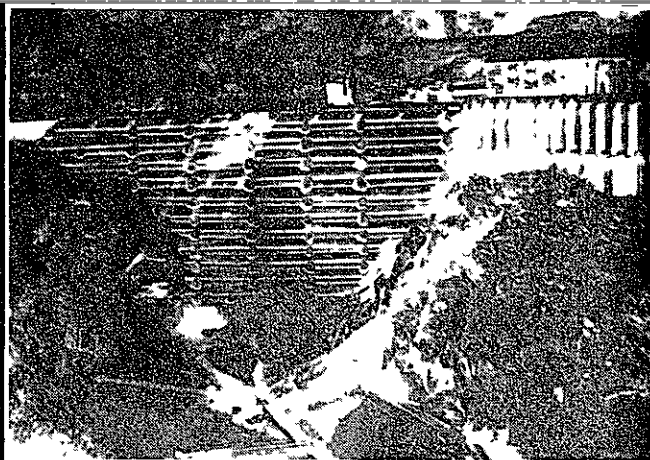
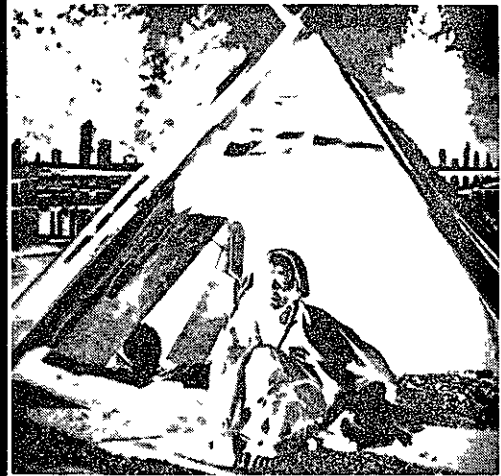
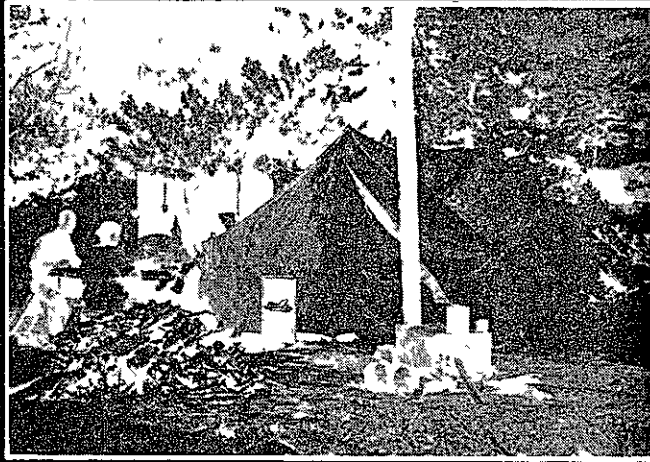


Chapter 3, Analysis of the Management Situation Summary



Ch. 3 Analysis of the Management Situation Summary

Introduction	3-1
Physical and Biological Environment	3-1
The Economic and Social Environment	3-2
Supply, Demand, and Management by Resource	3-5

Summary of the Analysis of the Management Situation

Introduction

The Analysis of the Management Situation (AMS) is a document that thoroughly examines the existing management situation on the PNF. It is part of the Planning Records.

In Chapter 3, The Affected Environment of the EIS for this plan, Forest environmental conditions and much of the AMS information is presented in detail. This chapter is a summary by resource of that information. The reader interested in a more definitive exposition of present resource conditions should consult the EIS Affected Environment.

Physical and Biological Environment

Location. The Forest is at the northern end of the Sierra Nevada mountain range in northeastern California and is bisected by the Sierra crest. The Sacramento Valley and the Honey Lake Valley form the western and eastern boundaries. To the north lies the volcanic Cascade Range, and to the south gradually rises the High Sierra. Quincy, the seat of Plumas County and location of the Forest Supervisor's headquarters, is in the central portion of the Forest on State Highways 70 and 89.

Climate. West of the Sierra crest, weather is primarily of a Mediterranean pattern with wet winters and dry summers. East of the crest the marine influence lessens, and there is a greater range in daily and seasonal temperatures, lower precipitation amounts, a greater contribution to total precipitation from summer thunderstorms and lower humidity. Over 95% of the precipitation falling on the Forest occurs during the winter months, ranging from 15 inches on the eastside to 90 inches on the westside. A snowpack of 5 to 10 feet or more is commonly present from December through May at elevations above 5000-6000 feet, although individual winter storms may be in the form of rain to the highest elevations.

Topography and Watershed. Elevations range from about 900 feet in the western foothills to 8,372 feet at Mt. Ingalls. In the western portion, the North and Middle Forks of the Feather River and their tributaries have carved deep canyons into the Sierra Block. Narrow plateaus of moderate relief are located between the canyons and are

the most productive timberland. The eastside is a part of the Basin and Range Province, with forested ranges and intervening broad valleys often used for livestock grazing. At the easternmost range, the Diamond Mountains, the terrain drops off sharply to the arid Honey Lake Basin. Except for this slope, nearly all of the Forest drains southwesterly to the Feather River.

Geology and Soils. A wide variety of rock types have been exposed by erosion following the faulting and uplift process which created the Sierra Nevada range. Most of those faults are considered inactive today, but low intensity earthquakes still occur.

This geologic complexity and the climatic variation across the range have resulted in diverse soils. Generally, the warmer and more humid westside has deeper, more productive soils; the cooler, arid eastside has shallow, less productive soils. Equally important, north-facing slopes have moister, deeper, more productive soils than do south aspects. Some rock types, such as serpentine, produce rather infertile soils. Granitic soils are susceptible to high rates of surface erosion. Volcanic rock and soils and glacial deposits are often subject to landsliding.

Vegetation. The following vegetation associations are present on the Forest:

	% of PNF
Westside Mixed Conifer	57
Eastside Mixed Conifer	8
Eastside Pine	13
Oak Woodland	7
Red Fir	5
Ponderosa Pine	3
Sagebrush	2
Climax Chaparral (brushfields)	1-2
Fresh Water Communities	1
Pine-Juniper Woodland (eastside)	0.8
Wet Meadows	0.4
Rocky Areas	0.4
Lodgepole Pine	0.4
Riparian Deciduous	0.4
Dry Grassland (eastside)	0.2
Digger Pine - Oak (foothills)	0.1
Mountain Hemlock (above 6000 feet)	.02

The Economic and Social Environment

Sphere of Influence. The lands administered by the PNF are located in five northeastern California counties: Plumas, Lassen, Sierra, Butte, and Yuba. More than 80% of the Forest lies within Plumas County;

and the Tahoe National Forests). Lassen and Sierra Counties have only minor acreages in the Forest, but the impact on them, from a socio-economic standpoint, are similar to those on Plumas County. Butte and Yuba Counties and the nearby Reno area are more urban, and the relative importance of the PNF outputs is lessened by the size and diversity of their economies. Most of the timber harvested from the PNF is milled in these five counties.

Accordingly, this socio-economic analysis deals primarily with effects in Plumas, Lassen, Sierra, Butte, and Yuba Counties.

Population. Population growth in the five counties has been substantial during the past two decades due primarily to in-migration of urban emigrants and retirees.

Employment. The economy in the area, for the most part, has been based on logging, lumbering, and agriculture. But employment in these sectors has been decreasing. Concurrently, employment in the service and trade sector has enlarged as a result of growth in the retirement population, urban emigration, and tourism.

The lack of diversification, rapid population growth, and the seasonal nature of tourism and resource-related industries have resulted in unemployment rates that are twice the State average.

Role of the Forest. The PNF contributes to the local economy by providing timber for harvesting and milling into lumber, by furnishing summer range for local and regional livestock operations, through the Receipts Act Payment Program, and through the influx of the annual operating budget. Local employment in the impact counties, as a result of PNF activities, amounts to approximately 7173 jobs. The Forest's annual budget, which includes locally-paid wages and contracted expenditures, peaked in 1981 at \$21 million.

According to the Receipts Act Payment Program, 25% of the revenues* earned by the Forest are returned to the counties in which the Forest is located for road and school programs; State law requires equal-sharing between these programs. These revenue payments play an important role in county finances, especially in Plumas County where, in 1980, 55% of the road budget and 21% of the school budget came from PNF receipts.

*Revenues include: a) value of timber harvested (including timber sales receipts, Knutsen-Vandenberg collections for reforestation and timber stand improvement on timber sales, and value of timber sale road improvements), b) land use permit fees, c) recreation user fees, d) mineral permit fees, and e) grazing fees.

Social Groups; Relation to Forest Management. Management direction and resource outputs of the PNF affect several local social groups, each of which places different demands and values on resource use. Six major groups identified are:

Long Time Residents. This group has a predominance of residents who have lived in the area for 20 or more years and are employed in logging, lumber manufacturing, and agriculture.

The older members tend to have strong feelings for stopping, or at least reducing, development. The younger group is more oriented towards resource utilization. Both tend to perceive the Forest Service, along with other government agencies, as authoritarian.

Urban Emigrants. This group ranges from professionals to those with alternative-lifestyles. For the most part, their values are compatible with those of the long-term residents. The newcomers generally place a high value on the need to protect ecological resources. They are often supportive of Forest Service regulation but critical of some timber management practices, such as herbicide spraying and clearcutting.

Governmental Workers. Employment by school systems and local, State, and the Federal government in the five counties is an important part of the economy. In general, this group is concerned over actions taken by the PNF that could affect income, job security, and timber receipts shared by the local road and school systems.

Retirees. The population segment older than 50 years comprises about one-third of the total population. Many of these people come to the area as second-home owners, and, upon retirement, move here either permanently or for all but winter months.

Most retirees hold conservative values and are oriented towards the protection of the environment. Recreation, including hunting, fishing, boating, and observation of nature, is considered important.

Business Community. These are people involved in manufacturing, services, and trades. Individuals are generally quite active within organizations and operate from a powerful influence base. They are sensitive to decisions on timber sales, mining regulations, and tourism that could affect their businesses.

Native Americans. The Maidu (Northeastern Maidu) and Konkow (Northwestern Maidu) ancestral territories included most of the PNF. Today, their descendents are primarily employed in logging and related areas. Accordingly, the group is concerned with PNF actions that would affect income, job security, and local job opportunity. In addition, Indian communities have concerns about

PNF actions that could adversely affect cultural or religious sites important to their heritage. Other groups with an interest in, or immediately adjacent to the PNF, include Nisenan (Southern Maidu), Washoe, and Northern Paiute.

Supply, Demand, and Management by Resource

On the following pages, each resource/program area of the Forest is discussed in terms of a) Current Management, b) Opportunities for Management Change, c) Supply, and d) Demand. "Opportunities for Management Change" is a description of possible future actions identified during the issue solicitation process. Chapter 4 Management Direction states those management actions actually selected for implementation.



Recreation

a. Current Management. Recreation management includes the planning, implementation, and maintenance of recreation facilities and activities, including the trail system. The PNF has a \$6.8 million investment in developed recreation sites due to past FS policy, but recent direction emphasizes dispersed recreation and use of the Recreation Opportunity Spectrum (ROS) system.

Funding of resources for recreation facility construction and maintenance has been derived from a variety of sources, including the Forest budget, Federal Energy Regulatory Commission (FERC) licensees (often utilizing Davis-Grunsky Act grants), the California Department of Boating and Waterways, California ORV license fees, and the California State Water Project. Funding levels over the years have resulted in limited developed recreation maintenance; if this trend continues, some site closures for health and safety purposes are likely.

The Forest currently makes use of several recreation plans for various purposes or areas. These regulate camping and motorized vehicle use and guide development of additional trails, campgrounds, and other facilities.

b. Opportunities For Management Change. Additional needed management efforts could: 1) initiate more precise direction for ORV management, 2) initiate use restrictions on some reservoirs to reduce conflicts, 3) renew an aggressive acquisition program for scenic easements or fee title to private lands within the Recreation Zone of the Wild and Scenic River, 4) develop parking and sanitation facilities for

cross-country skiers and snowmobilers and resolve conflicts between them, 5) acquire rights-of-way for hunters and fishermen across developing land in the Beckwourth and Milford Districts, 6) expand campground facilities at the reservoirs, including termination of special uses by private parties where needed, and 7) expand interpretive services in major use areas.

c. Supply. The recreation use-capacity of the Forest in "persons at one time" (PAOT), is 258,770. Thirty-eight family campgrounds are now in seasonal operation, and 24 offer capacity in excess of use. This assumes that optimum use is about 40% of theoretical season capacity; greater use indicates overcrowding during peak use periods. Most of the developed recreation is around five large reservoirs on the Forest. In general, the existing developed recreation supply does not approach the maximum capability of the Forest.

No major privately-owned recreation facilities utilize public land within the Forest.

Three recreation residence tracts are on the PNF. Current permits terminate at the year 2000.

Dispersed recreation on the PNF includes fishing, hunting, driving for pleasure, lake recreation, horseback riding, hiking, cross-country skiing, and off-road vehicle use. The Forest has one wilderness area, three Wild Trout Streams and 243 miles of trails, including 66 miles of the Pacific Crest Trail. ORV use occurs throughout the Forest except on that 13% closed for resource protection needs.

The two scenic recreational areas of special note are the Lakes Basin and the Middle Fork of the Feather River. The 10,800 acre high-elevation, glaciated Lakes Basin Recreation Area was set aside by the Secretary of Agriculture in 1926 for recreation purposes. The area has over 20 lakes, including the 500-acre Gold Lake, and offers 30 miles of scenic trail hiking, developed and dispersed camping, privately-operated horseback riding, and lodge accommodations.

The Federally-designated Middle Fork of the Feather Wild and Scenic River extends across the Forest from Beckwourth in the Sierra Valley to Lake Oroville. The river is divided into Wild, Scenic and Recreation Zones to promote different types of recreation experience.

d. Demand. Total PNF recreation has generally increased over the past 30 years and is currently 2.3 million Recreation Visitor Days (RVD's) per year. It is assumed that recreation demand will increase at the current population growth rate in the region, about 1.7% annually.

Historically, about 40% of the recreation use occurs on developed sites, and 60% is dispersed. It is expected that this ratio will

gradually shift in favor of developed uses due to the increasing average age of the population.

Developed Recreation. The average campground is utilized 20 to 35% of theoretical capacity, but 12 of the 38 family campgrounds are fully utilized. Most others are fully utilized on summer holiday weekends. The total use in 1982 was 976,000 RVD's. It is estimated that overall campground capacity would need to increase 30% by the year 2000 to accomodate estimated demand increases, primarily at the reservoirs.

Dispersed Recreation. The annual dispersed recreation on the Forest is 1,300,000 RVD's. The primary activities are camping, fishing, and pleasure driving. Demand for hiking trails is increasing Forest-wide and especially on the westside in Butte County. Hiking and backpacking demand will continue to increase. Annual ORV use is now increased markedly during the 1970's but is relatively constant at present. Cross-country skiing is the fastest growing dispersed recreation activity on the Forest. With no recorded activity earlier, the use was 2,100 RVD's in 1979, and 11,000 RVD's in 1982. Use in the Lakes Basin Recreation Area was estimated at 85,000 RVD's in 1982, and weekend overnight use is usually at capacity.

Use in the Middle Fork of the Feather Wild and Scenic River designated area was 121,500 RVD's in 1982. Demand in the wild Zone is limited by terrain and difficulty of access and is well below capacity, but use at river trails termini may exceed capacity in the near future. Use at the more accessible areas in the Scenic Zone is at or near capacity.

Since it is estimated that the present recreation capacity for all uses exceeds the projected demand 50 years hence, future recreation demand can in general be met. However, new campgrounds that serve the Reno demand and the Lakes Basin, and new trails and campgrounds on the western edge of the Forest, and retention of semi-primitive areas would be needed.



Visual Resources

a. Current Management. The Visual Management System as described in Appendix K, has been used to define current Visual Quality Objectives (VQO) for all lands, based on specified physical features of the land and viewer location, frequency, and duration assumptions. These objectives specify maximum desirable visual change due to uses such as timber harvest and road construction.

Certain areas, such as the Feather Falls Scenic Area, the Bucks Lake Wilderness, the Middle Fork of the Feather River, and the Lakes Basin Recreation Area, are managed for scenic (and recreational) values.

b. Opportunities For Management Change. Future management could adopt a particular distribution of VQO designations, monitor visual effects of timber harvest for adherence to adopted visual objectives, and maximize visual quality in corridors and other special visual zones.

c. Supply. Most of the Forest exhibits "common" landscape (83%) or "distinctive" landscape (17%), according to variety class definitions applied nationwide. A majority is classified in the "high" sensitivity level when considering viewer location. Past management activities have generally not had a dominant visual effect so that changes are not evident to the average person unless pointed out.

Historical trends in visual quality are difficult to assess. Wildfire, timber management, and road construction continue to cause the greatest loss in visual quality throughout the Forest.

d. Demand. Public demand for visual quality is intangible but is closely tied to recreational demand. Driving and walking for pleasure and sightseeing will increase 34% by 1990, according to the California Parkway System estimates. This suggests an eventual need for additional scenic routes and vista point turnouts. State Highways 70 and 89 (through the Forest) were designated in 1966 as possible Scenic Routes by CALTRANS but await legislative designation.

Demand for visual quality has and will continue to conflict with wood product and mineral demand. In many cases, this conflict can be mitigated by use of site specific measures such as, but not limited to those depicted in the publications listed in Appendix K.



Cultural Resources

a. Current Management. The PNF has inventoried, evaluated, protected, and enhanced cultural resources as required by law and administrative directives. The cultural resource program is involved in the inventory, appraisal, and management of prehistoric, ethnographic, and historic materials and properties. To date most inventory has been associated with resource management projects, especially timber harvest. Present objectives are to: 1) complete the inventory of all cultural properties by 1995, and conduct National Register evaluation and enhancement activities as directed by Congress and Forest Service policy; 2) complete an inventory of other cultural resources to meet the American Indian Religious Freedom Act of 1978 and Forest Service policy direction; and 3) evaluate previously-recorded properties.

b. Opportunities for Management Change. Additional needed management could: 1) evaluate previously recorded properties; 2) extend

inventories to lands beyond project areas; 3) integrate ethnic concerns into the project plans; 4) increase surveillance and other protective measures at repeatedly vandalized sites; 5) establish policy for managing standing historic properties; and 6) develop enhancement plans for selected National Registry sites.

c. Supply. By 1981, the PNF surveyed over 20% of its lands and collected documents on, or recorded over 1,700 cultural properties representing prehistoric, ethnographic, and historic land use.

The PNF's cultural resources occur over a wide area with varying degrees of predictability. Generally the locations of prehistoric sites are the most predictable, since livelihood was tied closely to the land. Many of these sites are found on the westside of the Forest in areas of favorable habitation below 4000 feet. Others occur adjacent or in higher intermountain and eastside valleys and within the major canyons.

Ethnographic site locations are more difficult to predict since many of them were located in remote areas in response to the devastating effects of cultural contact with foreigners. The most difficult site locations to predict are those of the historic period, because by then man was no longer tied to the land. The extensive distribution of California Gold rush artifacts on the PNF is important in studying this frontier era.

Approximately 1% of the recorded properties have been evaluated for eligibility for the National Register of Historic Places, Natural Landmark status, State Landmark status, or for dedication by historical preservation groups. When the inventory is complete, more than 10,000 total sites may be found, so that many more eligible sites are to be expected.

d. Demand. PNF cultural resources are used by and are of interest to scientists, visitors, and ethnic or working groups.

Visitor use is encouraged by interpretive sites - two existing, one under development, and three planned.

Native American groups in the area use, or have interest in, various Forest locales including sacred areas, places of origin and of cultural importance (burial sites, etc.), and sites where traditional gathering activities for subsistence or ceremony occurred. In addition, descendants of pioneers, settlers, and miners identify with certain locations.



Wilderness

- a. Current Management. The California Wilderness Act of 1984 established the Bucks Lake Wilderness.
- b. Opportunities for Management Change. The Wilderness Act provided that no other areas on the forest can be considered for wilderness designation during this planning period. A Bucks Lake Wilderness Plan, now under preparation, could provide guidelines for the use of prescribed fire from unplanned ignition to reduce unnatural accumulations of fuel and could guide recreation use management.
- c. Supply. The Bucks Lake Wilderness is located on the westside of the forest, on the Oroville R.D., between Bucks Lake and the North Fork of the Feather River, encompassing 21,000 acres.
- d. Demand. The Bucks Lake Wilderness is presently used for recreation (hiking, backpacking, and fishing), cattle grazing, and mining. Recreation centers on the Pacific Crest Trail which passes through the area, the Gold Lake - Silver Lake Basin, and the vicinity of Bucks Lake. Cattle graze the Bucks Creek allotment. A few active gold mining claims are within the area near the Union Pacific Railroad tracks and in the vicinity of Virgilia. Exploration operations have subsided since 1982.



Wildlife, Fish, and Sensitive Plants

- a. Current Management. The direction of the Fish and Wildlife Program is to: 1) maintain at least viable populations of all native vertebrate species through the use of Management Indicators Species; 2) provide habitat leading to viable populations of endangered or sensitive species; 3) improve and protect habitat for selected emphasis species; and 4) provide for diversity of plant and animal communities and tree species.

Portions of Yellow Creek, Nelson Creek, and the Middle Fork of the Feather River are managed as Wild Trout Streams. All fisheries are protected through application of "Best Management Practices".

- b. Opportunities for Management Change. Future management could prescribe limits on vegetation manipulation in each management area to protect habitat diversity. Breeding and foraging areas for old-growth dependent and other indicator species and for the expansion of endangered bald eagle and peregrine falcon populations could be provided.

c. Supply. The Forest contains approximately 313 vertebrate species. Fifteen species or groups have been selected as indicator species to represent the status of specific habitat types and thus entire wildlife communities. All communities are presently viable, although habitat for old-growth dependent species is diminishing.

Two endangered animals, five sensitive animals, and fifteen sensitive plants inhabit the PNF. Bald eagles nest and winter in significant numbers on the Forest. A program to introduce peregrine falcons is now underway.

Blacktail and mule deer are the most numerous big game species on the PNF. Portions of the summer and winter range for the Bucks Mountain, Mooretown, Sloat, East Tehama, and Doyle deer herds are present.

Over 1,000 miles of streams and 14,000 surface acres of lakes and reservoirs provide habitat for cold water fish species, primarily trout. Some outstanding fisheries are present, however in some waterbodies there are undesirable species. There have been no anadromous fish on the Forest since construction of Oroville Dam.

d. Demand. Trout fishing and big game hunting are important activities in the Forest and account for 16% and 3% of the total recreation use, respectively.

Most recreationists seek wildlife to enhance their wildland experience on the PNF. Photography is common. Others want only to know that wildlife exists. Consumptive and observational demands for wildlife will increase with human population expansion, but it is anticipated that the observational demand will grow faster.



Diversity

a. Current Management. The need for diversity management of vegetation types and seral stages has recently materialized. Adjustments of timber harvests to assure diversity have begun.

b. Opportunities for Management Change. To benefit species requiring mature and overmature seral stage habitat, such as bald eagle, spotted owl, and marten, reduced timber cutting or longer rotation ages could be used at a network of sites throughout the Forest. To benefit deer and other species which rely upon early seral stages, increased timber harvest and habitat improvement projects for increased forage and cover could be pursued in their most limiting seasonal range. The amount and distribution of diversity elements such as snags and dead and down material could be increased through adjustment of timber harvest or direct improvement projects throughout the Forest. In

general, at least 5% of each vegetation type could be retained or provided in each seral stage to provide a diversity "floor".

c. Supply. Extents of various vegetation communities were given earlier in this chapter. Presently 9% of the Forest's commercial timber stands are in early successional stages, 47% are in mid-successional stages, and 43% are in mature stages. Less than 3% of the mature stands are two-storied.

d. Demand. Diversity is increasingly valued for visual and recreational enhancement, to help assure the viability of all vertebrate wildlife populations, and to increase stability of the Forest's ecosystems.



Range

a. Current Management. Most rangeland on the Forest is divided into 79 separate areas referred to as "allotments". Livestock use, including numbers, season, and level of use, is controlled through the issuance and administration of grazing permits. Initial stocking rates were determined through grazing capacity estimates based upon standard range analysis. Information gathered through annual allotment inspections is used to refine the original capacity estimates. Allotments are improved from time to time by fencing and water source development.

b. Opportunities for Management Change. Future management could focus on increasing range capability, if demand increases so warrant, and on resolving any incompatibilities with recreation, wildlife, and watershed uses and restoring those riparian areas in deteriorated condition.

c. Supply. About 314,500 acres are currently suitable for grazing. These rangelands are classified as primary (12%), secondary (13%), and transitory (75%).

Primary range is chiefly meadow and perennial grassland that is easily accessed and has available water. Secondary range, generally grazed after the primary range, is predominantly sagebrush-timber and bunchgrass-timber associations.

Transitory range exists as a result of wildfire, recent regeneration cutting, or other timber management practices which open the tree canopy and allow the development of understory forage. Although transitory range makes up 75% of the suitable range, only about two-thirds of it is available for livestock use.

The rangelands are presently divided into 67 cattle allotments, 10 sheep allotments, and two allotments for dual use. The total grazing capacity* is 43,000 animal-unit months (AUM).

A continuous grazing system is used on 71% of the rangeland, deferred grazing management is used on 27%, and a rest-rotation system is used on 2%.

Range condition is satisfactory overall, with a static to upward trend. Areas in unsatisfactory condition are generally overgrazed riparian areas on the Forest's eastside.

d. Demand. Forty-five permittees are dependent upon PNF range to complete their ranching operations. This use has remained fairly constant since the 1950's. During 1981, approximately 7,500 cattle and 1,400 sheep grazed the allotments under fee permits, utilizing 72% of the 43,000 AUM capacity. Land exchange and transitory range utilization increased grazing use from 30,200 AUM's in 1982 to over 33,000 AUM's in 1986. On active allotments essentially 100% of the existing capacity is utilized.

Demand depends upon range fees, allotment location, and type of forage. Eastside demand is very strong, where allotments contain a high proportion of permanent range. Westside demand is low since most range is transitory. The demand for sheep allotments does not meet the supply of those so allocated.

Demand is also affected by County policy as to the responsibility for excluding livestock from intervening private lands not available for grazing. Presently Lassen and eastern Plumas Counties are "open range", giving landowners that responsibility, whereas western Plumas, Sierra, Butte, and Yuba Counties are "closed range", requiring operator control.



Timber

a. Current Management. PNF timber management is guided by several congressional acts, regulations of the Secretary of Agriculture, policies of the Chief of the Forest Service as stated in the FS Manual, and the R-5 Manual Supplement and the Regional Guide. In general, these guides require the Forest to produce a non-declining flow (relatively constant supply) of timber on a sustained-yield basis by balancing net growth and harvest. Although not embodied in law,

* "Grazing Capacity" is the residual after allowance for plant maintenance and wildlife consumption.

current policy is to simultaneously evolve the Region's forests to a "regulated" condition with a complete and equal distribution of tree-age classes, up to a chosen "rotation age". This goal, to be gradually approached, is aimed at producing equal annual timber volumes by always harvesting the oldest stands.

Timber management at the Forest level is currently guided by the FY 76-85 Timber Management Plan, which established those lands available for commercial forest use, estimates the potential timber yield (or "allowable cut"), and provides direction for silviculture and harvest methods, reforestation, timber stand improvement, and fuelwood management.

Although Regional silviculture policy is directed at ultimately achieving regulated Forests as just described, the PNF determines which of its stands are to be managed on an even-age and uneven-age basis. Under the current plan, all stands in the Standard and Marginal Components are managed on an even-age basis. A 110-year rotation-age has been adopted, based on the average culmination age of all PNF timberlands.

All harvesting in the Standard Component is by clearcut (where little or no understory is present), by overstory removal, and by thinning and sanitation cut, in that order of yield volume. Selection cuts are employed in the Special Component, and both selection and salvage cuts are applied in the Unregulated Component. Tractor logging is usually employed on slopes up to 35% and occasionally beyond. On steeper slopes, cable yarding is usually employed. Helicopter logging is occasionally employed.

Clearcut areas are normally planted the spring following harvest, or at least within three years. According to regulations of the Secretary of Agriculture, these lands must be planted within 5 years. In the case of overstory removal, the site must support a prescribed optimum density of trees older than two years within five years. If not, planting is required. Target restocking densities for regeneration

Timber Stand Improvement (TSI) includes suppression of competing vegetation and precommercial thinning of young stands. Competing vegetation is suppressed by mechanical, cultural, and chemical methods chosen on a case-by-case basis.

Based on the land classification and choice of silviculture and harvest types, the current Timber Management Plan estimated a potential annual yield of 251 MMBF/year for the FY 76-85 decade. Congressional funding has generally limited the actual harvest to 205 MMBF/year, however.

b. Opportunities for Management Change. NFMA provides direction and opportunity to reevaluate PNF timberland classification, silvicultural prescriptions, and yields.

Regional direction calls for an evaluation of silvicultural systems on a stand-by-stand basis, considering both timber productivity and other resource management needs, such as wildlife habitat and visual concerns. In particular, uneven-age management is to be considered for existing uneven aged stands or where conversion to such stands would be appropriate to achieving adopted Forest goals.

NFMA regulations also affect rotation age planning. In general, stands must exhibit an average diameter of 13" to be considered for commercial thinning harvest, and rotation ages for clearcuts must be those at least at 95% culmination of mean annual increment, which varies by forest type and site class.

In addition to the above planning decisions, future timber management can attempt to optimize growth rates on suitable timberlands by (1) priority harvest of poorly-stocked and old, slow-growing stands, (2) harvest of the overstory in two-storied stands, (3) additional suppression of competing vegetation where needed, (4) thinning of young stands, and (5) increased fire protection to reduce loss of the more flammable plantations. Release thinning for stand survival should take precedence over release for growth.

c. Supply. The PNF is a major timber-producer for the Forest Service in California (Region 5). Comprising only 6% of the Region 5 landbase, it now produces about 10.3% of the timber volume. This is primarily due to the PNF's larger share of the Region's commercial timberlands, some 9.6%, but apparently also due to some higher productivity as well. About 66% of the Forest now produces commercial timber. Considering both public and private lands, the PNF produces 4% of California's timber.

The harvest of PNF timber has grown markedly in this century. The Forest's annual production, only about 10 MMBF in 1910, has increased nearly twenty-fold in the past 70 years.

The current existing timber inventory volume is 25 billion board feet. Nearly one-half of this volume is white and red fir. The commercial pines (ponderosa, Jeffrey, and sugar) comprise one-third of the existing volume. Nearly 60% of the timberlands now have trees between 80 and 140 years of age. About one-half of the PNF timberlands are steeper than 30% and one-tenth are steeper than 60%.

Productivity of the timberlands varies substantially. Productivity is described by "Forest Survey Site Class". Since site classes are closely related to soil types, timberland productivity is addressed in the ensuing Soils section. That data suggests that the entire PNF

could potentially grow up to 435 MMBF/year if all forest lands were fully stocked.

The net or available growth on many stands is well below potential productivity due to stand structure and age. Significant gains in net growth could be achieved by harvest and regeneration of poorly stocked and old-growth stands. Other timber stands (TSI Backlog) need thinning and release to achieve full site utilization.

The recent Soil Resource Inventory, redefining productivity levels, indicates that 67,000 acres could possibly be reforested. Field verification will be necessary to determine if reforestation is physically possible and economically efficient.

d. Demand. During the 1970's, demand for PNF timber was very strong and resulted in overbids of four to five times the appraised value. Demand weakened considerably in 1981-82 due to the economic recession and remains suppressed due to high interest rates.

Demand competition is sustained by the presence of about a dozen sawmills within or adjacent to the Forest, and some PNF timber is hauled as far as Roseburg, Oregon, for milling. These mills could easily process an expanded PNF supply if market motivation is sufficient.



Christmas Trees

a. Current Management. The Forest offers both commercial and individual Christmas tree sales. There are no Christmas tree management areas, and production priority is second to timber.

Contracts are awarded for commercial Christmas tree harvest in timber stand improvement areas; where road construction, clearcut timber harvest, or other tree-displacement activities are imminent; or where tree growth creates powerline or roadway hazards.

The individual Christmas tree program is intended for local residents. The individual program is not offered in the westside La Porte and Oroville Ranger Districts where local sources are available.

b. Opportunities for Management Change. Future management can focus on longer term contracts for commercial sales resulting in improved Christmas trees while accomplishing timber stand improvement and fuels treatment. The individual program can be phased out when lot sales provide a sufficient local supply of trees.

c. Supply. The offered commercial supply has fluctuated between 11,000 and 20,000 trees in the past few years. The quality varies and

affects the actual purchase. This supply is 0.3 to 0.5% of the California demand.

Sufficient surplus trees are present, but continued growth in the individual program, due to relatively uncontrolled tree removal, may ultimately diminish the timber stock and stock quality.

d. Demand. Recently, about 4 million Christmas trees have been sold in California each year. About one-fourth million of these came from California public land tree sales (including the PNF). On the PNF, the purchase has varied from 42% to 100% of the offered supply, according to tree quality.

Future California demand is expected to remain at 4 million trees per year, but the out-of-State supply will grow due to increasing Douglas fir from Oregon and Washington. The PNF share will remain virtually constant.

Individual demand consistently increased until 1983. Recently, commercial lot sales have begun in the local area and are expected to increase.



Riparian Areas

a. Current Management. Current policy is to manage riparian areas in favor of riparian-dependent resources. Guidance for this management can be found in several Congressional acts, Regulations of the Secretary of Agriculture, and Executive Orders. This policy gives primacy to protection of soil, water, vegetation, fish, and wildlife resources, but still allows timber and livestock production unless unresolvable conflicts occur. Special Streamside Management Zones are designated in activity areas for this purpose.

b. Opportunities for Management Change. Future management could define more precisely the extent and allowable disturbance within riparian areas and could promote a restoration program for deteriorating areas. Existing roads and facilities could be removed from meadows and other riparian areas. Livestock grazing could be more intensively managed.

c. Supply. Approximately 4% of the Forest, or 45,000 acres, is estimated to be riparian. The condition of these riparian areas has not been inventoried, but is an integral part of watershed conditions; refer to "Supply" in the next section, Water, for a discussion of watershed conditions. Deteriorating riparian areas are present, primarily on the Forest's eastside. The condition of the Forest's riparian areas is poor to good, much having been heavily damaged and showing little or no signs of improvement.

d. Demand. Many demands are focused on riparian areas, since they are attractive to recreationists, wildlife, and livestock. Often riparian areas are of high timber site, making them attractive for timber production. They are therefore those places in the Forest where demands for multiple uses, often incompatible, focus upon each acre.



Water

a. Current Management. The water resource is managed to protect and enhance water quality and yield through: 1) mitigation of increased run-off due to resource harvest/management activities, where appropriate; 2) inventory and measurement of water uses, needs, and availability, including instream and riparian flow requirements; 3) water quality monitoring; 4) identification and restoration of watersheds in declining condition; 5) management of riparian and aquatic areas, based on the Stream Classification System; 6) application of Best Management Practices for water quality management; and 7) rehabilitation of selected damaged streams.

Water quality is managed, in general, to meet State of California objectives.

b. Opportunities for Management Change. Future management could adopt land-use mitigations for, and conduct restoration of, watersheds in deteriorated condition. A comprehensive sampling program to define background water quality in the Feather and Yuba River watersheds could be developed. In addition, the Forest could support State establishment of nutrient-loading and chemical contaminant standards for each reach of the Middle Fork Feather River to meet the requirements of the Wild and Scenic Rivers Act. The Water Uses and Needs Inventory could be completed and maintained to protect current and future PNF and other uses. Future management must address the potential for proposed open pit mining and processing to degrade watershed and stream conditions in the Rush Creek, Wolf Creek, and perhaps other watersheds.

c. Supply.

(1) Watershed Condition. Approximately 8% of the PNF (83,000 acres) is directly affected by deteriorated conditions on approximately 10,000 acres.

Rehabilitation of watersheds in declining watersheds has averaged 200 acres per year for the past 3 years. At this rate, the Forest will have achieved only 4 percent of the national goal to improve all backlog acres by the year 2000.

Most westside watersheds are in good condition, with a few major exceptions including the Slate and Canyon Creek and South Fork Feather River watersheds. The granitic watersheds are particularly sensitive to each increment of disturbance. Sheet and gully erosion caused by roads and skid trails is widespread in the French Creek watershed, and impacts on the fishery and water quality are high. Restoration by the PNF is in progress.

Many eastside watersheds are sensitive to land-use activities and are in deteriorated condition. Many eastside meadows have been dewatered by creek channel downcutting, and sediment production in these channels is high.

Mining, especially hydraulic mining, has had significant impact on several watersheds in the central PNF, primarily along the eastern margin of the Sierra crest. Losses of both aquatic and riparian habitat have occurred, and erosion on the denuded areas continues.

(2) Water Quantity. The average water yield from PNF lands is 2.4 million acre-feet per year (MMAF/year). Total yield in streams from and through the Forest is 4.4 MMAF/year. An estimated 0.67 MMAF/year (15%) is consumed within the Forest by domestic and irrigation users. Of the remainder, a minimum of 1.67 MMAF/year (38%) is needed to satisfy instream needs, such as fish habitat, riparian vegetation, and natural channel maintenance.

Intensive management to increase water yield through vegetation manipulation could result in a maximum 0.1% increase (1000-2000 AF/year) Forest-wide, and the cost would be substantial.

Large acreages of private land surrounded by the Forest in Indian and American Valleys are flood prone. Local flooding damage has been small, but damage along the Feather River, downstream from the PNF, in Marysville and Yuba City was at times substantial prior to construction of Oroville Dam.

(3) Water Quality. The overall quality of water flowing in the PNF is still considered acceptable, but quality deteriorates during times of heavy run-off, with decreasing and warmer flows, and locally due to mine drainage and wastewater discharge. An estimated 70% of the water draining PNF lands meets State water quality objectives.

Important sources of degradation are on both PNF and private land. Mine waste discharges have been the most persistent degrader, but sediment yield is now causing substantial degradation. The average Forest sediment yield is about three fold that of undisturbed land, but sediment yield in the most degraded watershed is seven-fold that of the pristine condition.

Sedimentation is a significant problem in the Spanish and Indian Creek tributaries of the North Fork Feather River, the South Fork of the

Feather River, and the Slate and Canyon Creek tributaries of the North Yuba River. Sedimentation affects aquatic habitats, power producing facilities, and the State Water Project. Much of the sediment is produced by streambank erosion. Ultimate causes are complex and not well known; it is probable that activities throughout the watersheds causing more rapid run-off are major contributing factors.

(4) Municipal-Supply Watersheds. Thirty-three PNF watersheds supply water to public water systems. The quality of the water reaching these systems usually meets requirements established by the State.

d. Demand. A major demand for water from the PNF is for use in the State Water Project. Ninety-two percent (92%) of the Forest drains to the State's Oroville Reservoir. This water is used downstream for irrigation in the Central Valley and for domestic and irrigation consumption in southern California. This demand may exceed the total supply by the year 2000.

A second major demand for PNF water is for hydroelectric power generation. Non-consumptive, low-sediment water demand from small and large hydroelectric power projects is increasing, especially for the North Fork of the Feather River.

The major additional water demands within the Forest are for municipal, domestic, and industrial supply; irrigation; propagation of fresh-water organisms; recreation; and various PNF uses.

Domestic water is in demand by 76 community systems (33 employing surface water diversions) and for an estimated 200 individual systems. These systems provide various degrees of treatment from no treatment to full treatment.

Agricultural uses include PNF stock-watering developments on the high-range-use arid eastside and inter-range valley irrigation for cattle pasture and hayfields. Supply is sufficient now and for the foreseeable future except, presumably, in adjudicated areas: Frenchman Lake Basin-Sierra Valley, Indian Valley, and the Honey Lake Basin.



Soil

a. Current Management. The basis for soils management is the Soil Resource Inventory, conducted at different intensity levels according to information needs, which allows evaluation of productivity potential and erosion hazard and development of project-specific mitigation measures to protect productivity. Timber productivity is quantified by use of Forest Survey Site Classes; range productivity by yield potentials in forage pounds/acre/year.

Current management focuses on the extent of disturbances, so as to reduce soil erosion and compaction. Methods include maintenance of ground cover to reduce soil loss, control of equipment to reduce compaction, and use of low to moderate fire intensities during prescribed burning to reduce loss of nutrients, ground cover, and alteration of soil structure.

b. Opportunities for Management Change. Future management can continue to focus on prevention of soil loss and compaction. It can additionally explore restoration of growth rates where site potential exceeds performance (especially on lands of timber site class 2, 3, and 4 or of range productivity 1,000 pounds/acre/year or more), chiefly by nitrogen fertilization.

c. Supply. High precipitation (70-80 inches) and warm mean annual temperature on the far westside have formed well developed and generally highly productive soils. Eastward, lower annual temperatures and precipitation (<15-40 inches) predominate. This environment forms soils slower, resulting in lower productivity. The generally arid eastside in fact has an extreme climatic range, and soil development and productivity vary from intermediate to the least.

The soil survey reveals that the highly productive soils (site classes 2,3,4) comprise one-quarter of the productive PNF land base but produce some 43% of the tree growth. The moderately productive soils (site class 5) make up about one-third of the land base and produce a little more than one-third of the annual increment. The low and least productive soils comprise 41% of the Forest but contribute only one-fifth of the annual growth. The latter soils are often in areas of unfavorable topography and climate, reducing the availability of this growth component.

Range productivity also varies greatly. Approximately 33% of the Forest can produce more than 1000 pounds/acre/year, but 29% can produce no more than 200 pounds/acre/year.

The erosion hazard to exposed soil is "high" on 29% of the PNF and "extreme" on 4%. The most erodible soils are of granitic origin, but pyroclastic and sedimentary soils are also highly erodible.

The supply of productive soils is dependent upon maintenance of adequate organic matter, control of erosion, and limiting compaction.

d. Demand. The demands for those yields dependent on soil productivity are discussed in the Wildlife, Fish and Sensitive Plants; Range; Timber; and Christmas Trees sections of this chapter. Soil erosion also affects water quality and therefore recreation demand; see Water section.



Air Quality

a. Current Management. The PNF adheres to State and County standards for air resource management. The eastside is in Sierra, Plumas, and Lassen Counties, which allow prescribed burning operations almost unimpeded. Counties on the western slope, Butte and Yuba, have much more stringent rules because of adverse effects of smoke on the Sacramento Valley. Prescribed burning operations are timed to minimize smoke in sensitive areas. Dust abatement is used on heavily traveled roads and near recreational developments and residential areas.

b. Opportunities for Management Change. No change is needed from current management.

c. Supply. The air supply is degraded by two PNF sources; fire smoke and road dust. Fire smoke is from both wildfire and prescribed fire. Since major wildfires usually occur during high wind conditions, and prescribed fires are constrained to periods favoring smoke dispersal, consequent air quality loss is usually not substantial. Road dust emissions are relatively constant, and may be actually decreasing due to use of dust palliatives on most log haul routes. Air quality is also degraded within the populated mountain valleys due to wood heating and sawmill emissions during winter inversion conditions. Incoming air from the Sacramento Valley is occasionally moderately high in particulates (rice stubble smoke) or chemical pollutants, but in general quality of the air is high and is not significantly degraded by PNF activities.

d. Demand. Clean air is a State and National priority embodied in maximum allowable pollutant concentrations. Prevention of Significant Deterioration of cleaner air could become a constraint to use of prescribed fire if Class I areas were created to protect any new Wilderness areas. No external Class I areas are significantly affected by PNF activities.



Minerals and Materials

a. Current Management. The PNF manages minerals and common variety materials in two ways: 1) administering Secretary of Agriculture Regulations for private exploration and extraction under the mining laws and administering "withdrawals" approved by the Secretary of Interior; and 2) providing common variety materials for PNF, other agency, and occasionally private party road and facility construction.

(1) Private Mineral Exploration and Extraction. Management policy is to encourage mineral activities in all areas not withdrawn from mineral entry. The PNF also has the responsibility to protect all surface resources, as well as public health and safety, under the various mining laws and NEPA. Such protection may affect mineral extraction feasibility.

Plans of Operation, required for all mineral activities that may significantly disturb surface resources, are approved and administered by District Rangers.

In the past, the PNF had many illegal occupancies on claims that were invalid or used for purposes other than mining. Most have been resolved, but all claim structures continue to be reviewed for mining necessity.

Wilderness, several recreational and scenic areas, administrative sites, and existing or potential power project sites and reservoirs are now withdrawn from mineral entry. However, mineral development can occur in withdrawn areas where a valid right exists. By October 21, 1991, each existing withdrawal previously established at the request of the Forest Service must be reviewed by the Forest and the Secretary of the Interior to determine whether it should be continued, and for how long.

(2) Forest Uses. "Common varieties", or mineral "materials", are constantly needed for timber sale road construction and other uses. Extraction is by the private sector under contract, and use of designated on-Forest excavation sites is encouraged. About five extraction operations per year now occur on the PNF.

Common varieties are also available by sale or free use to the public, subject to environmental analysis and discretionary regulation by the District Rangers.

b. Opportunities for Management Change. Future management can determine whether certain valuable common variety material quarries needed for these PNF uses that may also have some locatable mineral value should be withdrawn from mineral entry to protect the PNF investment. Withdrawal of certain popular streams to provide for recreational gold panning and dredging can also be considered. The withdrawal of all other areas must be reconsidered.

c. Supply.

(1) Locatables and Leasables. The central portion of the PNF contains a NW-SE trending mineralized belt with a "very high" potential as a source of various minerals, especially gold and copper. The eastside has sparsely-scattered mineralized areas. The westside has many "high" potential areas.

Geothermal energy sources appear to be limited.

Four major locatable mineral deposits have recently been explored and development apparently could become feasible: Moonlight Valley copper deposits and the Goldstripe Project gold deposits on the Greenville District, the Rich Gulch gold deposits adjacent to the North Fork of the Feather River on the Quincy District, and the Bellevue lode gold deposits on the La Porte District. Since deposits are large and disseminated, extraction could affect large land areas and produce substantial mineral and waste quantities.

(2) Salables. Common variety materials, although scarce in some areas, occur in substantial quantities in most areas. They occur as river alluvium, pit-run aggregates, and solid rock suitable for crushing. The inventoried potential supply is 11,500,000 cubic yards.

d. Demand. The PNF processes about 100 plans of operation each year, all for locatable minerals and mostly for small scale gold exploration primarily on La Porte, Oroville, Greenville, and Quincy Districts. No mineral leases or applications exist, and few are expected.

With the increase in the price of gold, the private sector has a renewed interest in the exploration for and development of this commodity. Present production is minimal, however. Further activity in lode and placer gold exploration and development, of both a commercial and recreational nature, is anticipated.

Demand for minerals is dependent on international politics and economics and is expected to generally increase. The number of Plans of Operations on the PNF is expected to increase approximately 25% per decade.

Log haul wearing surface and erosion control aggregate needs on the Forest are considerable and may be expected to increase slowly as more remote and steeper areas are accessed. At the current road-rocking rate of 30 miles per year, about 61 MCY are needed annually. Eventually only about 10-20 MCY per year would be needed for reconstruction and maintenance. Although the gross inventoried materials supply is sufficient for all anticipated needs, the establishment of even more sources should prove cost-effective by reducing haul distances.

Private and public agency use of PNF materials sources is, and will probably remain, insignificant.



Geology-Hazards

a. Current Management. Roads, structures, and timber harvest units are designed to avoid unstable slopes or prevent accelerated failure wherever possible. This is facilitated by a Geological Resources Inventory that includes mapping of active and dormant failure areas, geology and topography, and an inferred Land Instability Risk Classification.

Earthquake hazards are managed by locating buildings, fill slopes, dams, and other facilities out of fault zones and/or using special design to prevent failure.

b. Opportunities for Management Change. Future management needs include field verification and updating of the instability mapping, improved correlation of geologic units to soils and vegetative types, and analysis of causes of landslides and their relationship to geologic units and management activities, and increased understanding and use of geologic and geotechnical information during project planning and evaluation. The majority of the unstable areas on the PNF are small enough that they can be managed if properly identified and planned for during project design.

c. Supply. Potentially unstable areas more commonly occur in glacial deposits, old terrestrial sediments, and some volcanic rocks and marine deposits. Failures often occur only after some activity such as road building, timber harvesting, or mining disturbs natural slope equilibrium. Due to the diversity of rock types, the density of unstable areas on the PNF is probably higher than for average Sierra terrain, yet it is substantially less than that of the more weathered coast ranges. Nevertheless, failures here cause access, timber harvest, and stream sedimentation problems.

The landslide risk is "high" on 14% of the Forest and "extreme" on 3%. Only a few earthquake faults, primarily on the eastside, are considered active. The quite active Fort Sage Fault lies 5-10 miles east of the Forest's eastern boundary. The Maximum Expected Earthquake intensity, a measure of potential ground shaking, is considered "low" for the Forest's westside, "moderate" for the north and eastside, and "high" along the extreme northeastern Forest boundary.

The greatest threat from earthquakes on the PNF is initiation of landslides. Possible effects include road blockage by slides, cut/fill slope failure, campsite isolation and possible burial, structural damage, rolling boulders, and human injury.

d. Demand. In the past, timber harvesting and road building on the PNF have avoided much of the steepest and most unstable ground. Increasing demand for timber and minerals requires access to the more

remote, steeper, and often more unstable ground. Consequently, the need for land stability analysis will accelerate.

Geology-Groundwater

a. Current Management. Wells and springs are developed to serve campgrounds, administrative sites, and stockponds. Water quality monitoring is regularly performed. Many source developments are currently being upgraded to meet State and Federal quality standards.

Portions of the Forest may provide recharge to the adjacent privately-owned Sierra Valley, for which a groundwater monitoring and use-limitation entity has recently been created. Neither the Forest nor the Sierra Valley Groundwater Management Board currently manages recharge areas specifically for water production.

b. Opportunities for Management Change. In the future a Forest-wide groundwater management plan could be developed to help assure a safe and plentiful supply both on and adjacent to the Forest. Gravity-fed horizontal wells could be located to serve existing and new developments and reduce energy costs.

c. Supply. The supply of groundwater is a problem in some areas and not in others, due to natural conditions. Little can be done to alter the quantity in most basins. Geologic or geotechnical studies aid in locating the most likely sources for development.

d. Demand. Groundwater sources are needed to provide safe and relatively constant water supplies for campgrounds and for livestock and domestic use. Groundwater avoids problems of contamination and intermittency that are common with surface sources. Demands are slowly increasing. Total demands are relatively small and are confined to the smaller basins within the Forest.

Energy, Biomass, and Fuelwood

a. Current Management. Present policy gives preference to individual domestic heating uses of the resource over commercial utilization systems by reserving preferred materials at accessible locations for the individual users.

b. Opportunities for Management Change. The Forest can prepare a biomass-fuel prospectus in the future to assure equitable treatment of competing interests. If firewood demand continues to increase rapidly, amounts per permit or total permits could be limited.

c. Supply. About 163,000 dry tons of logging residue, spread over 30,600 harvested acres, are generated annually. Much of this is physically or economically unavailable for collection. Residue treatment (disposal) has increased somewhat over the past several years, but the majority is left untreated. Annual sawmill residue from PNF logs is about 63,000 dry tons. This supply is supplemented by snags (other than those protected for wildlife habitat) and windthrown trees, but these may not be available to woodcutters in portions of the Oroville and La Porte Districts.

Supply set-aside for individual use comes from roads left open in timber sale areas after harvest, delay of residue treatment in regeneration cut-units, cull logs left at landings, and timber stand improvement thinnings.

d. Demand. Past demand has been entirely for spaceheating: locally, in Reno, and in neighboring Sacramento Valley communities. A rapid increase in individual domestic use and commercial woodcutting has been occurring, both for local use and, more dramatically, for non-local consumption.

An estimated 48,000 dry tons of firewood for domestic use and 6,800 tons for commercial use was taken from the Forest in 1983. Biomass demands to fuel power generation plants could further decrease the firewood supply. Presently, two sawmills and one public school within the PNF generate energy from biomass, but they now use only mill wastes. However, an 11 megawatt (MW) powerplant is now operating in Westwood, 5 miles north of the Forest, and others have been proposed. These plants propose to use logging residue, stand thinnings, and any mill waste still available.

The demand for personal fuelwood could exceed the supply within the planning period, requiring a user cordage limitation. Demand for power plant biomass will depend on the costs of harvest and transport, accessibility, and relative cost of other energy sources, and may exceed the supply if all proposed plans are implemented.

Energy-Hydroelectric Power

a. Current Management. Hydroelectric development within the forest is regulated by the Federal Energy Regulatory Commission (FERC). The California Water Resources Control Board-Division of Water Rights regulates water rights. The PNF provides FERC with license provisions, comments on water rights applications, and grants conditional special use permits and power transmission line easements. The Forest encourages full development of the hydroelectric resource as long as other resources and uses are not unacceptably impaired.

b. Opportunities for Management Change. No future management changes are needed.

c. Supply. The average hydroelectric energy presently derived from the water flowing from or through the PNF is 6,460 million kilowatt hours per year (MMKWH/yr), mostly by PG&E from the North Fork of the Feather River. The Middle Fork, a major drainage protected in free-flowing condition, is unavailable for power generation, but its tributaries are available. Existing large-scale hydroelectric development on the North Fork of the Feather River is unique within the National context, due to quite favorable hydro-topographic conditions.

Present hydraulic facilities within and immediately downstream from the PNF, such as dams, weirs, and canals, have the potential to generate an additional 145-800 MMKWH/yr (an increase of 2-12%). If all proposed small hydroelectric projects (68) were developed, an additional 4-5 MMKWH/yr could be generated (a 0.06-0.07% increase). However, many sites may prove to be uneconomical due to costs of mitigating adverse effects on fisheries and other resources.

d. Demand. There is an increasing demand for all electrical energy sources nationwide. Demand is focused on the PNF by the presence of a major electrical transmission network.



Lands

a. Current Management.

(1) Ownership Adjustment. Continuing ownership adjustment with neighboring landowners is used to consolidate ownerships, facilitate Forest management, and minimize conflicts with adjacent land-users.

(2) Land Use. Use of PNF land by private parties and government agencies is authorized by permit, license, or easement, and unauthorized use is subject to both criminal and civil penalties. Since all such use represents an allocation of land to an individual at the exclusion of the general public, fees are assessed based on the value of the permitted use or of the land occupied. Uses are not authorized if use of private land will suffice or if the uses are incompatible with management objectives for the area.

(3) Land Line Survey and Occupancy Trespass. Objectives are to establish boundaries with an accuracy commensurate to management needs. Illegal occupancies are currently dealt with on a case-by-case basis, and some are resolved under the Small Tracts Act.

(4) PNF-BLM Boundary Adjustment. BLM-administered lands border the Forest in several places. Boundary change awaits conclusions of a nationwide study and Congressional action.

(5) Rights-of-Way Acquisition. Rights-of-way over intervening lands are acquired on a need basis for timber sales and recreation programs.

b. Opportunities for Management Change. Future management could identify certain PNF tracts which may be considered for exchange. Private lands desirable for acquisition could continue to be evaluated on a case-by-case basis. Purposes of acquisition could be reevaluated. The rate of boundary survey could be increased, primarily to resolve uncertainties in timber management.

c. Supply. The Forest encompasses about 1,400,000 acres. Within this gross acreage is about 1,168,500 acres of PNF and PNF-administered land (83%) and 236,000 acres of private land (17%). The Forest administers 14,811 acres of the Lassen National Forest near Paradise. Another 131,000 acres of private lands technically outside the Forest boundary are actually surrounded by the Forest.

The private lands vary from small parcels with poor access that are surrounded by PNF land to the larger mountain communities. Small Forest parcels are also surrounded by large blocks of private land. In some areas agricultural and timber uses of the past are giving way to residential subdivision adjacent to and within the Forest boundary.

Presently 183 miles of power transmission lines (66 KV or more) cross the Forest within established right-of-way. Those in the vicinity of the North Fork of the Feather River comprise 57% of the total.

Survey of 10% (250 miles) of the Forest boundary has been accomplished. About 6% of the Forest cannot now be intensively managed due to boundary uncertainty. About 15% of all landline establishment reveals some sort of trespass.

About 17,000 acres of BLM land border the eastside of the Forest from Portola on Highway 70 to Milford on Highway 395. Another 15,000 acres are within three miles of the Forest's westside in Butte and Yuba Counties.

Current rights-of-way acquisition averages 12 miles per year.

d. Demand. As adjacent private lands and communities develop, demands on PNF land increase. The PNF currently administers over 500 special use permits, licenses, and agreements. Requests for special uses, especially rights-of-way for roads, power, and water, will remain numerous. Interest in land exchange for ownership adjustment is expected to continue or increase. The growing demand for hydroelectric power sites and transmission corridors will probably continue until the better sites are developed.

PG&E has expressed interest in a new trans-Sierra power corridor for a 500 KV line tying future power generating facilities in Nevada with the Sacramento Valley power grid. One possible route crosses the PNF, including the Wild and Scenic River.

Timber demand and occupancy of private land are increasing the Forest's need for boundary survey.



Facilities

a. Current Management. Most new roads are constructed to access timberlands by timber sale contractors according to PNF plans and inspection approval. Others are constructed via public works contract funding and/or cost-sharing agreements (with counties, for example), or by Special Use Permittees.

The PNF provides road maintenance suitable for Forest administration, resource use, and recreation. Due to recent funding reductions, all maintenance levels are implemented at the lowest acceptable level based on use and watershed protection. Some roads are managed jointly with other parties (timber companies with inholdings, for example). The PNF encourages local road agencies to take over roads serving private holdings where subdivision or development occurs. The PNF leases some buildings for administrative purposes from the private sector. Although this minimizes capital investment, annual costs are significantly increased.

b. Opportunities for Management Change. Future management could include: 1) establishment of priorities for road system maintenance, since needs exceed the funding supply, 2) cost-benefit study comparing PNF ownership versus lease of major administrative buildings, 3) development of a major capital investment plan for repair and replacement of older structures, 4) decisions as to future use of fire lookouts, and improvements where warranted in conjunction with installation of new microwave radio facilities, and 5) establishment of water system upgrading priorities.

An additional ongoing management need is to protect existing log haul roads or to develop alternate routes where new subdivisions now, or may, front the historical routes.

c. Supply. PNF facilities include 3,700 miles of system roads and 1,200 to 2,000 miles of uninventoried low standard roads, 113 buildings, 43 water systems, 45 sewage systems, 79 road bridges, 12 trail bridges and 55 dams.

The Forest is traversed by 2-lane, all season State Highways 70 from west to east and 89 from north to south. Seasonal Plumas County Road

519 to the Lakes Basin area connects to the Yuba River canyon south of the Forest. Other major seasonal County routes are the Oroville-Quincy Road around Bucks Lake and the Marysville-La Porte-Quincy Road.

d. Demand. Future demand for roads depends on needs for Forest resources, primarily timber and recreation, and on availability and cost of fuel. In unroaded areas allocated to timber production, demand for new construction will continue to increase over the short-term. As new logging systems are developed, the demand for road reconstruction may increase. Since interest in improved water quality is expected to continue, demand for reconstruction, surfacing, and improved maintenance will increase.

Most of the PNF buildings and several utility systems are in need of rehabilitation. Some recreation facility water systems are in need of reconstruction to meet California drinking water standards.



Fire and Fuels

a. Current Management. The PNF fire protection program has recently been adjusted to be more cost-efficient and to gradually shift away from the former policy that favored complete wildfire exclusion.

The Forest is responsible for wildland fire protection on 1,132,000 acres of PNF land and 391,000 acres of private wildland by agreement with the California Department of Forestry. (That agency, in turn, provides protection for 42,000 acres of PNF lands). In emergency situations during the summer fire season where wildland and developed property meet and local fire agency suppression is inadequate or absent, the PNF responds to structure fires which threaten wildland.

Prescribed fire is used as a fuel management tool to access the ground for reforestation planting, promote new brush and grass sprouting for livestock or wildlife browse, reduce evapotranspiration to increase water yield, reduce fuels for wildfire hazard reduction, and abate weeds at recreation facilities.

b. Opportunities for Management Change. In future management, the former policy of total wildfire exclusion through aggressive wildfire suppression could be further relaxed. The wildfire suppression response could be varied between surveillance, confinement, containment, or control, depending on the potential for damage. In addition, unplanned ignition of prescribed fire by lightning in the Wilderness could be allowed for purposes of reducing unnatural accumulations of fuel.

c. Supply. From 1972 through 1981 the PNF experienced an annual average of 92 person-caused fires burning 1,800 acres and 126

lightning fires burning 1,200 acres. Eighteen large fires accounted for 93% of the total acreage, however. Most were person-caused. The majority of these fires resulted from simultaneous multiple ignitions.

Prior to lumbering, some major fires occurred during extreme fire weather, but, because of less fuel, less flammable stand structure, and the recurrence of fire, forest stands were infrequently destroyed. However, since the 1930's fires exceeding 10 acres have been quite destructive due to changes in the plant community structure and fuel accumulation. By attempting to exclude fire, management allowed the growth of a fire intolerant understory (e.g. dense true fire stands) and the accumulation of natural and timber harvest fuels. Large stand-destroying fires have therefore increased despite a policy of aggressive fire suppression.

Prescribed fire has been used on the PNF for the past several years. In FY 84, approximately 1900 acres were burned for timber management (reforestation and slash disposal), 400 acres for wildfire hazard reduction, and 800 acres for wildlife habitat improvement. Only planned ignitions have been used.

d. Demand. The need for protection depends on the resource value at risk. As resource management intensifies, values increase, and the need for protection is increased.

Fire protection needs are also increased by the continuing construction of new private residences adjacent to Forest lands. Since these are often areas with heavy fuel loads, the potential for catastrophic fire is growing. This creates a greater need for preventive measures, including education, enforcement of hazard reduction on private lands, and fuel management on adjacent Forest land.



Law Enforcement

a. Current Management. Law enforcement focuses on two areas: the safety and protection of users and PNF personnel, and the protection of resources from theft and destruction. The Forest maintains agreements and operating plans with four local County law enforcement agencies for assistance.

b. Opportunities for Management Change. No law enforcement changes are needed in the foreseeable future.

c. Supply. District employees provided 141 person-days of law-enforcement on a part-time basis in 1982 for petty and misdemeanor offenses. Forest and Regional Special Agents supplied 465 person-days on major offenses in 1982.

d. Demand. In 1982 there were 787 reported petty and misdemeanor offenses, resulting in 195 tickets issued, and 95 reported felonies, resulting in 9 arrests. These violations were a 21% increase from the previous year. This trend is expected to continue.



Forest Pests

a. Current Management. Pest control is sought through integrated pest management, which recognizes that insects, diseases, and destructive animals are important elements of the Forest and range ecosystems. They are considered "pests" only when they interfere with the attainment of management goals or endanger public health. The full range of pest management alternatives is considered for each pest situation.

b. Opportunities for Management Change. No policy changes are needed.

c. Supply. Annual mortality levels of 0.1 to 0.3 trees per acre Forest-wide can be expected. Some animal damage to seedlings and saplings also occur annually. Campgrounds around Lake Davis were closed in 1973, 1976, and 1981 because of plague infestation.

d. Demand. The need for salvage to control tree mortality from endemic insect and disease populations is usually fairly constant. The demand rises dramatically during periods of substantial mortality due to severe drought, and salvage efforts are increased commensurately. The demand for pest management due to animal damage to seedlings and the timber stock is relatively constant. Pest management for bubonic plague control varies in accordance with outbreaks of the disease.



Special Interest Areas

a. Current Management. The existing Butterfly Valley Botanical Area and the Feather Falls Scenic Area (including Bald Rock Canyon) are managed under special plans. Established SIA's are managed to protect their unique resources and, where appropriate, to foster their public use and enjoyment. Each formally designated area is managed with an individualized set of standards and guidelines.

b. Opportunities for Management Change. Adoption of the Forest Plan affords an opportunity to amend boundaries and management guidelines for existing SIA's, classify new ones, informally protect others, and

recommend certain ones for Research Natural Area or National Natural Landmark status.

c. Supply. The Butterfly Valley Botanical Area and the Feather Falls Scenic area are two of 15 officially designated SIA's statewide (as of 1982).

The supply of potential SIA's is gradually decreasing as man's activities alter scenic and undisturbed scientific qualities of many areas. Of the nearly 100 potential SIA's on the PNF, 9 areas have significant geologic, botanic, or scenic area values. Three areas are considered by the Natural Park Service to be potentially suitable for nomination to Landmark status.

d. Demand. Although demand for SIA's has not been quantified, interest in preservation of unique features and ecosystems is growing. University groups express growing concern for specific areas and frequently conduct field trips, summer camps, and research projects on the Forest.

Research Natural Areas

a. Current Management. None. No Research Natural Areas (RNA's) have been created on the PNF.

b. Opportunities for Management Change. Adoption of the Forest Plan affords an opportunity for the PNF to recommend RNA status for certain areas to the Regional Forester. Candidate areas can be specifically protected until designation occurs or is rejected.

c. Supply. After Forest-wide surveys in 1973 and 1977, 14 potential RNA's were identified on the PNF. Two strong candidates emerged after Regional Forester screening: the Mt. Pleasant-Spanish Peak area (about 1300 acres) in the red fir forest - mesic meadow complex, and a Modoc cypress grove at Mud Lake (120 acres).

d. Demand. Appropriate RNA's are needed to complete the Region's program of establishing research areas for each botanic element. Red fir and Modoc cypress RNA's are needed to help complete this system.



Human Resources

a. Current Management. The human resource programs that recently have been used include: Comprehensive Employment and Training Act (CETA), Senior Community Service Employment Program (SCSEP), Youth

Conservation Corps (YCC), Young Adult Conservation Corps (YACC), California Conservation Corps, California Manpower Indian Consortium, Butte County Inmate Program, and the Forest Volunteers. Enrollees are not considered employees, but they do important work for the Forest. Most program use is contingent upon Congressional funding rather than on Forest preference, except for the Forest Volunteers. If available, some housing and subsistence for enrollees is provided.

b. Opportunities for Management Change. No change in management of these programs appears warranted.

c. Supply. These programs accomplished \$1,640,000 worth of resource improvements and public service work in FY 80 and provided 142 enrollee-years employment. These figures declined to \$519,000 and 53 enrollee-years in FY 81 and \$313,000 and 61 enrollee-years in FY 82 due to congressional funding reductions. The volunteer program is being maintained, however.

d. Demand. Enrollee demand for the non-volunteer programs exceeds the supply. Demand is related to participant benefit, which varies with the type of program. Most programs provide job skills and a work record in addition to income, so as to enhance opportunities for unsubsidized placement in the private workforce. SCSEP, in addition to supplementing incomes, aids senior citizens in their sense of continuing usefulness.