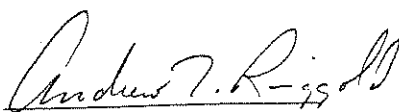


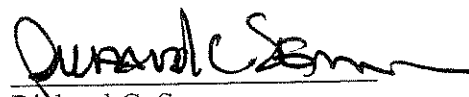
RESOURCES MANAGEMENT PLAN

Redwood National and State Parks

December 1999 Revision



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I. INTRODUCTION

A. Overview

Redwood National and State Parks (RNSP) in California include Redwood National Park, under the jurisdiction of the National Park Service (NPS), and three state parks — Prairie Creek Redwoods State Park, Del Norte Coast Redwoods State Park, and Jedediah Smith Redwoods State Park — under the jurisdiction of the California Department of Parks and Recreation (CDPR). Together, these parks include some 105,516 acres of land in Del Norte and Humboldt Counties in extreme northwestern California.

The NPS and the CDPR will cooperate to insure that management actions complement natural and cultural resources of the three California Redwoods State Parks located within the boundary of Redwood National Park. To this end, the National Park Service and the California Department of Parks and Recreation have signed a Memorandum of Understanding agreeing to manage the state and federal lands in a consistent and compatible manner as one ecological unit. The desired outcome is improved resources protection and fiscal savings through cost efficiencies.

This RMP revision updates the previously approved Redwood National Park plan (December 1994). In 2000, it is anticipated that RNSP will further update the RMP following the signing of the Record of Decision for the new joint General Management Plan/General Plan (GMP/GP) for Redwood National and State Parks. It is also anticipated that new RMP guidance/programming will be forthcoming from the National Park Service in 2000 that may influence future RMP revisions and that a broader review by CDPR will be required for a new Redwood National and State Parks Resource Management Plan. A determination about whether the NPS archeologist will assume cultural resource compliance responsibilities for CDPR lands within RNSP will be made in early 2000 which may also require further updating of the RMP.

This plan discusses the parks' natural and cultural resources, both of which are significant, and that are managed under the same broad guidelines. Implementation of each program is intended to complement the other.

The newly prepared GMP/GP provides guidance on major issues and sets the broad management objectives for the parks, including those related to resources management. The Resources Management Plan provides the framework and background to understand the resource problems of the parks and provides details on executing actions to meet the objectives set forth in the GMP. Specific resource areas are further addressed in resource management action plans. The Watershed Rehabilitation Plan, Fire Management Plan, Water Resources Management Plan, Black Bear Management Plan, Bald Hills Vegetation Management Plan, Davison Riparian Vegetation Mitigation Plan, Exotic Plant Management Plan, and Roosevelt Elk Relocation Plan are individual management plans which have been approved and are being implemented.

B. Purposes of the Parks

Redwood National Park was established to: “preserve significant examples of the primeval coastal redwood (*Sequoia sempervirens*) forests and the streams and seashores with which they are associated, for purposes of public inspiration, enjoyment, and scientific study....” (Public Law 90-545, October 2, 1968), and; protect existing irreplaceable Redwood National Park resources from damaging up slope and upstream land uses, to provide a land base sufficient to insure preservation of significant examples of the coastal redwood in accordance with the original intent of Congress, and to establish a more meaningful Redwood National Park for the use and enjoyment of visitors (P.L. 95-250, March 27, 1978).

Jedediah Smith Redwoods State Park was established to make available to people forever, for their inspiration and enjoyment, in a condition of unimpaired ecological integrity, the great forests of lower Mill Creek and of the Smith River, together with all related scenic, historic, scientific, and recreational values and resources of the area (July 1965 State Park and Recreation Commission Declaration of Purpose).

Del Norte Coast Redwoods State Park is established “to make available to the people, for their inspiration and enjoyment forever, the scenic grandeur of the coast of Del Norte County from False Klamath Cove northward to crescent Beach, where the coast redwood forest uniquely clothes the slopes directly facing the ocean: embracing also the important inland forests within the drainage of Mill Creek, adjoining Jedediah Smith Redwoods State Park: together with all scenic, historic, scientific, and recreational values and resources of the area” (November 1964 State Park and Recreation Commission Declaration of Purpose).

Prairie Creek Redwoods State Park is to: make available to people forever, for their inspiration and enjoyment, in a condition of unimpaired ecological integrity, the great forests of Prairie creek Basin and adjacent areas west to the sea, including the wide ocean beach: together with all related scenic, historic, scientific, and recreational values and resources of the area” (July 1963 State Park and Recreation Commission Declaration of Purpose).

C. Joint Statement of Purpose

The National Park Service and the California Department of Parks and Recreation have developed a statement of purpose to provide general guidance to the management of the entire complex of four parks that comprise Redwood National and State Parks:

Redwood National and State Parks were established to preserve significant examples of the primeval coastal redwood forests and the prairies, streams, seashore, and woodlands with which they are associated for purposes of public inspiration, enjoyment, and scientific study, and to preserve all related scenic, historical, and recreational values.

RNSP has the opportunity to perpetuate elements of cultural heritage and of magnificent natural ecosystems - the redwood forests, streams, coastal resources, and associated resources for the non-exploitive use and enjoyment of the people of America and the world. This Resources

Management Plan describes actions for both natural and cultural resources that begin this process.

D. Significance of the Parks

The joint RNSP GMP/GP identifies the significance of the parks:

RNSP preserve the largest remaining contiguous section of ancient coast redwood forest. This ecosystem includes some of the world's tallest and oldest trees, and it is renowned for its biotic diversity and inspirational atmosphere. The forest community includes a number of rare and endangered species, dependent on the integrity of the whole for their survival.

More than one-third of the lands within the parks have been heavily impacted by timber harvest and are the subject of an internationally recognized restoration program designed to restore integrity and recover lost values. Erosion related to logging roads is being reduced, natural topography is being restored to hillslopes crossed by roads, and topsoil is being returned to the surface to speed revegetation and retain genetic integrity of the vegetation.

RNSP are near the junctions of three active tectonic plates of the earth's crust. Steep, highly erodible landscapes and frequent earthquakes characterize the region and are all related to the geologic forces generated at plate boundaries. These forces influence not only the natural characteristics of the parks, but human use and habitation as well.

RNSP contain a rich variety of biotic communities from the Pacific Coast to the interior mountains. The mosaic of habitats within the parks includes old-growth forests, prairies, oak woodlands, and riverine, coastal, littoral, and near-shore marine environments. These habitats are increasingly important refugia for rare and endangered species.

RNSP contain 35 miles of scenic Pacific Ocean coastline and about 105,516 acres of coastal topography. The heavy rainfall and powerful rivers are part of the intricate and dynamic hydrologic system. This system, which includes portions of the watershed of Redwood Creek, the Klamath River, and the Smith River as well as the Pacific Ocean, provides a rich diversity of aquatic and riparian habitats. The Klamath and Smith Rivers are designated federal and state wild and scenic rivers.

RNSP preserve the legacy of 19th and 20th century conservation efforts that led to the establishment of three state parks in the 1920's, a national park in 1968, and an expansion of the national park in 1978. These federal and state lands are cooperatively managed to ensure the highest level of resource protection and visitor enjoyment. United Nations world heritage and international biosphere reserve status was granted in the 1980s.

Four American Indian cultures with ties to RNSP lands – the Tolowa, Yurok, Chilula, and Hupa peoples – represent a diverse indigenous presence. These groups maintain traditional lifeways, including arts, ceremonies, and methods of subsistence as well as three distinct languages. The archeological record of these peoples, extending back more than 4,500 years on RNSP lands, includes sites listed on the National Register of Historic Places. These resources are especially

important because of their direct association with contemporary American Indian communities, who rely on these resources for their spiritual, cultural, physical, and economic sustenance.

RNSP landscapes represent more than 150 years of land use practices by non-Indian peoples, including exploration, mining, fishing, ranching, timber cutting, and settlement. Some historic structures, roads, trails, and railroad beds remain. Logging practices were developed here that permitted the cutting of timber on an unprecedented scale. The intensity of logging spurred an environmental movement. The debate about land ethics continues today.

II. PRESENT RESOURCE STATUS

Major changes in the natural scene have occurred in the 150 years since the arrival of European culture on the north coast of California. Fully half the parks' land has been directly altered by logging, plowing, pasturing and other modifications of the vegetation that have directly impacted both natural and cultural resources. Some of the animals occupying the present parklands have been hunted or directly displaced by past habitat modification. Other elements of the pristine fauna have been influenced by changes elsewhere; for example, the loss of falcons and pelicans due to pesticides. Indirect effects of land use outside the parks are also strongly felt within parklands in and along streams.

Approximately 50,000 acres of the forestlands now within the parks were logged prior to park establishment and over 400 miles of logging roads constructed, mostly since 1950. Significant erosion has accompanied the alteration of the watershed by logging and, with periodic large storms and floods, has caused elevated and widened stream channels which in turn have destroyed or endangered streamside redwood groves. High suspended sediment levels and changes in streambeds have damaged aquatic resources.

In earlier times, the grizzly bear was hunted to extinction in California and Roosevelt elk were greatly reduced. The California condor was lost from habitat now within the park. Traditional Native American burning and other traditional practices responsible for maintaining some vegetation types were ended. The role of Native Americans as a predator of elk, deer, and other animals has been significantly reduced regionally, and totally eliminated within the parks.

The occurrence of fires both natural and Native American in origin has declined. Native aquatic systems were altered by introduction of exotic fish, hatchery plantings and watershed alterations. Exotic plant introductions have resulted in significant changes to plant communities and habitat alterations. Native prairie vegetation was altered by exotic pasture grasses and domestic livestock. Prairies and oak woodlands were invaded by trees in response to the lack of fire, road building and possibly lowered water tables. A few exotic birds and mammals have been introduced and persist, usually in association with humans; populations of marine mammals were reduced. The sea otter was extirpated. Native birds, including hawks and eagles, were greatly reduced.

Human influences will continue in and around the park and in contiguous watersheds. Some of these are agriculture, grazing, mining, commercial forestry, highways, air and water pollution, park visitors, and park resource management activities.

A. Natural Resource Baseline Information

There is not a complete resource basic inventory for Redwood National and State Parks, although many data have been collected in the conduct of other research and management projects. Most of this work was accomplished following expansion of the National Park in 1978. Investigations were in response to a congressional directive to undertake and publish the results of erosion and sedimentation studies. Other work included redwood ecology, the role of fire, soils classification and mapping, oak woodlands and grassland ecology, coastal vegetation descriptions, watershed rehabilitation procedures and monitoring, studies of various wildlife species (black bear, Roosevelt elk, river otter, coyote), second growth forest successions, intertidal and subtidal inventories, and fisheries biology and studies of the Redwood Creek estuary. Cultural and historical resources were also inventoried, listed, mapped and recorded. An extensive erosion and sedimentation research and monitoring program was undertaken along with several ancillary studies, including cold pool formation, flood history, precipitation monitoring and stream and sediment discharge. Air quality and meteorological monitoring along with monitoring of lichens were initiated more recently. Many of these efforts generate information which will prove useful for future studies and programs such as proposed inventory and monitoring and global climate change initiatives. To fulfill expectations of the latter, however, present investigations and basic data gathering efforts must be greatly expanded, be more specifically focussed, environmental monitoring must be automated and the program as a whole designed to satisfy other criteria.

In April, 1999, RNSP conducted a three day Vital Signs Workshop, designed to: identify resource components that should be monitored as indicators of present and future ecosystem health, establish the basis for selecting these monitoring components, and determine where, when, and how they should be monitored. Workshop participants included resource managers and research scientists from a variety of disciplines and interests.

a. Physiography

Redwood National Park and State Parks have two distinctive physiographic environments - the coastline and the mountains of the Coast Range. The physical nature of the coastline appears, for the most part, unaltered by humans. It is rugged, with stretches of steep, rocky cliffs broken by rolling slopes that are covered by grass and brush. The tidal zone is generally rocky and difficult to traverse, except for Gold Bluffs Beach, a seven-mile expanse of dunes and sandy beach.

Inland from the coast lies the dominating physiography of the Coast Range. Major streams and ridgelines trend northwest. The gently rounded summits of the mountains contrast with the steep sideslopes that have been deeply incised by streams. Elevations within the park range from sea level to 3,097 feet at Schoolhouse Peak.

b. Geology

The bedrock beneath RNSP is primarily of the Franciscan assemblage, a collection of sandstones, siltstones, and minor amounts of conglomerates. There also are isolated exposures of chert and volcanic greenstones. These rocks are thoroughly folded, sheared, and jumbled. The Franciscan is bounded on the west by the San Andreas Fault, which is several miles off the coast and on the east by the South Fork Mountain fault. The South Fork Mountain fault runs through the northeast corner of RNSP in the Little Bald Hills area.

The Franciscan assemblage was laid down on the ocean floor as deposits of sand and mud about 150 million to 100 million years ago. Continental drift and associated plate movements caused the Franciscan assemblage to collide with the continent, and eventually it uplifted to become the Coast Range. Continued folding and faulting complicated the Franciscan assemblage.

Just east of Crescent City, RNSP contains small remnants of marine and non-marine sedimentary deposits that are approximately 11 million years old and a corner of the Point Saint George marine terrace.

The other major geologic formation in the parks is a deposit of loosely consolidated sediments that are primarily fluvial in origin and informally known as the Gold Bluffs formation. It is exposed along Gold Bluffs Beach and in the Prairie Creek drainage basin. The Gold Bluffs formation is thought to be a river delta deposit laid down by the Klamath River more than two million years ago.

c. Soils

The soils in Redwood National Park are primarily derived from the Franciscan assemblage. Residual soils are confined mainly to patches on sloping ridge crests, except for those developed on the Gold Bluffs formation. There also are alluvial soils in the park that developed on floodplains, in alluvial valleys, and on stream terraces of major streams and rivers. For the most part, the soils in the parks are well developed because the mild wet climate has caused a high degree of weathering of the underlying materials. Primarily the topography and varying rock types in the underlying Franciscan assemblage control variations in soil types. Local variations may result from microclimatic differences influenced by slope aspect. Most of the soils have strongly developed surface horizons that are rich in organic matter and nutrients, particularly in areas that have coniferous forests, oak woodlands, and prairies, are moderately coarse textured, and have infiltration capacities but possess little cohesion and very low shear strength. The steep terrain, rainy climate, and deep, medium-textured soils make the area very susceptible to erosion.

d. Vegetation

Historically the region encompassing the present parklands was abundantly forested. Sitka spruce dominated the forests immediately adjacent to the ocean. Inland of the spruce forests, coast redwood was common with Douglas-fir, tan oak, hemlock, and grand fir occurring as associates.

With increasing elevation and increasing distance from the sea, redwood became less abundant and Douglas-fir, tan oak, madrone, and other species increased in importance. Redwood was

rare beyond 10 to 15 miles inland where forests were dominated by Douglas-fir, except where serpentine soils gave rise to specialized vegetation. Further inland at high elevations, east of present parklands, pines and true firs became more abundant.

Today, more than 125 years since the permanent settlement of the region by Europeans, this general pattern of vegetation persists. While extensive alteration of both the forest and non-forest vegetation has occurred, the general distribution of forest and non-forest vegetation is similar to that described in the first written records.

Sixteen vegetation types have been described for the park (Fire Management Plan, 1994). These include old growth redwood forest, second-growth redwood forest, partially cut redwood forest, young Douglas-fir forest, alder forest, prairie, oak woodland, mixed evergreen forest, riparian, coastal shrub, coastal spruce forest, freshwater marsh, coastal strand, Jeffrey pine woodland, chaparral, and unvegetated bare ground. In addition, the U.S. Fish and Wildlife Service has classified the western portions of the park for wetland and deepwater habitats.

Rare, Threatened, and Endangered Plants

Coastal bluffs, rock outcrops, streamsides, wet meadows, bogs, and serpentine soils host the majority of the rare plants of Redwood National Park. In comparison, heavily forested areas contain few rare plant species. The majority of the rare plants in the park occur within one harsh environment, the serpentine/periodotite rock belt stretching across northern Del Norte County. Here few nutrients are available for plant uptake because of the ultra basic (high pH) soil chemistry and its poor water holding capacity. Sparse vegetation survives in this area (Little Bald Hills) despite annual rainfall of 100 inches.

Threatened, endangered, candidate, rare, and sensitive plants that are known to inhabit the parks or for which suitable habitat exists are presented in Appendix H. No federal or state listed, proposed, or candidate threatened or endangered plant species have been confirmed in RNSP. No systematic surveys of the parks specifically for these or other sensitive plant species have been done; surveys for rare or sensitive plants are incidental to resource management or development projects, or are done when RNSP staff receive reports of such species.

RNSP botanists are investigating reports from summer 1999 that a few individuals of two federally listed plant species have been discovered. One report places the Western lily (*Lilium occidentale*) a federally listed threatened species, in the northern part of the park. RNSP staff also investigated a possible occurrence of beach layia (*Layia carnosa*), a federal and state listed endangered plant, at Freshwater Lagoon Spit. RNSP staff have not been able to confirm the presence of either species because the plants had finished blooming when park staff looked for the individuals. RNSP botanists will conduct surveys of likely habitat for both these species at the next possible opportunity. There are no records of specimens of western lily from the parks. The closest documented western lily population is north of Crescent City. Potential habitat for western lily in the parks includes coastal scrub and coastal prairie vegetation types. Lilies have not been encountered during surveys in conjunction with projects at Enderts Beach, Deer Meadow, DeMartin, Lincoln, and Ossagon Prairies or a small prairie just north of the mouth of Redwood Creek.

e. Terrestrial and Aquatic Wildlife

The wildlife and fisheries of the park includes a broad spectrum of the common species of the Pacific states. The mammals, birds, marine mammals, marine and anadromous fish and other marine groups include migratory species while the remaining groups and species are essentially resident. Most of the elements of the terrestrial faunal systems, especially those associated with the forests, remain intact. However, they may have been influenced by the habitat changes that have occurred. For example, recent surveys have found the status of amphibians to be generally good but affected by stream sedimentation.

The population and distribution of certain species of particular economic value or hazard have been strongly modified since 1850. The grizzly bear was known from park lands, but is now extinct. The Roosevelt elk was hunted nearly to extinction by the end of the 19th century, but remnant groups persisted and with protection have extended their range in areas formerly utilized. Today the largest observable groups of elk are found at Elk Prairie within Prairie Creek State Park, along Davison Road north of Orick, at the park office at South Operations Center, and along the Bald Hills Road at the eastern-most boundary of the park in the Redwood Creek basin. Mountain lions have also been dramatically reduced in number since first European contact. However, this reclusive animal is still observed occasionally and indications are that its numbers have increased dramatically within the last 15-20 years.

Hunting and poaching near the park also influence many of the park's larger mammals. Poaching may prevent the repopulating of certain areas by native species, for example, Roosevelt elk in some of the Bald Hills prairies. Poaching may also alter the population and individual characteristics of certain groups. The mountain lion, because of its wide-ranging character, is afforded the least protection by available park habitat. In fall 1999, a mountain lion radio-collared as part of a research project was found killed by poachers south of the park boundary in the Redwood Creek watershed.

Future developments in the parks may utilize wildlife habitat. Although the direct impact to wildlife is expected to be minimal, as mitigative measures are generally included to temper negative effects. For example, if backcountry camping areas are located in areas of high black bear use, bear problems typically found in other parks could develop at RNSP. However, measures such as visitor education and distribution and use of food storage containers should minimize this possibility.

Pesticide residuals, most notably DDT, continue to have a long-term influence on two migratory birds, the brown pelican and peregrine falcon. The park provides crucial habitat for both species; however, pesticides that originate outside the park will affect their long-term status for an indeterminate period.

Trespass cattle and occasional feral pigs utilize wildlife habitat, making it unavailable to native species. Although boundary fencing controls the trespass problem, feral pigs may continue to occasionally damage vegetation in the northeast corner of the park. Other exotics, including

European starling, muskrat and porcupine, have been successfully introduced or have invaded the area subsequent to suitable alteration by humans.

Depredation of private property by wildlife that also uses parkland has and continues to be a problem, especially in the southern portions of the parks. Park wildlife is influenced by attempts to control the problem, including fencing, live trapping and removal, and issuance of permits that allow private landowners or their agents to shoot the depredating animal.

Influences on fisheries include the effect of previous (and on-going) logging, commercial offshore fishing, Native American fishing rights, sport fishing, potential offshore oil and gas development and transport, and levee construction on Redwood Creek.

Logging in and above the park, along with severe storms, resulted in erosion of hillslopes and deposition of sediment in the tributaries and main stem of Redwood Creek and many other park streams. The excessive sediment has reduced the available fish spawning and rearing habitat in the rivers and creeks and correspondingly, the number of fish, especially salmon, coastal cutthroat trout, and steelhead. Although the park's watershed rehabilitation program may reduce sediment yields from some streams, ongoing logging upstream from the park and the large volume of sediment in the streams will limit the recovery of many areas.

Commercial offshore fishing may also influence the park's fishery resources through direct removal of commercially important anadromous fish, thus reducing the number available to return and spawn in park streams. The exercise by Native Americans of their traditional fishing rights and sport fishing have and will influence the park's fishery in much the same manner as commercial offshore fishing.

Offshore transport and proposals for off shore oil and gas lease sales could impact park fisheries, marine birds and other marine/intertidal resources, if oil spills occur and reach the coast.

Modification of the lower two miles of Redwood Creek through channelization and construction of levees has influenced the entire Redwood Creek fishery by eliminating summer rearing habitat at the mouth of the creek. This has most severely affected Chinook salmon and coastal cutthroat trout that use the embayment at the mouth of the creek to prepare to enter the ocean.

Marine systems are described only generally for the park area. Beyond the local extirpation of the sea otter and reduction of salmonids, the amount of change that has occurred is unknown. The southern sea otter has been considered for reintroduction along the northern California coast to help protect the species from oil spills off the central California coast.

Rare, Threatened, and Endangered Wildlife

Threatened and endangered fish and wildlife species within the park are listed in Appendix H. Increasing numbers of species are being listed or are being proposed for listing. Each listing requires greater effort by the park to manage activities to minimize disturbances to these species.

Terrestrial Wildlife- Of particular significance is the marbled murrelet, a marine alcid that nests and roosts on the broad limbs of ancient redwood and Douglas fir trees. Most of the known population of marbled murrelets in California (57-60%) occurs in near-shore habitats off the coast from RNPS. Surveys have revealed the largest numbers of murrelets in forests south of Puget Sound, Washington are found in lower Redwood Creek. While a recovery plan has not been prepared, a proposed critical habitat designation has been developed. This designation identifies the three state parks in RNSP as containing designated critical habitat. The U.S. Fish and Wildlife Service has indicated that it may be likely that the survival of this unique species will in large part depend on the ancient forests of Redwood National and State Parks. No specific surveys have been conducted to determine population numbers because they are difficult to observe and nests are equally difficult to locate. Instead, identification of occupied sites and suitable nesting habitat are considered the best indicators of potential nest sites. RNSP assumes that all old growth stands are occupied by murrelets unless determined otherwise through site specific surveys.

The northern spotted owl is also a prominent listed species. While a recovery plan has been developed, and while no critical habitat has been designated, management of the northern spotted owl is the basis of the Northwest Forest Plan that applies to all federal lands within its range in the Pacific Northwest. Spotted owls are usually found in old-growth forests in RNSP. Second-growth forest older than 40 years and forest stands as small as one acre (or less with remnant old-growth trees) is considered suitable spotted owl habitat. Dense, open-canopied forest stands, with associated snags and large down log habitat components, provide the primary nesting and foraging habitat to ensure successful reproduction. The dusky-footed woodrat is the primary prey species for the spotted owl in northwestern California.

Through vegetation analysis, RNSP has determined that there are approximately 55,000 acres of habitat suitable for roosting, foraging, and nesting for spotted owls. This includes all old-growth and uncut forests and second-growth forests that were cut more than 40 years ago. Another 37,000 acres may be suitable foraging habitat.

Thirty-nine northern spotted owl activity centers have been located in RNSP since 1993. A pair or a single owl may occupy an activity center. An average of 24 activity centers have been known to be occupied (annually). RNSP monitoring programs have noted that 14 activity centers have successfully fledged young since 1993. Six (42%) of these territories have fledged young more than one year.

Aquatic Wildlife- One fish species, the tidewater goby, which inhabited the coastal estuaries in the parks as recently as 1980, is listed as endangered. Four species of fish in the salmon family (referred to as salmonids) that inhabit the parks are listed, proposed for listing, or candidate species for listing under the federal Endangered Species Act. The southern Oregon/coastal California populations of Chinook salmon are proposed for federal listing as threatened. Critical habitat for coho and chinook salmon that inhabit the parks has also been proposed for RNSP streams. The coastal cutthroat trout and the Northern California and Klamath Mountains Province populations of steelhead are federal candidate species for listing as threatened.

Redwood Creek has both summer and winter runs of steelhead. The summer run has declined since surveys began in 1981. The most summer steelhead seen during NPS summer surveys of portions of the main stem of Redwood Creek is 44 fish. Few fish were seen in the mid-1990's. No other streams within the parks in the Redwood creek basin have been surveyed because these streams do not have large enough pools to support adult fish during the warm summer months.

f. Air Quality

Preservation of all of RNSP's resources depends on good air quality. Protection and maintenance of resources in their primeval state depends on minimizing all types of man-induced alterations, including degradation of air quality. Air pollution, even at quantities below the federal standards, can harm vegetation, degrade visual air quality, and diminish visitor enjoyment.

Air quality is an essential element of the visitor experience at RNSP. Much of a visitor's appreciation and understanding of park resources comes from seeing the trees, forests, streams, and seashores of the park. A number of overlooks and scenic vistas in the parks depend on good air quality, including coastal scenes and inland vistas (see Table 1). Both close-up and distant views of redwood forests are aided by good visibility. The scenic views described in the table below extend beyond park boundaries, but are nevertheless part of the park experience and worthy of protection. Park managers will participate in regulatory decisions (for example, air quality permits, plans, and rules) and work cooperatively with State and private interests to resolve air quality related conflicts and ensure that identified vistas (and any future vistas similarly identified) are adequately protected.

Table 1: Scenic Vistas

OBSERVATION POINT	VIEW ANGLE (azimuth)	KEY FEATURE
Hiouchi Flat	80-120°	Smith River Siskiyou Mountains Old Growth Redwood Trees
Crescent City	300-360°	Pacific Ocean Castle Rock
False Klamath Cove	200-340°	Pacific Ocean and Coastline
Requa	120-330°	Klamath River Pacific Ocean
Klamath River	280-40°	Klamath River Pacific Ocean Coastline
Coastal Drive	160-340°	Pacific Ocean and Coastline
Redwood Information Center	200-360°	Pacific Ocean Redwood Forest Hillslopes
Lady Bird Johnson	330-10°	Pacific Ocean Coastline Redwood Forest
Redwood Creek	120-140°	Redwood Forest Hillslopes
Bald Hills Road (numerous turnouts and overlooks)	0-360°	Prairies Oak Woodlands

		Redwood Forest Pacific Ocean
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Air quality also affects a number of resource related values of the parks. For example, the serpentine soils in the Little Bald Hills area (in the northeast corner of the park) host a Jeffrey pine woodland; Jeffrey pine are particularly susceptible to damage from ozone. Although RNSP contains no federally listed threatened or endangered plant species, a number of California Native Plant Society species listed as rare or endangered are found in the park. Most of these species are concentrated along the coast and in the Little Bald Hills area and may be influenced by alterations in air quality.

Air quality in the redwood region is generally considered good to excellent. Air quality monitoring indicates that air pollution levels do not exceed federal standards for sulfur dioxide and total suspended particulates. Humboldt and Del Norte Counties have achieved "attainment" status of SO₂ and total suspended particulates and is unclassified for ozone, carbon monoxide, and NO₂. Suspended particulates exceeded standards in the early 1970's, however, improved technology, better use of materials, and the reduction in the number of sawmills (and especially their concurrent teepee burners) has resulted in an overall reduction of suspended particulates.

Visibility has also improved as the quantity of suspended particulates has been reduced. Recent closure of mills near the park combined with elimination of open burning at other sawmills has resulted in clearer views with less haze and smoke. Occasionally, especially in the fall, vistas and scenic overlooks are obscured by smoke and haze from nearby sawmills and broadcast burning. Most views and scenes are impaired naturally by the fog, rain, and low clouds that are common to the redwood region. Two industrial sites along Humboldt Bay are the most serious point sources of pollution.

An air quality monitoring station is operated in the park near the mouth of the Klamath River. That station previously measured ozone, particulates, sulfates, nitrates, visibility, and meteorological conditions. Other stations are operated through the Northcoast Unified Air Quality Management District in near the park in Crescent City (5 miles west) and Eureka (40 miles south). Presently the park station monitors only particulates, sulfates, nitrates, and aerosol elemental composition as part of the IMPROVE air quality monitoring network. Particulates are the primary pollutant monitored at other stations within the region, although ozone monitoring occurs at the Eureka station. Testing for other emissions such as nitrous oxides, carbon monoxides, and sulfur oxides occurred in the early 1970's.

There are several legislative and administrative influences on air quality. The Clean Air Act, as amended in 1977, was established by Congress after determination that the nation's air quality was rapidly deteriorating, and that federal leadership and financial assistance were needed to cope with the problem. The stated purpose of the Act is to protect and enhance the nation's air quality. The primary Federal responsibility is to provide technical and financial assistance to State and local governments, who have the responsibility to develop and execute air pollution prevention and control programs.

Section 118 of the Act indicates that all federal facilities must comply with all federal, state, interstate, and local requirements in the same manner and to the same extent as any non-governmental entity.

Part C of the Clean Air Act is entitled "Prevention of Significant Deterioration of Air Quality." Among the stated purposes of this part is "to preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special or regional natural, recreational, scenic, or historic value..."

As part of this preservation effort, the Clean Air Act established three classifications with varying degrees of restriction of allowable air quality deterioration. Under the terms of this classification, the 1968 portion of Redwood National Park was designated Class I. This is a mandatory designation, and may not be changed. The remainder of the national park (1978 and state lands) was then designated Class II. According to the Act, this classification was not mandatory, and was anticipated that these lands would be recommended for upgrading to Class I as air quality related values are deemed important to the area. Under these designations, the maximum allowable increases of particulate matter and sulfur dioxide have been established (see Table 2).

However, the Clean Air Act amendments of 1992 clarified that what were previously Class II lands in Redwood National Park, are now designated Class I. Therefore, all lands within Redwood National Park are now designated Class I. However, the non-federal lands within RNSP are classified as Class II airsheds.

Class I and II designations are given to areas where air quality is cleaner than the national ambient air quality standards. Class I areas have the most stringent regulations for the protection of air quality, permitting the lowest increments of air quality degradation, whereas Class II status allows moderate deterioration that might accompany well-planned growth.

RNSP is within the jurisdictional area of the North Coast Unified Air Quality Management District. The district provides contract air pollution control services to Humboldt, Del Norte and Trinity Counties. The California Air Resources Board has assigned the parks to the North Coast Air Basin.

Natural causes of visibility impairment include fog, clouds, rain, salt spray haze, and natural forest haze inversion. All are part of the redwood environment; most contribute to and enhance the visitor experience on the northcoast.

Other park resource problems resulting from air pollution originating outside the park have not as yet been identified. There is no observed degradation of resources from air pollution.

Although there has been an overall regional decline in air pollution, a number of threats loom on the horizon. Offshore oil and gas drilling has been proposed for the Eel River basin. Although

just south of the park's coastline, emissions from that development could impair visibility and impact other resources within the park.

Occasional burning of debris piles, smoke from woodstoves, and prescribed burns are human caused sources of air pollution that originate in the park. All are minor, short-term sources; prescribed burns and debris burning are conducted in conformance with local air pollution regulations. None of these sources create resource problems within the park. Pursuant to "Regulation 2 of the California North Coast Air Basin, Open Burning Procedures," adopted May 13, 1976 revised March 14, 1984.

B. Cultural Resource Baseline Information

Redwood National Park contains a significant set of cultural resources including archeological sites, historic structures, cultural landscapes, ethnographic properties, and objects. Archeological sites, the majority of which are prehistoric, are recorded throughout the park, along the coast, inland and especially in the Bald Hills of the Redwood Creek basin. These sites, which range from temporary and seasonal camps to trail use sites to villages and sacred places, represent over 4500 years of use by at least three different Native American groups and their ancestors. The park archeological sites have associational significance for contemporary Indian peoples who have traditional ties to parklands. The sites are also significant for the potential to yield information on research questions concerning changes in settlement and subsistence patterns through time, the development of local and regional chronologies and the formulation of archeological survey methodology.

Park historic resources include roads, trails, structures and features associated with settlement, transportation, ranching and military events. Of note are a World War II observation station located on the coast and a rural historic ranching district, which reflects over a century of ranching by one family, on the prairies on the east side of the Redwood Creek basin. A cultural landscape is a component of this district. Park historic properties are significant both for their architecture and for their place in the broad patterns of local and state history.

Living in northwest California are a number of groups of Native Americans. Among these peoples, many aspects of the traditional culture continue including the languages, the arts, dances and ceremonies, and subsistence activities. Three of the groups, the Tolowa, the Yurok and the Hupa, have traditional ties to lands now within Redwood National Park. An initial inventory of park ethnographic properties includes a variety of resources: gathering places, ceremonial grounds, spiritual places, ethnographic villages, cemeteries, cultural landscapes and certain natural resources.

Numerous cultural resources projects have been completed for the Park. These include archeological surveys and excavations, historic studies, a research design, artifact analyses and Native American consultations. These projects have been described in "A Summary of Cultural Resources Projects, Redwood National Park" by Janet P. Eidsness (1988). Eidsness' study also provides a complete description of the park recorded cultural resources. For a detailed account of the present cultural resource status, the reader is referred to this summary report.

a. Archeological Sites

To date approximately 30,000 acres (almost 30%) of Redwood National and State Park lands have been archeologically surveyed and over 70 archeological sites have been recorded. Within the Redwood Creek basin, most of the surveyable lands have been subjected to complete, systematic, field reconnaissance that meets current professional standards. Elsewhere in the park, archeological survey has been less complete and in certain areas, does not satisfy current standards.

The majority of archeological sites have been evaluated for eligibility for listing on the National Register of Historic Places, and of those eligible, the majority have been listed on the Register, either as part of the Bald Hills Archeological District (26 sites) on the east side of the Redwood Creek basin, or as individual properties (3 sites) along the coast. Many of the archeological sites have been impacted in the past from logging and road building activities. These impacts have ceased.

Most of the archeological sites within the park were recorded over ten years ago. Since that time there has been major vegetation regrowth and, in the Redwood Creek basin, many of the access roads to these cultural resources have been removed. There is no systematic program to monitor the condition of archeological sites; the park archeological sites data base would benefit from re-recording.

The park archeological research design was written in 1980. Since that time, a substantial data has been obtained through archeological surveys and excavations and an artifact analysis. As a result there is a need for a revision of the research design. Similarly, the summary report on cultural resources projects was written in 1988 and should be revised.

b. Historic Structures

Nearly all of the park historic sites have been recorded. Two historic resources, a portion of the Old Redwood Highway and a World War II radar station, are listed on the National Register of Historic Places. The 1978 park lands portion of the Lyons Family Ranches in the Redwood Creek basin has been determined eligible for listing by the State Office of Historic Preservation. The Lyons Ranches Rural Historic District National Register of Historic Places nomination form, which includes both 1978 and recently acquired lands, is currently being revised.

The Lyons Ranches Rural Historic District includes eight structures: two barns, three sheep sheds, two line cabins and a bunkhouse. The majority of these structures have been stabilized and are now in good condition. Some still need additional work.

The recently acquired historic Prairie Creek Fish Hatchery was evaluated and determined eligible for listing on the National Register of Historic Places by the State Historic Preservation Officer. Currently, the property is being reviewed for listing on the national register.

There are additional needs in the management of the park historic sites. The submerged cultural resources, shipwrecks along the coast of the park, have not been inventoried or evaluated. The

park, which had its twenty-fifth anniversary in 1993, does not have an administrative history. And a number of the consultants who have conducted cultural resources studies for the park have recommended that the park establish an oral history program before information is lost.

c. Cultural Landscapes

The cultural landscapes of the park have not been evaluated by a specialist, but other cultural resources management professionals believe that the cultural landscape associated with the Lyons Ranches Rural Historic District, is a contributing element of the property. It is also possible that this cultural landscape overlaps an ethnographic cultural landscape, not yet described or evaluated. Another historic cultural landscape, associated with the Davison Ranch, does not appear to be significant. To date, the park does not have an accurate Level 0 cultural landscape inventory.

d. Ethnographic Sites

For the past fourteen years, regular consultations have been held with local Native Americans who have traditional ties to lands now within the park (see Eidsness 1988 for a summary of consultation subjects and results). The territories of two Native American peoples, the Yurok and the Tolowa, include lands now within the park. A third group, the Chilula, whose territory included park lands in the Redwood Creek basin, was assimilated by the Hupa, located to the east of the park. An initial inventory of ethnographic sites in the park exists; however, none have been evaluated for their eligibility for listing on the National Register of Historic Places.

Although many of the park cultural resources studies include park ethnographic information, and although ethnographic information is contained in the consultation records, no formal ethnographic overview for the park exists. In order to make the ethnographic overview more useful for park staff, it should also include contemporary traditional use information. In addition, park staff has requested an inventory of ethnographic placenames, for use in naming park developments and for describing study results (for example soil names). Fiscal year 2001 and 2002 funds for an ethnographic overview/traditional use study were recently programmed.

In 1996, a Memorandum of Understanding among the National Park Service, Redwood National Park, the California Department of Parks and Recreation, Prairie Creek Redwoods State Park and the Yurok Tribe, for Government to Government Relations, was signed. This document outlines the specific areas of increased cooperation between the parks and the tribe including quarterly meetings, consultations, self-governance, economic development projects, cultural issues, traditional gathering, data sharing and employment.

d. Objects

The park collection consists of both natural and cultural materials, with over 100,000 cataloged items and a backlog of more than 350,000 objects. Cataloged items include 56 Native American baskets, about 25,000 archeological objects, 2000 historical objects, 56,000 archival materials, nearly 5000 herbarium specimens, over 15,700 faunal specimens, and 300 geological specimens. Accessioned objects that need cataloging include approximately 100,000 historical objects, 150,000 archival materials and 100,000 biological items.

e. Cultural Context/Themes

Although a detailed cultural context, based on the Revision of the National Park Service's Thematic Framework (Report of Working Group, October 28, 1993), has not yet been developed for Redwood National Park, the relevant cultural contexts (themes) can be briefly listed.

I. Peopling Places The majority of the park archeological resources are associated with this theme, as are some of the ethnographic resources and certain objects in park collections. It is through these resources that research questions concerning human population movement and change through prehistoric, historic and ethnographic times can be answered.

III. Expressing Cultural Values This theme is represented in park resources both by some of the ethnographic resources, for example ceremonial grounds, and by objects in park collections such as American Indian baskets.

IV. Shaping the Political Landscape Within the park is a World War II facility listed on the National Register of Historic Places; it is associated with this theme.

V. Developing the American Economy A number of the park historic resources are significant within this context. These include resources associated with ranches, dairies, and logging.

VII. Transforming the Environment The interplay between human activity and the environment is well represented in the cultural landscapes of the Redwood Creek basin of the park. The forests were modified historically by logging and the prairies and oak woodlands, although natural features represent both ethnographic and historic landscapes.

III RESOURCE MANAGEMENT PROGRAM

Resource management strategies proposed in the Final GMP/GP (1999) are to:

- Ensure that all resource management efforts are consistent with and supportive of the perpetuation of the redwood forest ecosystem as the prime resource of the parks.
- Restore and maintain the RNSP ecosystems as they would have evolved without human influences since 1850 and perpetuate ongoing natural processes.
- Actively participate in land use decisions for activities such as logging, mining, and the development of highways and subdivisions adjacent to the parks to minimize impacts on RNSP resources and values.
- Cooperate with the timber industry, private landowners, and other government agencies to accomplish long-range resource management planning and reduce threats to the RNSP resources.
- Acquire and analyze baseline inventory data to determine the nature and status of the natural resources under RNSP stewardship.
- Monitor selected resources and environmental factors to detect change and to distinguish natural variation from local and bioregional human-induced resource threats.
- Aggressively pursue strategies to prevent theft and commercial exploitation of RNSP resources.

A. Natural Resources

a. Erosion Control, Prevention, and Sediment Monitoring

The rehabilitation of the Redwood Creek basin will remain the major program of natural resource management at RNSP. Important objectives of the overall effort include rehabilitation of logged hillslopes and disturbed grasslands, restoration of ephemeral, intermittent, and perennial stream channels, and revegetation of logged forestland. These objectives will be accomplished by controlling gully, rill, and slope erosion; by re-diverting streams back into their natural, pre-logging channels; by excavating fills placed in road and skid trail stream crossings; and by stabilizing mass movement features, where feasible.

Approximately 225 miles of logging road remain to be rehabilitated. Of these remaining roads, 155 miles are targeted for removal. Decisions on removing the final 70 miles are pending evaluation of administrative needs for those roads weighed against their erosion potential and long-term maintenance costs. The majority of these are wide roads that will require extensive excavation of large stream crossings and end hauling of large quantities of material. Details of the program are provided in a separate Watershed Rehabilitation Plan that is being revised to update the priorities for work remaining within the park and to recommend approaches to achieving the parks goals of minimizing human-induced erosion within the park.

Integral to the Revised Watershed Rehabilitation Plan is the Road Inventory that is to represent the basis for the thorough evaluation of sedimentation threats posed by remaining road surfaces in the park. The Road Inventory will allow for a prioritization based solely on the potential volume of soil to be delivered to park watercourses and the relative resource values associated

with individual watersheds. The actual priorities selected will be described in the Erosion Control and Disturbed Lands Restoration Plan (in preparation).

Work requires a multi-year approach, including: 1) Completion and documentation of the previous year's treated sites. Raw soil is revegetated with native trees and shrubs where appropriate and surface erosion controlled with mulch. Sites are surveyed and a cost analysis made which is documented in a comprehensive report; 2) Detailed site planning and implementation of specific work to be accomplished during the current year, including heavy equipment work carried out in the summer months to heal the pre-park scars caused by road building and timber harvest; and, 3) Planning for the next year's rehabilitation site work by preparing maps and evaluating erosional activity.

Additional projects include the removal of unnecessary roads and the maintenance of roads considered to be essential. Monitoring the effectiveness of treatment techniques assists in evaluating the relative success of efforts and in guiding future projects. However, budget limitations have reduced most such monitoring to selected rehabilitation sites following large floods.

Recent major storms and the resulting severe erosion and damage to the parks' resources have underscored the need to accelerate significantly the current rate of watershed restoration efforts within and upstream of the parks to prevent catastrophic resource degradation within the parks. Features of the landscape in the Redwood creek basin that are most susceptible to erosion are a result of intense land use that preceded establishment and expansion of the National Park and promulgation of California's Forest Practice Rules. At the current rate of road removal that averages about 2.5 miles per year, it would take approximately 66 years to remove 155 miles of road. RNSP believes this to be an unacceptable rate of progress and virtually ensures that another large storm will occur before these roads are treated resulting in catastrophic events similar to those that followed storms in 1964. The erosion of hillslopes and deposition of sediment in streams is still impacting park resources today. A major emphasis of the watershed restoration program will be the acquisition of increased funding to greatly accelerate the rate of road removal within the Redwood Creek basin in RNSP.

b. Upper Basin Erosion Control and Sediment Monitoring

Concurrent with erosion control and sediment monitoring in the park are efforts to reduce new erosion sources and monitor erosion and sedimentation in the upper basin of Redwood Creek as required in Public Law 95-250. As described in the Watershed Rehabilitation Plan, the objectives of these programs are to understand and characterize where sediment originates and how and when it is transported; to suggest modifications in timber harvest plans to reduce potential erosion problems; and to develop, in concert with local landowners, upper basin erosion control plans.

Water and sediment discharge in Redwood Creek upstream of the Park Protection Zone and at the downstream boundaries of the park will be quantified. The project includes monitoring water and sediment discharge of three tributaries undergoing timber harvest on different terrain types along with monitoring water and sediment discharge on a pristine unlogged watershed as a

control. Selected samples are collected during storms to quantify sediment discharge. Data collected will be used to evaluate sediment sources and transport processes in Redwood Creek and to help prioritize where upper basin erosion control work may be needed most.

About 85% of the 1,110 miles of logging roads located in the Redwood Creek basin upstream of the national park were constructed before the 1983 amendments to the state *Forest Practice Rules* were in effect, and more than 50% of these roads are currently not maintained. Of the total estimated erosion potential from all roads within the Redwood creek basin (5,185,000 cubic yards of sediment), 85% is associated with roads upstream of the national park on private timber lands. These poorly constructed and maintained roads represent a major threat to resources along the main stem of Redwood Creek in the national park. To date, RNSP staff working with private landowners and staff from the Bureau of Land Management have treated about 24 miles of logging roads upstream of the national park to eliminate erosion potential. The ability of RNSP staff to participate in further cooperative erosion control efforts is limited by the lack of resources.

The park is in the process of developing a cooperative resources management planning effort with the major upper basin landowners. The goal of this plan will be to identify potential erosion problem areas in the upper basin and to correct them. The park has met with landowners and drafted an agreement that focuses on identifying erosion problems associated with roads as the initial target of our efforts.

The park would work cooperatively with upstream landowners and other agencies to address conditions that contribute to erosion potential. Depending on opportunities offered by property owners and the availability of resources, up to 40 miles of roads would be treated per year upstream of the national park. This would take approximately 17 years to complete, given adequate funding and other resources. A major emphasis of the park will continue to be cooperating with upstream landowners to identify and rectify erosion problems and to acquire funding necessary to effectively deal with the significant erosion threat on private lands upstream of the park.

c. Timber Harvest Plan Reviews

An on-going program to perform office and field reviews of all timber harvest plan (THP) and road building proposals in the 30,000 acre Park Protection Zone (PPZ) will continue. Park staff will continue to participate in California Department of Forestry (CDF) pre-harvest field inspections (when permitted), develop site specific recommendations, express RNSP concerns at CDF review team meetings, inspect on-going operations as they are conducted and complete post-harvest compliance inspections. Efforts to gain access to pre-harvest inspections for THP's in the upper basin (above the PPZ) will continue. These efforts will focus primarily on convincing landowners that NPS representatives are interested in finding creative ways to harvest timber without causing excessive damage to resources.

Additional effort will be directed toward identifying impacts from timber harvest immediately adjacent to the parks. RNSP will develop recommended operating procedures for timber operations in these areas and forward them to the Board of Forestry for adoption/consideration.

d. Vegetation Management

The vegetation management program will emphasize rehabilitation site revegetation, threatened and endangered plant management, soils analysis and mapping, prairie, oak woodland management, prescribed fire implementation, exotic plant control, and vegetation monitoring.

A newly developing program of considerable importance concerns the management of the park's second growth vegetation. This program represents a complex and potentially controversial challenge for the park. Approximately 61 percent of Redwood National Park's land was logged prior to the establishment of the park in 1968 or its expansion in 1978. These cutover lands are in various stages of succession and are typically dominated by unnaturally high densities of Douglas-fir. The long-term development of these fir-dominated stands is of concern and subject to much debate. The park's objectives are to restore the pre-logging balance of species, to reduce the fire hazard posed by these dense fir stands, and to restore wildlife habitat values. Pilot projects will be developed to obtain better information on the techniques and costs of a large-scale program as well as give more information on the results that could be expected. Alternatives for management will be evaluated and presented for public review.

Emphasis will also be placed on fully implementing the Bald Hills Vegetation Management Plan by controlling fir invasion into the prairies. This will be accomplished principally by 'restoring' fire as a natural process but also through manual removal of fir where too large or otherwise infeasible to burn. Individual prescribed burn plans and conifer removal plans will be developed annually, implemented, and monitored.

The Exotic Plant Management Plan will be implemented by monitoring the distributions of target species and evaluating their present and future impact upon park resources. Control programs will be continued and/or implemented. A major emphasis will be placed on control of scotch broom and European beach grass which are particularly aggressive and which crowd out native vegetation.

Monitoring will continue on the permanent vegetation plots to document long and short term vegetation changes and to recommend management where necessary and appropriate.

Rare and Endangered Plants:

All activities that could have an effect upon vegetation would be preceded by an on-site inspection by the park plant ecologist. Rare, threatened or endangered plants are looked for and if found management actions for their protection and perpetuation will be taken to insure that the species and its habitat are not. The park will cooperate with the U.S. Fish and Wildlife Service, which is the lead agency in matters pertaining to threatened or endangered species, including delineation of critical habitat on parklands. Consultations following the Section 7 requirements of the Endangered Species Act of 1973 as amended will be conducted as required.

e. Wildlife and Fisheries

Wildlife projects will attempt to understand and characterize species and habitats within the parks with an emphasis on the wildlife related issues described earlier. Specific management

proposals will be formulated as a result of additional study. Action plans have been prepared for Roosevelt elk relocation and black bears. Additional action plans will be prepared for the Northern spotted owl, marbled murrelet, Redwood Creek estuary, Roosevelt elk, peregrine falcon, and mountain lion.

Study of native mammals will be oriented towards a number of individual species with the intent of analyzing current problems, foreseeing potential issues, and understanding wildlife associations with habitat types.

Increased efforts toward inventory and monitoring are proposed by increasing the scope of previous reptile and amphibian monitoring and including small mammals and avian species in the effort.

Within the last three years several species have been listed as Federally threatened. These include the Northern spotted owl, the marbled murrelet, and the tidewater goby. The brown pelican utilizes the marine zone during the summer, breeding elsewhere. Bald Eagles are occasional visitors. Peregrine falcons may be found in the park and have successfully nested and fledged young within the last two years. As a result a specific management plan is being developed for Peregrine falcons.

The last three years have seen the wildlife program of the park change from one of monitoring and developing management alternatives, plans, and actions for species affected by past land uses, to one of increasing time and resources devoted toward monitoring and managing for threatened species.

Proposals for park development and resources management projects will be reviewed on a routine basis for potential impacts to these species.

Study of both fish, habitat quality, and aquatic invertebrates is proposed. The emphasis is on continuing to develop an understanding the effects of logging on aquatic resources in the Redwood Creek watershed. In addition, continuing analysis leading to additional restoration activities at the Redwood Creek estuary is proposed. Any in-stream projects would be directed towards restoration of native fisheries.

Research, management, and monitoring of the Redwood Creek estuary will continue. Data will be used to develop restoration alternatives for the estuary that was severely impacted by construction of flood control levees and channelization. Management of estuarine water levels retains some critical fish-rearing habitat while preventing flooding of private property. Monitoring of these activities documents effectiveness and provides data for refining these activities. Increased funding would accelerate restoration of this critical habitat by making resources available to participate with the Corps of Engineers in implementing a proposed restoration project.

f. Geographic Information System

The park's Geographic Information System (GIS) is useful for effective and timely evaluation of newly acquired data across landscape boundaries. The plan provides for the continued progress and development of this key management tool that provides critical support for evaluating upper basin landuse issues, long term monitoring and evaluation studies (N-007). While in the near term the GIS will be primarily a tool for accomplishing traditional resource management activities, the program will continue to develop into an instrument integral to the operations of law enforcement, interpretation, and maintenance.

g. Air Quality

An air quality, visibility, and meteorological monitoring station will be operated in the park. The station was established in early Fiscal Year 1988 and monitors ozone, particulates, sulfates, nitrates, and aerosol elemental composition. The station is located near the mouth of the Klamath River.

B. Cultural Resources

Much has been accomplished in the Park cultural resources program. Most park actions have been in compliance with Federal cultural resources legislation and NPS cultural resources policies. A large percentage of parklands have been inventoried for cultural resources. Many of the eligible resources have been listed on the National Register of Historic Places. A substantial database, including a number of reports for public distribution, has been accumulated. And the park has a good record of working with local Native Americans. However, as reflected in the list of cultural resources project statements, critical needs exist. This update (12/99) includes only National Park Service cultural resource issues. A determination of whether the NPS archeologist will assume cultural resources compliance responsibilities for the entire RNSP complex is anticipated for early 2000. This RMP will be updated to reflect the results of that determination.

Staffing: (Systemwide Issues C24, C19) Currently, the cultural resources program at Redwood is staffed by one GS-12 Archeologist and one half of a GS-09/11 position. These positions are responsible for the complete cultural resources program including: compliance with pertinent Federal legislation and NPS policies; the inventory, evaluation and protection of park cultural resources; information management; development of the program according to NPS-28; and the interpretation of cultural resources. These positions also serve as the liaison between the park and the Native American community, a time consuming and difficult position. In addition, based on agreements between the park and the Western Region, Redwood is responsible for providing assistance and guidance with all aspects of the cultural resources programs, as described above, at Lassen Volcanic, Lava Beds and the Whiskeytown Unit. The permanent GS-09/11 position (above) is bare funded by all four parks, but only for six months.

Recent calculations using a preliminary draft of CR-MAP, show a major lack of cultural resources staff at Redwood. When LAVE, LAVO, and WHIS cultural resources responsibilities are also taken into account, the need for additional staff is severe. An increase in staffing also would result in accomplishing some of the smaller scale projects described in Project Statements C-009 (Update Cultural Resources Information Management), C-008 (Update Archeological

Site Records and Establish Archeological Monitoring Program), and C-012 (Nominate Archeological Sites to the National Register of Historic Places).

The completion of cultural resources projects at Redwood that are not within the scope of routine, on-going program activities has been accomplished through contracts supported by the allocation of various funds. While this has been successful to some degree, what is equally important is obtaining funding for additional permanent staff.

a. Objects

(Systemwide Issues C17, C18, C19, C20, C21, I-102, I-103) A full time museum curator, GS-11 was added to the park resources management staff in 1996. Great strides have been taken in cataloging, but thousands of items have been identified as potential additions to collections. For the most part, these materials document the unique watershed rehabilitation program at REDW; plant, fish and wildlife specimens, soil samples, and field records including data, field notes, photographs, and maps. A Museum Management Plan, created in 1997, recommends concentrating on four separate curation issues for the Park. Staff must establish collection-accessioning protocols and update the Park Scope of Collection Statement. Adequate museum collection storage facilities must be developed. Determinations must be made as to programming costs and procedures for archival processing of Park archives and resource management field records and project files. Manual and digital access to the collections and their contents for park staff and the public must be created.

Appropriate museum collection storage facilities do not yet exist in the Park, although an interim storage area has been set up at the Arcata Office Building. Collections can be found throughout the park at Requa, Wolf Creek, South Operations Center, and Headquarters. A GSA "Build to Suit" plan has been developed with a request for facilities that will meet professional and NPS requirements for managing and preserving museum collections.

The backlog of Resource Management materials remaining to be cataloged into the museum collection is an estimated 350,000 objects, comprised mostly of photographs and documents. Accessioning protocols have been developed. An archival survey of these materials must be performed. Then museum technicians with experience in archival processing and natural history collections must be retained to adequately document and care for these collections.

Library and digital access can only be achieved by adding staff and funding to the museum management program. Staff with expertise in digital file creation and preservation as well as archival and library skills must be retained to adequately care for collections. Eventually a conservation survey of the entire collection must be performed and object conservation planning developed and implemented.

b. Ethnographic Sites:

(Systemwide Issue C04) RNSP is one of the few national/state parks in California that has a large, active, group of local Native Americans who have strong traditional ties to lands now within the Parks. Because of this, there is a clear need not only for an ethnographic overview, but also as a part of that overview, a traditional use study (Project Statement C-003). The results

of this project would be directly relevant to additional projects including the development of a strategy or guidelines for Park Native American Consultations (Project Statement C-013) and an inventory of ethnographic placenames (Project Statement C-015). Information from the ethnographic overview/traditional use study also would be used in other projects such as the nomination of eligible traditional cultural properties to the National Register of Historic Places (Project Statement C-012) and establishing an oral history program (Project Statement C-014). Funds for an ethnographic overview/traditional use study are programmed for fiscal year 2001 and 2002.

c. Historic Properties

(Systemwide Issue C-11) Within the Redwood Creek basin is an exceptional historic cultural resource, the Lyons Ranches Rural Historic District. Nearly all of the lands owned and worked by the Lyons families for over a century are now under park management as are eight ranch structures and numerous features. The National Register of Historic Places nomination form for the Lyons Family Ranches is currently being revised. Funds for a management plan of the associated cultural landscape are obligated for fiscal year 2000. Another need for the Lyons Family Ranches is the repair and stabilization of some of the associated structures (Project Statement C-006).

d. National Register of Historic Places

Both Federal legislation and NPS policies mandate that eligible NPS cultural resources be nominated to the National Register. Although many of the park cultural resources are currently listed, others need to be listed and others need to be evaluated for eligibility. This includes prehistoric, historic and traditional cultural properties (Project Statement C-12).

e. Archeological Inventory

(Systemwide Issue C-02) As described above, archeological inventory in the Redwood Creek is adequate. Elsewhere in the park, both along the coast and inland, archeological survey has been cursory. In these areas, reconnaissance either has not been conducted or has focused on relocating ethnographically recorded sites. Project Statement C-010 corrects this deficiency.

f. Research Design

(Systemwide Issue C-02) The current research design for anthropological work in Redwood National Park was drafted over ten years ago. During that time, numerous archeological studies, both inventory and archeological excavation, have been conducted both within the park and in adjacent northwest California areas. The park research design needs to be revised in order to incorporate the results of recent studies and to provide a more pragmatic, testable framework within which to place the Redwood data (Project Statement C-011).

g. Administrative History

(Systemwide Issue C-08). In 1993 Redwood National Park celebrated its 25th anniversary. The need for a park administrative history has been noted in past park operations evaluations. An administrative history is important for all parks, but is especially important for a park such as Redwood which has a controversial history, a unique resources management program and a record of complex relationships with the surrounding communities (Project Statement C-004)

h. Submerged Cultural Resources

Systemwide Issue C02) It is known that numerous ship wrecks occurred along the northwest California coast in areas within the Redwood National Park jurisdiction. Project Statement C-007 would inventory and evaluate these cultural resources.