire staff and staff from the other divisions.

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Goal 7: Improve knowledge and understanding of fire through research and monitoring and continue to refine fire management practices.

- √ Research and monitoring efforts will address the comparative effectiveness of various fuels treatments and their effects on the environment.
- √ Research results will be used to adaptively guide the fire management program by using results and trends to continually fine tune project objectives to achieve the maximum resource benefit.
- √ Research topics will include the fire history of PRNS, the effects of fire on abiotic and biotic resources, effects of fire on rare native plant and animal species, methods for controlling non-native plants using prescribed fire and methods for restoring native grasslands using prescribed fire (NPS 1999).

2.2 GENERAL MANAGEMENT CONSIDERATIONS

2.2.1 Legal Considerations

The NPS is constrained from implementing fire management actions that do not comply with relevant federal laws, regulations, or policies. These include NPS Organic Act, legislation establishing PRNS and GGNRA, NPS Management Policies (revised in 2000), Director's Orders 12 (regulations for implementing the National Environmental Policy Act), Director's Order 18 (regulations for Fire Management Programs), and the PRNS and GGNRA General Management Plan, and guidance from adopted PRNS planning and policy documents.

Enabling Legislation. Congress established PRNS on September 13, 1962 “to save and preserve, for purposes of public recreation, benefit and inspiration, a portion of the diminishing seashore of the United States that remains undeveloped (Public Law 87-657).” An amendment to Public Law 94-544 (passed in 1976) instructs the NPS to administer the Seashore without impairment of its natural values.

Congress established GGNRA by Public Law 92-589 “in order to preserve for public use and enjoyment certain areas of Marin and San Francisco Counties, California (San Mateo County added by P.L. #96-607).” In addition to providing for recreation and educational opportunities consistent with sound principles of land use planning and management, the NPS was also instructed to “preserve the recreation area, as far as possible, in its natural setting, and protect it from development and uses which would destroy the scenic beauty and natural character of the area.”

Wilderness Act (16 USC 1133) applies to all work that could directly or indirectly affect the areas of the park that are currently or are proposed as wilderness. All actions undertaken in the wilderness, including suppression of wildfires and other aspects of fire management, must conform to the “minimum requirement” concept, and be conducted in such a way as to protect natural and cultural resources (NPS, 2000, Sec. 6.3.9).

The minimum requirement concept is a two-step documented process that is used to determine:

1. Whether the proposed action is appropriate or necessary to administer the area as wilderness and does not pose a significant impact to wilderness resources and character, and

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2. Which techniques or types of equipment should be used to ensure minimum impact to wilderness resources and character (NPS, 2000, Sec. 6.3.5).

Endangered Species Act as amended (PL 93-205, 87 Stat. 884, 16 USC §1531 et seq.) protects threatened and endangered species from unauthorized take and directs federal agencies to ensure



California red-legged frog
by Marc Jennings

that their actions do not jeopardize the continued existence of such species. There are currently 1,300 species that found entirely or in part in the USA and its water that are listed or proposed for listing as threatened or endangered under the Endangered Species Act (ESA). In the FMP planning area, there are 22 animal and 19 plant species listed under the ESA. The National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) share responsibility for implementing the ESA. Generally, USFWS manages land and freshwater species, while NMFS manages marine and "anadromous"¹ species. During the FMP NEPA process, the NPS completed formal consultations with the FWS and NMFS as required by Section 7 of the ESA. All measures to avoid adverse effects to listed plants and animals recommended by

NMFS and FWS through consultation have been incorporated into the FMP mitigation measures. It is the responsibility of NPS staff to ensure these measures are followed as FMP projects are implemented.

Clean Air Act. All PRNS prescribed burns must be submitted to the Bay Area Air Quality Management District (BAAQMD) with a Smoke Management Plan for approval. The BAAQMD grants approval to burn based on air basin air quality and competing requests to burn submitted by other entities. Due to these extenuating circumstances, plans for burning may not always be approved for implementation if air basin conditions are poor or there are too many competing requests for approval to burn.

National Historic Preservation Act requires agencies to take into account the effects of their actions on properties listed in or eligible for listing in the National Register of Historic Places. The NPS, in consultation with the Advisory Council, the California State Historic Preservation Officer (SHPO), American Indian tribes, and the public has developed a Programmatic Agreement for operations and maintenance activities on historic structures. This Programmatic Agreement provides a process for compliance with National Historic Preservation Act, and includes stipulations for identification, evaluation, treatment, and mitigation of adverse effects for actions affecting historic properties. The NPS sent a scoping notice and the Draft Fire Management Plan/EIS to the State Historic Preservation Officer and the Advisory Council for Historic Preservation. No response or comments were received from these offices. To avoid significant adverse effects to cultural resources while



Pierce Point Ranch
by Richard Hitchman

¹ **Anadromous:** Anadromous fish are born in fresh water, migrate to the ocean to grow into adults, and then return to fresh water to spawn. In the FMP planning area, anadromous fish listed under the ESA are coho salmon and steelhead.

implementing the FMP, the NPS adopted cultural resource mitigation measures to address the pre-project, implementation and post-project periods. It is the responsibility of NPS staff to ensure these measures (CR-1, CR-2 and CR-3) are adhered to for each FMP project.

2.2.2 Jurisdictional Considerations

Direct Protection Areas (DPA). The NPS has wildland fire protection responsibility for all federally owned lands inside the boundary of the Seashore. Hence federally-managed lands within the congressionally designated boundary of the Seashore are Federal Responsibility Areas or National Park Service - Direct Protection Area (DPA). For Point Reyes National Seashore, this DPA includes all lands within the Seashore boundary that are federally managed and, through agreement, the northern lands of Golden Gate National Recreation Area on Bolinas Ridge. The NPS has the financial responsibility, as well as the fire protection force to accomplish this. However due to the limited capability of its protection force Marin County and other nearby West Marin fire agencies provide strong backup and reinforcement to any fire in or near the Seashore.

2.2.3 Technical or Logistic Considerations

Limited Season for Effective Use of Prescribed Burning. The normal weather window for prescribed burning at Point Reyes is from mid-June to November. Burning in grasslands should be conducted after the grasses have cured which can be as late as early July. Summer and fall burns must be timed to occur between the dissipation of the morning coastal fog, which can keep much of the planning area moist throughout the day, and the onset of the strong afternoon sea breezes. The later months of the prescribed burning period, from late September until the first rains in November, can be relatively fog free but prescribed burns can be difficult to schedule or complete if red flag conditions develop quickly given that fuels moistures are already very low.

Risk-related Considerations. There are four communities bordering PRNS that are listed as federal “communities at risk from wildfire” under the National Fire Plan. Because of the potential for risk to public safety or property from an uncontrolled wildland fire at PRNS, the policy at PRNS is full suppression for all wildland fires, precluding the fire management tool of wildland fire use. Since the risk of escape of a prescribed burn is a major factor when deciding between prescribed burning and mechanical fuel reduction, prescribed burns near the interface may be modified to minimize smoke production and limit the duration of the fire to a single day. This precludes fire management strategies involving large-scale landscape fire restoration at PRNS.

Park Resources or Values Considerations. PRNS has significant populations of threatened and endangered plant and animal species, and other unique wildlife. These biota can and do affect the time, location and layout of fire management activities. Avoiding these sensitive resources can result in burn units that are not optimally laid out for operational defensibility. This could require more firefighters or a prescription that calls for a slower, smaller or more precisely drawn prescribed fire than could optimally be achieved.

PRNS has significant prehistoric and historic resources including archaeological sites, structures, isolated artifacts and cultural landscapes. Subsurface and surface resources include at least 124 Coastal Miwok sites, mainly processing areas and shell middens, numerous shipwrecks, and 92 archeological sites from the historic period. It is estimated that only 87% of the park area has

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been surveyed so many sites remain undiscovered. The majority of the over 300 historic structures in PRNS are ranch structures in the Minimal Management FMU, but several of the 10 treatment FMUs contain National Register Status structures, such as the Olema Lime Kilns and Upper Pierce Ranch, and other historic structures. In addition, PRNS manages 39 cultural landscapes; 16 of which are within the treatment FMUs.

Staffing Considerations. The NPS has instituted new guidelines for prescribed burning (NPS 2005b, Chapter 10), which, among other changes, require that all NPS prescribed burns have “contingency resources” (such as fire trucks on stand-by) committed and assigned to every burn. These contingency resources must be available based on the prediction of a worst-case scenario. Resources may be requested from competing projects especially in the peak of the national fire season in the summer months when resources needed for prescribed burns are also needed for emergency fire suppression.

2.3 WILDLAND FIRE MANAGEMENT OPTIONS

To accomplish FMP goals, wildland fires will be suppressed and prescribed fire will be introduced where appropriate for hazard fuel reduction and/or resource benefit. Mechanical fuel reduction projects will focus on Wildland Urban Interface areas and protection of park visitors, staff and sensitive natural and cultural resources. Mitigation measures addressing potential environmental impacts will be incorporated into site specific projects as assigned through interdisciplinary project review as required by the NEPA process completed for the FMP. Fire managers will balance the potential resource impacts of wildland fire with the potential resource impacts of fire suppression activities in choosing the Appropriate Management Response.

PRNS contains significant natural and cultural resource values. Values to be protected and their susceptibility to damage or loss by fire are discussed in more depth in the descriptions of the Fire Management Units (FMU), Section 2.4 of this FMP. Resource management objectives, in turn, drive strategies that aim toward the restoration and maintenance of naturally functioning ecosystems, restoration of cultural landscapes and protection of sensitive natural and cultural resources.

Wildland fires at the PRNS are managed with the support of local community fire departments and federal land management agencies. This community-based approach to wildland fire management involves partnership, cooperation and collaboration between PRNS and Marin County Fire Department (MCFD) and local government and volunteer fire districts, local homeowners associations and special districts such as Marin Municipal Water District (MMWD).

The PRNS Division of Fire Management provides technical assistance to Pinnacles National Monument on fire management matters, including fire management programs such as the Weather Information Management System (WIMS), the Wildland Fire Management Information (WFMI) System, the National Fire Danger Rating System (NFDRS), the Resource Ordering System Status (ROSS), the Incident Qualification and Certification System (IQCS), Fire Program Analysis (FPA), and FIREPRO budgeting. The Division also assists the Pinnacles National Seashore with wildland fire qualification and certification programs, coordination of fire training and mobilizations, development of agreements with local and state agencies, administration of Rural Fire Assistance Program grants to local rural fire departments, fuel

reduction activities, prescribed burning, and developing fire prevention, preparedness, and suppression operational plans.

PRNS, in accordance with NPS policy, uses Minimum Impact Suppression Tactics (MIST) in all fire management activities. MIST is defined as the application of techniques that effectively accomplish wildland fire management objectives while minimizing the impacts to cultural and natural resources commensurate with ensuring public and firefighter safety and effective wildland fire control. Further information is provided in Section 3.2 and the MIST Guidelines are in Appendix E, Section 9.

2.4 ENVIRONMENTAL FACTORS INFLUENCING FIRE MANAGEMENT

2.4.1 Historic Role of Fire

When compared to research into the prehistoric fire record, fire frequency in California has been decreasing over the past century as a result of fire suppression. The lack of periodic fire in the current period has resulted in changes in vegetation structure and species composition. For example, it is generally assumed that forest stand density in many areas has increased, and shrub and grassland habitats in many areas are being reduced in size due to encroachment by conifers. Populations of the Marin manzanita, a fire dependent plant, are becoming increasingly rare as a result of habitat loss due to shading from increasing forest stand density.

It has been well documented that fires in the Point Reyes area and within California coastal ranges were frequently set by Native Americans (Slaymaker, 1982; Keely, 2002) and European settlers. Fire history studies conducted in and around the peninsula show the northern coastal prairie was very important to the Coastal Miwok as a source of food. Seeds were harvested from the coastal prairie and other grasslands in late summer. Individual seed fields were the possession of specific families and were probably often burned after harvest to improve growth the next year. Documentation of Coast Miwok culture indicates burning of grasslands for several purposes, but information on the extent and timing is minimal. Some sources indicate that fields were burned frequently, as often as once a year (Lewis, 1973; Slaymaker, 1982). Pre-contact burning along the coast may have focused on grasslands, while later burning during the Spanish and Anglo periods focused on shrublands to increase pasture acreage. The latter probably did not burn grasslands because of the need for winter livestock forage, leading to a very different fire regime (Greenlee and Langenheim, 1990). A small percentage of historic fires were probably lightning caused.

Ecosystems of Point Reyes are not burning today with nearly the frequency they did in the past. This change in fire frequency can result in shifts from understory to overstory dominance, increases in fuel loads and changes in forest structure, including increases in ladder fuels, which may lead to increased incidence of overstory, stand-replacing fires (Covington et al., 1994).

The best records of Point Reyes fire history reside in fire-scarred tree rings in redwood, and to a lesser extent, in Douglas-fir trees. Bishop pines are relatively short-lived trees (100 to 120 years), and generally occur in single-aged stands which arise after a stand-replacing fires. While the age of a Bishop pine stand can give solid evidence of a single large fire, it yields little insight into longer-term fire history. Shrubs respond to burning by either sprouting back from their stumps, or by regenerating via seeds in the soil so little record of the physical evidence of fire is retained. The same is true of grassland species.

2.4.2 Research Studies on Fire History

Due both to past logging and the relatively thin bark and low resistance to burning in Douglas-fir, Douglas-fir forests are a limited source of data on fire history. However, at least one research team (Brown et al., 1999) was able to extract data from fire scars on Douglas-fir and redwood trees at three locations in Point Reyes. The researchers found that fire scars did not extend much beyond the late 1700s. The oldest Douglas-fir tree found in the park dated to 1680, but this individual had no fire scars. Within the approximately two hundred-year period of fire scars (roughly 1800 to the present), researchers calculated a mean fire interval ranging from 7.0 to 13.0 years for the Douglas-fir forests. They were unable to cross-date any pre-settlement redwood trees, although some post-settlement trees did contain fire scars that successfully cross-dated with the Douglas-firs. Researchers speculated these trees were likely basal sprouts that established after the original redwood stand was logged, or grew in response to fire. Using fire scar information for burns from the early 1800s to the early 1900s, the researchers calculated a mean fire return interval in the redwood groves of 7.7 to 8.5 years.

Adjacent to Point Reyes, Finney (1990) found mean fire intervals between 1850 and 1900 that ranged from 6 to 33 years, with a mean of 14 years in coast redwood stands on Bolinas Ridge. He was able to document high fire frequency in the grove studied dating from the middle 1400s. Jacobs et al. (1985) calculated mean fire intervals of 22 to 27 years from stumps containing fire scars on ridges surrounding Muir Woods National Monument.

Work at Humboldt Redwoods State Park revealed a larger range in fire intervals, although this area has higher precipitation levels than Point Reyes and so is not directly comparable. Stuart (1987) calculated mean pre-settlement fire intervals in Humboldt from fire scars and redwood sprouts varied between 11 and 44 years. In the same area, Fritz (1932) estimated that at least 45 severe fires had burned during the previous 1,100 years, with a mean fire interval of 25 years. At Salt Point State Park, Finney and Martin (1989) found fire return intervals of 20.6 to 29.0 years. The authors state that all of these studies probably overestimate the actual mean fire interval.

Sediment taken from the bottoms of the lakes at the south end of Point Reyes Peninsula provides further evidence of forest fires over the past several centuries (Russell, 1983). In an on-going charcoal stratigraphy study by Anderson (2001), sediment cores from Glenmire and Wildcat lakes are being analyzed with radiocarbon dating. The Glenmire sample within the Douglas-fir forest; the Wildcat Lake area is dominated by coastal scrub. Sediments from both lakes indicated a near absence of fire during the past 100 years. Ongoing research is examining additional sediment cores from wetland areas in Point Reyes through radiocarbon dating and pollen analysis with the goal of constructing a more complete fire history.

2.4.3 Recent Fire History

The Marin County Fire Department has historically maintained a list of the larger fires in the county in the 20th century. Several of these fires have occurred in the project area. A fire in October 1917 burned 2,000 acres on the ridge west of Inverness. The largest fire, in September 1923, burned 40,000 acres from Lucas Valley to Bolinas including 35 homes in Woodacre.

More recently, the Mount Vision Fire burned more than 12,000 acres in 1995. It was started by an unattended campfire on October 3 at approximately 1:00 pm within Tomales Bay State Park. Driven by 40- to 50-mile per hour winds in steep terrain and heavy forest fuels, the fire rapidly

burned 700 acres and spread to PRNS and the residential community of Paradise Ranch Estates where 48 structures were destroyed. By October 6, up to 1,200 firefighters had participated in suppressing the fire. The next night, October 7, 1995, the fire was declared contained after burning a total of 12,354 acres (11,598 acres NPS lands, 386 acres State Park lands, 370 acres of private lands). The fire was declared controlled 9 days later.

Since 1997, on the average, about three wildland fires occur annually in the planning area. In all cases, the burned area was less than ten acres and most were kept to less than one acre. Most of the fires occurred in the Olema Valley and all but one were human-caused. The one exception was a single lightning caused fire.

Fires in Western Marin County also can have natural sources of ignition. Conditions conducive to lightning-caused wildfire do occur in Point Reyes, but they are rare (Martin and Sugnet, 1984). The Bay Area averages about 3 lightning days a year. On the average, two lightning storms occur each year in the Inverness vicinity with 18 percent of these storms occurring in September (Martin and Sugnet, 1984). Between 1970 and 1989, 13 lightning-ignited fires occurred in the following areas: Inverness Ridge, Mt. Tamalpais, and Stinson Beach. On September 27, 2001 a lightning fire occurred on Bolinas Ridge above Stinson Beach. During this same September storm, an observer saw about 60 lightning strikes from the Mount Barnabe Lookout near Samuel P. Taylor State Park, adjacent to the National Seashore. In addition, Pacific Gas and Electric staff counted 4,600 lightning strikes in the Bay Area during this storm (Freed, 2001).

2.4.4 Historic Weather Analysis

PRNS receives an average of 38.2 inches of rain annually. This amount is higher than much of the San Francisco Bay area due to the somewhat more elevated terrain along the coast. Most annual rainfall in Marin County occurs from November through March (see Table 1). The following general climate description is from “Climate, Physiography, and Air Pollution Potential – Bay Area and its Subregions (BAAQMD, 2003a)”:

“Areas along the West Coast of Marin County are usually subject to cool marine air. In the summer months, the marine air is cooled as it passes over the offshore upwelling region, and forms a fog layer along the coast. In the winter, proximity to the ocean keeps the coastal regions relatively warm. Temperatures do not vary much over the year at these coastal areas: high 50s in the winter and low 60s in the summer. The warmest months are September and October, which are in the mid to high 60s.”

“...wind speeds are highest along the west coast of Marin, about 8 to 10 mph. Although most of the terrain throughout central Marin County is not high enough to act as a barrier to the marine airflow, the complex terrain creates sufficient friction to slow the airflow. Downwind, at Hamilton Air Force Base in eastern Marin County, the annual average wind speeds are only 5 mph. The prevailing wind directions throughout Marin County show less variation, and are generally from the NW.”

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FIGURE 1 – DOMINANT WIND PATTERNS, CENTRAL CALIFORNIA

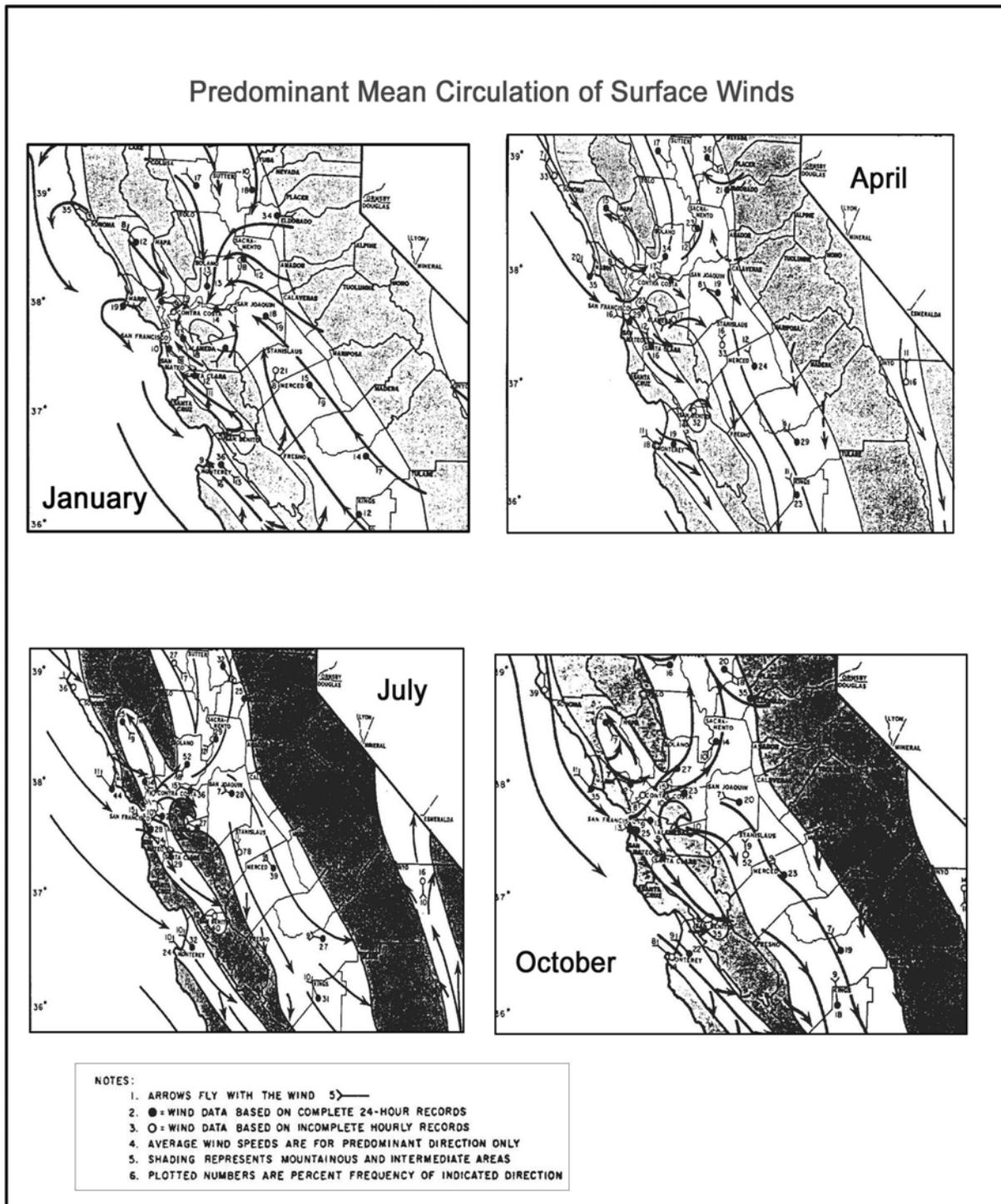


Figure 1 above illustrates predominant wind patterns occurring in California (Bell, 1958). The predominant regional surface winds during winter flow from the north-northeast. During spring and summer, stronger north-northwest winds dominate. These northwesterly winds are primarily

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caused and/or strengthened by the combination of high pressure offshore and the warmer air inland. During the fall transition, when warm easterly winds break through to the coast while inland conditions remain hot and dry, the coastal region faces its most significant fire threat.

Long-term average temperature and precipitation data have been collected at Bear Valley at the eastern part of the Point Reyes National Seashore (NPS, 2003). The Bear Valley monitoring station is the closest surface meteorological station to the project site. Surface climate data are presented in Table 1. Average temperatures (°F) during the summer vary from the high 40s to the low-to-middle 70s. Summer precipitation is low, averaging less than 0.2 inches per month, due to the strong stationary high-pressure system located off the coast and preventing weather systems from moving through the area. During the winter, average temperatures (°F) vary from the mid-to-upper 30s to the upper 50s-low 60s. About 84% of the precipitation in the area occurs during November through March, generally in association with storm systems that move through the region.

TABLE 1 -- TEMPERATURE AND PRECIPITATION DATA FOR
BEAR VALLEY, POINT REYES NATIONAL SEASHORE

Month	Average Daily Temperature (°F) ^a		Average Precipitation	
	Minimum	Maximum	Daily	(inches)
January	36.5	58.6	47.7	8.65
February	39.5	62.1	50.8	6.69
March	39.7	63.0	51.4	5.64
April	39.5	65.4	52.4	2.42
May	44.0	68.0	56.7	1.07
June	46.6	71.1	58.9	0.20
July	48.6	73.9	61.2	0.09
August	49.4	74.4	61.9	0.14
September	48.0	75.7	61.9	0.34
October	44.1	72.3	58.2	2.10
November	39.7	64.9	53.1	5.68
December	35.9	59.0	47.5	6.27
Annual Average	42.0	66.2	54.2	39.57 (total)

Source: Pt. Reyes National Seashore, 2003.

^average temperature and precipitation data for 1964-1989.

2.4.5 Fire Season

According to NPS FIREPRO III Base Analysis for PRNS, the composite "statistical" fire season can be defined by occurrence of wildfires. From this analysis, an early, mid, and late season is defined, with an embedded "core" season where annual base funding is derived. The core season is thus defined as pay period 15 through pay period 22 (July through mid-October).

The fire season at Point Reyes differs somewhat from most areas in the western United States. Following the cessation of winter rains in mid-April, fuels begin to dry and the light fuels of the annual grassland (2,000-7,000 lbs/acre) cure. During the summer months, live, dead and downed

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round wood material and duff in the understory of PRNS's forest stands gradually lose moisture. Bimodal peaks of fire danger occur in late spring and late summer/early fall. In most years, persistent fog keeps fire danger moderate in July and August when danger is highest in most of the western United States. The period from September 1 through October 31 can be considered the most critical time of fire danger for PRNS.

2.4.6 Fuel Characteristics and Fire Behavior

PRNS support a variety of vegetation classes, including hardwood forest, Monterey Pine/Monterey Cypress, Douglas fir/Coast Redwood Forest, Bishop pine forest, Riparian Woodland, Coastal Scrub, Grassland, Pasture and Coastal Dune.

Table 2 above represents an overall view of fuels on an area-wide basis.

TABLE 2 -- FUEL GROUPS AND MODELS (AREA IN ACRES)

Vegetation Type	Fuel Models	Monitoring Types	Acres
Douglas Fir Forest	6,8,10	FPSME1D10	16,301
Coast Redwood Forest	9		2,220
Bishop Pine Forest	10	FPIMU1D05	3,590
Hardwood Forest	8		7,896
Riparian Forest	8		2,336
Eucalyptus Forest	8	FEUGL1D08	219
Coastal Scrub	2,4,5,6,8	BBAPI1D105	18,577
Grassland	1	BCYSC1D05 BGEMO2D05 BLOPE1D01 BPHAQ1D03	19,842
Coastal Dune	1,5		1,862

Acreage estimates may not accurately reflect vegetation changes after the 1995 Vision Fire.

Also, not all vegetation types in PRNS are represented in this list.

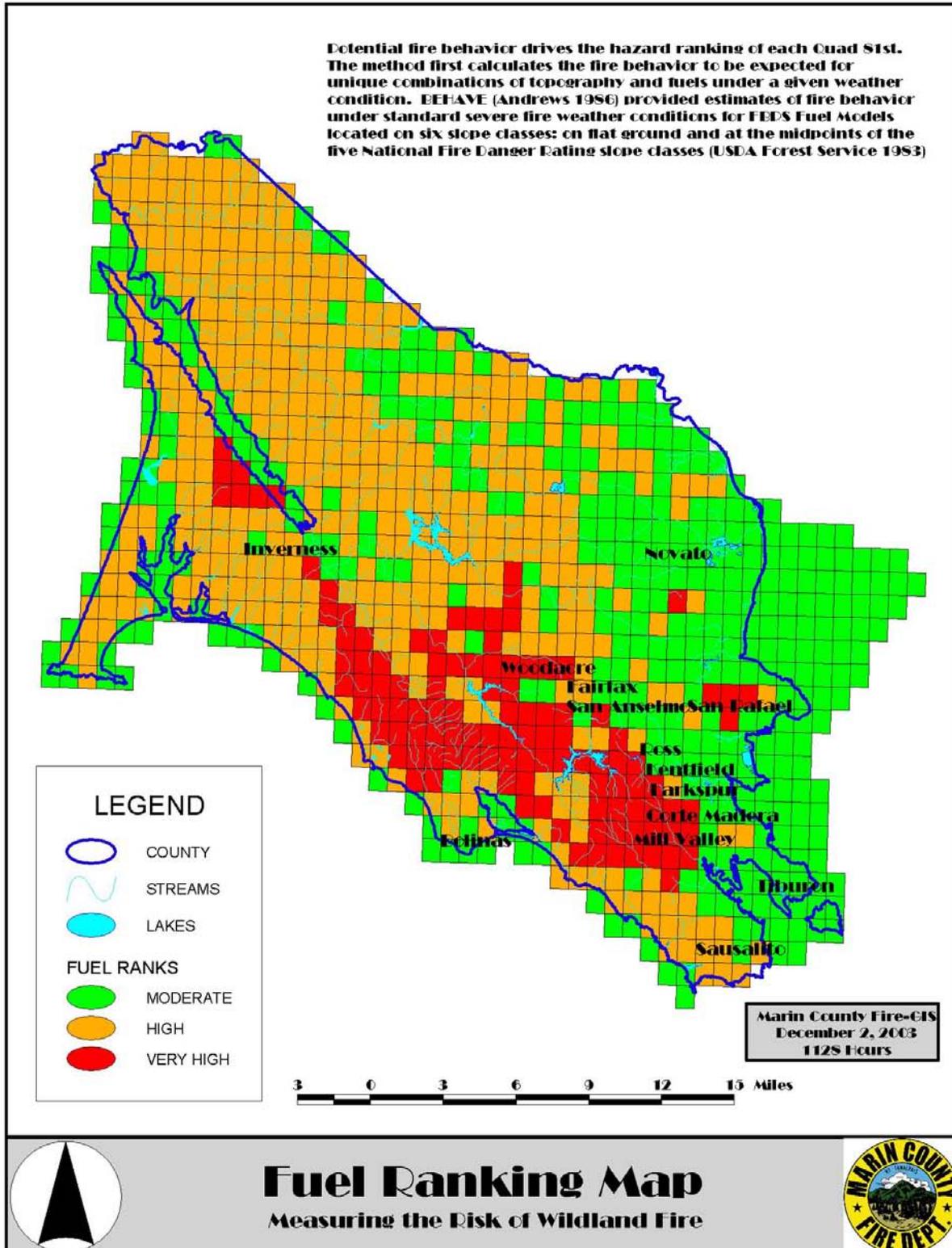
Source: PRNS GIS Database 2006

2.4.7 Hazard and Risk Modeling

Marin County Fire Department, using data provided by PRNS Fire and GIS personnel, developed a wildland fire risk model to determine areas of highest risk in the FMP planning area. Potential fire behavior was used to determine the degree of hazard (see Figure 3). Inputs to the potential fire behavior included topography and fuels under extreme weather conditions.

Using the same fire behavior inputs combined with additional variables (roadless area; certain fuel models with high rates of spread and intensity; slopes >40%;) produces another model which identifies areas where the resistance of controlling a wildland fire is amplified.

FIGURE 2 -- FUEL RANKING MAP



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The results of the model show that critical fuels and potential control problems are concentrated in the interface area along Inverness Ridge where the residential subdivision is adjacent to national parklands. Vegetation conditions here are heavier surface fuel loads and dense stands of fire adapted Bishop pine which could produce a high intensity wildland fire. The situation is compounded by the narrow road widths of the subdivision and inadequate area of defensible space providing substandard protection for many of the subdivision homes in the interface area. The largest fire in the 44-year history of the park was the 12,000-acre Vision Fire in 1995 which spread through the tree crowns driven by extreme north wind conditions. The Vision Fire destroyed 45 homes in the Inverness Ridge interface area.

Another portion of the FMP planning area with critical fuel concentrations is the southern portion of Highway One FMU. This area contains extensive stands of dense, non-native, highly flammable eucalyptus trees. Though there are few residences in the area, these eucalyptus stands represent a potential wildfire that could have a high resistance to control and, under extreme weather conditions (i.e. red flag day), spread to more densely populated communities such as Bolinas or Stinson Beach.

Many trees are killed by mostly surface fire but many survive, usually survivors include fire-resistant species of relatively large size.

Severity within individual fires varies between understory burning and stand-replacement, which creates a fine-grained pattern of young and older trees. This type of regime probably is due to fluctuations in weather during fires, diurnal changes in burning conditions, and variation in topography, fuels, and stand structure within burns. Highly dissected terrain is conducive to this fire regime.

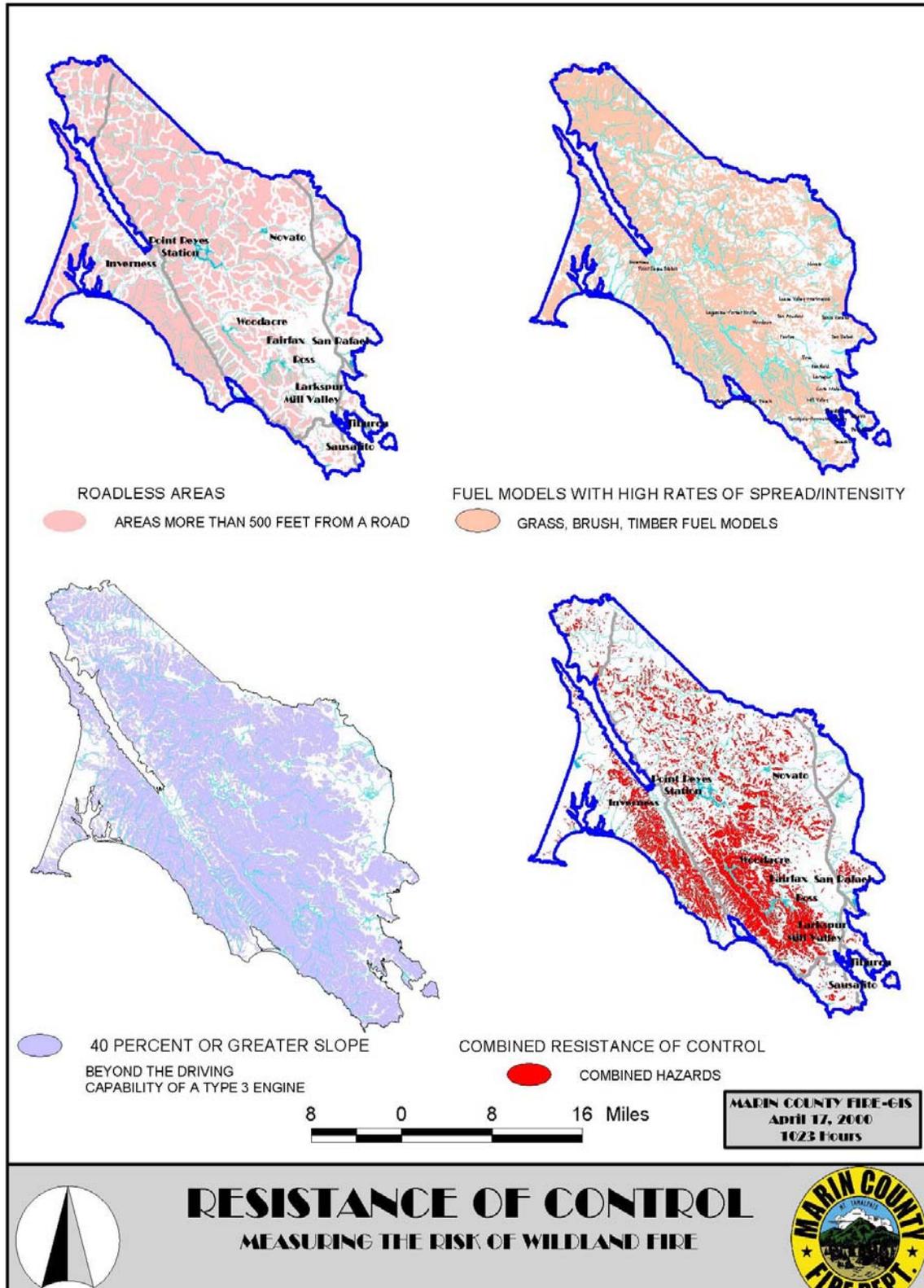
Fire severity varies over time with individual fires alternating between understory burns and stand-replacement. This regime has also been termed “variable” and has been applied to redwood forests.

Prior to Euro-American settlement, shrub-dominated or grassland plant communities in the project area may have been influenced by a stand-replacing fire regime, as most fires likely killed or removed most of the aboveground vegetation. The variability in topography, fuels, and diurnal weather fluctuations, however, could have resulted in a mixed severity fire regime, as described above for forests and woodlands.

The current fire regime for the Point Reyes area has changed dramatically since the mid-1800s as a result of Euro-American settlement patterns and practices. Effective fire suppression has resulted in large accumulations of fuels in many forest, woodland, and shrub-dominated plant communities. Thus, when fires do burn, they often are stand-replacing, as evidenced by many areas within the perimeter of the 1995 Vision Fire.

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FIGURE 3 -- WILDFIRE RISK



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2.5 PRNS FIRE MANAGEMENT UNITS: DESCRIPTION, STRATEGIES, CONSTRAINTS

A “Fire Management Unit” (FMU) is any land management area definable by common objectives, land features, access, values to be protected, political boundaries, fuel types, major fire regimes, or agency-designated special management areas directed by agency policy or congressional action (i.e., Wilderness or Wilderness Study Area).

For fire planning purposes, the planning area was divided into 11 fire management units (FMUs) based on geography, fuels management and habitat improvement needs, and on values at risk (see Figure 4). Ten of the FMUs, totaling 21,856 acres, represent the portion of PRNS where nearly all FMP actions, such as prescribed burning or mechanical fuel reduction treatments, would take place. The eleventh FMU - the Minimum Management Unit - includes most of the park and totals 71,046 acres. FMP actions in the Minimum Management FMU would be limited primarily to vegetation clearing around buildings and along roads and trails, prescribed burns with research objectives and, like the remainder of the park, full suppression of all wildfires.

Prescribed burns and mechanical treatments intended for resource objectives initially would be small and would be subject to intensive monitoring and research. If research results indicated that ecological conditions were improving after treatments in certain habitat types, the size of treatments in these habitat types could increase.

The FMP proposes small pilot project burns in habitats where the ecological effects of burning are not fully understood. These include Douglas-fir stands, Bishop pine forests, coastal scrub, and some grassland habitats. The focus for prescribed burns would be on areas where ecosystem health could be improved by burning and where fuel accumulations have created fire hazards. Prescribed burns would be conducted to approximate historic natural fire intensity and fire intervals to the extent possible while also ensuring public safety and protecting property.

Prescribed fire may also be used to reduce infestations of highly invasive non-native plant species. To increase effectiveness, PRNS staff may time these burns to suppress the invasive plants before they go to seed; this could result in prescribed burns scheduled for months that could seem contrary to burns that focus primarily on reducing fuels.

If herbicides are used, they are applied according to strict specifications using detailed Material Safety Data Sheets. Any application requires the approval of the park’s Integrated Pest Manager and the Washington Office coordinator for herbicide application. No applications occur in riparian or wetland areas (FMP FEIS page 38).

FIGURE 4 -- PRNS FIRE MANAGEMENT UNITS



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2.5.1 Tomales Bay FMU

The 2, 781-acre Tomales Point FMU encompasses all of Tomales Point north of the fence that delineates the Tule Elk Reserve. The fence runs east-west across the peninsula from Tomales Bay to the Pacific Ocean. The plant species composition of the grasslands in this FMU includes a mixture of native and non-native grasses and forbs, with scattered patches of coastal scrub dominated by coyote brush (*Baccharis pilularis*) and lupine (*Lupinus arboreus*).

No fire history data have been collected from the immediate vicinity of Tomales Point, but it can be inferred from fire history data collected elsewhere in PRNS that this FMU has been subject to periodic fire through time.

Environmental Considerations.

- Presence of approximately 450 tule elk.
- Populations of ten plant species of management concern, six of which are considered Species of Concern by the USFWS and one, Point Reyes blennosperma (*Blennosperma nanum*), is listed as rare by the state of California.
- High probability for unrecorded prehistoric sites.
- Pierce Ranch Complex, cultural site and landscape that includes eucalyptus trees.
- Presence of invasive non-native plants such as cape-ivy and velvet grass. Velvet grass is a highly invasive, non-native, perennial, rhizomatous grass that has been increasing in aerial extent and density in many areas of the PRNS Seashore, and has been identified by the park's Exotic Plant Management Plan (NPS 1989) as a priority for management.
- Portions of the FMU are within the Tomales Bay Watershed which is listed by the Regional Water Quality Control Board as impacted by sediments, nutrients and pathogens. FMP actions should not further impact this watershed.

Fire Management Strategies.

- Based on results of research conducted in other California grasslands, application of prescribed fire to the coastal grassland plant communities would be evaluated to determine if fire can be used to increase native species richness and density,
- Small prescribed burns would be conducted in the Tomales Point FMU and would be carefully monitored to determine the response of the plant communities, including the plants of special concern, to fire.
- Based on the results of research burns, prescribed burning would be considered to improve or expand habitat and forage for tule elk

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- Research burning will examine the use of prescribed burning to increase numbers of host plants for Myrtle's silverspot butterfly.
- Studies could be conducted to determine the response of the invasive non-native velvet grass to prescribed burning at different times of the year.
- Mechanical treatments include managing eucalyptus and Monterey cypress trees around Pierce Point Ranch using cutting and stump treatment of the eucalyptus with herbicides.

2.5.2. Headlands FMU

The Headlands FMU comprises 881 acres including the Point Reyes Lighthouse bluffs and Chimney Rock area at the westernmost tip of the Point Reyes peninsula. It contains some areas of designated wilderness along the outer bluffs. Vegetation on the unit is dominated by grassland and patches of mixed coyote brush and coastal scrub. The Headlands FMU has been subject to intense grazing pressure from cattle in the past, and currently some areas continue to be grazed, while others have more recently been excluded from agriculture.

Prescribed burns have not been conducted in this FMU in the past. Although fire history data have not been collected in this area, it is unlikely that this area has historically burned frequently due to the prevailing fog and moist conditions occurring most of the year.

Environmental Considerations.

- Twelve plant species of management concern occur in this FMU (Appendix B, Species List); five of these are federal Species of Concern, one is state-listed as rare (Point Reyes blennosperma), and one is state-listed as endangered (Point Reyes meadowfoam – *Limnanthes douglasii* var. *sulphurea*).
- The Headlands harbor sensitive animal species such as brown pelican and Steller sea lions. Other sensitive animal species include nesting seabirds such as ashly storm petrel.
- Marine mammals such as harbor seals are sensitive to human activities including low flying helicopters.
- Lands within this FMU receive very high levels of visitor use, and are popular for wildflower viewing in the spring.
- Cultural landscapes and historic structures including the Point Reyes Historic Ranch District, Ranch A, the Point Reyes Lifeboat Station and the Point Reyes Lighthouse.
- High probability for unrecorded prehistoric sites.



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- Half of this FMU is within the watershed of the Drakes Bay Drainages parts of which support steelhead trout so water quality of the creeks must be protected during FMP actions.

Fire Management Strategy.

- Small, prescribed burns would be applied in this FMU on a trial basis to determine if fire can be used to reduce the aerial extent and density of invasive non-native plants such as velvet grass, and to increase the percentage of native plant species in the headlands communities.
- Headlands - the effects of prescribed burning on coastal grassland plant communities would be evaluated to determine if fire can be used to increase native species - both animal and plant - richness and density, and/or to reduce density and aerial extent of non-native species.

2.5.3 Estero FMU

The 1,638-acre Estero FMU is located at the northern end of Drakes Estero, along the edges of Schooner and Home bays. Vegetation is primarily grassland and mixed coyote brush and poison-oak scrub habitats, with patches of wax-myrtle (*Myrica californica*) in seasonal drainages. A stand of Monterey pine is in the southeast corner of the FMU. PRNS has been using prescribed fire and mowing treatments to control the non-native Scotch broom (*Cytisus scoparius*) since 1993.

Environmental Considerations.

- Populations of Pt. Reyes mountain beaver occur in shrubby drainages within this unit. This species, although not federally listed, is of concern to Seashore managers as it is a rare species whose populations were significantly reduced by the Vision Fire in 1995.
- Nine plant species of management concern; five are federal Species of Concern.

Fire Management Strategy.

- Prescribed burns would be conducted to contain and reduce the extent and density of the non-native plants Scotch broom, Monterey pine, Monterey cypress, and eucalyptus. Eucalyptus should be treated with herbicides to prevent resprouting. Monterey pine will not resprout from the cut stump if the stumps are cut low enough to the ground surface (Cal-IPC 2004).
- Continue cutting and mowing to suppress Scotch broom.
- Conduct research burns on the effects of prescribed burning on the areal extent and density of Scotch broom.

2.5.4 Inverness Ridge FMU

The linear 1,250-acre Inverness Ridge FMU runs from the western edge of Tomales Bay State Park south along Inverness Ridge to the Bayview Trail parking area. Inverness Ridge - To date, prescribed burns have not been conducted in this FMU. The ridge is dominated by dense stands of Bishop pine (*Pinus muricata*) in the north, which grade into Douglas-fir (*Pseudotsuga menziesii*) forests further south. The understory vegetation beneath the Bishop pine forest is dense consisting of species such as salal, huckleberry and manzanita (*Arctostaphylos ssp.*). The understory of the Douglas-fir forests can be sparse, consisting primarily of grasses and herbs, or more dense, with salal and huckleberry.

Environmental Considerations.

- Four federal plant species of management concern, including two federal Species of Concern - Marin manzanita (*Arctostaphylos virgata*) and Mount Vision ceanothus (*Ceanothus gloriosus var. porrectus*).
- Northern spotted owls, federally listed as a threatened species, nest within this FMU.
- The Inverness Ridge FMU is immediately adjacent to residences and small commercial areas in Inverness Park.
- Portions of the FMU are within the Tomales Bay Watershed which is listed by the Regional Water Quality Control Board as impacted by sediments, nutrients and pathogens. FMP actions should not further impact this watershed.



Fire Management Strategy.

- The proximity of dense, flammable vegetation to the communities of Inverness and Inverness Park makes this area a focus for mechanical and prescribed fire fuel reduction projects.
- Conduct small pilot prescribed fire projects (less than 30 acres) in Bishop pine forest to determine:
 - a. whether understory biomass and dead and downed fuels can be effectively reduced without increasing invasive plant populations.
 - b. the effects on populations of plant and animal species associated with the Bishop pine community (including Marin manzanita and Mount Vision ceanothus).
 - c. the effects on dusky-footed woodrats, northern spotted owls, and Point Reyes mountain beavers.

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- Conduct prescribed burns and mechanical fuel reduction projects to promote regeneration of rare plant species that respond to fire and/or disturbance.
- Mechanical fuel reduction would include the creation and maintenance of a 3-mile shaded fuel break along the ridge. The purpose of the fuel break would be to reduce the risk of a wildfire burning in the park spreading into adjacent private lands. Initially, a 0.25-mile section of fuel break would be constructed and evaluated for effectiveness and to determine the significance of resultant environmental effects from both construction and maintenance of the fuel break. The fuel break could eventually extend from the Bay View Trail Parking Area to Point Reyes Hill and would be approximately 50-60 feet wide. Within the fuel break, the objective would be to reduce dead and downed woody debris by 60%, limb up trees to 10 feet in height, thin trees up to 4 inches in diameter, and brush cut vegetation in a mosaic pattern to break up fuel continuity.

2.5.5 Limantour Road FMU

This 4,142-acre FMU consists of a corridor along the entire length of Limantour Road from the Limantour Beach parking area, east over Inverness Ridge, and descending down to the intersection of Limantour Road and Bear Valley Road. Much of the unit is within the Philip Burton Wilderness Area. For management purposes, it also includes the area encompassing the PRNS headquarters buildings, the Bear Valley Visitor Center, and the Coast Miwok cultural exhibit at Kule Loklo.



The southwestern portion of this FMU, from Limantour Beach to Inverness Ridge, spreads out east and west of the road to include portions of the Phillip Burton Wilderness Area. Vegetation in this area is dominated by grassland and mixed coastal scrub in the southwest, which intergrades into Bishop pine stands and Douglas-fir forests on Inverness Ridge. An extensive salt water and brackish marsh system occurs at the Estero de Limantour, and high quality riparian corridors are located along several northeast to southwest trending creeks (e.g., Muddy Hollow, Laguna, Coast). The section of this FMU that stretches from Inverness Ridge west to the Bear Valley area supports Douglas-fir forest, mixed conifer/hardwood forest with coast live oak, California bay, coyote brush scrub, and grasslands.

Environmental Considerations.

- Six plant species of management concern, three considered federal Species of Concern.
- A free-ranging herd of approximately 28 tule elk.
- Federally-listed threatened coho salmon (*Oncorhynchus kisutch*) and steelhead trout (*Oncorhynchus mykiss*) in streams within the FMU.
- Large tracts of eucalyptus at Kule Loklo.

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- High probability for unrecorded prehistoric sites.
- Northern spotted owls are known to nest in the eastern section of this FMU.
- Portions of the FMU are within the Tomales Bay Watershed which is listed by the Regional Water Quality Control Board (RWQCB) as impacted by sediments, nutrients and pathogens. Approximately one fifth of the FMU flows to the Drakes Bay by creeks that may support steelhead trout. FMP actions should not degrade the water quality of these watersheds.

Fire Management Strategies.

- Prescribed burns would be conducted to reduce the density of Monterey pines, reduce hazardous fuel accumulations along the road corridor, and maintain defensible space around buildings and visitor use areas.
- Roadside thinning and limbing up of trees
- Cut to suppress Monterey pine.
- Conduct prescribed burns to assess the effects of fire on highly invasive non-native Harding grass.
- Conduct prescribed burning to determine if the effects may benefit populations of the rare plant fragrant fritillary (*Fritillaria liliaceae*).

2.5.6 Wilderness North FMU

The Wilderness North FMU is 1,591 acres. It is primarily Douglas-fir forest interspersed with small open meadows. It trends along Inverness Ridge southeast from the Bayview Trail parking area to the Bear Valley Trail. The terrain is characterized by steep slopes that climb up from the east and west toward the central ridge. The FMU contains Mt. Wittenberg, the highest point in the planning area at 1,407 feet. Much of the unit is within the Philip Burton Wilderness Area and contains Sky Camp, a backcountry campground.

Environmental Considerations.

1. Spotted owls are known to nest in this unit.
2. The FMU supports one plant species of management concern – the California bottlebrush grass (*Elymus californicus*).
3. Portions of the FMU are within the Tomales Bay Watershed which is listed by the RWQCB as impacted by sediments, nutrients and pathogens. Approximately one fifth of the FMU flows to the Drakes Bay by creeks that may support steelhead trout. FMP actions should not degrade the water quality of these watersheds.

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Fire Management Strategies.

- The initial burns in this FMU would be small pilot projects in Douglas-fir forest and grassland near Mt. Wittenberg. The primary objectives of these burns includes:
 - Reducing or breaking up the continuity of areas of very dense fuel loading in the forest thereby reducing the overall risk of more adverse effects associated with an unplanned ignition (e.g., potential stand-replacing crown fire, loss of homes or other structures);
 - Establishing areas of reduced fuel loading where fire suppression crews could be staged in the event of a wildfire; and
 - Reintroduce fire into forests that may have burned as frequently as a 7-14 year fire return interval, but which have not burned for 50-100 years.
- If small burns effectively reduce understory biomass, larger burns may be conducted in this FMU in the future.
- Use mechanical treatment to thin forests prior to prescribed burning to determine if this pre-treatment can be beneficial to Douglas fir ecosystem and can increase firefighter safety.
- When working in appropriate habitat, efforts should be made to evaluate the effects of prescribed burning and mechanical treatments on spotted owl habitat and on dusky-footed woodrats.

**2.5.7 Wilderness South**

This 2,297-acres unit is largely comprised of designated wilderness lands south of the Vedanta Society property. It is aligned along Inverness Ridge south of Wilderness North FMU and extends to just south of Mud Lake. Wilderness South FMU includes Firtop peak at 1,324 feet above sea level and lands southwest of Firtop, reaching to the coast at Wildcat Camp. Vegetation in this FMU is dominated by dense stands of Douglas-fir with significant amounts of dead and downed material present. The southwest corner of the FMU supports high quality stands of coastal scrub, including coffeeberry, California sagebrush, coyote brush, bush monkeyflower, and lizardtail. There are a few remnant stands of Marin manzanita in this FMU. The plant reproduces most readily after fire. The absence of fire and increasing overshadowing by the overstory has led to significant manzanita mortality. Encroachment of Douglas-fir into the areas with Marin manzanita has further reduced direct sunlight reaching the Marin manzanita.

Environmental Considerations.

- This FMU supports two plant species of management concern, Marin manzanita (*Arctostaphylos virgata*), and California bottlebrush grass (*Elymus californicus*).
- Northern spotted owls, federally listed as a threatened species, nest within this FMU.
- Cultural landscapes and historic structures including Olema Valley Historic Ranch District's Five Brooks Ranch and Stewart Ranch and Wildcat Military Reservation.
- Roughly one third of the FMU is within the Olema Creek Watershed which supports coho salmon, steelhead trout and California red-legged frogs while the remainder of the FMU flows to the Drakes Bay Drainages whose creeks support steelhead trout. FMP actions should not contribute to the degradation of water quality of these watersheds.

Fire Management Strategies.

- Projects should treat the area supporting Marin manzanita, either through prescribed burning or mechanical fuel reduction projects. The initial prescribed burns would be smaller pilot projects in Douglas-fir forest and grassland near Firtop, and in Douglas-fir forest near Mud Lake. The primary objectives in these locations would be to determine if prescribed burning can effectively reduce understory biomass and be safely conducted. If the burns prove effective, larger burns may be conducted in the future.
- Mechanical treatment should be used as a pre-treatment prior to prescribed burning to reduce understory and forest density.
- When working in appropriate habitat, efforts should be made to evaluate the effects of prescribed burning and mechanical treatments on spotted owl habitat, dusky-footed woodrats and Marin manzanita.

2.5.8 Highway One FMU

The 2,874-acre Highway One FMU begins immediately south of Five Brooks and runs south along the Olema Valley on both sides of Highway One south to the Bolinas-Fairfax road. The FMU includes the riparian corridors on Olema and Pine Gulch creeks and their tributaries which support coho salmon and steelhead trout. At higher elevations above the riparian areas, the vegetation is dominated by annual grassland, mixed scrub, and hardwood communities; many of the grasslands are grazed by cattle.

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Environmental Considerations.

- The Highway One FMU contains dense stands of French broom and eucalyptus.
- Most unplanned ignitions at PRNS occur in this FMU and are related to vehicle traffic on Highway One.
- Northern spotted owls, federally listed as a threatened species, are found within this FMU.
- Cultural landscapes and historic structures including Bolinas Copper Mines, Hagmaier Ranch, Ralph Giacomini Ranch, Teixeira Ranch, Wilkin's Ranch, and Olema Lime Kilns.
- High probability for unrecorded prehistoric sites.
- Roughly a quarter of this FMU is within the Olema Creek Watershed and one third drains to the Pine Gulch Watershed, both of which support coho salmon, steelhead trout and California red-legged frogs. FMP actions should not contribute to the degradation of the water quality within these watersheds.

Fire Management Strategies.

- Use mechanical treatments such as mowing to reduce grasses and control non-native French broom.
- Mechanical treatments to thin or remove eucalyptus.
- Prescribed burning to reduce roadside fuels and suppress French broom.
- Where appropriate, evaluate the effects of prescribed burning and mechanical treatments on creeks, riparian habitat, coho salmon and steelhead, and California freshwater shrimp.

2.5.9 Bolinas Ridge FMU

The Bolinas Ridge FMU is a long, linear FMU, 2,381 acres, stretching from Olema, east along Sir Francis Drake Blvd, and then south along Bolinas ridge to the Bolinas-Fairfax Road. The northern half of the unit contains grasslands grazed by cattle. Drainages within the northern portion of the FMU support mixed scrub, hardwood woodlands, and some Douglas-fir. The southern half of the unit supports primarily Douglas-fir and redwood forests, hardwood forests, and mixed scrub plant communities. A large portion of the northern half of this FMU is subject to grazing by cattle, which serves to reduce fuels. Prescribed burns have been conducted in the northern portion of the FMU on the site of a former Christmas tree farm and at Beebe Ranch. Burns would continue at this site, and would also be conducted in the Beebe Ranch area, and in grasslands and shrublands along Bolinas Ridge.

Environmental Considerations.

- At the southern end, the FMU supports a dense stand of maritime chaparral that supports three rare species – glory brush manzanita, Marin manzanita and Mason's ceanothus. The latter species is a federal Species of Concern and is state-listed as rare.
- No mechanical treatment was anticipated for the Bolinas FMU with the exception of routine roadside fuel reduction, trail clearance, mechanical treatments to prepare for prescribed burning and clearing for defensible space around structures. Mechanical fuel reduction projects that fall outside these categories would require additional NEPA review and possibly ESA consultation.



- Cultural landscapes and historic structures including the North Pacific Coast Railroad Grade.
- Northern spotted owls, federally listed as a threatened species, are found within this FMU.
- A quarter of the FMU is within the Olema Creek Watershed which supports coho salmon, steelhead trout and

California red-legged frogs. The northern portion of this FMU is within the Lagunitas Creek Watershed which supports California freshwater shrimp in addition to the three species also found in Olema Creek. FMP actions should not contribute to the degradation of the water quality within the watersheds.

Fire Management Strategies.

- Prescribed burning of the grasslands along the western portion of Sir Francis Drake Boulevard would be conducted to create a corridor of defensible space along the road.
- In the southern half of the FMU, the emphasis for prescribed burning would be along the Bolinas Ridge Fire Road. Burns would be conducted in cooperation with the Marin Municipal Water District for both fuel reduction and to achieve a natural resource benefit by stimulating reproduction in the rare, fire adapted species Marin manzanita, glory brush ceanothus and Mason's ceanothus.
- Prescribed burns in the southernmost portion of the ridge in coastal chaparral and mixed scrub habitats would be evaluated to determine if fire can be used to increase native species richness and/or density.

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2.5.10 Palomarin FMU

The 2,021-acre Palomarin FMU begins near Double Point in the Philip Burton Wilderness Area and follows the coastline southeast to the U.S. Coast Guard property, then turns inland on the northeast side of Mesa Road. This FMU supports primarily mixed coastal scrub and grasslands. The area flanking the Palomarin trailhead is characterized by an exceptional diversity of nonnative plants, including eucalyptus, French broom, cape-ivy (*Delairea odorata*), pittosporum (*Pittosporum oblongata*), periwinkle (*Vinca major*), Harding grass (*Phalaris aquaticus*), kikuyu grass (*Pennisetum clandestinum*), oblong spurge (*Euphorbia oblongata*), and others. To date, prescribed burns have not been conducted in this FMU.

Environmental Considerations.

- Three plant species of management concern are located in the Palomarin FMU.
- Cultural landscapes and historic structures including the Bolinas Military Reservation.
- High probability for unrecorded prehistoric sites.

Fire Management Strategies.

- Mechanical treatments would be used to reduce the densities of non-native invasive plants, including eucalyptus trees, beyond the Palomarin Trailhead and into the wilderness area in this section of the park.
- Mechanical treatment would include clearing of trees along roadways, mowing grasslands along the road, and cutting Douglas-fir encroaching into coastal scrub before these areas are burned.
- Prescribed burns would be conducted to reduce hazardous fuel accumulations and French broom populations near the Commonwealth garden site and along roadsides.
- The effectiveness of prescribed burning at reducing the density or diversity of non-native, invasive plants would be assessed by park staff in conjunction with PRBO Conservation Science staff (formerly known as PRBO - Point Reyes Bird Observatory) in the area near the Palomarin Trailhead.
- Small-scale pilot burns also would be conducted to reduce fuels, and to discourage Douglas-fir encroachment on coastal scrub habitats around the Point Reyes Bird Observatory (PRBO) field station to create a mosaic of vegetation in the area and improve habitat for birds. Burns in coastal scrub would generally be less than 100 acres and used in part to determine effects.



2.5.11 Minimum Management FMU

The Minimum Management FMU is 68,455 acres and includes all area of PRNS not included in any of the other ten FMUs. The majority of the pastoral zone (roughly 19,000 acres) is in this FMU and is dominated by grasslands and grazed by cattle. The area also includes large tracts of the Wilderness Area that support mosaics of forest, scrub and grassland. The FMU includes large bodies of water such as Drakes Estero, Limantour Estero, Abbotts Lagoon, and Tomales Bay.



Environmental Considerations.

- All known populations of the seven federally threatened and endangered plant species in PRNS occur only in the Minimum Management FMU, so would not regularly be subject to either prescribed burning or landscape-scale mechanical fuels treatments. Proposed FMP projects that could impact these species would require additional consultation.
- All known populations of Myrtle's Silverspot Butterfly and Western Snowy Plover in PRNS occur in the Minimum Management FMU. The FMP anticipated no impact to these species from FMP actions. If FMP projects are proposed that have potential to affect either of these species or habitat, additional consultation would be required.
- Numerous cultural landscapes and historic structures including most of the Olema Valley and Point Reyes Historic Ranch Districts, the Coast Guard Facilities, many of the Coastal Defense Sites and the RCA Marine Radio Station.
- Leaseholder improvements for dairy farming and ranching operations, the youth hostel and water supply for Bolinas.

Fire Management Strategies.

- Clear sufficient defensible space around all park structures.
- Provide adequate overhead clearance along all park roads and fire roads to allow for the passage of emergency vehicles (14 foot overhead clearance).
- Thin roadside vegetation within 10 feet of the edge of park roads and fire roads.
- Remove hazardous trees along roads and fire roads.
- Small areas within pastoral lands that have invasive non-native species, such as Scotch or French broom or Monterey pine, may be burned or mowed to reduce the density and aerial extent of these invasive species (NPS 2004, p. 294).

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Any fire management strategies, including suppression, prescribed fire, or mechanical fuel reduction should factor in the protection of natural and cultural resources, while maintaining that safety of employees and private citizens is the highest priority in any activity. On all wildland fire management actions, use of minimum impact suppression tactics (MIST) is the policy of the National Park Service.

3.1 GENERAL IMPLEMENTATION PROCEDURES

All wildland fires will be suppressed with aggressive initial attack action. All suppression activities on federal lands will be managed in Unified Command with Marin County Fire Department, a contract county for the California Department of Forestry and Fire Protection (CDF). Unified Command with Marin County Fire Department is required due to the proximity of local government and state fire protection areas of jurisdiction. Woodacre Emergency Command Center (ECC) is responsible to contact the appropriate fire management or law enforcement personnel to respond to the report of a wildland fire. Typically the Fire Management Officer or Chief Ranger responds to the Incident Command Post and serves as a Unified Incident Commander, Agency Representative or Resource Advisor.

A qualified Resource Advisor will be requested to proceed to all fires or to fires that have potential to spread on these lands. The Resource Advisor will assist in identifying sensitive resources and provide input on appropriate actions to minimize the impacts to these resources. The NPS Incident Commander or Agency Representative is responsible for requesting a Resource Advisor through the Park Dispatch.

3.2 MINIMUM IMPACT SUPPRESSION TACTICS

The policy at PRNS is to suppress all unplanned ignitions using minimum impact suppression tactics (MIST) whenever possible and feasible given the constraints along the urban interface. Suppression of fires will be aggressive and will be conducted with the highest regard for human safety. Specific MIST Guidelines tactics are included in Appendix E, Section 9.

Suppression will be accomplished through a combination of cooperative agreements with local fire agencies and qualified park fire personnel. Annual operating plans will identify individual suppression concerns in order to minimize suppression impacts. Furthermore, all control efforts will be evaluated for consideration of effects on resource values.

3.3 WILDLAND FIRE SUPPRESSION

All non-management ignited wildland fires at PRNS will be suppressed due to the close proximity of improvements and residences to wildland fuels (NPS 2005b).

The NPS has wildland fire protection responsibility for all federally owned lands inside the boundary of the Seashore. Hence lands within the congressionally designated boundary of the Seashore are Federal Responsibility Areas (FRA) or National Park Service - Direct Protection Area (DPA). The NPS has the financial responsibility, as well as the fire protection force to accomplish this. However due to the limited capability of its protection force, Marin County and

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other nearby West Marin fire agencies provide strong backup and reinforcement to any fire in or near the Seashore.

Local Government fire agencies in West Marin are responsible for structure fire protection in their areas of responsibility (Local Responsibility Area or LRA). State Responsibility Areas (SRA) are unincorporated, non-federal watershed lands under the protection responsibility of CDF. The responsible fire entity for unincorporated watershed lands in Marin County is the Marin County FD acting as the Agent for CDF.

The objective of wildland fire suppression, as an integral part of wildland fire management in the NPS, is to manage wildland fires safely and efficiently to accomplish protection objectives. It will



be integrated into land and resource management plans and activities on a landscape scale, across agency boundaries, and will be based on best available science. Protection priorities are (1) human life and (2) property and natural/cultural resources (NPS 2005b).

Because PRNS has limited fire management capabilities, most suppression activities will be accomplished in conjunction with the local fire agencies. This allows the cooperating West Marin fire agencies to assume interim Incident

Command of initial attack actions until a qualified federal Incident Commander and personnel arrives to assume Unified Command of the incident. Within the boundary of the park, all wildland fires will be suppressed according to federal and local government protocols as determined by the Unified Incident Commanders. Federal actions will be consistent with direction provided in RM 18, DO 60 and *Interagency Standards for Fire and Fire Aviation Operations*.

3.3.1 Range Of Potential Fire Behavior

All of the wildland fuels complexes represented at PRNS display a range of fire behavior; the most typical are described below:

- May and June. Creeping ground fires in herbaceous litter and underlying duff with overall lighter fuels and soil moistures such as early in the fire season.
- July. Surface fire spread with active flame front generally occurs during periods of lowering fuel moistures.
- August and Early September. Active surface fire spread with torching, short range spotting, usually due to higher frontal winds and/or lower humidity.

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- September and October. Running surface fire with torching, intermittent or sustained crown fire, short and long-range spotting under high winds, low humidity, low foliar and surface fuel moistures, during north and east wind conditions where indices can be over the 90th percentile.

This is the typical fire behavior for these vegetation types during the fire season at PRNS.

- Grasslands. The critical concern in this vegetation type is the rate of spread and ease of ignition with grasslands acting as a vector to ignite other vegetation types. This is one of the most dangerous wildfire types for firefighter safety due to its rapid frontal spread. Production of airborne embers ahead of the flame front is not typical due to the rapid rate of spread.
- Brush and Scrub Dominated Communities. The Coastal Scrub vegetation types tend to be difficult to ignite. However, once ignited, fires in this community are difficult to suppress due to the dense stands and presence of volatile oils that make them burn faster and hotter.
- Eucalyptus Forests. The ignition potential of these forests is very high and directly related to the depth of the litter and dead materials on the ground. A continuity of fuel from the ground to the crown of the forest presents the greatest hazard with over 200 acres having high crowning potential.
- Bishop pine Forests. The critical concern in the Bishop pine stands is the stand density of reproduction following the 1995 Vision Fire. As this species of pine requires fire to regenerate themselves, much like lodgepole pine, young growth stands can be dense enough to generate crowning under severe wind conditions. Extensive dead fuel loading, due to the presence of needles, hazardous understory and dead wood underneath the canopy cover and lower portions of the tree boles, adds to the potential for crowning.
- Hardwood forest. This vegetation type with closed canopy tends to represent low hazard due to the relatively little surface fuels present and ignition potential is moderate due to the effects of canopy cover. Fire behavior is dependent on the buildup of surface fuels and dead materials within the tree that can carry fire to the crown.
- Redwood forest and Riparian forest. The behavior of fire in this type of vegetation tends to be fairly benign due to high fuel moistures and high humidity.

3.3.2 Preparedness Actions

The term “preparedness” refers to 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.

Due to the proximity of GGNRA, close coordination and operational consistency in preparation for fire season is important. The FMOs from each unit will meet on a regular basis to coordinate preparedness activities, establish joint projects and procedures for wildland fire, mechanical fuels reduction and prescribed fire, readiness, funding issues, problem areas, and other items.

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The following items will be reviewed annually at joint meeting of the respective FMOs:

- Prepare mutual severity needs analysis for coming fire season when conditions exceed those of a normal fire year (consider: pre-positioning of suppression resources; augmentation and support outside local organization needed).
- Review new policies, roles and responsibilities.
- Review and update as necessary all delegations of authority and Agency Administrator Briefing Package.
- Identify any mutual safety issues and mitigating actions required.
- Clarify mutual criteria for team transitions, managing mutual multiple fire activity.
- Develop mutual and integrated action items to implement staffing levels (Ref: Step-up Plan).
- Identify strategies to communicate fire program principles to cooperators and publics (Red Flag alerts, severity, closures, etc.).
- Agree on mutual standards to evaluate performance of the preparedness operations within the Bay Area National Parks Network.
- Address other issues requiring coordination.

3.3.2.1 Fire Prevention

Prevention objectives for the planning area will include:

- Reduce the number of human-caused wildland fires.
- Integrate fire prevention messages into a variety of programs, ranger activities, and local media, targeting the community, schools, visitors, and landowners.
- Coordinate fire prevention efforts with all cooperators and affected landowners.
- Prepare and post prevention-related signs and messages.

3.3.2.2 Training and Fire Readiness

The purpose of wildland and prescribed fire training is to promote safe and effective individual performance in accomplishing fire management goals and objectives.

All wildland fire personnel will be qualified and certified for the position(s) assigned, according to the Wildland and Prescribed Fire Qualifications System Guide (PMS 310-1). The Interagency Standards for Fire and Fire Aviation Operations, Chapter 2, “Requirements for Fire Management Positions” details additional requirements for fire positions (NIFC 2006). Reference Manual #18 (NPS 2005b) and Director’s Order #18 (NPS 2005a) provide the guidelines for training and readiness.

All employees involved in wildland fire and prescribed fire operations will have their qualification records entered into and maintained annually in the Incident Qualification and Certification System (IQCS) and ROSS.

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Refresher courses (firefighter safety, basic aviation operations, etc) and other required annual training will be coordinated by qualified staff and held annually.

Readiness actions (in addition to those listed above) are described below.

- Fire caches and equipment shall be inspected and documented for completeness and serviceability on a pre-season and fire season basis.
- Ensure timely follow-up actions to preparedness inspections.
- PRNS will maintain supplies, materials, and equipment at the Fire Cache at Bear Valley Headquarters to meet normal fire-year requirements for a Type 6 engine. Minimum staffing during fire season includes 1-Duty Officer, 1-Engine Operators and 1-firefighter.

The following preparedness activity schedule will be followed annually as appropriate:

1. Year-round: NFDRS Weather Station (#042308) online, data entered into WIMS.
2. Annually - Local Preparedness Review.
3. May 1: Annual Operating Plan (AOP) between Marin County Fire Department will be updated and agreed to by all parties.
4. May 1– June 15: All fire line qualified permanent personnel will take the Work Capacity Test; seasonal personnel will be tested upon entering on duty.
5. May 1 – June 15: Red Cards will be signed by FMO and distributed to employees.
6. June 15 – 30: All engines and support equipment will be serviced and fire-ready; Step-Up Plan reviewed and updated.
7. May 15 – June 30: Training for all seasonal employees completed, including mandatory refresher for all carded employees.
8. May 1 – end of season: Roster of all fire qualified personnel maintained, with PPE/initial attack gear/Red pack ready for two-hour callout.
9. November 15: Fire Training and Experience Records will be entered in IQCS for permanent employees.
10. November 31: Equipment winterized, cache inventoried, post-season reviews and reports completed.
11. July 15: Annual Preparedness Review (RM-18 & *Interagency Standards for Fire and Fire and Fire Aviation Operations, Chapter 19*).

California Seasonal and Monthly Outlooks, prepared by the Northern California Geographical Area Predictive Services Unit will be analyzed as early as conditions warrant before and during fire season. Severity funding requests, if indicated from the Outlooks, should also be prepared and finalized in coordination with GGNRA. Submissions will move through agency fire channels to Fire Program Staff at the Regional Office. Refer to Interagency Standards for Fire and Fire Aviation Operations, Chapter 9 (NIFC 2006), and/or RM-18, Chapter 18 (NPS 2005b).

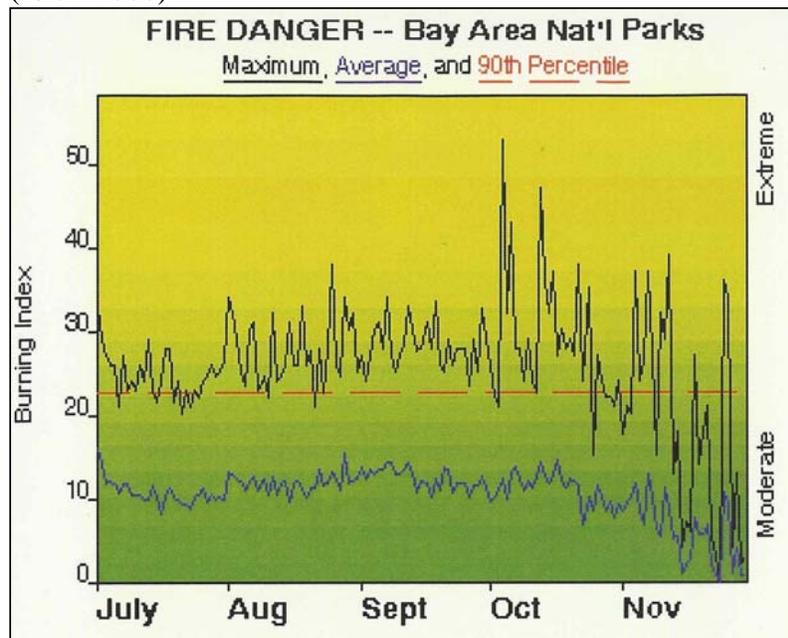
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3.3.2.3 Fire Weather and Fire Danger

Following the cessation of winter rains in mid-April, fuels dry rapidly and the light fuels of the annual grassland (2,000-7,000 lbs/acre) cure and live, dead and downed round wood material and duff in the understory of the Seashore's forest stands gradually lose moisture.

Fire season at Point Reyes begins in early June. At this time, high-pressure air masses frequently stagnate over the Great Basin. Strong foehn winds, referred to as Mono winds in central California, may develop if there is a low-pressure trough off the coast. These winds bring warm, dry air to Point Reyes and cause rapid drying of fuels. These episodes usually last 1-2 days and fire danger can be extreme. In typical years, a persistent coastal fog bank is formed by July 1,

FIGURE 5 -- MONTHLY BURNING INDEX LEVELS (1981-2000)



following the stabilization of the Pacific high over central California. From July through early September fog moves inland and back out to sea in a 3-4 day cycle in response to heating and cooling in California's Central Valley. Fine fuel moisture fluctuates in this cycle, while wood fuels and duff remain relatively wet. In mid-September the fog pattern changes and fuel moistures drop steadily. It is at this time that conditions contributing to Mono winds occur. The combination of prolonged drought, low relative humidity and a peak in fuel production often

causes fire danger to be high through September and October. In addition, almost one fifth of the area's annual lightning storms occur during this period (Martin and Sugnet, 1984).

In summary, the fire season at Point Reyes differs somewhat from most areas in the western United States. Bimodal peaks of fire danger occur in late spring and late summer/early fall. In most years, persistent fog keeps fire danger moderate in July and August when danger is highest in most of the western United States. The period from September 1 through October 31 can be considered the most critical time of fire danger for PRNS (see Figure 5). Figure 5 displays the FireFamily Plus Analysis for the FMP area indicating the periods when burning indices are at average, maximum and 90th percentile.

3.3.2.3.1 Weather Stations

PRNS accesses data from the Barnabe RAWS site located to the east of the Seashore above San Geronimo Valley. The station is located in western annual grassland with some coastal scrub. Indices from this station will generally over-predict fire behavior for PRNS. The station is cataloged in the Weather Information Management System (WIMS) as # 042308 (see Table 3,

Vicinity RAWs Stations) A second RAWs site, the Olema Valley RAWs, has been added to the Seashore but is in the process of being set up to transmit data to WIMS. Olema Valley RAWs site (#042303) is located at Bear Valley Park Headquarters.

Station Name	Station ID	MesoWest ID	Fuel Model	Location	Elevation	Owner
Olema Valley	042303	OVYC1	2	38.0425 122.7958	37 feet	NPS
Barnabe	042308	BBEC1	2	38.0281 122.7022	810 feet	NPS/Marin County
Woodacre	042309	WDAC1	2	37.9906 122.6447	1400 feet	Marin County

TABLE 4 -- RED FLAG WARNING MATRIX

Red Flag Guidance/Verification Matrix				
The matrix below assume 10-hour fuel moisture of less than 6%, annual grasses are cured, and no wetting rain (greater than 0.10 inch) has fallen in the past 24 hours.				
Relative Humidity	Sustained 20 foot Wind Speed (Note: the wind event should be expected to last at least 8 hours)			
	Sustained Wind 6-11 mph	Sustained Wind 12-20 mph	Sustained Wind 21-29 mph	Sustained Wind 30+ mph
Day MIN 29-42% Ngt MAX 61-80%				RED FLAG WARNING
Day MIN 19-28% Ngt MAX 46-60%			RED FLAG WARNING	RED FLAG WARNING
Day MIN 9-18% Ngt MAX 30-45%		RED FLAG WARNING	RED FLAG WARNING	RED FLAG WARNING
Day MIN < 9% Ngt MAX < 30%	RED FLAG WARNING	RED FLAG WARNING	RED FLAG WARNING	RED FLAG WARNING
To help verify Red Flag Warnings the links above will show you what RAWs sites have met the RFW criteria during the last 24 hours. After clicking on the Day MAX or Ngt MAX RH link <u>double check the times on the observations</u> . Both day and night observations will show up.				

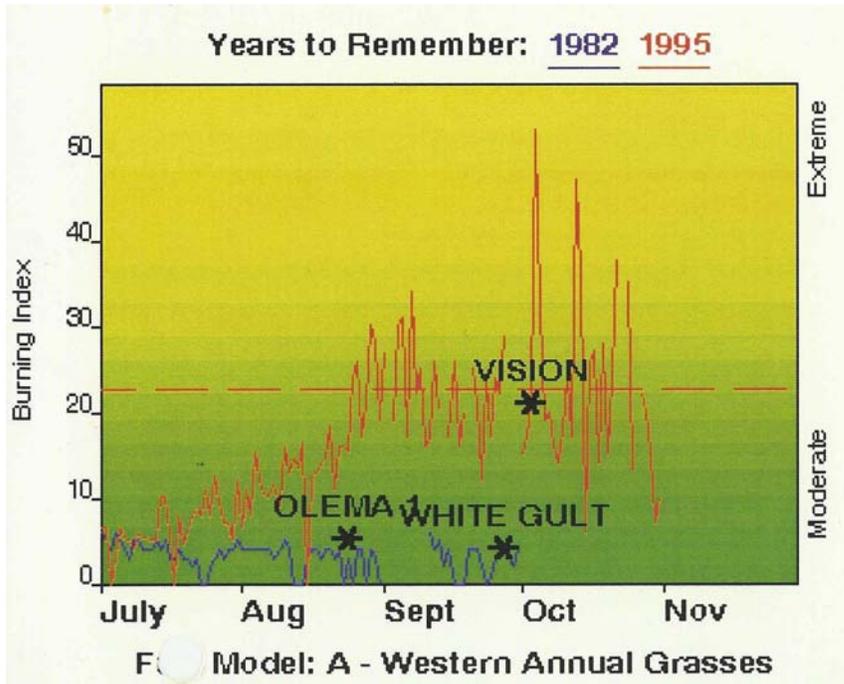
3.3.2.3.2 National Fire Danger Rating System (NFDRS)

NFDRS is a multiple index system developed to provide information about current and predicted fire danger conditions. Analysis used NFDRS Model A, Slope Class 2 (0-25 percent), perennial herbs, and Climate Class of 2 (semi-arid). Restriction thresholds for Park Visitor Activities are

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found in Appendix E, Section 4. The Northern California Coordination Center Predictive Services Group, in conjunction with the National Weather Service San Francisco Bay/Monterey Weather Forecasting Office, monitors, analyzes and predicts fire weather, fire danger and fire management resource impacts across the Bay Area and East Bay Hills.

FIGURE 6 -- BURNING INDEX LEVELS DURING PAST WILDFIRES



Red Flag Warnings are issued to warn of an impending or unusually severe fire weather event. As shown in Table 4, a warning is issued when the combination of conditions shown in the chart are occurring or expected within 24 hours.

Fire managers can use the NFDRS for computing daily and forecasted fire danger. Local thresholds documented on Fire Danger Pocket Cards that shout “Watch

Out” are: 20 foot wind speeds exceed 15 mph, Rh less than 25% and temperature over 80 degrees. The pocket card also uses the Burn Index (BI) of above the 90th percentile as a key indicator of increased fire activity. The graphic below from the Bay Area Parks Network Fire Danger Pocket Card shows the BI in relation to past major and minor incidents.

3.3.2.4 Step-Up Plan

The Step-Up Plan describes a series of escalating management responses which are intended to supplement normal wildland fire capabilities for short periods (i.e., normally one burn period). This policy-compliant plan is in table format and is located in Appendix E, Section 5.

3.3.2.5 Detection

Typically, most fires will be discovered and reported by local residences or members of the public using the Seashore for recreation. It is expected that most individuals wishing to report a fire would contact Marin County Fire Department at Point Reyes Fire Station in person or call Woodacre ECC through the 9-1-1 tie-in rather than notifying PRNS staff directly.

3.3.3 Initial Attack

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

All unplanned wildland fires must receive aggressive initial attack action (IA) by the nearest available suppression forces. Generally, first on scene would be a Marin County Fire Department engine company. NPS personnel will respond after notifying the Park Dispatch and Woodacre ECC. Woodacre ECC will be the ordering point for all initial attack fires within PRNS. As safety allows, initial attack Incident Commanders will assess the complexity of the fire to determine their capacities to manage the incident. If the initial attack Incident Commander (IC) is unable to initiate action due to the management complexity of the incident, forces will be staged in a safe location or modified tactics will be used until a fully qualified Type 3 Incident Commander arrives on scene.

If a federal Type 3 IC is not immediately available to take over the incident, a Battalion Chief or higher from the Marin County Fire Department may assume that position with the FMO and Superintendent's concurrence. If a fire continues into a second operational period, the ordering point will shift from the Woodacre ECC to Mendocino National Forest (NF) ECC.

Marin County Fire Department and nearby West Marin fire agencies have been authorized by an MOU to undertake initial attack actions on PRNS lands. This allows cooperating West Marin fire agencies to assume authority of initial attack actions until a qualified federal Incident Commander and personnel arrive to assume Unified Command of the incident.

3.3.3.1 Initial Attack Priorities and Closest Resources

In the unusual event that there are multiple simultaneous fires within PRNS, a fire start which has the potential to threaten life or property would have priority for suppression actions.

PRNS will follow the Closest Forces Concept for initial attack actions on PRNS lands. Employing the closest forces concept means that regardless of the protecting agency, the fire suppression resource that has the shortest timeframe to be the first to reach the incident location will be the one dispatched. This concept is standard operating procedure for all cooperating fire protection agencies in West Marin and is included as part of cooperative agreements with our local fire agencies.

3.3.3.2 Appropriate Management Response

The AMR will be based on objectives, relative risk, external influences and management boundary defensibility and may include one or some combinations of the following:

- Initial Attack. A planned response to a wildfire given the wildfire's potential fire behavior. The objective of initial attack is to stop the spread of the fire and put it out at least cost. This is an action where an initial response is taken to suppress wildfires consistent with firefighter and public safety and values to be protected.
- Wildfire suppression with multiple strategies. This action categorizes wildfires where a combination of tactics such as direct attack, indirect attack and confinement by natural barriers are used to accomplish protection objectives as directed in the Wildland Fire Situation Analysis (WFSAs).

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- Control and extinguishment. These actions are taken on a wildfire when the selected WFSA alternative indicates a control strategy. Sufficient resources are assigned so that control of the fire can be achieved with a minimum of acres burned.

3.3.3.3 Fire Response Time Frames

The PRNS road system is in relatively good condition with most areas in the park accessible by vehicle and thus, response times to fires by engines would be relatively short. Those fires which require a walk-in response such as fires in FMUs in the Philip Burton Wilderness will have a delayed arrival time. However those arrival times are still considerably short when compared to other areas. Aerial delivery of firefighters by helicopter is an alternative to walk-in if speed to an incident is necessary. If fire response personnel feel they cannot walk to a fire by nightfall, firefighters can be delivered by helicopter and additional personnel can walk-in the following morning to reinforce those that staffed the fire the previous night.

CDF Copter 104 stationed at Boggs Mountain is the closest available helicopter capable of aerially delivering firefighters on the ground to staff an incident in remote areas where walk-in times are long. The copter would be ordered through Woodacre ECC as a CDF supplied resource. Marin County Fire Department and local West Marin fire departments have wildland fire resources available year around. (CDF Copter 104 is available early June through late November).

3.3.3.4 Restrictions and Special Concerns

As a unit of the NPS, there are sensitive resources requiring special protection throughout PRNS. During the NEPA process which preceded the preparation of this FMP, NPS staff and the public considered the potential impacts to the park and general area resources from wildland fire, fire suppression actions and more routine fire management projects. After reviewing the level of adverse and beneficial effects that could result from implementation of the FMP, staff, regulatory agencies and the public contributed to the development of a series of mitigation measures to be applied to FMP actions in order to minimize or avoid the predicted potential effects. These mitigation measures were adopted by the NPS through the signature of the Record of Decision for the FMP EIS by the Pacific West Region Deputy Director. It is therefore mandatory that appropriate mitigation measures from the list attached in Appendix D be adhered to when implementing FMP actions.

Mitigation measure requires that each FMP action conforms to the agreements and commitments made through the FMP NEPA process. To ensure that this occurs:

“five year plans and individual projects will be subject to NPS project review. Prior to approval, all projects will be submitted through an NPS internal review process wherein an interdisciplinary team will evaluate if the potential effects of the proposed projects are adequately addressed through the FMP NEPA process. Conformance to the conclusions in the FMP EIS will be documented for the NEPA record. If the team finds that the project has major new environmental effects not addressed in this EIS or effects greater than those described in this EIS, a separate environmental process will be conducted.”

The interdisciplinary team will assign mitigation measures to the proposed FMP actions. Mitigation measures may include those in Appendix D as well as project specific measures

developed to protect specific conditions of a project site. All FMP actions and project review materials will be signed by the Superintendent prior to implementation.

3.3.4 Extended Attack and Large Fire Suppression

The Incident Command System (ICS) provides for a management/organizational structure on incidents that evolve in complexity or increase in size, whether within a few hours or over several days. While the criteria for incident complexity vary by local conditions, a fire that has escaped initial attack is considered in extended attack when it:

1. Has not been contained by the initial attack resources dispatched to the fire.
2. Will not have been contained within management objectives established for that unit or area.
3. Has not been contained within the first operational period and there is no estimate of confinement or control.

When complexity levels exceed initial attack capabilities, the appropriate ICS positions should be added commensurate with the complexity of the incident. The Incident Complexity Analysis and the WFSA assist the Superintendent in determining the appropriate management structure to provide for safe and efficient fire suppression operations. When an Incident Management Team is ordered to manage a fire, a Superintendent In-Briefing Package and Delegation of Authority as well as a draft WFSA will be prepared and presented to the team upon arrival at the Seashore. A unified command structure will be a requirement in all multi-jurisdictional incidents.

An Incident Complexity Analysis (NIFC 2006, Chapter 10, Appendix 10-4 or 10-5) will be used as a guide for IC's, fire managers and Agency Administrators to evaluate emerging fires in order to determine the level of management organization required to meet agency objectives. This will assist in identifying resource, safety, and strategic issues that will require mitigation.

The WFSA is a decision making process in which the Superintendent or representative describes the situation, compares multiple strategic wildland fire management alternatives, establishes objectives and constraints for the management of the fire, selects the preferred alternative, and documents the decision. The format and level of detail required depends on the specific incident and its complexity. When a wildland fire cannot be controlled during the initial suppression response action or a prescribed fire has exceeded its parameters and been declared both unsuccessful and a wildfire, a WFSA will be initiated and a new strategy selected *Interagency Standards for Fire and Fire Aviation Operations*, Chapter 10-E (NIFC 2006).

Extended attack occurs when a fire has not been contained or controlled by initial attack forces and continues into the next operational period. Qualified IC's from Marin County Fire Department may fill this role if a federal IC is not available or until federal oversight can be provided. A transition to a higher level incident management team may be necessary as the incident grows in complexity. A Delegation of Authority will be prepared for all incidents involving federal lands which transition to a Federal Type 1 or 2 Incident Management Team. Mendocino NF ECC will be the ordering point for all Type 1 or Type 2 complexity fires.

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3.3.4.1 The Wildland Fire Situation Analysis (WFSA) Development

The WFSA is a decision making process in which the Superintendent (or designee) describes the situation, compares strategy alternatives, evaluates expected effects of each alternative, establishes objectives and management constraints, selects the preferred alternative, and documents the decision. It serves as a contingency to undesirable outcomes. If the selected alternative does not accomplish objectives, the WFSA can be amended.

The Superintendent or designee and the FMO and/or Incident Commander prepare the WFSA. Required elements to be addressed in a WFSA are:

- Current Situation
- Evaluation Criteria
- Alternatives
- Analysis of Effects
- Record of Decision
- Review/Evaluation/Update
- Probability of Success
- Consequences of Failure

TABLE 5 -- WILDLAND FIRE SITUATION ANALYSIS

SPECIFIC SITUATION	WFSA CONSIDERATIONS
Human-caused fire =(unwanted fire)	
Fire exceeds extended suppression action =(unwanted fire)	
Fire Exceeds prescribed burn plan in all FMU =(unwanted fire)	
Fire projected to leave federal lands, and the adjoining jurisdiction(s) will not/cannot accept management of the fire	

3.3.4.2 Complexity Decision Process for Incident Management Transition.

PRNS has developed a unit specific Incident Complexity Analysis for Type 4 and 5 fires and criteria for transitioning to a Type 3 incident command structure. See further information in Section 3.3.4, Extended Attack, and Appendix E, Section 13, PRNS Incident Complexity Analysis for Type 5, Type 4 and Transition to Type 3 Incidents.

3.3.4.3 Delegation of Authority for IC

The Delegation of Authority for IC form permits the Superintendent to delegate the responsibility for all incident suppression efforts to another qualified individual. The newly

delegated IC may be from another park unit, another federal agency or a state or local agency. The person has to be qualified for the complexity level of the incident as determined by the previous IC. See further information in Section 3.3.4, Extended Attack, and Appendix E, Section 12, Example of Delegation of Authority Form.

3.3.5 Rehabilitation Guidelines and Procedures

While many wildfires cause only limited damage to the land and pose few threats to fish, wildlife and people downstream, some fires create conditions that require proactive efforts to prevent further damage from occurring. Loss of vegetation exposes soil to erosion; runoff may increase and cause flooding, sediments may move downstream and damage houses or fill reservoirs, and put endangered species and community water supplies at risk. The Burned Area Emergency Response (BAER) program addresses these situations with the goal of protecting life, property, water quality, and deteriorated ecosystems from further damage after the fire is out.

There are four complementary parts to the BAER Program:

1. Suppression Activity Damage are repairs necessitated by damage resulting from the suppression activity rather than a result of the wildfire. The repairs are planned and implemented primarily by the incident command organization prior to demobilization. Suppression Activity Damage repairs are charged to the incident account.
2. Emergency stabilization (ES) actions are set out in the Burned Area Emergency Response Plan completed within 7 days of the containment of the fire by an interdisciplinary Burned Area Emergency Response Team. The Team surveys the burn area, identifies where repairs are needed and how the repair will be conducted. The goal of ES is to minimize threats to life and property or to stabilize and prevent unacceptable degradation to natural and cultural resources. ES repairs are to be implemented within one year of containment of the wildfire. ES is part of the Emergency Operations appropriation
3. Burned Area Rehabilitation (BAR) requires the preparation of a Rehabilitation Plan identifying projects that are in need of repair or improvement on a landscape scale resulting from direct damage by the wildfire. The goal of the rehabilitation plan is to rehabilitate and establish healthy, stable ecosystems in the burn area, prioritizing relative values to be protected, commensurate with rehabilitation costs. The plan is developed with public participation and describes projects and follow-up actions occurring up to three years after containment. BAR is a separate non-emergency appropriation.
4. Long-term (>3 years) Restoration are those rehabilitation actions occurring beyond the initial three years or after the repair or replacement of major facilities damaged by the fire.

Interior Department Guidance on the BAER program is found in Departmental Manual 620, Chapter 3. An Interagency Burned Area Emergency Response Handbook, Version 4.0 can be found at <http://fire.r9.fws.gov/ifcc/esr/Policy/es%20handbook%202-7-06.pdf>. The Burned Area Rehabilitation Handbook is currently in Draft form and circulating for review. Specific best management practices for implementing ES and BAR actions at PRNS should consider the following recommendations:

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- Burn area seeding may be considered, depending on specific local impacts. In 2005, the PRNS range management program began a seed increase program to grow out local, native seed for ranch projects. This seed may be available for rehabilitation; contact the PRNS Range Management Specialist. All seed applications must be approved by the PRNS Resource Advisor prior to purchase and application.
- To the greatest extent possible, waterbars shall be hand-placed. No mechanical equipment will be used in wilderness areas unless such action is in response to an immediate threat to watershed stability.
- A post-burn watershed assessment will be made for fires affecting sensitive watersheds.
- Rehabilitation actions may require consultation with the FWS and the NMFS. See Endangered Species Act (ESA) Section 7 Handbook, Chapter 8 for further guidance. Consultation shall be coordinated through the BAER Team in conjunction with local PRNS staff. If a BAER Team is not assigned to the incident, an ESA Coordinator will be assigned to this duty.
- NHPA compliance may be required prior to implementation of ES or BAR projects. A determination should be made as to whether the actions meet the requirements for NHPA compliance under emergency conditions described in the NHPA regulations, provision 800.12.
- Emergency stabilization funds can be used to control nonnative invasive plants within burned areas when it can be documented that the invasive may spread quickly and can out-compete emergency stabilization relying on seedings or reestablishment of native vegetation. Options for treatment may include chemical, biological or mechanical methods to control aggressive invasives, post-fire detection and monitoring which may be funded for up to one year following containment of the fire.
- If herbicides are prescribed for emergency stabilization actions, they will be applied according to strict specifications using detailed Material Safety Data Sheets. Any application requires the approval of the park's Integrated Pest Manager and the Washington Office coordinator for herbicide application. No applications would occur in riparian or wetland areas.
- Exclusion of livestock is critical for the recovery of burned vegetation or establishment and maintenance of new seedings. Limiting livestock and horse grazing will be considered to meet stabilization objectives. See Interagency Burned Area Emergency Response Guidebook, Version 4.0, (2006) for additional information.



- Monitoring intensity should be commensurate with the complexity of the emergency stabilization treatments, level of concern or controversy associated with the emergency stabilization treatment. See Appendix F, Wildland and Prescribed Fire Monitoring and Research Plan. Monitoring of rehabilitation treatments will be coordinated with the PRNS Fire Ecologist and Bay Area Network Fire Effects Monitoring Program.

3.3.6 Records and Reports

Quality, long-term documentation records for all actions taken on a wildland fire is critical. All decision documents, monitoring data, supporting documentation, and operational documents (Incident Action Plans, maps, unit logs, etc.) will be assembled and organized during and following a wildland fire management action.

Specifically, the fire report and file should contain:

- Any written policies, guidelines or authority statements signed by the Superintendent.
- Copy of the NPS WFSA.
- ICS-209's (Incident Status Report) for fires over 100 acres in Timber or over 300 acres in Grass.
- Copies of purchase orders, personnel request orders, etc. associated with the fire.
- All situation maps.
- Personnel rosters.
- Press releases, clippings, videotapes.
- Accident reports.
- All monitoring data, spot weather forecasts, Internet printouts.
- Documentation of financial charges made against the assigned account number.
- Narratives and unit logs.
- Burned Area Rehabilitation plan.
- DI-1202 Fire Report (completed within 10 working days after fire has been declared out).

It is particularly important to include IC narratives (see above) regarding effectiveness of planned strategies, trigger points, holding actions, and other pertinent factors encountered during the fire.

3.4 PRESCRIBED FIRE

For purposes of the Plan and as defined by federal Wildland Fire Management Policy, prescribed fire is any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan (burn plan) must exist prior to ignition. This plan contains a prescription defining goals, weather and fire behavior parameters, monitoring, and treatment methods used to achieve project specific objectives, while prioritizing firefighter and public safety. All Prescribed fire projects also require an approved Smoke Management filed with BAAQMD.

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For the foreseeable future, the prescribed fire program under the FMP will be aimed at restoring fire as a natural ecological process and reducing hazard fuels concentrations (see below). Many areas subject to first entry treatment may require subsequent treatment(s) in order to achieve hazard fuels reduction objectives, rather than attempting to meet all objectives on the first treatment and risk costly escape and/or unacceptable resource damage.



The range of possible beneficial outcomes of prescribed burning projects includes an increase in firefighter and public safety, protection of real property and natural and cultural resources, reduced risk of high intensity wildland fires, avoidance of savings property damage costs and the restoration of

fire to fire-adapted landscapes.

The late fall fire season is one of the primary constraints limiting the number of days available in the project area during which prescribed burns can be conducted each year. Other constraining factors are air quality and disruption of wildlife breeding periods.

3.4.1 Annual Planning and Documentation for Prescribed Burning

Prescribed fire project prioritization for the Seashore is determined annually in early winter. This includes projects for the following year as well as an updating to the five year plan. These are based on actual accomplished projects from the current and previous years, and target goals in the FMP.

Priorities are initially established based on the Fuel Ranking and Hazard maps produced by Marin County FD. However, these rankings strictly look at defending homes and property from wildfire; they do not include Resource and Vegetation Management goals or strategic fuel break locations based on government ownership boundaries. Sites for prescribed burning are proposed based on the risk factors, fuel conditions and resource management issues identified in the PRNS FMP for each. Based on the relative strength of the justification, projects are further considered for potential effectiveness in addressing critical needs and feasibility of implementation (i.e., under-story and ground fuel thinning along a major roadway to reduce the potential for fire ignitions or create a strategic holding position; or burning along a ridge line to reduce fire behavior in the event of a wildfire adjacent to a community.) Each FMU has unique goals and objectives, and therefore the creation and prioritization of projects within and between FMUs is

not readily quantifiable and must be based on the reasoned expertise of fire staff. All projects also follow the guidelines established by the California Fire Alliance and their requirement for the creation of CWPPs. Though we are not bound by the strategies in the CWPP but we do seriously consider, coordinate, cooperate, and plan with our local cooperators to ensure efficiency, and that our overall goals and strategies are in unison.

Another reality facing fuels and prescribed fire management decisions is the lack of funding. This reality must also be included in project decision criteria. Some of the highest ranked priorities based on fuel ranking and hazard maps would also be the most costly based on their proximity to private property. These projects require smaller acres to minimize public impacts and require more resources to ensure protection of property. The likelihood of these projects being funded by the regional office is diminished by the associated high cost per acre.

Project selection and prioritization involve a conglomerate of multi-divisional staff members including but not limited to: Vegetation and Range Management, Fire Ecologists, Fire Suppression Operations, Environmental Compliance Specialist, and Interpretation and Education.

All these disciplines gather and are able to bring new ideas to the table and to discuss and provide input for projects that are developed by the FMO office.

New projects for resource enhancement, vegetation and range management, and urban interface protection are presented to the group. These projects are prioritized base on the likelihood of funding, difficulty of operations, actual benefits from project completion, and the safety of the public and park staff. An additional key ranking criteria is how future projects relate to previous ones. Projects that are a continuation of work begun on long-term fuel reduction zones carry a high ranking. This ensures that previous efforts are maximized.

There is no set formula for determining and prioritizing projects. The Park staff needs to remain very flexible to address and react to changing management goals and budget realities. All projects that are approved have the complete involvement and support from all management disciplines within the park.

Requirements set forth in RM-18, Chapter 10, Section 6, Prescribed Fire, will be followed.

Prepare annual program priority list based on projects listed in the multi-year implementation plan. Prepare map of archaeological/biological survey before January 15 for anticipated projects to be conducted during the following fiscal year. The list identifies projects in priority order. This list is submitted through NFORS database by March 10. Regional fire staff informs PRNS FMO of the final list of selected projects by mid-summer via Superintendent Verification Sheet.

Once verified, the annual FMP review can be conducted. The finalized list of projects is presented at the beginning of the fiscal year to the Division Chief and Superintendent for review and comment. At that point, it is appropriate to conduct NEPA project review on the finalized list. As FPA comes on-line, the annual FMP review may be tied to the FPA schedule changing the annual review period to each January.

The following information should be included in project-level plans involving prescribed fire:

- Develop project objectives and site-specific treatment methods to accomplish objectives into a comprehensive project description for the NEPA assessment.

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- Input project information into the Planning, Environment and Public Comment (PEPC) database system, implemented agency-wide for all levels of NEPA review. Burn plans for areas that were sufficiently assessed through the FMP FEIS will be reviewed by the IDT and the conformance with the FEIS documented through a Memo to the File of the FEIS. The project impacts and mitigation measures must conform to the formal consultation conducted as part of the FMP. If a proposed project does not conform, additional consultation may be warranted. Upon completion of annual review process, any additional written documentation will be filed as part of the FMP EIS NEPA process as a Memo to File.
- If, due to proposed burn location, sensitive resources to be affected or potential burn intensity, a proposed prescribed fire is such that it was not anticipated in the FEIS, the burn will require a separate NEPA review and perhaps additional ESA or NHPA consultation. NEPA conformance for these projects will be conducted per D.O.-12, RM-12 and PRNS SOP-03. Conformance would be achieved by an EIS or EA if there is potential for significant adverse effect or exceptional circumstances; projects without potential for significant adverse effect may meet the requirements for a categorical exclusion for prescribed burning (categorical exclusion G.1).
- Following mitigating actions, an original copy of the burn plan will be routed with attached clearances by the FMO/Burn Boss.

Other actions which should be considered by the FMO or assigned Burn Boss in implementing a prescribed fire are the following:

- Reconnaissance (GPS) and burn unit layout and compliance (involve resources staff as needed to identify values to be protected, etc.).
- On-site documentation, fire effects monitoring, Job Hazard Analysis (JHA) elements, logistics, and identified mitigation work; complete complexity rating.
- Analyze potential ignition patterns with prescriptions, weather, fuels, and topography.
- Coordinate all burns w/grazing permit holders, cooperators, and media.
- Smoke management considerations, monitoring, modeling, and consultation with the Bay Area Air Quality Management District.
- Pre-burn notifications.
- Briefings, logistics, contingencies.
- Go/No-Go decision process.
- Organization, implementation plans.
- Follow-up coordination, evaluations, cost summaries, record keeping, reporting requirements (a DI-1202 will be completed for each burn and submitted via input through relevant agency channels within 10 working days after declared out date).
- Submit data for GIS addition to prescribed fire thematic map.

3.4.1.1 Annual Review

The five-year fuels treatment plan will be updated annually as target units are burned and fuel reduction projects completed. [The current Five Year Fuels Treatment Plan is Appendix E, Part 18 to this FMP.] Fire Management staff at the PWR office have established a process for the annual review of the five year fuels treatment plan *vis-à-vis* ensuring that actions conform to the findings and commitments agreed to in the NEPA process for the FMP. In addition to NEPA conformance, the annual review process provides a framework for ensuring continued conformance with the requirements of the ESA consultations and NHPA programmatic mitigation measures. The review of the five year fuels treatment plan will be undertaken by a multi-disciplinary team representing the range of expertise of the fire staff.

The specific process to follow for the annual review is found in Section 4.6.1.

3.4.1.2 Long-Term Strategy

The long-term strategy for the prescribed fire program is to employ prescribed fire as a tool to reduce hazardous fuel buildups and restoring fire as a key ecosystem process, while ensuring public safety and protection of property or resource values. Consideration should be made such that prescribed fire treatments should be implemented in a manner that simulates the natural ecosystem function of fire as determined through fire ecology and historic research to restore fire as a keystone natural process.

Goals and Objectives for the PRNS FMP were developed during the initial stages of the FMP NEPA process. These goals and objectives, along with the principles of federal wildland fire management policy and NPS fire management guidelines, constitute the long-term strategy of the FMP. Goals and objectives are found in FMP Section 2.1. Federal and agency fire management policies are summarized in FMP Chapter 1.

3.4.1.3 Personnel

All prescribed fire personnel assigned to prescribed fires will meet all national requirements for training and experience in NWCG 310-1. The Burn Boss assigned to prescribed fires will be certified according to complexity and fuel type of the treatment unit.

3.4.1.4 Fire Behavior and Fire Effects Monitoring

Before the burn, fuels characteristics such as live and dead fuel moisture contents will be established to check prescription parameters and fire behavior calculations. Prior to ignition, a Spot Weather Forecast will be submitted and the results analyzed by the Fire Effects Monitor and the Burn Boss as a factor of the Go/No-Go decision making process. During ignition, on a timetable agreed upon by the Fire Effects Monitor and the Burn Boss, but not to exceed one hour, on-site weather, smoke, and fire behavior observations will be recorded on forms found in the Western Region Fire Monitoring Handbook.

The Bay Area Cluster Fire Effects Monitoring Crew has established plots in a representative number of prescribed burn units. After the burns, on a schedule established by monitoring protocols, the crew will record post-fire data and submit annual reports to the Fire Ecologist and resources division for evaluation of burn effectiveness.

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3.4.1.5 Reporting and Documentation

For NPS, all prescribed fires will be documented with the following information, stored in an individual fire folder and maintained in the Seashore's files:

- Original signed Prescribed Burn Plan.
- Checklist of pre-Burn prescribed fire activities.
- All reviewer comments.
- All maps.
- Notification checklist.
- Permits such as burn, smoke, etc.
- Monitoring data.
- Weather forecasts.
- Superintendent Go/No-Go pre-ignition approval.
- Operational Go/No-Go checklist.
- Incident Action Plans.
- Unit logs, Daily Validation or other unit leader documentation.
- Press releases, public comments, and complaints.
- Smoke dispersal information.
- Post fire analysis.
- Fire Occurrence Report (DI-1202).
- NFPORS entry.

3.4.1.6 Prescribed Burn Plan Elements

For NPS, each plan shall include at the minimum, the elements listed below. An example of the outline of a Prescribed Fire Plan is in Appendix E, Section 16 of this FMP.

- Signature page.
- Executive summary.
- Description of prescribed fire area.
- Goals and objectives.
- Risk management.
- Project complexity.
- Organization.

- Cost.
- Scheduling.
- Pre-burn considerations.
- Prescription.
- Ignition and holding actions.
- Wildland fire transition plan.
- Protection of sensitive features.
- Public and firefighter safety.
- Smoke management.
- Interagency coordination and public information.
- Monitoring.
- Post-fire rehabilitation.
- Post-fire reports.
- Appendices.

3.4.2 Exceeding Existing Prescribed Burn Plan

If prescription parameters are exceeded during project execution, the Burn Boss will terminate ignition operations at a safe and appropriate location based on fire behavior, fuels, topography and weather conditions. If the project area comes back into prescription based on current and forecasted weather, ignition operations may continue. If not, the project area is put into a mop-up or patrol status. Holding actions will maintain control of the fire until a decision to continue, postpone or extinguish the prescribed fire is made and the Agency Administrator or their designee is notified. This decision making process will be articulated in the prescribed burn plan.

If the prescribed fire exceeds project boundaries and/or slopovers and spot fires are not contained within one burning period, suppression actions will be taken and the entire prescribed fire project will be declared a wildfire. Once declared a wildfire, suppression is the only option. A wildland fire cannot be converted back to a prescribed fire.

If at any time the prescribed fire poses a threat to life, property, or high value resources, beyond those mitigated in the plan, suppression actions will be taken and the fire will be declared a wildland fire.

Once the prescribed fire is declared a wildland fire, all subsequent actions (i.e. operational needs, notification, strategies, resource orders, etc.) will be defined under a wildland fire transition plan, which is part of the prescribed fire plan until an initial Wildland Fire Situation Analysis (WFSA) is completed.

3.4.3 Air Quality and Smoke Management

3.4.3.1 Regulatory Compliance and the Approval Process

Visibility and clean air are primary natural resource values in all NPS units. The protection of these resources must be given full consideration in fire management planning and operations.

PRNS is a Class I air shed under the Clean Air Act. Class I areas are places where pollution prevention is given a special priority; they include national parks established before 1977 with a total area greater than 6,000 acres. An air quality standard and degree of visibility were established for Class I areas like PRNS to serve as baseline barometers to track changes in emission levels over the ensuing years since 1977 by changes in visibility and emission levels. The GGNRA lands managed by PRNS are designated as a Class II area, where some incremental increase in emission levels is allowed based on the proximity of a population center.

The Federal Government has ceded responsibility and authority to establish air quality standards and regulations to the states (RM 18-Chapter 14). Therefore, PRNS complies with the Clean Air Act by adhering to the requirements of the California Air Resources Board and the Bay Area Air Quality Management District (BAQMD).

The California Air Resources Board (CARB) is responsible for disseminating regulations about air quality, including state ambient air quality standards and area designation. Title 17 of the California Code of Regulations, entitled Smoke Management Guidelines for Agricultural and Prescribed Burning, provides direction to air pollution control and air quality management districts for the regulation and control of agricultural burning and prescribed burning. These guidelines are intended to allow the use of prescribed burning as a tool, while minimizing smoke impacts on the public.

The Bay Area Air Quality Management District (BAAQMD) is the air quality management district for Seashore lands and has primary responsibility for control of air pollution from prescribed burning. BAAQMD has procedures that must be followed prior to implementation of a prescribed burn plan.

Prescribed burn plans must include a Smoke Management Plan that is to be submitted to BAAQMD a minimum 30 days in advance of the planned burn date. The Smoke Management Plan must include primary information about the proposed burn including smoke emission data. After reviewing and approving the Smoke Management Plan, BAAQMD issues a written approval to conduct the burn with specific conditions. The BAAQMD Application Form for Pile Burning is included as Appendix E, Part 15, to this FMP.

All fire management-ignited fires must be conducted on an “allowable burn day” unless the district has granted a variance in advance. Notice of an allowable burn day is posted by BAAQMD each afternoon for the burns planned for the following day

BAAQMD makes available a 96, 72, 48, and 24 hour burn forecast service to better assist fire agencies in determining their proposed burns dates. Final approval to burn is obtained by contacting BAAQMD the morning on the planned burn day. BAAQMD verifies the total acreage burning allocations in the district and if the fire agency’s acres and/or tonnage to be burned that day would not exceed the total allocation for the area, final approval is granted.

Following the burn, the Fuels Management Specialist must submit information on the fuel types and quantities or acres burned.

3.4.3.2 Regional Air Quality Considerations for Prescribed Burning

The air pollution potential in the region is moderated by the strong westerly winds most of the year. Pollutants are comparatively more concentrated near the ground during colder weather or after sunset. The marine dominated cool spring and summer conditions feature limited vertical mixing, but the cool moist conditions are not conducive to fire generation or propagation.

The frequent occurrence of temperature inversions over the project area and its surroundings limits the air mixing height and, consequently, could concentrate air pollution levels near the ground.

Atmospheric stability and mixing heights are considerations for determining pollutant dispersion. In general, the less stable an atmosphere, the greater the turbulence, resulting in more mixing and better dispersion. Good ventilation results from deep vertical mixing and at least moderate wind speeds within the mixing layer.

Mixing heights generally increase as the air temperatures increase, so that more dilution occurs during hot weather or the heat of the day. Improved vertical mixing typically accompanies the warm easterly fall winds that lead to the most significant fire threats in the project area.

3.5 NON-FIRE TREATMENT APPLICATIONS

PRNS uses two primary non-fire treatments to achieve FMP objectives: mechanical treatments and herbicidal treatment. Mechanical treatments allow fire managers to produce a desired change in vegetation on the ground based on values to be protected and fuel characteristics without the hazards associated with applying fire. The defensible space zone created around a structure is tactically located on the landscape to increase the effectiveness of adjoining fuel breaks, prescribed burn control lines or to help alter future fire behavior during a wildfire. Vegetation removed is chipped, piled to be burned or moved to another area for reuse.

Mechanical treatment may involve the use of the following equipment: chainsaws, chippers, mowers, weed whackers, and heavy equipment such as bulldozers, front loaders or haul trucks. Based on the type of vegetation to be treated, some projects will require the use of approved herbicides to ensure that plants do not re-sprout. The most commonly treated plants are eucalyptus, acacia, cotoneaster and broom. Herbicides are typically spot applied using backpack pumps. Grazing is also a tool of non-fire treatment that may be used under special circumstances.

Defensible space around buildings within the park is accomplished annually (with funding permitting). All efforts are made to conform to the California Fire Marshal's code pertaining to defensible space.

PRNS will follow RM-18 and the requirements to prepare a Hazard Fuels Project Plan that includes specified elements for all mechanical treatments and the *Interagency Standards for Fire and Fire Aviation Operations*, Chapter 6. Prescribed fire follow-up treatments may or may not be employed.

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Fuel break construction should be identified on an appropriate Geographic Information System (GIS)-compatible project location map (exact locations using GPS).

Fuel break planning will consider the following guidelines (see also mitigation measures below):

- Canopy thinned and feathered (or gradually opened) toward the area being defended, with spacing necessary to prevent crown fire and/or “wind tunnel” effect.
- Retaining a reasonable level of surface forbs and other plants to discourage exotic invasion.
- Fuel-break width is dependent on fuels conditions and other considerations.
- Photo-points installed to monitor vegetative recovery, exotic invasion, etc. Additional monitoring will be carried out as necessary.
- Levels of vegetation reduction will vary for each project based on the vegetation type, fuel loading levels, and surrounding vegetation types.
- All burn preparations involving pre-treatment with mechanical techniques will be reviewed through the park’s project review process and described in the burn plan. This may include but is not limited to:
 1. Snag felling, bucking in and around the treatment perimeter.
 2. Reducing tree densities along the treatment perimeter.
 3. Pruning individual trees and brush along the treatment perimeter.
 4. Bucking and removal of logs near the control line only (through bucking into short lengths, piling and burning on site).
- Defensible space around buildings within the park is accomplished annually (with funding permitting). All efforts are made to conform to the State Fire Code requirements.

High priority non-fire hazard fuel treatments will be sited strategically with the objective of meeting the goals and objectives of this Fire Management Plan. Mechanical fuel reduction projects could include the following:

1. Creation of Defensible Space Surrounding Park Structures. Over 75 structures in PRNS have either one or a combination of values as historic structures, administrative buildings or residences. In a 1996 survey, these structures were identified as needing defensible space clearance. Vegetation around these structures will be reduced to provide the minimum 100-foot radius of defensible space now recommended by the California Fire Code. If the predominant fuel to be cleared around a structure is grass, then the remaining herbaceous cover after treatment will be either low grass or a patchy continuity of taller grasses. Fuel reduction will be accomplished by the Bay Area Network Hazard Fuels Reduction Crew in cooperation/collaboration with residents and Division of Facilities Maintenance personnel.



2. Maintenance of Required Roadside Fuel Reduction and Overhead Roadway Clearance. As recommended by the State Fire Code, fuels will be reduced within a ten-foot wide strip along all fire and emergency ingress/egress roads. Not all trees will be removed but trees will be limbed up to 10 feet above ground level. Overhanging

limbs lower than 14 feet above the roadway will be trimmed back to provide safe clearance for emergency vehicles. It will also allow defensible space if the road is used for firing operation in the event of a wildfire. This work will be completed by the Bay Area Network Hazard Fuels Reduction Crew.

3. Creation of Shaded Fuel Breaks in Areas of the Park Not Accessible by Road. Shaded fuel breaks will be constructed in areas along the park boundary not accessible by road in order to reduce hazardous fuels and slow the progression of a wildland fire. A shaded fuel break involves removing dead and down fuels, limbing trees and removing selected shrubs with minimal ground disturbance. These semi-cleared areas will be sited to take advantage of topography and naturally occurring areas of low fuels and may not necessarily be adjacent to structures. Modeling completed as part of the Marin County Fire Department's County-wide Fire Plan (2002) (and used in the PRNS FMP FEIS) and fuel breaks later included in the 2006 Marin County Community Wildfire Protection Plan are used to develop the shaded fuel breaks for PRNS.

In areas that may have a high occurrence of species of special concern, shaded fuel break treatments need to take into account the environmental considerations and place limitations on the recommended methods to protect these specimens yet remove the targeted dead fuel. While many of these populations have been located, it is unlikely that all populations within PRNS have been identified. Therefore mechanical fuel reduction and prescribed burning should focus on pruning or thinning to reduce the overall fuel volume rather than removing the entire plant.

4. Whole Tree Removal of Eucalyptus to Reduce Hazardous Fuels and Contain the Spread of Non-Native Trees on NPS Lands. Thinning small diameter eucalyptus trees will rely on fuel reduction projects completed by the Bay Area Network Hazard Fuels Reduction Crew. Projects will consist of felling with subsequent and immediate chemical stump

CHAPTER 3 – FIRE MANAGEMENT PROGRAM COMPONENTS

treatment to prevent resprouting. Selective thinning of small diameter eucalyptus reduces the ground fuel loading and ladder fuels. Reducing the loading of standing fuels allows for an aggressive initial attack and decreases the resistance to control. Locations identified in the PRNS FMP EIS for these projects include stands along Highway One from the Hagmaier's Ranch House to the Bolinas-Shoreline Highway intersection; areas along Mesa Road (Bolinas) and the Palomarin Trailhead area; Bear Valley Headquarters-Kule Loklo-Morgan Horse Ranch; Coast Guard area of the North District. Where feasible and appropriate, large diameter whole-tree removal of eucalyptus may be warranted to remove the parent tree seed source. The cost of such projects is extremely expensive and may be cost prohibitive. However every effort should be made to remove the seed tree overstory if eucalyptus trees are to be contained.

Treatment methods in eucalyptus forests should emphasize removal of leaf litter, dead materials, fuel ladders, stand density reduction, as well as follow-up treatment to ensure trees are monitored to eliminate stump sprouts. Hand labor, “jackpot” burning, mechanical cutting and chemical follow-up treatment of stumps are preferred treatments. In stands where the potential for crown fires exist, the stand will need to be treated to reduce the spread of fire to the tops of the trees by removal of ground fuels, felling of trees less than 12 inches in diameter at breast height and limbing up the remaining trees to ten feet above ground level.

To discourage the further establishment of weedy species, a closed canopy of overstory should be maintained. Some of the eucalyptus stands areas along Highway One are actually a mix of native hardwoods, such as tanoak and coast live oak, that have persisted among the eucalyptus trees. Removing the eucalyptus may allow the stand to convert to a less flammable fuel type. Project objectives would determine whether the stand should be managed for this emerging vegetation (native hardwoods) or whether the existing canopy of eucalyptus should be maintained. Young eucalyptus (1-10 years) should be removed while still relatively small and easy to remove. It is anticipated that eucalyptus stands will need treatment every 2 to 3 years (perhaps even annual treatment in dense productive stands) to reduce densities, manage resprouts, ladder fuels and new shoots.

5. Silvicultural Treatments on Douglas-fir to Reduce Encroachment in Areas Traditionally Void of Douglas-fire. Thinning of small diameter Douglas-fir trees would be accomplished by the Bay Area Network Hazard Fuels Reduction Crew. In these areas, trees would be felled and slash disposed of by the most economical and sustainable method. Selective thinning along Highway One from Olema south to Dogtown; and near the Coast Guard Station along Mesa Road should be planned where Douglas-fir regeneration is beginning to encroach into traditional grasslands and coastal scrub. The elimination of grazing in these areas has encouraged the movement of Douglas-fire down from the west facing slopes onto the open grass areas. Small diameter Douglas-fir, less than 8 inches in diameter should targeted for removal.

3.5.1 Annual Review

The five-year fuels treatment plan will be updated annually as target units are burned and fuel reduction projects completed. [The current Five Year Fuels Treatment Plan is Appendix E, Part

18 to this FMP.] Fire Management staff at the PWR office have established a process for the annual review of the five year fuels treatment plan *vis-à-vis* ensuring that actions conform to the findings and commitments agreed to in the NEPA process for the FMP. In addition to NEPA conformance, the annual review process provides a framework for ensuring continued conformance with the requirements of the ESA consultations and NHPA programmatic mitigation measures. The update of the five year fuels treatment plan will be undertaken by a multi-disciplinary team representing the range of expertise of the fire staff. More information on the Annual Review process can be found in FMP Section 4.6.1.

3.5.2 Equipment and Seasonal Use Restrictions

Project equipment will be selected for effectiveness and the potential to avoid or minimize impacts to park resources. The process is the same as described for prescribed burning. Please refer to Section 3.3.3.4.

3.5.3 Effects Monitoring

For non-fire treatments, treatment prescriptions and locations will be documented and photo-monitoring will take place. Monitoring of non-fire treatments will be carried out by the Fire Effects Monitoring Crew according to the protocols found in Appendix F, Wildland and Prescribed Fire Monitoring and Research Plan.

3.5.4 Reporting and Documentation

All mechanical treatment projects will be listed in the PRNS five year fuels treatment plan and subject to the FMP annual review process. Individual projects will be assessed for potential effect and conformance with federal regulations through the Planning, Environment and Public Comment (PEPC) database system, now implemented agency-wide for all levels of NEPA review. Site specific projects that have been sufficiently assessed through the FMP FEIS will be reviewed by the IDT and the conformance with the FEIS documented through a Memo to the File of the FEIS.

Projects proposing types of activities or an intensity of impact or type of impact not anticipated in the FEIS will require separate NEPA review. NEPA conformance for these projects will be conducted per D.O 12, RM-12 and PRNS SOP-03. Conformance may be satisfied with a Memo to File to the FMP FEIS or, if there are new environmental effects not addressed in the FEIS, by a separate NEPA process.

3.5.5 Annual Planned Projects

All fire management projects, including mechanical treatments and prescribed burns, will be scheduled in the Seashore's Five Year Fuels Treatment Plan. Where projects will require recurring maintenance on a predictable interval or several initial re-treatments, these actions will also be scheduled in advance on the five year fuels treatment plan.

3.6 FIRE EDUCATION, INFORMATION AND NOTIFICATION

Public information and education are essential components of a successful fire management program. Informed and supportive agency staff, local community, visiting public, and partner organizations, will contribute greatly to the effectiveness of the fire program and the resources that it is designed to benefit.

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Based on the ecological principles and operational procedures of the Fire Management Plan, the goals for the fire information and education program are:

Goal 1: Offer year- round educational opportunities focusing on fire ecology, fire history, and fire management, which communicates how fire and fuels management activities meet natural resource management goals, and accomplish the mission of the National Park Service.

Goal 2: Work with local communities, park residents, and park permittees to promote fire safety, fire prevention, defensible space, firewise community planning, and fuels management. Provide fire safety messages with campfire permits.

Goal 3: Develop and maintain interagency, educational, and community partnerships to improve and expand fire education activities.

Goal 4: Provide accurate and timely incident information for local, regional, and national fire operations as needed.

Goal 5: Support regional and national fire management program activities through information and education.

Strategies for the public information and education program include:

- Establish a network of contacts and develop a proactive process that disseminates current and accurate fire information to multiple audiences.
- Incorporate the principles of fire's role in the ecosystem and the importance of fire as a resource management tool into interpretive programs, exhibits, video, interpretive trails through burned areas, publications, and special group presentations.
- Use national and local websites to promote prevention/mitigation and wildland fire education objectives.
- Report wildland fire activity through the NPS Fire News website.
- Forward all fire-related press releases to the respective Agency Administrator or Public Information Officer (PIO) for approval and keep members of the administrative staffs well informed of fire activity.
- Develop public information programs that promote the benefits of firewise community planning, defensible space, mechanical fuel reduction, and fire safe recreation.
- Establish relationships with local media representatives, and accommodate requests for information and access in order to promote the fire program.
- Conduct outreach to owners of adjacent lands and/or groups with traditional cultural concerns in conjunction with planning fire education, and fire management activities.

A detailed Fire Communications and Education Plan is in FMP Appendix G.

3.7 FIRE ECOLOGY AND FIRE EFFECTS MONITORING PROGRAMS

3.7.1 Programmatic and Policy Direction

The NPS is committed to monitoring fire management activities to determine whether management goals and objectives are being met and to facilitate adaptive management. The authority for fire management monitoring in the NPS is found in Director's Order #18, Wildland Fire Management, Section 5.2 Fire Management Plans and Section 5.8 Prescribed Fire Monitoring. The NPS Fire Ecology Strategic Plan: 2004-2008 (http://www.nps.gov/fire/ecology/program_direction/strategic_plan.htm) provides programmatic direction and Reference Manual #18, Chapter 11, provides policy direction for fire management monitoring (http://www.nps.gov/fire/download/fir_wil_rm18_ch11.pdf).

3.7.2 Current Program

PRNS hosts both the San Francisco Bay Area Network Fire Ecologist and the Southern and Central California Fire Effects Monitoring Crew. The Fire Ecologist serves PRNS, Golden Gate National Recreation Area, and Pinnacles National Monument. The Fire Effects Monitoring Crew serves six California parks in addition to PRNS. The goal of the Fire Ecology and Fire Effects Monitoring program at PRNS is to determine whether prescribed fire and mechanical fuels treatments objectives are being met and to help refine projects and objectives based on monitoring data.

The primary ecosystems at PRNS include Bishop pine forest, Douglas-fir forest, redwood forest, non-native pine/cypress/eucalyptus forest, hardwood forest, riparian woodland, coastal scrub, grassland, pasture, and coastal dune. However, the fire management program is currently actively managing only the coastal scrub, grassland, and non-native eucalyptus forest ecosystems. PRNS has ninety-three fire effects monitoring plots in eight different monitoring types: northern coastal scrub, Scotch broom, eucalyptus, French broom, non-native grassland, Harding grass, Bishop pine and Douglas-fir forest. All of the monitoring types, with the exception of the eucalyptus type, follow the protocols described in the FMH Monitoring Handbook (NPS 2003). Protocols for the eucalyptus monitoring type can be found in the Wildland and Prescribed Fire Monitoring and Research Plan (Appendix F).

3.7.3 Monitoring Levels

Fire effects monitoring occurs at a variety of levels. The most basic of these, Level 1, is the monitoring of environmental conditions including weather, fuel conditions, fire danger rating, etc. The fire effects program will coordinate with the Bay Area Network Inventory and Monitoring program to coordinate Level 1 monitoring efforts. Both programs will work together to ensure that monitoring efforts are not duplicated and to determine the most efficient way to accomplish Level 1 monitoring.

Monitoring Level 2 is fire observation, including fire behavior, smoke volume and movement, fire location and size, etc. Data will continue to be collected at levels 1 and 2 to satisfy the requirements for a Post-Fire Report for prescribed fires or a Wildland Fire Report for wildfires. Protocols for Level 2 post-wildfire monitoring will be included in Appendix F. Additionally, burn severity assessments will be completed for all fires greater than 500 acres and CBI plots will be installed in association with the burn severity assessment. For mechanical projects, treatment prescriptions and locations will be documented and photo-monitoring will take place.

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Protocols for monitoring non-fire treatments will be included in Appendix F.

Levels 3 and 4 are the monitoring of short-term (≤ 2 years) and long-term (> 10 years) change. Variables monitored at these levels of change include fuel loading and vegetation composition among others. Level 3 and 4 monitoring will take place in all monitoring types that are being actively managed by the fire management program through either prescribed fire or non-fire treatments. The monitoring effort must be sufficient to evaluate whether fire management objectives are being met.

3.7.4 Data Management and Analysis

Fire effects data will be maintained by the fire ecologist and lead fire effects monitor in both paper and digital form. Data will be analyzed by the fire ecologist on an ongoing basis. Data analysis will be presented to park fire management and resource staff annually as part of the annual review/update process. This analysis will be used to determine whether fire management projects are meeting their objectives, to adjust and refine fire management objectives if necessary, to adjust how and where fire management projects are carried out, and to identify fire research needs.

3.7.5 Wildland and Prescribed Fire Monitoring and Research Plan

The Wildland and Prescribed Fire Monitoring and Research Plan describes in detail how monitoring is to be conducted at PRNS. The Fire Monitoring and Research Plan presents ecological models for each of the monitoring types within PRNS and outlines the management and monitoring objectives for each. It also details the methods, locations, and frequency of monitoring. The format for the Plan will follow the guidelines provided by the NPS Fire Ecology Steering Committee. Appendix F will be added to the FMP coincident with the 2007 annual FMP update.

3.8 FIRE RESEARCH

The NPS is committed to supporting fire research to promote sound fire management decisions. The policy direction for fire research within the NPS is found in RM #18, Chapter 15 (http://www.nps.gov/fire/download/fir_wil_rm18_ch11.pdf). Fire research has been ongoing at PRNS since the mid-1990s. The objectives of fire research at PRNS are two-fold. The primary research objective is to collect and analyze data on specific biological resources in a scientifically rigorous manner to determine positive or adverse effects of prescribed burning on targeted resources. The secondary objective is to improve the knowledge base about prescribed fire and wildfire such that fire research will contribute both to science and to fire management. Research has been conducted by park staff and by outside researchers. It is the goal of the fire program at PRNS to continue in-park research efforts and to recruit high caliber research from outside organizations.

Past fire research at PRNS has been focused on two primary areas: the effects of the 1995 Vision Fire and the fire history of the area. The 1995 Vision Fire provided a rare opportunity to study the role of fire in the unique ecosystems of PRNS. Much of the post-Vision Fire research is summarized in the publication, “Lessons Learned from the October 1995 Vision Fire” (2003). Studies in this publication examine a wide array of topics including the effects of fire on the Point Reyes Mountain Beaver, changes in ectomycorrhizal communities following fire, and post-

fire vegetation response. Fire history at the PRNS has also been the subject of several research studies. Researchers have used dendrochronology and sediment core analysis to reconstruct historical patterns of fire history and vegetation (Brown et al. 1999, Anderson 2005).

A draft fire research plan for PRNS was drafted in 2001 and is currently being revised (Parravano and Moritsch 2001). When completed, it will be added to Appendix F of this FMP. High priority topics for future fire research include the effects of fire on invasive species with a particular emphasis on broom, Harding grass, and velvet grass; the effects of fire on rare chaparral plants; the effects of fire on the spread of Sudden Oak Death; the effects of fire on wildlife species that are of high management priority; and the reconstruction of historical vegetation patterns.

CHAPTER 3 – FIRE MANAGEMENT PROGRAM COMPONENTS

4. ROLES, FUNDING AND REVIEW

4.1 NPS ORGANIZATIONAL STRUCTURE, ROLES, AND RESPONSIBILITIES

The Organizational Chart for the Point Reyes National Seashore Division of Fire Management outlines the current structure for this division (See Figure 7).

The overall fire program responsibility rests with the Fire Management Officer (FMO). This position reports to the Superintendent, who retains ultimate responsibility for all Park programs. The FMO supervises the daily operations and reports directly to the Superintendent. The Fire Ecologist plays a key role in the overall fire management program by overseeing long-term fire ecology planning for the Seashore and fire ecology strategies for the Bay Area Network. The Fire Information, Education and Prevention Specialist resides in the Division of Interpretation to better service the Bay Area Network. The Fire Planner primarily serves PRNS and GGNRA, providing compliance guidance and documentation for fire-related projects. Both the Fire Ecologist and Fire Planner report to the Supervisory Plant Ecologist at PRNS in the Division of Resource Management. Refer to the Organizational Chart for additional fire management positions for PRNS.

4.1.1 Park Superintendent

1. Ensures safe implementation of wildland fire management program at PRNS.
2. Ensures program supports Service-wide initiatives.
3. Approves wildland fire management plan and updates, interagency agreements and operating plans, delegations of authority, prescribed burn plans, and management of wildland fire incidents, through daily updates of the WFSAs.
4. Ensures compliance of Section 106 of NHPA, Organic Act and other relevant laws and policy.

4.1.2. Fire Management Officer

1. Develops and updates PRNS fire management plans, including annual appendix updates.
2. Ensures PRNS has the capability and skills to safely implement wildland fire programs as identified in the fire management plan.
3. Monitors fire danger and recommends fire restrictions in concert with neighboring agencies.
4. Perform administrative duties, i.e., approving work hours, completing fire reports for command period, maintaining property accountability, providing or obtaining medical treatment and evaluating performance of subordinates
5. Monitors actions taken on wildland fires, and ensures proper and adequate documentation.

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6. Approves DI-1202 (Individual Fire Report) and ensures they are properly prepared and submitted to WFMI.
7. Initiates taskbooks for wildland fire positions and certifies completion.
8. Formulates and directs the budget accountability program for preparedness, hazard fuels operations, emergency fire accounts and approves all FirePro expenditures.
9. Prepares WFSAs as needed.
10. Reviews prescribed fire burns plans.
11. Reviews procedures for off-unit dispatches of park personnel.
12. Sets goals and objectives for the wildland fire program, including staff supervision.
13. Coordinates with the GGNRA FMO and PINN staff on fire management actions and

issues.

14. Establishes liaisons with cooperating agencies, and coordinates and maintains cooperative agreements.

4.1.3 Fire Program Planner

1. Research and prepare NEPA documentation for fire management program projects, participate in planning meetings and site visits, input projects into PEPC, ensure compliance of fire management projects with the respective FMP NEPA documentation, and shepherds projects through the review and approval process.
2. Conducts consultations with the regulators for the Endangered Species Act, submits required documentation for approvals required by the Clean Water Act, Coastal Zone Management Act, etc.
3. Oversees the annual review process for the Fire Management Plan and the update of the five year fuels treatment plan.
4. Prepares documentation necessary for federal regulatory compliance for entities receiving federal funding through the National Fire Plan.
5. Represent NPS at FireSafe Council meetings.
6. Review and comment or prepare documentation for others in the San Francisco Bay Network and regional office.
7. COR for contracts for studies and surveys supporting compliance assessments.

4.1.4 Fuels/Prescribed Fire Specialist

1. Prepares prescribed burn plans and fuel reduction plans and inputs information to PEPC for units in the SF Bay Area Network.
2. Provides input into five-year fuels treatment plans for SF Bay Area Network.
3. Implements prescribed burns as Burn Boss.
4. Coordinates prescribed fire and mechanical hazardous fuels reduction operations for the Bay Area Parks Network.
5. Serves as Incident Commander on wildland fires
6. Manages National Fire Plan Operating and Reporting System (NFPORS) data entries for all Bay Area Parks
7. Serves as acting FMO as needed.
8. Coordinates, prioritizes and schedules the work of the Bay Area Network Hazardous Fuels Reduction Crew within the SF Bay Area Network and elsewhere as requested.

4.1.5 Engine Foreman

1. Ensures personnel and equipment readiness and capability for safe initial response.
2. Ensures 2-Type 6 engines are maintained in a state of readiness.
3. Participates in annual refresher training.
4. Leads PRNS fire crews in daily readiness activities, including fire safety briefings.
5. Supervises temporary fire technicians.
6. Implements signing and fire prevention activities.
7. Issues task books for Firefighter Type 1 and 2 and Engine Operator positions.

4.1.6 Fuels Technician (Fuels Crew)

1. Ensures Fuels Crew personnel and equipment readiness and capability for safe project work.
2. Leads Fuels Crew in conducting mechanical fuels reduction and prescribed burning projects.
3. Prepares prescribed burn plan components as requested.
4. Leads Fuels Crew in daily readiness activities, including fire safety briefings.
5. Determines prescribed burn unit preparation needs.
6. Leads Hazardous Fuels Crew personnel in safety sessions.

4.1.7 Engine Operator

1. Acts as assistant to the Engine Foreman.
2. Oversees fire cache inventory
3. Prepares prescribed burn plan components as requested.
4. Involved in all aspects of wildland fire suppression.
5. Implements signing and fire prevention activities.

4.1.8 Fire Program Management Assistant

1. Serves as payroll, personnel, and travel administrator for PRNS fire program.
2. Maintains payroll, procurement, inventory, travel and other records as needed.
3. Ensures accurate fire reports are entered into SACS, DI-1202 are signed and filed.
4. Maintains/updates employee fire qualifications records for PRNS.
5. Updates list of employee fire qualifications in IQCS.
6. Maintains and updates fire program budget and tracks expenditures in AFS3.
7. Initiates and updates Fire Code incident tracking system.

4.1.9 Fire Education and Information Specialist

1. Responsible for the development, coordination, and dissemination of internal and external communication of fire management program activities in the Bay Area Network.
2. Works with community stakeholders and various local, state, and federal agencies to provide fire education and information for the Bay Area Parks and surrounding communities.
3. Supports Fire Management program activities at the regional and national levels through fire education and information.
4. Responsible for developing and managing partnerships and projects which expand fire education capacity in the Bay Area Network.
5. Serves as Public Information Officer for prescribed fire and wildland fire in the Bay Area Parks.
6. Serves as an interdisciplinary team member to integrate fire management, resource protection, and public education.

4.1.10 Fire Ecologist

1. Manages and analyzes fire effects data.
2. Manages and refines monitoring program including the communication of measurable objectives, monitoring schedules, protocols and data analysis procedures. Writes the fire monitoring plan.

CHAPTER 4 – ROLES, FUNDING AND REVIEW

3. Hires, trains, and supervises fire effects monitors.
4. Assist with writing prescribed fire objectives and prescriptions for burning.
5. Provides expertise on the role of fire in ecosystems and advice on how fire can be used to accomplish management objectives.
6. Oversees long-term fire ecology planning for the Seashore and other parks in the Bay Area Network.
7. Identifies research needs, solicits researchers, writes proposals, and applies for funding for research projects.
8. Serves as a liaison between fire managers and resource management at host and cluster parks.
9. Contributes to and reviews compliance and other management documents.

4.1.11 Lead Fire Effects Monitor

1. Leads the California Mediterranean Coast and San Francisco Bay Region fire effects monitoring program (PRNS, PINN, GGNRA, SAMO, CHIS, JOTR).
2. Collects scientific data on vegetation monitoring plots in order to determine the effectiveness in meeting prescribed fire objectives.
3. Hires, trains and supervises fire effects monitors.
4. Identifies plants to the species level in a variety of ecosystems.
5. Monitors fire weather and fire behavior during prescribed burns.
6. Manages fire effects database and ensures quality control.
7. Sets monitoring schedule and communicates schedule with host parks.
8. Collaborates with fire ecologist on planning and annual reporting documents.

4.1.12 Fire Effects Crew Members (biological Science technicians)

1. Collect vegetation and fire effects monitoring data on monitoring plots.
2. Identify plants to the species level in a variety of ecosystems.
3. Enter data into databases.
4. Participate in wildland and prescribed fire operations.

4.2 FUNDING.

The Fire Management Program Center (FMPC), National Interagency Fire Center, will issue an annual budget structure and allocation report to PRNS. Allocated amounts will be entered in the Federal Finance System (FFS) at the allocation (ALCT) level by the FMPC for the following activities: Preparedness, Burned Area Rehabilitation, Hazardous Fuels Reduction, Wildland Urban Interface, and Rural Fire Assistance. PRNS will stay within the line item spending authority for each activity until additional funding is requested and approved.

CHAPTER 4 – ROLES, FUNDING AND REVIEW

The WASO Budget Office covers Emergency Suppression, Wildland Fire Use and Emergency Stabilization obligations and expenditures at the regional allotment (ALOT) level at year-end. Expenditures in the Emergency Suppression and the Burned Area Rehabilitation Activities are tracked through unique project accounts using the Fire Code guidelines.

The Fire Program Analysis System (FPA) will replace the existing NPS FIREPRO planning and budgeting program in the next few years. FPA will also replace the fire planning and budgeting systems in use by four other federal land management agencies.

4.3 INTERAGENCY COOPERATION AND CONTACTS

TABLE 6 – CONTACTS			
INTRA-AGENCY CONTACTS			
Golden Gate NRA	FMO Alex Naar	415-331-6374	[email address]
Pinnacles NM	Superintendent Eric Brunnemann	831-389-4485 x. 233-	[email address]
Marin County FD	Chief Rich Lopez	415-499-6717	[email address]
INTER-AGENCY CONTACTS			
Inverness Public Utilities District	Chief Jim Fox	415-669-7151	[email address]
Bolinas FD	Chief Anita Brown	415-868-1566	[email address]
Nicasio Volunteer FD	Chief Joe Runyon	415-662-2201	[email address]
Marin Municipal Water District	Mike Swezy, Resource Specialist	415-945-1190	[email address]
Marin Open Space District	Brian Sanford Supervising Ranger	415-499-7473	[email address]
Mendocino NF	FMO Dave Sinclair	530-934-7734	[email address]
Northern California Coordination Center	Ed Duncan, DOI Coordinator	530-226-9710	[email address]
National Weather Service Forecast Office, San Francisco-Monterey Bay.	Ryan Walburn, Fire Weather Forecaster	831-656-1710	[email address]
Bay Area Air Quality Management District	Doug Tolar, Enforcement and Compliance	415-749-5118	[email address]

CHAPTER 4 – ROLES, FUNDING AND REVIEW

4.4 INTERAGENCY AGREEMENTS

TABLE 7 – INTERAGENCY AGREEMENTS		
FIRE DEPARTMENT OR DISTRICT	AGREEMENT	DATE
Marin County Fire Department	in progress	
Bolinas Fire Protection District	in progress	
Inverness Public Utilities District	in progress	
Nicasio Volunteer Fire Department	in progress	

4.5 RECORDS AND REPORTS

TABLE 8 – RECORDS AND REPORTS			
FORM/REPORT	RESPONSIBLE PARTY	DISTRIBUTION	FREQUENCY
DI-1202 Fire Report	NPS Superintendent	Copy (1202 only) to Archives (SACS) within 10 work-days;	Per Incident
Interagency Fire Qualification Form and Card (IQCS card)	Fire Program Assistant Signed by FMO	Affected Personnel	Annually
Fire Weather/Indices (daily; see dates in Section 3.3.2.2)	Engine Foreman/Fire Program Assistant	Staffing levels (BI) to Visitor Center and Dispatch	Daily
Daily Cost Accounting	IC/Burn Boss	As agreed	Schedule to be determined
WFSA	Park Superintendent	Agency-specific	Per Incident

4.6. ANNUAL REVIEW OF THE FIVE YEAR FUELS TREATMENT PLAN AND FMP

Annual Review Process of the Operational FMP and Five Year Fuels Treatment Plan (per PWR Fire Staff)

[The current Five Year Fuels Treatment Plan is Appendix E, Part 18 to this FMP.]

1. Summarize the previous year's actions:
 - Wildland fires, prescribed burns, mechanical fuel reduction projects,
 - Education and information programs for the public,
 - New or renewed agreements with other fire or land management agencies,

- Personnel information (number of positions, network location)
2. Assess Progress.
 - Did we achieve what was anticipated in the five year fuels treatment plan?
 - If the plan was not implemented as proposed, what were the budget or staffing challenges that kept you from being able to manage effectively?
 - Are there unforeseen circumstances that came up which were limited by the program's goals, objectives or mitigations that should be considered for inclusion in the over all strategy to better meet goals and objectives?
 3. Update FMP and Five Year Fuels Treatment plan.
 - Is new background information available to the park that is relevant to fire management planning (i.e., data gathering, annual fire ecology report findings)? Are there changes to methodologies or procedures that should be incorporated into the FMP (i.e., modeling or analyses, of risk, ecological modeling, or new management policies)?
 - Were there "lessons learned" from the past season that are important to note?
 - Are there research or field observation results that indicate strategy should be modified?
 - Were there outside (non-fire management) disturbance(s) (e.g., volcanic, windstorm, flood) that did or will affect the implementation of the FMP or five year fuels treatment plan?
 - Are there modifications to the FMP or the five year fuels treatment plan to suggest? Do any of the issues reviewed support continuation, refinement, or reconsideration of the plan as written.
 - Are there changes in DO-18 and RM-18 or other policy documents that require changes to the FMP or five year fuels treatment plan?
 4. Identify Issues Raised.

In implementing the FMP, were issues of concern raised by park staff, staff of other agencies, or the public? How were issues resolved? If not yet resolved, how does the review team propose solving these issues?

5. Assess Conformance with NEPA and other Federal Regulations.
 - Are there changes in the affected environment of PRNS or Northern Lands GGNRA that could result in significant effects to the environment (i.e., change in species listing under the ESA, CNPS, etc., new cultural resources identified, change in air pollution emissions status for the air basin, change in water quality status, new water quality projects completed)?
 - Were there projects or parts of projects that appear to be out of sync with the range of actions assessed in the FEIS?
 - Were there impacts that differed from those anticipated by the EIS assessment?

CHAPTER 4 – ROLES, FUNDING AND REVIEW

- Was the NEPA documentation adequate to address the actions undertaken during the past season?
- Does the updated FMP or five year fuels treatment plan include actions that do not conform to the scope of the assessment in the EIS?
- Are modifications needed to the NEPA record to retain the program in conformance?

Determine the needs for further compliance and let the regional fire and compliance office know your intentions.

6. Proposed Changes to the Five Year Fuels Treatment Plan and FMP.

- Use the current version of the Regional Environmental Screening Form to determine if any proposed changes to the FMP need further compliance

Initiate changes to the plan using NEPA process if needed, if not, make the changes, and in either scenario send new version to the National Office and to Regional Office