CHAPTER 3 CONTENTS

PAGE

Physical Environment III-1
Biological Environment III-2
Social and Economic Environment III-7
Resource Management Programs III-9

SUMMARY OF THE ANALYSIS OF THE MANAGEMENT SITUATION

INTRODUCTION

This chapter summarizes the existing situation for each resource area of the Six Rivers National Forest (Forest). It also identifies projected demands and opportunities, where possible. Chapter 3, Affected Environment, of the accompanying Environmental Impact Statement describes each resource in detail.

PHYSICAL ENVIRONMENT

GEOLOGY

The Forest lies within two physiographic provinces: the Klamath Mountains and the Coast Range. The Forest contains landslide and earthquake hazards but no volcanic hazards. Geologic resources on the Forest include minerals (see Resource Management Programs: Minerals), construction materials, and areas of unique geological value (see Resource Management Programs: Special Interest Areas).

Landslide Hazards: Landsliding is a natural process which is also influenced by routine forest management activities such as road construction and timber harvest. Landslides constitute the most significant of the geologic hazards on the Forest. About 19 percent of the Forest is susceptible to high or extreme landslide hazards.

Earthquake Hazards: Major active faults west of the Forest and one possible active fault in the southwestern section of the Forest generate earthquakes that have minimal effects on the Forest.

Groundwater: The potential for development of large groundwater supplies on the Forest is low, although moderate groundwater supplies could probably be developed in some of the relatively thick, more uniform sand and gravel deposits along parts of the Trinity and Mad rivers.

Earth Construction Materials: The Forest contains adequate materials to meet its needs for road construction and some landscaping and decorative materials.

SOILS

Soils on the Forest are variable due to differences in parent material, topography, climate, biology, and age. Older soils include some of the most productive lands on the Forest. About 84 percent of the Forest's soils are rated as capable of growing trees for industrial wood.

The deep red lateritic soils in the North Fork of Smith River watershed are very old and are unique to the continental United States.

Erosion Hazard: About 20 percent of the Forest's soils have a very high erosion hazard rating if the vegetation and duff are removed, particularly soils derived from dioritic rock and South Fork Mountain schist. High rates of surface erosion (rilling and gullying) do not usually occur on this Forest because the surface soil structure is resistant to breakdown by raindrop impact; water infiltration rates are high; duff, litter, slash, and surface rock fragments provide residual soil cover; and vegetation regrows rapidly after disturbance.

Projected Demands and Opportunities

Soil quality standards will be applied on a site specific basis to protect this non-renewable resource.

WATER

The Forest generates high amounts of water, mostly in the form of rainfall. The water is used for municipal and domestic supply, fisheries, agriculture, industry, recreation, hydropower, and maintaining riparian ecosystems. There are 24 municipal-class watersheds on the Forest; there are no formal municipal watershed

agreements. There are no major floodplains on the Forest and no flood control structures.

Past disturbances from management activities, on public and private lands, have contributed to soil erosion and stream sedimentation. The 1964 flood had a major influence on Forest streams. These effects tend to be cumulative. Watershed analysis, as required by the FSEIS-ROD, will provide most of the data on which to base cumulative effects analyses.

Restoration work has been accomplished throughout the Forest at a rate of about 150 acres per year.

Projected Demands and Opportunities

Some additional restoration needs have been identified. There will be opportunities to identify needs and accomplish more restoration work and to monitor the cumulative effects of restoration on water quality.

AIR

Almost all of the Forest is within the State's North Coast Air Basin. Air quality on the Forest is very good, with all Federal standards consistently achieved (including those for ozone, carbon monoxide, particulate matter, and nitrogen dioxide). The Forest Service is responsible for protecting values and resources affected by air quality in Class I areas, designated under the Clean Air Act. The Yolla Bolly-Middle Eel Wilderness is the only Class I area on the Forest, although the Marble Mountain Wilderness could be affected by Forest activities. The rest of the Forest, including the other wildernesses, are Class II areas.

The Forest uses prescribed burning for fuels management on about 2,000 acres per year. Effects of smoke from prescribed burning can be annoying, but tend to be of short duration and low intensity.

Projected Demands and Opportunities

Monitoring air quality will provide insights into the air quality situation and provide a basis for measuring trends. Maintaining air quality may require application of new techniques and prescriptions for fuels treatment.

BIOLOGICAL ENVIRONMENT

BIODIVERSITY

Biological diversity is the variety of living things in an area and the ecological processes in which they function as a system. Most landscapes within the Forest contain complex vegetation patterns and an unusually rich and varied flora. To date, 163 plant associations and 52 sub-series have been identified within 13 vegetation series. Some of the factors contributing to this diversity are climate, underlying geology, and natural and human-caused disturbances.

Northwest California has the most predictable and wettest climate in California. The Forest climate varies from cooler and wetter in the north to hotter and drier in the south. The Forest was divided into three zones for landscape analysis. The north zone includes the Smith River NRA and the portion of the Orleans District northwest of the Klamath river. The central zone includes the southeast side of the Orleans District and the Lower Trinity District. These two zones are within the Klamath Mountains Section. The south zone, which comprises the Mad River District, is entirely within the North Coast Mountains Section. The closed canopy conifer stands in the Klamath Mountains Section give way to a mosaic of conifer forests and their seral stages, intermixed with oak woodlands and grasslands, in the North Coast Mountains Section.

Parent rock differs between Sections. The Klamath Mountains Section is generally composed of fine textured metamorphics, while the North Coast Mountains Section is generally composed of coarse textured sandstones, which add to the drier conditions in the south zone and contribute to the higher frequency of stand replacing wildfires.

Disturbance has had the greatest impact on vegetation patterns within the Forest. Natural disturbances such as fire, floods, landslides, windthrow, and insect epidemics tend to shape vegetation patterns on a short-term scale. Fire has resulted in the pattern of seral stages spread across the Forest. Burning by Native Americans prior to European settlement influenced the

composition and patterns of vegetation. Large scale stand-replacing wildfires which occurred between 1870 and 1920 are responsible for the dominance of vegetation in the early and mid mature seral stages, much of which is found in the ridgetop and upper one-third slope positions. Ridgetop and upper one-third slopes burn with much higher frequency than lower one-third slopes. As recently as 1987, a fire in the upper one-third slope in the south zone converted over 5,000 acres of mid mature coniferous forest to the shrub/forb seral stage.

Other disturbances, including Forest management activities such as prescribed fire, fire suppression, logging, and road construction, have affected vegetation at the stand and landscape levels. Timber management was a selective agent of succession; late seral and old growth stands were selected for regeneration harvests, further emphasizing the landscape dominance of younger seral stages. Cattle grazing also plays its part in disturbance. Cattle act as selective agents of succession, eating palatable species and leave behind non-palatable ones, which may eventually dominate a site.

Seral stages: the relative abundance of various seral stages, the developmental stages of a plant community in an ecological progression, is a measure of the diversity of the forest. Seral stages vary in horizontal and vertical structure, providing a diversity of habitats for plant and animal species. The percent of the Forest and the structural and species diversity found in each seral stage on the Forest are summarized below.

Shrub/forb harvested: 5 percent; structural diversity very low; species diversity can be the highest of all seral stages, but is made up of species that are found in all seral stages.

Shrub/forb natural: 5 percent; diversity similar to shrub/forb harvested.

Pole harvested: 6 percent; shrub and herb layers lacking; can have lowest species diversity.

Pole natural: 6 percent; shrub and herb layers lacking.

Early mature: 30 percent; shrub and herb layers lacking; snag density low, less than 18" dbh; vertical and horizontal diversity is lacking, species diversity second lowest of all seral stages.

Mid mature: 26 percent; shrub and herb layers of low cover; snags over 20" dbh occur; vertical and horizontal diversity low.

Late mature: 7 percent; shrub and herb layers begin to increase in cover; more snags, large snags a standard component; vertical and horizontal structure diversity begin to appear; species diversity is increasing.

Old-growth: 16 percent; shrub and herb layers apparent, vertical and horizontal diversity high; density of snags and logs high; species diversity second to shrub/forb seral stage; many species restricted to this stage.

Forest vegetation is found in three major categories: the forest series, oak woodlands, and grasslands. All seral stages found on the Forest are best represented in the conifer forest category. The old-growth seral stage is represented best in the moist north zone (25 percent of the conifer vegetation), less in the central zone (17 percent), and least in the south zone (8 percent). The mature seral stages show a reversal of this trend, increasing in frequency from north to south. The oak woodland category is found primarily in the early mature and mid mature seral stages except in the south zone, where it is found in most seral stages. All of the vegetation in the grassland category (2 percent Forest-wide) is contained in the shrub/forb natural seral stage.

Historic Range of Variability: An historic range of variability (HRV) for forest vegetation was calculated for the period from 1790 to 1990. Analysis of the HRV showed several trends in the Forest.

1. Narrower ranges of variability occur in the old-growth seral stage within the north zone as elevation increases, pointing to the higher frequency of stand replacing wildfires on high elevation sites than on low elevation sites.

2. A high frequency of tanoak vegetation occurs in the shrub/forb and pole seral stages, primarily related to past intensive forest management.

3. The existing condition within the old-growth seral stage of the tanoak series is lower than the historic range of variability.

4. The tanoak series appears to be the only series whose existing condition falls outside the historic range of variability.

5. The historic range of variability begins to drop as we move south into drier areas.

6. The greatest degree of change occurs in the south zone.

7. The amount of vegetation associated with the mature seral stages shifts in relation to the amount of old-growth.

Projected Demands and Opportunities

The Forest is currently conducting three activities to assist in managing for biological diversity. The ecological classification program describes plant associations along with their physiographic features (elevation, aspect, slope, soils, parent rock, for example) in units called ecological types. The vegetation mapping project will complete a vegetation map layer for the Forest which includes vegetation series and sub-series, seral stage, overstory size class, and canopy closure. The ecological unit inventory maps ecological types, existing vegetation, soils, and geology and integrates this data into ecological units. The areas selected for ecological unit inventory are those that require this site specific information to address management concerns or needs, such as watershed assessments. These ecological types, when described and mapped, will provide the future vegetation management units for the Forest and will allows for tracking the elements of vegetative diversity (species, community, ecosystem, landscape) throughout the Forest.

GENETICS

The Forest's diverse climate and topography contribute to the diversity in its animal and plant life, contributing to considerable genetic variability. The Forest contributes to genetic diversity best in places largely undisturbed by man's activities. Genetic diversity can also be conserved through propagation of seedlings at the Humboldt Nursery.

Projected Demands and Opportunities

The Forest has opportunities to conserve genetic diversity by cooperating with the Research arm's Center of Conservation of Genetic Diversity in research projects and by considering genetic diversity in site specific projects.

RIPARIAN ZONES

Riparian ecosystems are the interface between the aquatic and terrestrial ecosystems. Riparian communities occur around streams, lakes, ponds, wet meadows, springs, and wetlands throughout the Forest. Approximately 159,000 acres of riparian areas occur throughout the Forest, including 65 wet meadows and 90 ponds and lakes.

Riparian areas provide habitat for a greater number of wildlife species than do other habitat types. At least 250 wildlife species use riparian areas for breeding, feeding, and resting and as travel lanes and connectors between habitat types. Riparian vegetation is important to fish habitat. Riparian areas are attractive to livestock and are also the focus of water-related recreation uses.

Riparian systems on the Forest have been altered extensively over the past 150 years by natural events and man's activities. Standards and guidelines developed since the late 1960s have provided for greater protection of streamside areas that in earlier eras.

Management direction for wetlands and riparian areas is to insure high quality aquatic habitat and functioning riparian ecosystems now and in the future.

Projected Demands and Opportunities

Standards and guidelines in this Plan require management that will balance the range of resource uses with the goal of ecological sustainability in order to maintain the long term productivity of riparian areas.

SENSITIVE PLANT SPECIES

Federally listed endangered plants are protected under the provisions of the Endangered Species Act (ESA) of 1973, as amended. The Del Norte population of McDonald's rock-cress is under consideration for Federal listing. Pnding a taxonomic treatment of McDonald's rock-cress, which is now underway, the USFWS will determine whether the Del Norte population warrants Federal listing.

There are 30 plants on the Forest sensitive plant list; 19 are known to occur on the Forest and suitable habitat exists on the Forest for the other nine species. About 80 percent of the sensitive species are found on dry, rocky serpentine sites with soils which are nutrient poor and even toxic to most species. The rest are associated with non-serpentine outcrops and ultramafic parent material, oak woodland/grasslands, and wet meadows/bogs. Many of the species are located within Botanical Areas (see Resource Management Programs: Special Interest Areas).

Projected Demands and Opportunities

The Forest will develop species management guides and monitoring plans for sensitive species, species groups, and habitats in cooperation with other agencies where possible. Data gathered on the Forest will be available for transfer to the California Natural Diversity Database, and cooperative efforts may be conducted with varied interest groups and organizations.

WILDLIFE

The Forest is home to 298 known species of terrestrial wildlife, including 76 mammals, 185 birds, and 37 reptiles and amphibians. Forty-eight of these are game animals or furbearers. Chapter 3 of the EIS provides detailed information on the following species.

Threatened and Endangered Species: Four Federally-listed threatened andendangered species are found on the Forest: bald eagle, peregrine falcon, northern spotted owl, and marbled murrelet.

Bald eagle and peregrine falcon are classified as Endangered and are managed in accordance with their recovery plans. There are four known bald eagle territories, several suspected nest territories, and a small wintering population on the Forest. The Forest has 22 sites with potentially suitable peregrine falcon habitat and is thought to have nine pairs of nesting peregrine falcons.

The northern spotted owl and marbled murrelet are classified as Threatened. Neither the owl nor the murrelet has an approved recovery plan; until they do, management for these species will be guided by the Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl (FSEIS) and the associated Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl (ROD). The Forest has 232 known pairs of spotted owls, 46 territorial singles, and a floating population of over 56 single owls. Murrelets were observed at seven locations on the Gasquet Ranger District in 1988 and 1989; three sightings were confirmed in 1992 surveys of selected sale areas using the regionally approved protocol.

Candidates for Federal Listing: Candidate species are species under consideration for possible listing as endangered or threatened. They have no protection under the ESA. Candidate species known or suspected to occur on the Forest are the California red-legged frog, Del Norte salamander, foothill yellow-legged frog, northwestern pond turtle, northern goshawk, California wolverine, Pacific fisher, Pacific western big-eared bat, white-footed vole, Karok Indian snail, Siskiyou and Trinity Alps ground beetles, and the Klamath bumble bee.

Forest Service Sensitive Species: These animal species were identified by the Regional Forester due to concerns for the viability of their populations, as evidenced by significant current or predicted downward trends in population numbers, density, and/or habitat quantity and quality. The Region 5 sensitive species known or suspected to occur on the Forest are American marten, Pacific fisher, northern goshawk, great gray owl, willow flycatcher, northwestern pond turtle, summer steelhead trout, and spring chinook salmon.

State Listed Species and Species of Special Concern: The Forest also recognizes species listed as threatened or sndangered within the state and state "species of special concern," a designation assigned by CDF&G to species with populations considered to be declining or in jeopardy of extinction. Species of special concern known or having the potential to occur on the Forest include the osprey, sharp-shinned hawk, long-eared owl, merlin, purple martin, yellow warbler, yellow-breasted chat, prairie falcon, golden eagle, great blue heron, American badger, and red tree vole (Williams, 1986).

Harvest species and hunting: Harvest species are those animals traditionally hunted or trapped. Commonly hunted species that inhabit the Forest include black bear, black-tailed deer, gray squirrel, mountain quail, California quail, blue grouse, ruffed grouse, turkey, band-tailed pigeon, wood duck, and mallard. Furbearing mammals which are trapped include mink, gray fox, raccoon, bobcat, and coyote.

Management Indicator Species: Six individual MIS species and seven multi-species assemblages were selected to gauge the effects for each alternative proposed in this EIS and to monitor the effects of plan implementation. Each species within the multi-species assemblages is likely to respond somewhat differently to various management activities that may occur. Monitoring several similar species will provide a better reflection of the range of responses expected from all wildlife species associated with a given habitat or habitat element.

Northern spotted owl: Spotted owls are expected to be sensitive to changes in habitat quality because they are fairly habitat specific, and they represent the habitat needs of other wildlife species that use mature and late-successional forest habitat for all or part of their life cycle.

Pileated woodpecker: The pileated woodpecker is expected to be a good indicator species because it is habitat specific, it requires large snags and logs as do many other species of wildlife, and it is still fairly common and well distributed.

Black bear: Black bear was selected as an indicator species because of its habitat association with mid- and late-successional stages of all forest vegetation types and unique meadow types and its large down log requirements.

American marten: Marten is a good indicator of habitat quality because it appears to be uniquely associated with true fir vegetation types, it is habitat specific, and it requires large logs or deadfalls for resting and denning.

Pacific fisher: Fisher is a good indicator of habitat quality because it is habitat specific, and it represents the habitat needs of other wildlife species which utilize mid-elevation mature and late-successional Mixed Evergreen forests on the Forest as well as wildlife species which use large cavities and concentrations of downed woody debris for denning or nesting.

Black-tailed deer: Black-tailed deer was selected as an indicator species because of its association with early- and mid-successional stages of all forest vegetation types and unique meadow and hardwood types.

Bog/seep/spring/wet meadow/talus wildlife assemblage: Two species which are dependent on these densely vegetated wet areas to meet life requirements represent this habitat type.

Marsh/lake/pond assemblage: Three species which are sensitive to water chemistry, large woody debris, adjacent forested habitats, and disturbance were chosen to represent this habitat type.

River, stream, and creek wildlife assemblage: Eight species which are sensitive to water quality (chemistry and temperature), snags and large woody debris, adjacent forested habitats, and disturbance were chosen to represent this habitat type.

Snag assemblage: Ten species which are dependent on snags for all or part of their life cycle were chosen to represent this habitat type.

Downed woody material assemblage: Five species which are dependent on downed woody material for some aspect of their life were chosen to represent this habitat type.

Black oak/white oak assemblage: Four species with a variety of needs and uses for oaks were chosen to represent this habitat type.

Tanoak and Pacific madrone assemblage: Three species were chosen to represent this habitat type.

Projected Demands and Opportunities

Public lands offer opportunities for the public to hunt, view, and photograph wildlife otherwise unavailable to many. Conservation strategies will be developed and implemented to assist Threatened and Endangered species through recovery and to prevent listing of other sensitive species under the Endangered Species Act.

FISHERIES

Current Situation

The Forest supports both anadromous and resident fish populations including salmon, steelhead, trout, sturgeon, bluegill, crappie, and bass.

Anadromous Fish Resource: The primary fishery resource on the Forest is anadromous fish production, particularly in the Klamath, Trinity, and Smith river watersheds. Steelhead, which are harvested only by

sports anglers in freshwater, make a substantial contribution to the economies of communities near the rivers. The Forest provides habitat for steelhead in the Klamath and Smith river systems and the headwaters of the Eel, Mad, and Van Duzen rivers. Locally important fisheries include resident trout, green sturgeon and American shad in the Klamath River, and warm water fish in Ruth Reservoir.

Klamath-Trinity River System: Current population levels of chinook salmon in the Klamath and Trinity rivers are so low that there is little economic yield from the remnant fisheries. The Forest contains about 15 percent of the total Klamath-Trinity River watershed, including several important spawning tributaries for salmon and steelhead. Steelhead provide the major sport fishery in this river system. Angler success has been very low in the past several years. The steelhead fishery is primarily supported by the "half-pounder," which is found in only three rivers in the world; the Klamath and Eel are two of those rivers.

Approximately 10 percent of the Trinity River watershed is on the Forest. It is estimated that, since 1950, the lower river steelhead population has declined by 80 percent. Natural chinook salmon populations have also had major declines, although the Trinity River Hatchery has mitigated some of this loss.

Indian Tribal fisheries, both commercial and subsistence, focus primarily on fall chinook salmon, which occurs primarily downstream of the Forest on the Yurok and Hoopa reservations. A small subsistence fishery occurs upstream of the Forest, near Ukonom, carried out by the Karok Tribe. There is also a small tribal fishery for steelhead and green sturgeon.

Smith River System: Approximately 85 percent of the Smith River watershed is within the Forest. Habitat quality and quantity in the Smith River system are superior to the Klamath River, although the 1964 flood caused a drastic decline in the quality of the fish habitat, which has not fully recovered. Chinook salmon and steelhead are the dominant anadromous fish, and their large size has given the river national prominence among sport fishers. Coho salmon and coastal cutthroat trout are widely distributed in the basin in generally low numbers.

Sensitive species: The coho salmon, which occurs on the Forest in very low numbers in the Klamath and Smith river watersheds, is currently being evaluated for protection under the Threatened and Endangered Species Act. The green sturgeon, which occurs in the Klamath River, is currently listed by the U. S. Fish and Wildlife Service as a candidate for listing under the Threatened and Endangered Species Act. The summer steelhead, which occurs on the Forest, is classified by the Forest Service in Region 5 as a Sensitive Species; this designation requires that habitat for the species be maintained or enhanced.

Resident Fish Resource: Resident trout are found in many areas throughout the Forest, providing ample opportunity for anglers who seek small, native trout in remote streams. The most significant warmwater fishery occurs in Ruth Reservoir, where 15,000 trout of catchable size are released annually. The largest sport fishing use of a natural lake is at 28-acre Fish Lake where 10,000 catchable rainbow are released annually. Other species are sought at both locations as well as at 12 other natural lakes on the Forest.

Fish habitat improvement: The Forest anadromous fish habitat improvement program focuses on improving the quality and quantity of spawning habitat for adult salmon and steelhead, and rearing habitat for juveniles. The Forest cooperates in a small-scale hatchery program that seeks to rebuild stream populations of native chinook salmon in tributaries within the Klamath-Trinity River basin. The Forest has initiated a modest program of experimental habitat improvement for bass in Ruth Reservoir in cooperation with CDF&G and Humboldt Bay Municipal Water District. The Forest also cooperates in two major restoration programs for anadromous fish in the Klamath-Trinity river basin.

Projected Demands and Opportunities

Habitat management and small scale hatcheries on the Forest provide opportunities for depleted anadromous fish stocks to recover during inland spawning and rearing. Success in recovery will provide more opportunities for sport, commercial, and Indian fish catches.

SOCIAL AND ECONOMIC ENVIRONMENT

SOCIAL

Current Situation

The three main issues that define the social climate are protection of the environment, economic stability, and protection of Indian cultural activities and values. The

Forest's primary zone of influence is Del Norte, Humboldt, and Trinity counties; the secondary zone of influence takes in Curry County, Oregon, and Siskiyou County, California.

Diverse lifestyles and values exist in these zones of influence (see the section on Social Categories), yet they have one thing in common: their lifestyles are intrinsically linked to the land and natural resources.

Population Composition: The Forest's zones of influence are racially homogeneous; roughly 86 percent of the population is caucasian. Most Native Americans, who comprise roughly six percent of the region's population, are indigenous to the area. African Americans, Hispanics, and Asians have made population gains over the last decade.

Social Groups and Lifestyles: A wide range of social groups live in the Forest's zone of influence. Four major groups (described in EIS Chapter 3) have been identified within the social structure: amenity emphasis, environmental priority, Native Americans, and commodity dependent residents. These four groups are not mutually exclusive; many people have interests in more than one group at a time.

Trends Affecting Social Conditions: The following trends affect conditions in the primary zone of influence and the interaction of the social groups: "reverse migration," represented by the notable increase of retirees and immigrants from urban areas; continued and/or increased environmental concern; increased political awareness and organization of Native American groups; and continuing and increasing participation in grass roots movements.

Projected Demands and Opportunities

The public is demanding an ever-increasing say in Forest planning and policy-making. There will be varied opportunities for the public to participate in these activities, especially at the project planning level. Partnerships will provide opportunities for other government agencies, groups, and individuals to participate in Forest management activities.

ECONOMICS

The Forest directly influences the economy of Humboldt, Del Norte, and Trinity counties and, to a lesser degree, portions of Siskiyou and Josephine counties. These counties are predominantly rural and depend to some extent on the Forest's natural resources. Population density in these counties is less than 20 percent of the State average. Sixty-two percent of the population lives in rural areas or in small communities of 3,000 or less; 38 percent lives in the major population centers along the coast near Humboldt Bay and Crescent City. Population growth in the region was about half that of the State generally during the 1980s, with much of this growth from retirees, urban flight, and expanding government and educational services.

Local employment: Government employment, wholesale and retail trade, services, and manufacturing comprise 75 percent of the area's employment. Employment in the first three areas increased steadily since 1972. Employment in manufacturing, which has been primarily related to timber, declined more than 50 percent since 1972, continuing a trend that started in 1960. Lower harvest levels on private lands, consolidation of small businesses into a few large holdings, and automation all contributed to declining employment levels. Harvest levels on the North Coast have stabilized since 1987 at an average of 1.1 billion board feet per year. This harvest level is predicted to be maintained over the next 10 to 15 years, although increasing restrictions on the timber land base due to other resource concerns may affect the actual supply of timber.

Per capita income within the primary zone of influence is about 30 percent below the State average, due in part to lifestyles that include more self-sufficiency and employment in seasonal industries. Unemployment in the zone averaged 73 percent above the State level in 1989.

Forest contribution to the local economy: The Forest contributes to the local economy in three ways: resource outputs, Forest employment and expenditures, and payments to counties.

> **Forest outputs:** Various Forest outputs contribute to the health of the local economy: timber, recreation, fisheries and wildlife, range, and miscellaneous Forest products. The economic value of Forest outputs such as timber, commercial fisheries, and range can be quantified using market values or Forest usage fees. Other uses, such as sport fisheries, hunting, and many other recreation uses cannot be so easily measured.
>
> **Forest Employment and Expenditures:** The administration of the Forest impacts the local

economy, especially in the small towns where the Ranger Districts are located (Gasquet, Orleans, Willow Creek, Mad River/Dinsmore). The Forest pays salaries to full time, seasonal and temporary employees who live in local communities. It purchases goods and services for a variety of activities and supports human resource programs that provide local employment and on-the-job training in resource management.

Payments to Counties: Twenty-five percent of gross Forest receipts are returned to the counties, prorated on the basis of the acreage contained in each county. These funds are earmarked for school districts and county roads and were $7.8 million in 1989. Counties also receive payments in lieu of taxes for each acre of Federal land in the county; these payments can be used for any governmental purpose. The State tax on harvested timber also is returned to the counties.

Projected Demands and Opportunities

Commodity outputs and associated Forest investments in maintaining and improving those outputs generate public and private sector employment. Employment incomes circulate through the local economy, generating indirect/induced employment and income in other sectors.

Forest investment in recreation, fisheries, and wildlife present opportunities to increase contributions to the local economy from these non-commodity outputs such as increased recreation, commercial and sport fishing, hunting and non-consumptive wildlife uses.

New programs are being developed to assist rural communities in diversifying their economies in order to help compensate for economic losses due to decreasing timber outputs. The Forest is helping rural communities tap into sources of funding, such as assistance for water and waste disposal facilities, loans to develop community facilities for public use, and business and industrial guaranteed loans in rural communities.

RESOURCE MANAGEMENT PROGRAMS

RESEARCH NATURAL AREAS

Research Natural Areas (RNAs) are part of a National network of reserved public lands, representing a diversity of ecosystems, that provide opportunities for research and ecological study.

A Regional program has identified major types of forest vegetation that should be represented in the National RNA network. The Yurok RNA has been established within the Yurok Experimental Forest to study old growth redwood; it is managed by the Pacific Southwest Forest and Range Experiment Station. Six areas, representing various elements, were evaluated as candidates and dropped from consideration for RNA status. Horse Linto has been nominated for further consideration; six other areas are being considered for two more nominations. Eight areas are recommended in this Plan for establishment as RNAs: Adorni, Craigs Creek, North Trinity Mountain, Ruth, L.E. Horton, Soldier, Hennessy Ridge, and Upper Goose Creek.

Projected Demands and Opportunities

Opportunities and demands for restoration and research will be identified in the management assessment developed for each RNA.

SPECIAL INTEREST AREAS

Special Interest Areas: Special Interest Areas (SIAs) are established to protect areas on the Forest with unique characteristics. The goal is to interpret the surroundings for public enjoyment and increased understanding of natural resources.

SIAs can be established to highlight areas with botanical, ecological, cultural, geological or other special values. Botanical areas contain outstanding examples of some part of the Forest flora. Ecological areas contain a variety of plant communities. Geological areas are sites with unique or outstanding features that demonstrate the earth's development and processes. The following areas have been identified as SIAs: Bear Basin Butte North Fork Smith River, and Horse Mountain (botanical areas), Myrtle Creek (botanical and cultural), the Lassics (botanical and geological), Broken Rib Mountain (ecological), and Bluff Creek (geological).

There are other areas on the Forest that are of special interest. Some are geologic features such as the surface trace of the Coast Range fault, giant landslide features, elevated stream terraces, and exposures of distinctive geologic materials. National Park Service

candidates for designation as National Natural Landmarks include the Siskiyou Mountains, Trinity Alps, Yolla Bolly Mountains, the Lassics, Stony Creek Bog, and Bear Basin Butte. Significant Natural Areas of California, identified by the California Department of Fish and Game, are also included.

Projected Demands and Opportunities

Designated SIAs and other areas of special interest provide opportunities for interpretation and public education as well as cooperation with various organizations for studies and monitoring.

HUMBOLDT NURSERY

Humboldt Nursery is located near the coast about 15 miles north of Eureka. The Nursery produces tree seedlings for reforesting National Forest System and Bureau of Land Management lands in California, Oregon, and Washington, as well as for the Bureau of Indian Affairs, Redwood National Park, and state agencies. The Nursery produces the following commercial species: Douglas-fir, the largest component of its crop, redwood, and several species each of true fir, cedar, spruce, pine, and hemlock. The Nursery, in recent years, has begun to cultivate non-commercial species: red and white alder, digger pine, big leaf maple, tanoak, Brewer oak, and Oregon white oak; woody shrubs such as California redbud, coast coffeeberry, buckbrush ceanothus, and blue blossom (wild lilac); and experimental plots of Pacific yew, cottonwood, and various willows grown from cuttings.

Projected Demands and Opportunities

The Nursery will continue to produce seedlings of more varied species, offer public interpretive opportunities, and foster partnership with local agencies.

LAW ENFORCEMENT

The number of law enforcement incidents on the Forest is rising steadily in relation to increases in numbers of Forest visitors and pressures from and uses by adjacent landowners.

The Forest cooperates with law enforcement agencies in local counties and with other State and Federal agencies. All law enforcement resources are overstretched, and delayed response by enforcement agencies with Forest jurisdiction do occur.

Projected Demands and Opportunities

The trend for law enforcement needs, case complexity, and potential hazards for Forest employees, visitors, and permit holders are expected to continue as will the demand for additional employees to be trained and equipped to function in a full law enforcement capacity.

HERITAGE RESOURCE MANAGEMENT

Heritage resources on the Forest are varied and complex, ranging from 6,000- to 8,000-year-old prehistoric sites to historic mining ditches and cabins and administrative structures built by the Civilian Conservation Corps. Contemporary local Indians continue to use Forest sites for ceremonial and religious purposes and to obtain a variety of natural resources for daily use.

The Forest uses heritage resource inventories, usually associated with proposed projects, to record and conserve traces of the prehistoric and historic records and to identify and respond to cultural concerns relating to the contemporary values of Forest users. The Forest consults the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation for all proposed undertakings.

About 15 percent of the Forest has been inventoried and 980 heritage resource sites identified. One cultural district and one property have been formally listed on the National Register of Historic Places; four more districts have been determined to be eligible for listing. Eleven areas have been designated Native American Cultural Use Areas (NACUAs) in recognition of American Indian spiritual values associated with them.

Local Indians have a variety of concerns about Forest management as related to their cultural activities. The Forest uses the Coordinated Resource Management concept to promote Indian involvement in resource management activities to address their concerns. Heritage resource management also enables the development of resource management projects that are co-sponsored by Indian tribes, the Forest Service, and other public agencies.

Projected Demands and Opportunities

Evaluation of heritage resource properties will continue in the future in response to Forest projects.

As more projects are proposed in river corridors, inventories will be completed to fill the knowledge gap for these areas. The recent trend to high priority for enhancement and interpretation will continue and is likely to contribute to increased visitor use. Research opportunities will continue to be available, and cooperation between the Forest and the archaeological program at Humboldt State is likely to expand.

FIRE AND FUELS MANAGEMENT

Fire Management: The Forest averages 64 fires burning an average of 805 acres per year. Most are caused by human activity and have light to moderate effects on the Forest environment. Heavy lightning storms, which may start over 100 fires, occur every 7 to 8 years. Less than 10 percent of fires burn more than 400 acres; the largest recent fire burned over 12,000 acres in 1987. Fires in wilderness are currently controlled.

The Forest funds a relatively small initial attack organization; if a fire escapes initial action, cooperating agencies and the "militia" (non-fire Forest Service employees) are called into action. The size of the militia has shrunk in recent years; consequently, initial reinforcement may be delayed and some fires are likely to require more suppression than might have been needed in the past.

The Forest coordinates fire management activities with other agencies, such as the California Department of Forestry and Fire Protection, the Hoopa Indian Tribe, and the Bureau of Indian Affairs.

Fuels Management: Most fuels management activities have been prescribed burning, such as timber sale slash, to remove logging residue and prepare sites for reforestation and to lower fire hazard. There is a current shift taking place towards larger area understory fuel treatments to counteract the unnatural fuel buildups that have resulted from several decades of aggressive suppression.

Projected Demands and Opportunities

Suppression actions should strive to protect the specific attributes of the various land allocations. Prescribed burning will provide the opportunity for ecosystem process restoration, habitat improvement and maintenance, and hazard reduction. More expensive fuel treatment methods such as handpiling and/or rearrangement of fuels may also be used.

Growing populations will increasingly demand smoke management and other public health and safety considerations.

Comprehensive fire management action plans that consider alternatives other than control will be completed for wilderness areas.

ENERGY RESOURCES MANAGEMENT

Energy production: The Forest currently provides energy from biomass (dead or living trees) and small amounts from water and sun.

Firewood is gathered by individuals or commercial dealers. Demand from individuals has fallen off in the last decade since the Forest Service began charging for permits. Cull logs, hardwood chip logs, and sawmill "by-products" are also used for commercial power generation in both Humboldt and Del Norte counties when economical, but Forest products have seldom been harvested primarily for power production.

Two hydroelectric plants on the Forest produce and sell power to Pacific Gas and Electric Company; both are on the Mad River district. Otherwise, electricity is transmitted from Oregon and California's Central Valley to the Forest and coastal areas.

Solar-powered facilities are used at communications sites and other remote locations. The potential to generate wind power on the Forest is untapped.

Energy conservation: Energy conservation efforts have reduced Forest Service fleet fuel usage and improved the energy efficiency of Forest Service facilities.

Projected Demands and Opportunities

Biomass for firewood and commercial power generation will generally be less available from the Forest than in the past as less timber is harvested and dead and down wood will be left in place to protect the habitat of plant and animal species dependent on its existence. Conflicts may be expected to develop among various user groups. The demand for firewood will depend not only on its availability, but also on its costs compared to costs of alternate energy sources, restrictions on wood stove or fireplace emissions, and local population increases.

Neither of the utility companies anticipates the need for additional transmission lines in the next 10 to 20 years.

LANDS PROGRAM MANAGEMENT

The Forest manages about 960,000 acres of NFS land. There are about 134,000 acres of land scattered within the Forest boundaries that are in other ownership. The private lands were generally acquired, before the National Forest was established, under various laws intended to encourage settlement and resource production.

Landownership adjustment involves changes in ownership to make management easier and to reduce administrative costs. Historically, large holdings of cutover private timber lands were exchanged for federal forested lands. A relatively recent trend, which is expected to continue, is for smaller exchanges to acquire lands with other resource values, such as wilderness and habitat for threatened or endangered wildlife and plants.

The Forest boundary location program supports the resource programs and landownership adjustment program. About 30 percent of the roughly 1,300 miles of boundary line between public and private land are unsurveyed or inadequately surveyed. Boundary location and marking identifies encroachments, some of which can be resolved under the Small Tracts Act (STA). The Forest has completed about 25 STA cases; 60 or more encroachments with potential for resolution under STA authority are waiting establishment of Wild and Scenic River corridor widths.

Special use authorizations allow others to use approximately 3,800 acres of National Forest System land for a wide variety of uses. Powerlines occupy 3 utility corridors crossing the Forest. Three of the four communications sites that serve a variety of communications uses will be designated multi-user communications sites.

The Forest acquires easements across private property, when needed, to access NFS land for management activities.

Projected Demands and Opportunities

The land adjustment program will continue to shift from being primarily driven by timber needs to providing for other resource and management needs. Most of the surveyed boundary line between Government and private land are planned to be surveyed, marked, and posted to standards by the year 2010, identifying additional encroachments that may be resolved under STA authority. Opportunities to find alternative ways to manage lands under special use authorization and/or meet public needs for these uses will be explored. The demand for new rights-of-way will shift toward providing access for public recreation activities. Negotiations with private land owners will take more time and sensitivity than in the past.

MINERALS MANAGEMENT

Mineral commodities are classified by law as either locatable, leasable, or common variety mineral materials. The Forest contains a variety of locatable and common variety minerals. There are no known leasable minerals, such as gas and oil.

Locatable minerals: These minerals may be acquired through compliance with the General Mining Laws of 1872, as amended. They include gold, chromite, mercury, nickel, cobalt, manganese, and copper. The Forest does not generally produce large quantities of any locatable minerals, compared to production statewide. There are 4,398 acres of outstanding mineral rights on the Forest.

The number of claims on the Forest has dropped by at least half since 1990, due to designation of the NRA in 1990 and institution of a BLM claim maintenance fee in 1993. The number of plans and notices submitted for proposed operations, primarily for suction dredging, dropped correspondingly. Proposed operations are evaluated under NEPA; operators must comply with requirements for protecting resources, such as Threatened and Endangered plant and animal species, and for reclamation to a second productive use where appropriate.

Forty percent of the Forest lands have been withdrawn from mineral entry, subject to valid existing rights under wilderness, Wild and Scenic Rivers, and NRA designations. Less than 1 percent of the Forest lands are withdrawn for recreation and administrative purposes, and these withdrawals have been recommended for termination.

Common variety minerals: Common variety minerals that occur on the Forest include various earth construction materials. Most sand and gravel deposits are located along streams and are replenished periodically by natural deposition. Rock aggregate for road surfacing material is a non-renewable resource. All known rock sources have been inventoried and mapped; these deposits are distributed throughout the Forest. Historically, the demand for common variety

mineral materials was primarily for use on Forest roads and facilities, with relatively small amounts used by private parties.

Projected Demand and Opportunities

Sixty-five percent of the forest is considered to have less than moderate potential for mineral development during the planning horizon; 25 percent is considered to have moderate potential. Demand is difficult to predict, as it depends on market value, world supply, and the cost of extraction and reclamation. Research Natural Areas and Native American Cultural Use Areas that are not already withdrawn from mineral entry will be considered for recommendation for withdrawal.

RANGE MANAGEMENT

The Forest currently makes available 15,897 AUMs (animal-unit-months) for approximately 1,987 cattle between April and October each year. Range management includes using fencing and water developments to distribute livestock in a way that minimizes the impacts on other Forest resources.

About 25 percent of the 297,000 acres of NFS land in allotments is suitable rangeland. These suitable lands could support up to 28,809 AUMs. The suitable range is primarily annual grassland, oak woodland, browse, and transitory range. Most transitory range, which supports grazing for about 20 years, is the result of timber management activities that open up the forest, allowing grasses, forbs, and browse to flourish until trees once again dominate. Reductions in timber harvest levels and changes in silvicultural systems will result in fewer acres of transitory range, and the number of AUMs available will be less over time.

Grazing is authorized on 18 allotments on 2 districts: 12 on Mad River district and 6 on Lower Trinity district. Three of the active allotments include wilderness lands. Seven permittees on Mad River allotments utilize about 90 percent of the AUMs permitted on the forest; 12 permittees on Lower Trinity allotments utilize the other 10 percent.

The ecological condition of the rangelands on the Forest is not known at this time. Current management intent is to complete ecological classification of rangelands and to determine condition and trend, where applicable. Problems associated with livestock use include grazing within riparian areas and construction of roads that cause range allotment management problems such as a need to install fences, gates, and cattleguards.

Projected Demands and Opportunities

The demand for Forest rangelands is expected to remain at current levels over the next decade. There is an opportunity to improve vegetative conditions and damaged riparian areas by improved management practices. The Pacific Southwest Region has initiated a project to provide an ecological classification of all forest plant communities that will facilitate identification and interpretation of vegetation-soil communities at project level planning.

RECREATION PROGRAM MANAGEMENT

The Forest provides a diverse array of recreation opportunities in a variety of settings. Forest attractions include numerous rivers, streams, and lakes, steep mountains to gentler oak woodlands, four wildernesses, the Smith River National Recreation Area, and a road system that makes much of the Forest available to the motoring public.

The most popular recreational activities are camping, picnicking, swimming, fishing, hiking, horseback riding, boating, and motorized uses such as viewing scenery and off-highway vehicle travel.

Some recreation occurs at permanent sites developed specifically for recreation purposes. The Forest has 15 developed campgrounds, 2 developed camping areas, 10 camping areas with no potable water, a boat ramp, and some trailheads. Several of the Forest's older campgrounds are functionally obsolete; those in the Smith River NRA are being upgraded first to provide more "modern" and accessible facilities.

Dispersed recreation is outdoor recreation that involves relatively low density use and occurs over broad expanses of land or water. Dispersed recreation, which generally occurs during summer and fall, accounts for much of the recreation use on the Forest, especially along its rivers and streams.

The network of Forest roads and the 230 miles of trails provide access for dispersed recreation activities. Two nationally designated Scenic Byways cross the Forest.

Redwood National Park, the State's redwood parks, and three National Forests are in close proximity to the Forest and provide similar recreational opportunities. Outfitter/guide operations, resorts, and special events under special use permit provide a variety of recreation experiences on the Forest.

Projected Demands and Opportunities

The Forest provides a supply of potential outdoor recreation opportunities that is estimated to be three to four times the existing dispersed use without changing the character of the setting, although the available supply of water-based recreation is limited. Chapter 3 of the EIS describes the inventoried recreational opportunity spectrum (ROS) acres, capacity, and use.

There are opportunities to improve the facilities at existing developed campgrounds to meet the demands of today's campers, including facilities for recreational vehicles and physically challenged users. There are also opportunities to provide more day-use areas and increase the number of outfitter/guide and recreation special event permits without significantly impairing the recreation experience.

ROADLESS AND WILDERNESS AREA MANAGEMENT

Some of the Roadless areas "released" in 1984 have been roaded; all have been managed for multiple-use other than wilderness. None are recommended to be managed to protect wilderness potential in this Plan.

Wilderness areas on the Forest include portions of the Yolla-Bolly Middle Eel Wilderness (11,100 acres), Trinity Alps Wilderness (27,600 acres), Siskiyou Wilderness (74,000 acres), and all of the North Fork Eel Wilderness (8,260 acres). Their total area (121,000 acres) represents about 13 percent of the Forest's land base.

These wilderness areas encompass a variety of special features, including national recreation trails, wild rivers, unique plant communities, portions of the Helkau Cultural Resource District, and good winter deer range.

Projected Demands and Opportunities

Wilderness use is expected to be about 25,000 visitor days per year in the first decade, increasing at about the rate of population increase.

WILD AND SCENIC RIVERS MANAGEMENT

The California Wild and Scenic River system incorporates 366 miles of the Smith, Klamath, Trinity, and North Fork of the Eel River which are within the Forest; these were designated by the Secretary of Interior as part of the national system in 1981. Wild, scenic, and recreational classifications are all represented. These streams are 35 percent of the wild and scenic rivers on NFS lands in California. The primary reason for the designation of these streams was their outstanding anadromous fisheries value; the North Fork of the Smith was also valued for its whitewater boating. The Smith River and its tributaries were redesignated by Congress in 1990 under the Smith River NRA Act.

The boundaries of the South Fork of the Trinity River and management direction for it were established in its River Management Plan in 1992. The boundaries of the remaining streams are established in this Plan. Management direction for the Smith River and its tributaries is included in the Smith River Management Plan (Appendix A). Implementation schedules will be developed for the remaining designated segments of the Trinity, Klamath, and North Fork of the Eel rivers.

Portions of the Van Duzen and the North Fork Eel rivers and Redwood Creek were listed in the Nationwide River Inventory but not designated under the National Wild and Scenic Rivers Act. The Van Duzen and North Fork Eel portions were determined to be ineligible for wild, scenic, or recreational status. Detailed analyses are in Appendix D of the EIS. Redwood Creek has potential outstanding values; the approximately one-half mile on NFS lands will be maintained in a condition that will not diminish its potential for wild and scenic designation.

Projected Demands and Opportunities

Six streams were identified through public scoping as potential wild and scenic rivers; only Blue Creek was determined to have values that would make it eligible for designation. Additional stream segments have been found to have values that would make them eligible for designation. Detailed analyses of these stream segments are in Appendix D of the EIS.

TIMBER MANAGEMENT

The amount of timber sold and harvested from the Forest has varied considerably in the last 40 years,

more than doubling from the mid 1950s and then declining as timbered lands were removed from the available land base by various Congressional and Executive Branch actions. Harvest and sale levels declined rapidly from the late 1980s to the present; establishment of the Smith River NRA and protection of Threatened and Endangered wildlife species contributed significantly to this decrease.

Forest Land Classification: The National Forest Management Act of 1976 (NFMA) requires an assessment of National Forest lands to determine those acres which are capable, available, and tentatively suitable for timber production.

Capable lands are those where growth potential is at least 20 cubic feet per acre, per year. **Available** lands are those which have not been legislatively or administratively withdrawn from timber management. Wilderness areas, late seral reserves, and riparian reserves are examples of lands which are unavailable. **Tentatively suitable** acres are those lands which can be reforested within five years and where timber harvest would not cause irreversible damage to soil productivity or watershed conditions.

Only lands determined to be capable, available, and suitable are managed for timber outputs and contribute to the calculation of allowable sale quantity (ASQ). Approximately 28 percent of the Forest's 958,470 acres are available, capable, and tentatively suitable for timber production.

Products: Sawtimber is the most important commercial commodity produced on the Forest. It is estimated that the Forest has approximately 12 billion board feet of standing timber on lands classified as tentatively suitable for timber production. The primary species harvested is Douglas-fir. Other conifers and small amounts of black oak are also harvested.

Nearly all of the timber from the Forest is processed in Oregon and northwestern California. Some local mills depend heavily on timber from the forest, and bidding on most sales is highly competitive.

The long term price trend from below $50 per thousand board feet (mbf) in the early 1970s to over $350 per mbf in fiscal year 1992 reflects the increasing scarcity of timber supply in relation to demand.

Hardwoods are present in the Forest and dominate sites at various stages in the revegetation cycle; fire, logging, reforestation, and site conditions affect the presence of hardwood. Individuals purchase fuelwood from the forest, most often collecting it from recently logged areas. Less logging means that fuelwood is less available and usually further from home. Some commercial operators purchase fuelwood sales, which tend not to be highly profitable. Hardwood is also is used to produce paper pulp, generate electric power, and for lumber.

Harvest Methods: Harvest methods used on the Forest include ground skidding, cable yarding, and aerial yarding. Skidding is appropriate on a small fraction of the Forest's tentatively suitable land base. Cable yarding is the most frequently used method. Aerial yarding by helicopters has been rare on the Forest but is increasing. This trend is expected to continue as helicopters are used to harvest otherwise inaccessible areas or to mitigate specific resource concerns; costs of helicopter logging and subsequent entries into an area without road access for regeneration, timber stand improvement treatments, and monitoring will be higher with this method.

Silvicultural Systems: Various silvicultural practices are used to influence vegetation development. Forest stands on the Six Rivers are managed by one of two silvicultural systems: even-aged or uneven-aged. Silvicultural principles and systems are described in detail in Appendix K of the EIS.

Even-aged management has been the primary silvicultural system for the Forest, and was selected as the preferred method in the 1971 Timber Management Plan. Until recently, clearcutting has been the primary method used to regenerate stands under that plan. The shelterwood method has also been used, and intermediate harvesting has occurred, primarily as thinnings and salvage cutting.

Some uneven-aged management has occurred on the Forest in areas with specific resource objectives such as maintenance of a continuous forest cover.

Traditional even-age systems have been modified in the last few years to provide increased diversity in forest stands. Regeneration with legacy is a method used to retain various levels of large live conifers and hardwoods, snags, large logs, and patches of understory conifer seedlings and saplings. Low levels of legacy retention provide important habitat niches for various wildlife species, but may appear similar to

a clearcut. High levels of legacy retention subdue the visual effects of harvesting and move a site toward a multi-story stand structure considered important to some species associated with late successional forests.

The historical emphasis of National Forest timber management has been to optimize tree growth for timber production. The new emphasis is to maintaining the health of the ecosystem and all its component parts. Tree growth will continue to be optimized when it does not conflict with ecosystem health.

Reforestation: National Forest Management Act (NFMA) regulations specify that trees can only be harvested from lands that can be adequately reforested within 5 years after harvest. Reforestation is achieved by either natural or artificial methods. Artificial regeneration by planting is the most commonly used method on the Forest, using mostly Douglas-fir, ponderosa pine, and Jeffrey pine. Natural regeneration is most often used to establish shade tolerant species. Stock is usually planted at 2 to 3 times the recommended stocking standards to allow for seedling mortality and removal of inferior trees in 10 to 15 years, leaving the "superior performers" in the stand. The seedling survival rate is generally 70 to 80 percent, resulting in a high percentage of the Forest's plantations meeting reforestation standards within 5 years after harvest.

Release and precommercial thinning treatments are used to suppress vegetation which is competing with desired seedlings for light, moisture, and nutrients, and to thin dense stands of older seedlings and saplings to provide adequate growing space for selected trees. Release and thinning can be accomplished by manual, mechanical, or chemical methods, depending on site conditions, costs, other resource concerns, and public opinion. About 23,500 acres currently need some treatment. Release of Forest plantations was accomplished primarily by herbicide applications until 1984 and have been done by manual or mechanical methods since then.

Projected Demands and Opportunities

Knutson-Vandenberg (KV) funds generated from timber sale receipts will continue to finance sale area improvement projects including reforestation, stand protection and improvement, slope stabilization, wildlife and fisheries habitat improvement, and recreation development.

Opportunities exist to manage the forest to produce timber and forest products and provide for other resources, including wildlife; to help accelerate the development of desirable structural components; and to maintain or enhance species diversity within stands and across broader landscape areas. A variety of timber harvest systems can be used as a tools in this management. The relationship between disturbance, including timber harvest, and other biological, physical, and social aspects of the ecosystem are not fully understood. Timber management practices need to be monitored and evaluated in the upcoming years, and adjustments made as new information becomes available.

TREES WITH SPECIAL MANAGEMENT CONSIDERATION

Three tree species found in small groups, or as individuals, on the Forest are of concern to the public and Forest managers: redwood, Pacific yew, and Port-Orford-cedar.

Redwood is found in small areas in the Smith River NRA and within the Yurok Redwood Experimental Forest. There are approximately 2,600 acres where redwood is a component of the stand. All groves of redwood are protected from harvest on the Forest.

Pacific yew is near the southern extent of its range on this Forest. It has many special uses and is important culturally to Native Americans for use in bows and other products. There were no commercial collections of yew bark on the Forest during the period 1991-1993, when it was being collected in the Pacific northwest for research on the cancer treatment properties of taxol.

Port-Orford-cedar is a valuable conifer, found in some areas on the Forest, that may be legally exported as raw logs. The species has been infected in some areas by a root disease, and special measures are needed to prevent the disease from spreading to uninfected areas.

Potential Demands and Opportunities

The Pacific Southwest Forest and Range Experiment Station, Redwood Sciences Lab conducts wildlife and

watershed related studies of redwoods which occur within the Yurok Experimental Forest.

Port-Orford-cedar will be managed according to the Forest Plan Standards and Guidelines that should provide an opportunity to prevent spread of the root disease. Opportunities may occur to reestablish Port-Orford-cedar in plant associations which have been altered by root disease.

SPECIAL FOREST PRODUCTS

Special forest products are defined as non-timber, renewable vegetative natural resources, such as berries, floral greenery, cones and seeds, mushrooms, and dyeing materials. Many rural residents rely on plant material from the Forest for food, medicinals, and other uses. The act of collecting has cultural and spiritual significance to Native Americans.

The trend in rural communities is to rely more heavily on a broader range of forest products; new markets have been developed for them.

The Forest sells special forest products under permit or contract; no permits are required for personal collection. Demand for special forest products has risen faster than the Forest can meet it. The potential for social conflict rises as more people with different values demand similar products.

Projected Demands and Opportunities

Demand for special forest products is expected to increase and must be managed sustainably. Research, monitoring, education, real market value pricing, public participation, habitat enhancement projects, and assisting in developing the infrastructure and markets to support a special forest products economy are among the opportunities that will be explored during this planning period.

PEST MANAGEMENT

The primary groups of forest pests likely to interfere with some management objectives are: competing vegetation, diseases, insects, and vertebrates. Some of the pests found on the Forest are dwarf mistletoes, white pine blister rust, root diseases, black-tailed deer, black bears, and various rodents. Many of these pests can be treated to minimize their effects.

The Forest Service implements an integrated pest management (IPM) approach to dealing with forest pests: prevention, detection, evaluation, suppression, and monitoring. Pest management goals are directed toward reducing pest-related losses to levels that maintain a healthy forest environment.

Projected Demands and Opportunities

Preventive measures can be included in management prescriptions, especially for activities or areas which pose a high risk for introduction of pests.

VISUAL RESOURCE MANAGEMENT

The Forest has a diverse landscape with many areas of high scenic quality such as rivers, steep river canyons, and forested peaks. There are two different types of landscapes. The northern portion of the Forest has very steep slopes and sharp ridges; the southern portion has gentler, moderately steep slopes with more rounded landforms. The scenic qualities of the Forest have changed over the last 100 years, from an undisturbed appearing landscape to one modified by human activities such as timber harvest and road construction.

The Forest Service has adopted the visual management system defined in the USDA Handbook #462, which includes the inventory of three elements that represent the natural and social setting. Variety class identifies the diversity of landscape features and the appeal of the scenery as distinctive, common, or minimal. Sensitivity level indicates the public's level of concern