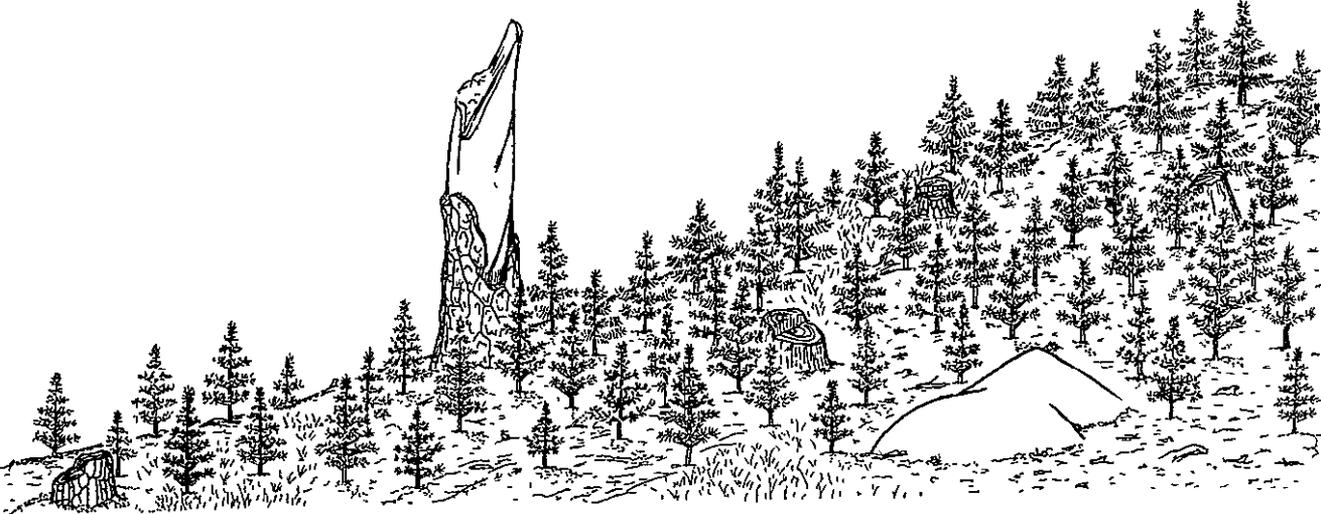


Chapter III
Summary of the Analysis
of the Management Situation



III. Summary of the Analysis of the Management Situation

This chapter summarizes the analysis of the Eldorado management situation. It links the existing Forest situation to past, current, and future supply and demand trends for National Forest goods and services.

Subpart A describes the Forest as it is today. That picture includes the social, economic, physical, and biological setting of the Forest. Subpart B depicts the supply/demand trends and production potential for applicable resources. Subpart C addresses resource uses and opportunities.

A. Existing Situation

1. Social and Economic Setting

The social and economic setting of the Forest is organized into two areas of influence. The first area is identified as the **Impact Counties**. These are the four California counties in which the Forest is located: Alpine, Amador, El Dorado, and Placer. The second area is called the **Extended Zone**. The Extended Zone consists of outlying urban regions of California and Nevada that use the Eldorado primarily for recreation. These urban regions are further known as standard metropolitan statistical areas (SMSA's). Each SMSA is an integrated social and economic unit with a large population nucleus. SMSA's that comprise the Eldorado's Extended Zone are:

Modesto
Reno
Sacramento
San Francisco - Oakland
San Jose
Stockton
Vallejo

Social - Social effects flow in two directions. Actions and policies of the Eldorado influence the Impact Counties and the Extended Zone. Residents of both of these two areas, in turn, influence Eldorado activities. They create a visitor demand for its uses and its amenities. As populations in the Impact Counties and Extended Zone grow, these demands on the Forest continue to increase. As the social composition of the people in these areas changes, the Eldorado will concurrently receive pressures for different management direction.

Seven social groups will interact with Forest managers as the Plan is implemented. These groups are (1) developed recreationists, (2) American Indians, (3) newcomers, (4) commuters, (5) timber communities, (6) environmentalists, and (7) local merchants. Persons may belong to more than one group. People in these groups have distinct lifestyles, attitudes, beliefs, and values. These social traits translate to individual thoughts, likes, and fears about how the Forest is managed.

The population of the Impact Counties has grown rapidly in the last decade, especially when compared to the State as a whole. As reflected by the statewide situation, both natural increase and immigration contribute to this population growth. Joining longtime residents of the Impact Counties is a new population composed of retirees, exurbanites, commuters, alternative lifestyleers, and a substantial number of second homeowners. Statistically the second homeowners are not recorded in the Impact County populations but may eventually become fulltime residents.

Most of the Impact Counties have a higher proportion of their population over the age of 65 and a lower ratio under 18 than the State as a whole. A higher proportion of seniors also makes up the median age for the Impact Counties compared to the median age for the State.

The Impact Counties have a relatively small minority population when compared to either the State or the nation. Alpine County with a high American Indian population is an exception. The other three Impact Counties are fairly similar in racial and ethnic character. The only significant minority group is Hispanics.

All of the Impact Counties were predominantly rural in 1970, while the State was almost totally urban. In the 1980's, Alpine County is still totally rural; but Amador, El Dorado, and Placer Counties have increased their urban population. However, none of the Impact Counties could be considered predominantly urban when compared to the State.

The Extended Zone is more like the State in its characteristics than the Impact Counties. None of the SMSA's in the Extended Zone have rapid population growth rates equal to those found in the Impact Counties. The Reno, San Francisco-Oakland, Stockton, and Vallejo-Napa SMSA's all have comparable or lower proportions of persons in the under-18 age group than the State. Modesto, Stockton, and San Francisco-Oakland have considerably higher proportions of people over 65 than either the State or the remaining parts of the Extended Zone. These last three SMSA's serve as a large source of retiree immigrants to the Impact counties.

The Extended Zone has a relatively high minority population, except for the Reno SMSA. Minority members are predominantly Hispanic and Black. The Stockton and San Jose SMSA's both have a higher proportion of Hispanics than the State. Hispanics account for 10 to 13

percent of the population throughout the Extended Area. Relatively large proportions of Blacks are found in the Sacramento, San Francisco-Oakland, and Vallejo-Napa SMSA's. The Extended Zone SMSA's ranged from 70 to 98 percent urban in the 1970's. The trend is that the Extended Zone will gain even more urban population in the 1980's. Increasing urbanization is one of the main reasons why people leave the Extended Zone and move to Impact Counties. Urbanization is also a strong reason why people travel to the Eldorado for outdoor recreation opportunities that are not available closer to home.

The major industries in the Impact Counties are government, retail trade, services, and manufacturing. Retail trade and services include employment for tourism and recreation. These two industries also serve the growing population of the Impact Counties. The manufacturing industry, which includes wood products, is significant to total employment only in Amador County. However, in El Dorado and Placer Counties, the wood products industry is important to the local economics of the communities where mills are located or where other job opportunities are limited. Employment in Alpine County is not appreciably affected by the economics of the wood products industry.

Employment that is either seasonal or sensitive to regional and national markets is a problem faced by some of the major industries in the Impact Counties. Jobs vary with the national and state economy in both the wood products and construction industry. These two industries are largely seasonal. Some portions of the services and retail trade industry, such as skiing and government employment, can be seasonal, too. The average annual unemployment rate in the Impact Counties, in most cases, is higher than the average rate in the State. High unemployment may be attributed to the increasing population and the inability to add a correspondingly large number of job opportunities in the Impact Counties. The high unemployment situation is also due to the seasonal nature of jobs in some of the major industries of the Impact Counties.

Per capita incomes are lower in the Impact Counties than in either the Extended Zone or the State. The percent of families below the poverty level in the Impact Counties is comparable to or slightly higher than the State. Although incomes are lower in the Impact Counties than in the State, the percentage of families receiving public assistance from Food Stamps, and aid to Families with Dependent Children, is lower than in the State. However, the number of Social Security recipients is proportionately higher in the Impact Counties than in the State, reflecting a higher number of seniors. Crime rates are generally lower in the Impact Counties than in the state, except for Alpine County.

Economic - The Eldorado directly affects the economics of the Impact Counties. The Forest provides revenues to county government through receipts Act payments. The Forest provides employment opportunities

to Impact County residents through Forest Service work and procurement; the recreation opportunities it offers; and utilization of Forest resources such as timber, range, and minerals. The Forest provides recreation opportunities for residents of the Extended Zone. Finally the Forest provides two types of energy resources -- hydroelectricity and wood -- for both the Impact Counties and Extended Zone.

The two Forest resources that most directly affect the Impact Counties are recreation and timber. Recreation is important because of the employment and income it generates for the Impact Counties major industries of retail trade and services. Timber is important because of its contribution to Receipts Act payments and the mill employment it provides in Amador, El Dorado, and Placer Counties.

The Eldorado, the Impact Counties, and the Extended Zone are interrelated in their affects on one another. The Forest attracts people from the Extended Zone because of its recreation opportunities. Collections made by the Forest for recreation use contribute to Receipts Act payments received by the Impact Counties. Recreation use indirectly contributes to the Impact Counties growing reliance on tourism as an industry. Another example of the direct effects of Forest resources on the Impact Counties is the dependence of local mills for timber. Eldorado timber products substantially contribute to Receipts Act payments, provide local employment, and are marketed throughout the State.

Commodity versus noncommodity uses of the Forest have caused increasing scrutiny of Eldorado policies. The local communities that depend on timber for employment, as well as Impact County governments that partly rely on Receipts Act payments for school and road budgets, have tended to sustain or increase their demand for commodity uses. On the other hand, some residents of the Impact Counties who view the Forest with a strong environmental ethic choose to lobby the Eldorado to reduce commodity uses.

2. Physical and Biological Setting

The Forest ranges in elevation from less than 1,000 feet in the Mother Lode foothills to more than 10,000 feet above sea level along the Sierra crest. The mountainous topography is broken by the steep canyons of the Mokelumne, Cosumnes, American, and Rubicon Rivers. Plateaus of generally moderate relief are located between the steep canyons.

A Mediterranean type climate extends over most of the Forest, creating warm, dry summers and cold, wet winters. Average annual precipitation varies from 40 to 70 inches. More than 90 percent of this precipitation occurs from October through April, falling mainly as snow in the higher elevations. A deep snowpack of 5 to 10 feet or more is usually present above 6,500 feet from December to May. Winter low temperatures below zero and summer high temperatures above 100 degrees fahrenheit represent a normal seasonal climatic spread.

Adjacent Ownerships - Land status includes 190,270 acres of other than federal ownership inside the boundary. This figure is about one-quarter of the gross land area. Several large owners have in-holdings that exceed 10,000 acres. However, many of these large ownership parcels are not contiguous. Small, scattered ownership is also prevalent. All of these mixed pieces create a broken ownership pattern throughout the Forest. Intermingled ownership generally complicates use for both parties. Considerable surveying, monumenting, and boundary posting needs to be completed along common property lines to facilitate Forest administration and prevent trespass.

Air Quality - The Forest is located in the Mountain Counties Air Basin. The Forest Service complies with regulations implemented by the California Air Resources Board and the four local County Air Pollution Control Officers to meet California air quality standards.

This resource element is largely affected by external sources of air pollutants, principally those that originate in the Central Valley. Eldorado managers have very little ability to influence these outside factors. The continuous drift of pollutants from agricultural and metropolitan areas makes attainment of Class I Airshed condition in wilderness a difficult goal.

The management practice that internally affects the Forest air quality most is burning of logging debris. Besides adhering to County burn-day policies, the Forest follows an established federal Air Resource Management System (Forest Service Manual, Region 5 Supplement 5153). Under this system, the Forest manages all prescribed burning operations to prevent or minimize smoke penetration away from the Forest. Other Forest sources are wildfire, recreation vehicle traffic exhaust, and dust from travel on unsurfaced Forest roads. All of these are short-term effects, which essentially are manageable under forest practices, standards, and guidelines.

Biomass - The Forest has not extensively entered the biomass market. Biomass management in forest terms is the conversion of vegetative fiber to energy. The Forest's potential in biomass production lies in recovering precommercial thinnings of young stands of marketable tree species, cleared brush, and logging residue. Recovery of biomass normally involves chipping materials at the source and hauling them to an off-forest generation plant. Much of the logging residue is harvested by individual firewood gatherers for home heating. However, the surplus biomass estimated to be available annually for energy conversion is one-million tons green weight.

Chaparral - Woodland chaparral is not extensive on the Forest. A chaparral management program per se is not practical because of the low acreage and scattered nature of this vegetative type. Therefore chaparral is lumped with other vegetative types under a stand maintenance management prescription. Existing species and

composition of chaparral are primarily protected for watershed and wildlife values. In the few instances where chaparral grows on high-site soils, it may be type-converted to grass or forbs for range and wildlife.

Diversity - Diversity is a characteristic that represents the richness, relative abundance, and patterns of different species of plants and animals. Seven successional (seral) stages of plant and animal communities occur on the Forest. The abundance and location of these habitat stages in contrast to one another has been changed by land altering practices such as timber harvesting and road building. Diversity will continue to change over time as forest management intensifies.

The affects of change relate to both the visual appearance of the Forest and the perpetuation of fish and wildlife associated with early, mid, and late successional vegetative species. While the practice is even-aged silviculture (which reduces old-growth trees and favors early successional species), the guiding management requirement is to always maintain a sufficient level of habitat appropriate for all native species, providing this minimum habitat Forest-wide is accomplished by retaining at least 5 percent of each seral stage existing at the start of the plan. No existing seral stage is now below the minimum percentage.

Energy - Potential sources of energy on the Eldorado include hydroelectric, fuelwood, biomass, geothermal, solar, and wind. Only the hydroelectric and fuelwood sources have been extensively utilized in the past. Hydroelectric, fuelwood, and biomass are described as separate resource elements elsewhere in this section of Chapter III.

Biomass, solar, and wind sources have not yet been assessed in detail by the Forest. Timber harvest and other management activities such as precommercial thinning, planting site preparation, and vegetative type conversion constantly create material that could be made available for biomass energy generation. A market has not been developed locally to take advantage of the supply potential.

The State Energy Commission has identified sites within the Forest that offer the best wind development opportunities. These sites have been entered in the resource data base. Solar energy has relatively high potential because of the clean air, latitude, and number of cloudless days found here. However, solar development opportunities are restricted by mountainous terrain and distance to major points of use. Front country areas that are reasonably level and close to existing transmission corridors have the best potential.

Facilities - The Forest has a high density transportation system containing 2,367 miles of roads and 349 miles of trails. An additional 400 miles of privately owned roads are located inside the Forest boundary. The Eldorado Dam System Inventory shows 70 dams or diversions on National Forest land. These diversions are related to

hydroelectric projects, wildlife improvements, and livestock watering facilities. Two major airports serve the Forest: Sacramento Metropolitan Airport and South Lake Tahoe Airport. Three smaller county airports are situated in Georgetown, Placerville, and Jackson. None significantly affect Forest use patterns. The Forest maintains 86 federally owned buildings that are used for housing, office space, and service and storage.

Fire and Fuels - The Forest adheres to national fire policy. The Forest has essentially applied suppression action to control each wildfire in order to meet land management objectives at a least cost effort.

The Forest has historically experienced an average of 88 fires per year. Lightning accounts for 42 fires annually; the rest are person-caused. Large, extended burning-period fires occur every 7-14 years, usually during periods of extreme weather conditions. Recent large fires such as the Ice House, Pilliken, Chili Bar, and Wrights have brought major resource damage to the Forest and have required heavy investments in burn rehabilitation. The future protection of the extensive plantations on these burns is a critical job.

Two factors contribute to the complexity of protection. The first problem is created by a buildup of live and dead fuels. Live fuels have increased because of the emphasis on fire prevention and interruption of natural burn cycles. Dead fuels have accumulated from Forest activities such as timber harvesting. The second problem is tied to land ownership. Twenty-seven percent of the lands within the Eldorado fire protection boundary are privately owned. Residential and other capital developments located on intermingled lands have increased the risk of fire and placed added emphasis on protecting private improvements from wildfire loss.

Fish - The Forest has about 611.4 miles of fishable streams in four major drainage systems: North Fork of the Mokelumne River, Cosumnes River, South Fork of the American River, and the Middle Fork of the American River (including Rubicon). The Forest contains 297 lakes and reservoirs totaling 11,994 acres in both public and private ownership. Eleven large reservoirs alone account for 9,000 surface acres. The remaining water bodies are small, high-elevation lakes.

Rainbow, brown, and eastern brook trout are the main sport fish species. The California Department of Fish and Game operates an active trout fingerling stocking program in the high-elevation lakes and reservoirs and plants more than 200,000 catchables annually in streams and reservoirs.

Forest Pests - The Forest regularly practices pest management as a protection measure. Annual mortality levels vary between years, but past surveys indicate that between 0.1 and 0.3 trees per acre per year are affected. This mortality is usually the result of one or more pests, often in association with adverse environmental

conditions. Pests also cause growth loss, loss of regeneration, top kill, product degradation, and hazard to recreationists. Several pests have been, and will continue to be, significant. These include annosus root rot, black stain root disease, dwarf mistletoe, blister rust, western pine beetle, fir engraver, pine engraver, Douglas-fir tussock moth, pocket gopher, deer, squirrels, and chipmunks.

The activities and impacts of these pests are mitigated by the application of accepted management control practices. Methods of control include biological, chemical, cultural, regulatory, mechanical, and manual. Selection of appropriate methods depends on the pest environment situation and the value of the resources involved. The treatment selection is made at the project level and tiered to the Plan.

Fuelwood - Both commercial and domestic fuelwood is gathered on the Forest. Commercial use involves timber sale permittees who seek to earn a living or supplement their income by supplying firewood to local and extended markets. Domestic use involves private individuals or families that remove firewood for heating their private homes. Individual permits were issued free until 1983. Now these permits are sold at a nominal fee of \$10.00 per cord.

Two main sources of fuelwood supply are found on the Forest. One source is commercial timber sale residuals, which are the cull sawlogs or unmerchantable limbwood and top material left in the woods after harvest of green sales. The second source is the dead material that comes from trees and large limbs that fall to the ground, or the smaller suppressed trees that die from competition with other trees. Frequently fire salvage material is made available for firewood sale.

Geology - The Forest is made up of several major types of geological formations. A series of steeply tilted, metamorphic rocks trending northeast-southwest is found along the western part of the forest. Slates, phyllites, and shists dominate this formation. Ultramafic rock interrupts this metamorphic formation in a small north-south belt on the Georgetown District. Granite rocks of the Sierra Nevada batholith are found underlying the remainder of the Forest. Volcanic breccias and flows now overlay the granite batholith along major ridges. This volcanic formation once covered much of the Forest, but subsequent erosion and glaciation have removed it, exposing the underlying granite rocks. Glaciation has occurred from the crest of the Sierra down to 6,000 feet, and glacial deposits are interspersed with the granitic and volcanic formations.

Historical and Cultural - The cultural resources of the Eldorado National Forest are many and varied. American Indians, Europeans, Asians, and non-Indian Americans have left their cultural mark on the land in the form of villages, hunting and food processing sites,

mining camps, railroad grades and railroad logging camps, emigrant way stations and wagon trails, and many other sites. Approximately 750 historic and prehistoric sites have been recorded on the forest, and many more undoubtedly exist.

The Eldorado has had a Cultural Resources Management (CRM) program since 1973. The three main components of the program, as directed by law and National Forest policy, are inventory, evaluation, and enhancement of cultural sites. These management directions are also guided by a "cultural ecology" theoretical orientation that emphasizes the interrelationship between technology and environment, and the effect of both on social and ideological systems. Coordination and consultation with the Office of Historic Preservation (OHP) and the Advisory Council on Historic Preservation (ACHP) are guided by regulations expressed in 36 CFR 800. The current CRM overview will be sent to the OHP; and CRM program alternatives will be coordinated with the State History Plan to ensure compatibility.

The primary cultural resources management emphasis on the Eldorado is inventory. To date, 142,000 acres, or about 24 percent of the total forest area, have been surveyed. Inventories are conducted on a project-by-project basis. They are not guided by a rigorous, scientifically derived model, but rather an intuitive model based on stratification of sensitivity using extensive prefield research and sampling of areas of low sensitivity. Most inventories have been conducted primarily in forested environments. More, intensive inventories are needed in non-project related areas such as high elevation and non-forested environments in order to expand the data base.

At present, project avoidance of known sites is the standard measure of impact mitigation. This approach has the effect of limiting other management options and dedicating portions of the land base to a single use. An emphasis on evaluation of cultural sites would undoubtedly contribute to expanding general management options. Thus far, evaluations have been limited. The lack of an organized, research oriented data base, or regional research designs hinders evaluation of particular classes of cultural resources. Organization of the Forest into study units such as major watersheds, and elaboration of the cultural resources overviews will contribute to the resolution of the situation.

Although no cultural resources on the Eldorado are currently listed on the National Register of Historic Places (NRHP), several sites have been formally determined to be eligible. In order to be considered significant, sites must meet NRHP criteria or must possess local, commemorative value.

Protection and maintenance of significant cultural sites is problematic. On going damage associated with intensive recreational use, vandalism, and erosional processes threatens the integrity of sites. Historic properties such as administrative sites, railroad

trestles and grades, and cabins are especially vulnerable to natural processes of deterioration and decay. The Cultural Resources Monitoring Plan, public education, and enhancement of cultural properties are mechanisms for alleviating the situation. Some enhancement, in the form of cultural interpretation, has been planned for the PiPi prehistoric site and the Emigrant Summit and Pony Express historic trails.

Hydroelectric - The Eldorado is typical of the western Sierra Nevada, where large volumes of water runoff and mountainous terrain provide head (elevation difference) and reservoir sites to run hydroelectric generators. The development of hydroelectric power is a process that is initiated by agencies and individuals outside of the Forest Service. The FERC, upon consultation with the Forest Service, is responsible for determining whether proposals for hydroelectric development are (1) compatible with purposes for which the National Forest was created and (2) consistent with the nation's need for energy in light of the other public needs for the land proposed for development. The final authorization for a project rests with the FERC.

The Forest Service role is (1) to recommend to the FERC if a project interferes or is inconsistent with the purposes for which the National Forest was created or acquired (this is a recommendation only; it is not binding) and (2) to protect National Forest resources by conditioning the license through Section 4(e) of the Federal Water Power Act.

The Forest Service policy for hydroelectric generation is contained in Section 2770.3 of the Forest Service Manual. The manual states, "Consider energy potential a National Forest resource in arriving at management decisions concerning proposed hydroelectric projects." Hydroelectric potential of National Forest land is recognized as a valid and important resource, but it must be balanced with other uses and resources of the Forest.

Lands - The Forest is located in four counties: Alpine, Amador, El Dorado and Placer. Nearly all of the National Forest land is reserved from the public domain by Presidential proclamation dated prior to 1911. Before the establishment of the Eldorado, private acquisition of public domain was possible by means of various land acts that encouraged settlement of the west. This private acquisition established an irregular ownership pattern and Forest boundary. As a result, the Forest has become engaged in an active lands program to consolidate interior ownership and simplify management. Adjustment is accomplished by land exchange, purchase, or donation.

The Forest also conducts an annual land line location program. Current programming results in the marking and posting of approximately 90 miles of property line per year. Marking and posting reduces the potential for trespass and allows Forest Service project designers to accurately locate their proposed work on the ground.

Private lands inside and along the western edge of the Forest are continually being developed by their owners. Use of these private lands has brought the need for access, water, sewage treatment, fire protection, communications, utilities and other public services. The Eldorado also contains facilities associated with 24 water and power reservoirs operated by 5 municipal and private utilities. The Forest has issued nearly 500 separate nonrecreation special use permits and easements to authorize the occupancy of a wide range of roads, buildings, and facilities.

Law Enforcement - The Forest has experienced an obvious increase in intentional unlawful activities during the past 10 years. These crimes have mostly been directed towards theft of government property, primarily wood products. The acts also include willful disregard of regulations, nonpayment of user fees, occupancy trespass, serious vandalism, and threats to Forest employees performing their official duties.

Similar increases of crime have occurred on private lands and improvements inside the Forest boundary. Permittees who legitimately occupy federal lands have experienced increases in civil disobedience, burglary of residences, and property theft. Recreational thefts have risen sharply, with sizeable losses from parked cars or unattended campsites. Significant winter losses of ski and winter sports equipment occur at special use ski facilities.

Crimes are predominantly in the misdemeanor or petty offense category. Felony crimes against Forest visitors, residents, and employees are rare by comparison. The misdemeanor crimes are usually associated with minor fire violations, fuelwood theft, vandalism, theft from parked cars, and failure to pay recreation fees.

Claims against the government have become more frequent. The Eldorado must treat routine incidents as having potential for future litigation against the Forest. Potential claims require thorough investigation by law enforcement personnel.

Law enforcement actions normally are the responsibility of the local agency such as the County Sheriff; however, the complexity and volume of offenses involving the Forest have led the Eldorado into an expanded program. The changing role of the Forest Service in this field has resulted in both stepping up the Eldorado's internal law enforcement program and adding to reliance upon free and paid cooperative services from the counties.

Minerals - Numerous mineral commodities occur throughout the Forest in deposits varying in size, grade, and development potential. A geothermal source possibly extends into the Forest west of Markleeville. These resources are handled by claim location, by lease, or by mineral materials permit, depending on the type of discovery. Activity in leasables and mineral materials has been minor in the past and is not expected to significantly increase during the period of the Plan.

Claims are continually being filed for locatable minerals, however. The Forest annually receives 75 to 100 notices of intent to operate mining claims. Formal plans of operations are eventually developed for about 10 percent of these notices because proposed mineral activities will cause surface disturbance of National Forest land. Plans of operations are formal agreements between the claimant and the District Ranger to schedule work and provide environmental protection of forest resources. This prevailing interest in locatables should continue through the next 10 years or more.

Range - The Forest authorizes 24 grazing allotment permits that cover approximately 111,000 acres of suitable range. These permittees have been utilizing available forage at the rate of 12,000 - 14,000 animal unit months (AUM) per year. This is mainly transitory range that permittees graze from May to October to supplement or round out their private land operations.

Recreation - The Forest is located within 3-4 hours driving time from the San Francisco Bay Area metropolitan complex of 4.5 million people. The Forest is located within 1-2 hours driving time from Sacramento, where the city and surrounding population is nearing 1.0 million. Outdoor recreation is a major use of the Eldorado because of its location and direct highway access to these large population centers.

The Forest offers a wide variety of recreation opportunities, both winter and summer, with its range of climate, vegetation, and topography. The principal outdoor recreation activities are sightseeing, camping, picnicking, hiking, hunting, fishing, horse-back riding, boating, downhill skiing, cross-country skiing, and off-road vehicle travel.

All four of the existing alpine ski areas have potential for expansion and the potential exists for development of one new area. The Forest, in 1984, began development and improvement of ORV areas through funding provided by the State of California "Green Sticker" Program. It is anticipated that this will be a continuing program of the Forest. In 1985 the Forest began an "analysis of continuance" for recreation residences, organization camps, and resorts along Highway 88 on the Amador Ranger District. After completion of this study it is planned to proceed with similar studies on the balance of the Forest.

Water is a major recreation attraction on the Forest. Streams, natural lakes, and man-made reservoirs provide key features for a substantial share of the recreation activities. Public access to some of the more desirable streams and lakeshores is impeded by other uses. Several of the reservoirs have recreation developments provided under the terms of FERC licenses. Amador and Pacific Ranger Districts receive the heaviest concentrations of developed use; however, increasing numbers of recreationists each year are

using ORV areas, wilderness, and other dispersed areas. The Forest averages more than 3.0 million recreation visitor days annually. About 57 percent of the Eldorado's use takes place in dispersed areas.

Riparian - Riparian areas consist of riparian ecosystems, aquatic ecosystems, wetlands, and flood plains. These areas are among the most productive, sensitive, diverse, and geographically limited lands in the Forest. Many important resources such as fish, wildlife, and certain vegetation communities, are totally dependent on these riparian areas for their existence. The natural and beneficial values of riparian areas include ground water recharge, moderating of flood peaks, visual and recreational enjoyment, timber production, forage production, wildlife habitat, and cultural resources. Geographical boundaries of riparian areas are determined by soil and vegetation.

Riparian areas have four characteristics in common: (1) they create well-defined habitat zones within much drier surrounding areas; (2) they make up a minor portion of the overall Forest; (3) they are generally more productive in terms of biomass, plants, and animals; and (4) they are critical sources of diversity within the Forest ecosystem.

Sensitive Plants - Eight sensitive plant species are known, and two species is suspected to occur on the Forest. None of them are Federally listed as threatened or endangered; one, Senecio layneae, is listed by the State of California as rare. Sensitive plant species growing on National Forest lands are managed to ensure they will not become threatened or endangered because of Forest Service actions.

Sensitive plants of the Eldorado are:

<u>Calochortus clavatus</u> var. <u>avius</u>	Eldorado tulip
<u>Draba asterophora</u> var. <u>asterophora</u>	Tahoe draba
<u>Draba asterophora</u> var. <u>macrocarpa</u>	Cup Lake draba
<u>Lewisia pygmaea</u> ssp. <u>longipetala</u>	Long-petaled lewisia
<u>Lewisia serrata</u>	Saw-leaved lewisia
<u>Lomatium stebbinsi</u>	Stebbins' lomatium
* <u>Navarretia prolifera</u> ssp. <u>lutea</u>	Yellow bur navarretia
<u>Phacelia stebbinsi</u>	Stebbins' phacelia
** <u>Senecio layneae</u>	Layne's butterweed
<u>Silene invisa</u>	Camouflaged campion

* Endemic to the Eldorado National Forest and El Dorado County.

** Rare, State of California.

Soils - Over 30 major soil series have been identified and mapped on the Eldorado National Forest. Their characteristics are extremely diverse due to the variety of such soil forming factors as vegetation, topography and geology. Soils weathered from volcanic parent materials dominate our productive timber lands. Typically

soils found below 4,500 feet are considered to be highly productive because soil above 4,500 feet become coarser in texture, shallower in depth and have reduced productivity over the lower elevation soils. At the higher elevations of the Forest, most of the soils have been removed by glacial action leaving large expanses of glaciated rock outcrop with pockets of soils weathered from alluvium, glacial till and outwash, and granitic rock.

Special Areas - The Forest has several potential special areas. The term special area, in this case, is used to categorize formally dedicated areas other than wilderness or wild and scenic rivers. They fall into three separate classes: (1) Research Natural Areas, (2) Botanical/Geological/Archaeological Special Interest Areas, and (3) National Trails.

The inventoried sites and trails are listed as follows:

Candidate Research Natural Areas

Peavine
Station Creek
Snow Canyon
Middle Mountain

Botanical/Geological Special Interest Areas

Big Crater - Geological
Leonardi Falls - Botanical
Little Crater - Geological
Rock Creek - Botanical
Round Top - Botanical/Geological
Traverse Creek - Botanical
Wrights Lake Bog - Botanical
Pyramid Creek - Geological
Mokelumne - Archaeological

National Trails

Emigrant Summit Trail
Pacific Crest Trail
Pony Express Trail
Rubicon Springs 4WD Trail

Timber - The major commercial timber species are ponderosa pine, Jeffrey pine, sugar pine, white fir, California red fir, Douglas-fir, and incense cedar. The tolerance of the majority of these commercial species is high enough to allow seedlings to endure fairly heavy shade, but it is too low to allow for full tree development unless the tree is dominant in the stand. These species grow best as evenaged stands of one species, or as dominant individual trees in evenaged stands of mixed species, due primarily to sunlight requirements.

The principal vegetative types native to the Forest are:

Woodland Chaparral - found in canyon areas up to 4,000 feet. Major species are digger pine, interior live oak, yerba santa, western redbud, scrub oak, California laurel, and many grasses and forbs.

Mixed Conifer - growing in the 2,000 to 6,500 foot elevation range. Major species include ponderosa pine, sugar pine, incense cedar, white fir, Douglas-fir, bigleaf maple, California black oak, and interior live oak. Secondary species include deerbrush, mountain whitethorn, Sierra mountain misery (bear clover), greenleaf manzanita, thimble berry, and Sierra currant. This forest type also has extensive meadows consisting of grasses and forbs.

True fir - growing in the 6,500 to 8,000 foot elevation range. Species include red fir, lodgepole pine, western white pine, Jeffrey pine, chinquapin, snowbrush, quaking aspen, grasses, and forbs.

Subalpine - growing in the 7,500 to 9,000 foot elevation range. Species include mountain hemlock, western juniper, whitebark pine, alpine willow, wild buckwheat, squaw currant, columbine, brush cinquefoil, white heather, and penstemon. Tree growth is scattered in this type.

Lands suitable for timber production are, for the most part, presently accessed, situated on gentle slopes (35 percent or less), and supported by productive soils. Long term sustained yield (LTSY) is calculated at approximately 143.4 million board feet per year. The allowable sale quantity (ASQ) is 138.4 million board feet annually.

Visual Resources - The Forest lies within the Sierra Nevada Landscape Province. The western slope of the Sierra Nevada is dominated by uniform summit altitudes, giving the appearance of a widely-extended and deeply-trenched sloping plateau. It is typified by dark blue-green forest terrain that is moderately rugged and often dissected by deep valleys and river canyons. The existing visual condition exceeds forest visual quality objectives.

The character of the landscape can be represented by three general descriptions: (1) the front country, (2) the mixed conifer/red fir zone, and (3) the crest zone. Ponderosa pine stands are of lighter color, more open, and frequently interrupted by large brushfields at the lower elevations.

The Eldorado uses the Forest Service Visual Resource Management system to deal with its visual resources. Forest landscapes are mapped by their visual quality, known as Variety Class; by magnitude of public concern for scenic quality, known as Sensitivity Level; and by measurable standards for visual resource management, known as Visual Quality Objectives.

Existing Visual Condition (EVC) refers to the levels of natural character that currently exist within the Forest. The EVC assessment provides a baseline for evaluating the amount of change in visual quality that will result from management activities.

Water - Water is a major resource. The average Forest acre receives about 60 inches of precipitation annually. Average annual runoff is about 29 inches. This runoff is roughly equal to a yield of 2.42 acre-feet of water per acre of land per year. Forest lands yield an estimated 1,444,000 acre-feet per year. The present water quality of surface waters is excellent yearlong. A few periods of moderate degradation are caused by sediment moving from disturbed lands such as timber harvest areas, roads, and wildfire burned areas.

Water quality maintenance and improvement measures called Best Management Practices (BMP's), developed in compliance with Section 208 of the Federal Clear Water Act PL92-500, are currently being implemented on the Eldorado. The (BMP's) are the measures both State and Federal water quality regulatory agencies expect the Forest Service to implement to meet water quality objectives. See Appendix F, Water Quality Management for a listing of these (BMP's).

Wild and Scenic Rivers - The Forest does not have any currently designated wild and scenic rivers within its boundaries; however, segments of four rivers appear as candidates on the National Park Service nationwide inventory. These rivers are segment 1 of the North Fork of the Mokelumne, and all segments of the Rubicon and the North and Middle Forks of the Cosumnes. The North Fork of the Mokelumne can be considered for dual designation because the Eldorado segment lies within the Mokelumne Wilderness. The Forest has the responsibility for assessing the suitability and eligibility of these streams for each class (recreation, scenic, wild) of wild and scenic river. The Stanislaus National Forest will be responsible for making recommendations on the North Fork of the Mokelumne above Salt Springs Reservoir.

Wilderness - The Eldorado contains portions of the Desolation and Mokelumne Wildernesses. Desolation is shared with the Lake Tahoe Basin Management Unit. Mokelumne is shared with the Stanislaus and Toiyabe National Forests. Desolation contains 42,194 acres. Mokelumne contains 59,865 acres, 19,494 acres of which were added by the California Wilderness Act of 1984. The Mokelumne addition is comprised of parts of the former Salt Springs, Tragedy-Elephants Back, and Raymond Peak RARE II roadless areas.

Desolation Wilderness lies immediately southwest of Lake Tahoe and approximately 90 miles east of Sacramento. It includes the headwaters of the Rubicon River, the South Fork of the American River, and numerous lesser drainages that empty into Lake Tahoe. Desolation Wilderness is a spectacular area of high, glaciated basins, craggy peaks, and more than 80 mountain lakes. Elevations range from 6,000 to 10,000 feet. As one of the most heavily used

wildernesses in the National Forest System, Desolation operates on a daily visitor quota basis that sets an overnight camping limit of 700 people from June 15 through Labor Day. There are numerous pre-existing uses in the wilderness, including streamflow and snow measurement devices, streamflow maintenance dams, power company reservoirs, and range management facilities. These uses create nonconformities and some conflicts of use.

Mokelumne Wilderness lies on both sides of the Sierra crest, but the Eldorado portion is on the west slope. It is situated entirely within the North Fork of the Mokelumne watershed. The terrain is rugged and remote. Elevations range from 4,000 to 10,400 feet. The area is spectacular and rugged. Much of the boundary is inaccessible except by foot and horse trails. Most of the area is sparsely timbered, although numerous small scattered stands provide good examples of various forest types. The area provides an excellent challenge to wilderness users who desire primitive naturalness and solitude. The recent expansion of the area included about 600 acres of private land. However, there are few existing nonconformities or conflicts in this wilderness. Visitor use is light in Mokelumne Wilderness in contrast to Desolation. The quality of the wilderness experience is considered excellent.

The balance of the nondesignated acres in the Mokelumne proposal and five other former Eldorado RARE II areas have been released for multiple use management by the California Wilderness Act. Other released RARE II areas are: Pyramid Peak, Poison Hole, Rubicon, Fawn Lake, and Dardanelles. Unroaded sections of these areas may once again be evaluated for wilderness in second generation forest plans 10 years from now. The California Wilderness Act named Caples Creek RARE II area for further study in the planning process. //

Wildlife - The Forest provides habitat for 320 species of birds, mammals, reptiles, and amphibians. Wildlife on the Forest has been affected by habitat changes that have occurred since the middle 1800's. However, most of the components of the original ecosystem are still present today -- only in different amounts. Some species, such as grizzly bears and wolves, have disappeared. Man has introduced many other species, which have never naturally occurred here, such as English sparrows, starlings, wild turkeys, beavers, muskrats, and bullfrogs. The few animals listed as endangered or sensitive never thrived here in great numbers but will now be maintained at viable population levels.

Woodlands - Two woodland types grow on the Forest. They are digger pine-oak and black oak. Digger pine-oak is characterized by a digger pine and blue oak overstory, with an understory consisting of mixtures of manzanita, buckbrush, redberry, California coffeeberry, western mountain mahogany, other shrub species, and annual grasses. This type occurs at low elevations under 4,000 feet.

The black oak woodland is a vegetative community characterized by dense to open stands of black oak and associated hardwoods, with minor amounts of interspersed conifers. The shrub understory is usually sparse but may be dense in openings. Other hardwoods associated with black oak include canyon live oak, bigleaf maple and Pacific madrone. Understory includes poison oak, deerbrush, and various forbs. The black oak woodland type ranges from 1,000 feet of elevation at the western forest boundary up to about 6,000 feet in the interior.

B. Supply/Demand Situation

A detailed supply/demand analysis was made for several Eldorado resource elements. This part of the summary of the management situation focuses on past, present, and future trends for those resources that have reliable economic analysis data available. Production potential is incorporated into the supply trends where applicable.

1. Range

a. Supply - The total supply estimate is a result of three forms of activities. These are: (1) background, (2) timber induced, and (3) range capital investments. Each of these items are discussed below.

The background supply is determined by the existing vegetation. Vegetation has different grazing capacities prior to any activities being performed. Table III-1 illustrates the total background grazing supply.

TABLE III-1
BACKGROUND GRAZING SUPPLY
(AUM Capacity by Vegetative Type)

Vegetation	AUM's/Acre	Number of Acres	AUM's
Grassland	.333	949	316
Meadow	.5	2,937	1,469
Perennial Forbs	.2	851	170
Sagebrush	.125	1,646	206
Browse	.167	25,435	4,240
Conifer	.05	77,620	3,881
Broadleaf Trees	.05	1,018	51
Annual Grass	.333	422	141
Total			10,474

An additional supply of forage for grazing is made available through timber activities. Clearcutting makes additional forage available for a short time before the timber stand is reestablished; however, this availability occurs only if the forage species are not suppressed to promote the growth of the desired conifer species. Table III-2 shows the potential AUM's per acre made available through these activities.

TABLE III-2
 GRAZING SUPPLY INDUCED BY TIMBER ACTIVITIES
 (Animal Unit Months Per Year)

Timber Activity	AUM's Per Acre			
	1st Decade	2nd Decade	3rd Decade	4th Decade
Clearcut	.1	.063	.045	0.0
Shelterwood	.1	.1	.063	.045

The third form of grazing supply results from range capital investments. These are vegetation altering activities designed for the specific purpose of enhancing range. These activities include: (1) type conversion of low site timber to grass, (2) type conversion of hardwoods to grass, (3) brush regeneration, (4) intensive meadow management, and (5) lodgepole conversion to meadows. The increase in range supply resulting from these activities is illustrated in Table III-3.

TABLE III-3
 INCREASE IN FORAGE SUPPLY
 FROM RANGE CAPITAL INVESTMENTS
 (Animal Unit Months Per Acre Per Year)

Activity	AUM's Per Acre		
	1st Decade	2nd Decade	3rd Decade
Hardwood Type Conversion	.200	.200	.200
Low Site Timber Type Conversion	.200	.200	.200
Brush Regeneration	.333	.143	.125
Meadow Management			
Wet Meadows	2.0	2.0	2.0
Dry Meadows	1.0	1.0	1.0
Lodgepole to Meadow Conversion	1.0	1.0	1.0

When grazing supply is desired beyond background and timber induced levels, some combination of the above activities may be performed. These activities carry a higher cost, however.

b. Demand - The Forest provides approximately 2 percent of the total local and regional supply of range forage.

Historically there has been a regional demand for new forage areas. Livestock are being transported hundreds of miles to obtain forage. When new forage areas have been offered to the market in viable allotments, they have been taken. The demand for range forage exceeds the 24,600 animal unit month production capacity of the Forest. This trend of demand exceeding supply is expected to continue throughout the 10-year plan period.

2. Recreation

a. Supply - The current and potential supply was estimated for the following forms of recreation: (1) dispersed, (2) downhill skiing, (3) campgrounds, and (4) other developed sites. Because of the different nature of these types of recreation, different procedures were used to estimate their individual supplies. The following discussion details that process and the results for each.

All the forms of developed recreation supply (campgrounds, ski areas, and other) were based on the following three factors: (1) persons-at-one-time (PAOT) capacity, (2) season of use, and (3) utilization. PAOT capacity is simply a measure of how many individuals can physically occupy the site at a given time. This is multiplied by the number of days the site is open (season of use) to arrive at the theoretical supply. The final step to arrive at the actual supply is to multiply the theoretical supply by the utilization factor. The utilization factor takes peak use days and midweek vacancies into account. It is not practical to have every site full every day. The utilization factor thus reduces the theoretical capacity to a level that may realistically be achieved. The utilization factor for the Forest was assumed to be 50 percent.

The potential supply of campground, ski area, and other developed recreation considers the construction of new sites and the expansion of existing ones. The Forest Service has the ability to expand its current recreation supply through such capital investments as trail-heads, parking lots, picnic grounds, and campgrounds. Table III-4 shows the existing and potential supply of developed recreation. The potential supply includes the development of all areas identified as potential.

TABLE III-4

CURRENT AND POTENTIAL DEVELOPED RECREATION SUPPLY
(MRVD - Thousand Recreation Visitor Days)

Type	MRVD	
	Current Supply	Potential Supply
Campgrounds	1,239.4	1,728.0
Ski Areas	2,451.4	3,480.5
Other Developed	<u>1,174.0</u>	<u>4,223.0</u>
Total	<u>4,864.8</u>	<u>9,431.5</u>

Current recreation resource planning uses a concept called Recreation Opportunity Spectrum (ROS). It consists of combinations of activities, physical settings, and experience opportunities. The five ROS classes used are: (1) Primitive - P, (2) Semiprimitive Nonmotorized - SPNM, (3) Semiprimitive Motorized - SPM, (4) Roaded Natural - RN, (5) Rural - R. Definitions of each class are in the glossary of the Environmental Impact Statement.

Table III-5 displays the existing situation using these ROS classes. Shown for each ROS class are acres, PAOT's and developed and dispersed RVD's in 1982.

TABLE III-5
EXISTING SITUATION BY ROS CLASS
(MRVD - Thousand Recreation Visitor Days)

ROS Class	N.F. Acres	PAOT	1982 MRVD Use	
			Developed	Dispersed
P	81,029	648	0	80.4
SPNM	57,920	521	0	126.4
SPM	56,114	617	3.0	203.5
RN	396,954	32,947	1,046.1	1,426.4
R	4,707	3,907	415.3	2.8
Total	596,724	38,640	1,464.4	1,839.5

b. Demand - The quantity demanded of RVD's has been steadily increasing for all forms of recreation (see Table III-6). The largest increase has been in total developed use where the quantity demanded has increased 38 percent over the last 5 years. The smallest increase during the same period has been only 9 percent in motorized recreation.

TABLE III-6
QUANTITY DEMANDED OF RECREATION VISITOR DAYS
(MRVD - Thousand Recreation Visitor Days 1975-1982) 1/

Year	Dispersed		Developed	Wilderness
	Nonmotorized	Motorized		
1975	848.6	609.5	1092.3	108.8
1976	735.2	609.3	1001.3	98.6
1977	771.0	611.3	1161.0	117.2
1978	795.1	624.9	1320.7	151.2
1979	931.5	616.4	1560.9	111.5
1980	1015.3	664.1	1512.6	129.0
1981	1069.9	713.3	1435.4	129.0
1982	1019.8	679.9	1464.4	139.8

1/ Use figures from prior years were not calculated in a similar manner, and therefore, are not comparable.

The figures for 1976 and portions of 1977 are abnormally low because of the combined drought and gas shortage that kept large numbers of recreationists away from the Forest during that time. Some portions of the Forest were even closed due to the exceptionally high fire hazard.

Demand projections were made for two forms of recreation: total developed, and dispersed combined with wilderness. Wilderness was combined with dispersed because wilderness can create its own demand. If a person has been backpacking in an area with primitive characteristics, and if the area is recommended for wilderness, the person would become a wilderness user. Consequently, limiting a wilderness demand analysis only to use in existing wilderness may be misleading when the same kind of recreation experience occurs just outside the wilderness and could result in underestimating wilderness demand. Combining dispersed with wilderness demand also allows economic competition between those two forms of recreation for land allocations. If an area is recommended for wilderness, there is a net loss to dispersed recreation. Combining these two forms of recreation into one demand constraint provides the Forest with the ability to assess the trade-offs between wilderness use and general dispersed recreation.

The demand projections for total developed recreation and the combination of wilderness and dispersed recreation are shown in Table III-7. Demand was considered as a function of population in the market area.

TABLE III-7
PROJECTED RECREATION DEMAND
(MRVD - Thousand Recreation Visitor Days)

Decade	Year	Total Developed	Dispersed/Wilderness
1	1990	2,483.8	2,140.7
2	2000	3,227.2	2,470.2
3	2010	3,842.5	2,742.9
4	2020	4,410.0	2,995.2
5	2030	4,951.5	3,237.7

Table III-7 shows that the largest increase in demand is expected for total developed recreation. A lesser increase is expected for the dispersed/wilderness combination.

Using the ROS class concept, potential capacity and demand are displayed in the following table.

TABLE III-8
POTENTIAL RECREATION CAPACITY AND DEMAND
(Capacity and Demand in Thousands of RVD's)

ROS Class	N.F. Acres	Total PAOT	Potential Capacity	Demand				
				1990	2000	2010	2020	2030
P	81,029	891	190	192	214	234	252	272
SPNM	57,920	753	304	155	172	188	201	217
SPM	56,114	1,066	347	274	303	330	356	383
RN	396,954	50,413	8,271	3,498	4,409	5,166	5,833	6,483
R	4,707	4,924	794	505	599	667	763	834
TOTAL	596,724	58,047	9,906	4,624	5,697	6,585	7,405	8,189

3. Timber

a. Supply - The Forest reinventoried its timber resource in 1984 ("Automated Forest Classification and Inventory in the Eldorado National Forest," USDA, Forest Service, March 1983). The previous inventory was made in 1972. The latest version was completed using land satellite imagery to produce timber type maps with associated vegetation labels. Each timber type was field sampled for inventory data. The results are displayed in Tables III-9 thru 11.

TABLE III-9
EXISTING COMMERCIAL CONIFER INVENTORY BY STRATA

Strata	Acres	Cubic Volume		Scribner Volume	
		Vol/Acre	Total (MMCF)	Vol/Acre (MBF)	Total (MMBF)
M3G	77,986	5,371.6	418.9	35.121	2,738.9
M3P	116,557	3,121.2	363.8	20.721	2,415.2
M4G	54,511	7,982.4	435.1	52.103	2,840.2
M4P	36,958	5,047.6	186.5	32.864	1,215.6
R3G	10,627	8,458.3	89.9	53.781	571.5
R3P	13,526	2,906.9	39.3	18.997	257.0
R4G	12,364	8,877.5	109.7	57.004	704.8
R4P	13,185	5,088.4	67.1	32.760	431.9
TOTAL	335,714	5,094.5	1,710.3	33.288	11,175.1 <u>1/</u>

Average Mixed Conifer Volume per Acre = 32.201 (Plantations Excluded)
Average Red Fir Volume per Acre = 39.540 (Plantations Excluded)

1/ An estimated additional 33.3 MMBF of mixed conifer inventory is within the oak strata.

TABLE III-10
COMMERCIAL CONIFER VOLUME SUMMARY BY STRATA

1. Wilderness Inventory:

Strata	Acres	MBF/Acre	Total Volume (MBF)
M3G	216	35.121	7,586.1
M3P	1,897	20.721	39,307.7
M4G	126	52.103	6,565.0
M4P	181	32.864	5,948.4
R3G	772	53.781	41,519.0
R3P	832	18.997	15,805.5
R4G	766	57.004	43,665.1
R4P	731	32.760	23,947.6
TOTAL	5,521	33.390	184,344.4 MBF

2. Low Site Commercial Conifer Inventory:

Strata	Acres	MBF/Acre	Total Volume (MBF)
M3P	27,609	20.721	572,086.1
M4P	1,326	32.864	43,577.7
R3P	4,114	18.997	78,153.7
R4P	634	32.760	20,769.8
TOTAL	33,683	21.185 MBF	713,587.3 MBF

3. Hardwood ^{1/} Inventory - Oak Strata and Mixed Conifer

	Acres	Cubic Volume (MMCF)	Scribner Volume (MMBF)
Oak Strata	7,933	24.9	95.8
Mixed Conifer	286,012	907.5	508.9
TOTAL	293,945	932.4	604.7

1/ Black Oak only

TABLE III-11
PERCENT SPECIES COMPOSITION

Douglas-fir	11%
Ponderosa Pine	16%
Jeffrey Pine	4%
Sugar Pine	6%
Western Whitepine	Nominal
Lodgepole Pine	2%
White Fir	25%
Red Fir	7%
Incense Cedar	20%
Black Oak	8%
Other Hardwoods	1%
TOTAL	100%

b. Demand - Timber demand cannot be projected from historical sale trends. All timber offered in viable sale packages in the past decade was sold; therefore, past sale trends only reflect the amount of timber that the Forest was able to put up for sale rather than the amount demanded. Almost all of the timber is sold to 17 companies operating 11 sawmills, a peeler plant, and a box plant within 50 miles of the Forest. Only the short run (0-5 years) mill capacity in the local area could limit the amount of timber that can be sold. However, over longer periods, both the number and size of mills operating in the local area historically have adjusted to fit the supply of available private and National Forest timber.

The demand for timber is determined by trends in regional and national markets for wood products. These markets are primarily influenced by population and income levels, interest rates, the number of housing starts, and the level of imports and exports in wood products. The size of regional and national markets is very large in comparison to the

productive capacity of the Forest, and the Forest itself is unable to significantly affect market prices. Timber prices have trended upward, reflecting the increasing scarcity of timber. This pattern is expected to continue. 1/

4. Water

a. Supply - Water supply is generated from three different sources. These are: (1) background, (2) timber induced, and (3) intensive water yield practices.

Background water is yield that naturally occurs prior to any vegetative manipulation. Stream flow records show that the average acre of land within the Forest boundary yields 2.4 acre-feet per year; however, various elevation zones, as represented by vegetation and soil types, give predictably different yields. These yields were approximated so that the parts are equal to the whole. Background yields that representing the base period from 1911 to 1960 are approximated in Table III-12.

TABLE III-12
BACKGROUND WATER SUPPLY

Elevation	Vegetative Type	Yield Ac. Ft./Acre/yr
1,000-3,500	Ponderosa pine and brush	1.1
3,500-6,000	Mixed conifer	2.3
6,000-8,000	Red fir and lodgepole	3.0
8,000-10,000	Subalpine and barren	4.0
Average		2.4

Additional water yield is generated by clearcutting and shelterwood harvests. This extra water yield is an induced benefit of timber activities that were not designed to promote water yield. Table III-13 illustrates the amount of induced water yield that results from these practices.



1/ See DEIS Appendix B for the timber prices and trends used in the modeling and analysis process. For a comprehensive analysis of timber markets, see An Analysis of the Timber Situation in the United States 1952-2030, U.S. Department of Agriculture Forest Service, Forest Resource Report No. 23, December 1982.

TABLE III-13
INDUCED WATER YIELD FROM TIMBER ACTIVITIES
(Acre-feet Per Acre Per Year)

Practice	Area	Yield in Acre-Feet/Acre/Yr		
		Decade 1	Decade 2	Decade 3
Thinnings	All	.00	.00	.00
Clearcut	Ponderosa pine	.50	.17	.00
Clearcut	Mixed conifer	.75	.25	.00
Clearcut	Red fir	.92	.67	.25
Shelterwood Prep. Cut	Ponderosa pine	.42	.17	.00
Shelterwood Prep. Cut	Mixed conifer	.58	.25	.00
Shelterwood Prep. Cut	Red fir	.75	.42	.08
Shelterwood Regen. Cut	Ponderosa pine	.08	.00	.00
Shelterwood Regen. Cut	Mixed conifer	.17	.00	.00
Shelterwood Regen. Cut	Red fir	.17	.08	.00
Selection Cutting	All	.00	.00	.00
Group Selection	Ponderosa pine	.20	.07	.00
Group Selection	Mixed conifer	.38	.13	.00
Group Selection	Red fir	.55	.40	.15

Intensive water practices are specifically designed to enhance water yield. These include type conversions of low site timber lands, type conversion of hardwoods, and snowpack selection in the red fir zone. Table III-14 displays the induced water yield generated by these intensive practices.

TABLE III-14
INDUCED WATER YIELD FROM INTENSIVE WATER PRACTICES
(Average Yield in Acre-Feet Per Acre Per Year)

Practice	Area	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Type Conversion	Hardwoods	1.58	1.58	1.58	1.58	1.58
Type Conversion	Ponderosa pine	.42	.42	.42	.42	.42
Type Conversion	Mixed conifer	.58	.58	.58	.58	.58
Type Conversion	Red fir	1.00	1.00	1.00	1.00	1.00
Snow Pack Selection	Red fir	1.50	1.50	1.50	1.50	1.50

The maximum supply of water was estimated by a Forest water yield opportunity evaluation that considered all the activities that increase water yield. The results of the analysis to project maximum water yields for 5 decades is shown in Table III-15 below.

TABLE III-15
ANNUAL MAXIMUM WATER SUPPLY FOR THE 50-YEAR HORIZON
(Thousand Acre-Feet Per Year)

	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Background Yield	1444	1444	1444	1444	1444
Induced Water Yield	48	49	59	52	38
Total Water Yield	1492	1493	1503	1496	1482

The Forest is currently targeted to yield 1,823,000 acre-feet per year of water meeting State and Federal water quality objectives by 1990, and 1,842,000 acre-feet per year by 2030. These outputs are not feasibly attainable, however, as they represent outputs in excess of the total water yielded from National Forest lands, which averages only 1,444,000 acre-feet per year. Currently, 1,386,000 acre feet of water yielded from National Forest Lands, approximately 96 percent, meets State and Federal water quality objectives.

b. Demand - The demand for water can be divided into three categories: (1) withdrawal use, such as hydroelectric, which removes water from its natural courses, uses it, and then returns it to a stream or underground source for reuse; (2) consumptive use, which represents that portion of the withdrawal consumed through evaporation, transpiration, or by discharge to irretrievable locations; and (3) instream uses such as rafting, swimming, and fisheries.

Each of the above types of use will increase as population increases. The demand for water from the Eldorado, which supplies only a portion of total regional demand, is expected to increase throughout the 50-year planning horizon.

5. Wilderness

a. Supply - Wilderness supply is based on the miles of trails in the wilderness as well as acres. Trails provide access into these areas and distribute use. If these trails did not exist, the majority of the use would not occur. The Desolation Wilderness was studied to estimate the available supply. As one of the most heavily used wildernesses, it is already regulated to avoid overcrowding. No greater use can be attained beyond the current use in Desolation without degrading the wilderness experience. Desolation also has the maximum trail density per acre. Therefore, its use represents the maximum wilderness RVD's per mile of trail and per acre. The calculation for wilderness supply is shown in Table III-16. The coefficient of 2.89 RVD's/acre was used only for areas presently accessed with trails. Areas without trails used a coefficient of 0.0 RVD's/Acre.

TABLE III-16
WILDERNESS SUPPLY ESTIMATE
(Recreation Visitor Days Per Year)

Maximum Use	121,900	RVD's
Miles of Trails	70.3	Miles
Use Per Mile	1,734	RVD's
Acres Accessible	42,194	Acres
Use Per Acre with Trails	2.89	RVD's
Use Per Acre without Trails	0.0	RVD's

This coefficient was applied to both Desolation and Mokelumne Wilderness to estimate the existing supply. The existing available wilderness supply is 189,179 RVD's.

If additional wilderness supply is desired, there are two options: either construct more trails in the existing Mokelumne Wilderness area or add more wilderness. Table III-17 shows the current wilderness supply and the potential supply available from additional trail construction or the additions of Further Planning Areas.

TABLE III-17
WILDERNESS SUPPLY UNDER VARIOUS ASSUMPTIONS

Assumption	RVD's
Current Situation	248,500
Additional Trails in Existing Areas	46,500
Caples Creek (with trails)	<u>50,100</u>
TOTAL	345,100

The maximum wilderness supply that could be created is 477,857 recreation visitor days.

b. Demand - The demand for wilderness recreation has been steadily increasing on the Eldorado. Desolation Wilderness, one of the most popular wilderness areas in California, has experienced such heavy use that it is now on a quota system. Table III-18 shows the past wilderness use on the Eldorado.

TABLE III-18
PAST WILDERNESS USED
(Thousands of Visitor Days)

Year	RVD's	Year	RVD's
1970	52.1	1976	108.8
1971	76.2	1977	98.6
1972	100.2	1978	117.2
1973	99.3	1979	151.2
1974	108.2	1980	111.5
1975	106.2	1981	129.0
		1982	139.8

A discussion of demand projections for wilderness is referred to previously under recreation demand.

6. Wildlife

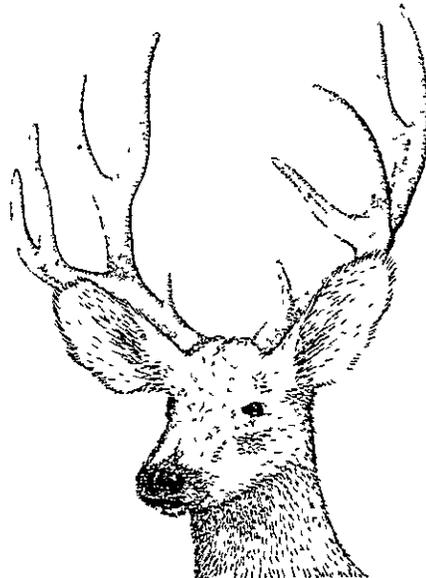
a. Supply - The forest has an inventory of wildlife habitat types based on Wildlife Habitat Relationships (Verner and Boss, 1980) and Forest timber type mapping. Wildlife population data and trends for most of the indicator species are derived from estimates based on habitat models and input from species experts within the California Department of Fish and Game.

Table III-19 displays the current knowledge about supply (populations) and demand for wildlife. The California Department of Fish and Game does not have supply/demand figures in the approved deer herd management plans. However, the increased herd management goals prescribed in the plans imply a potential increase in demand for deer hunting and harvest in the future.

Current use of wildlife is estimated using Wildlife and Fish User Days (WFUDs). Combined consumptive and nonconsumptive use in 1982 was estimated at 143,000 WFUDs. Each WFUD represents 12 hours of wildlife use such as hunting, bird-watching, or photography. WFUDs can most accurately be calculated for deer and bear because hunter success and the number of animals taken is known. Estimated WFUDs in 1982 for deer, bear, and small/upland game are listed in Table III-19.

b. Demand - Data for predicting nonconsumptive demand for wildlife is sketchy. Overall, nonconsumptive uses such as bird-watching and nature photography are increasing and will continue.

The RPA objectives for habitat show an increase in capability for species that are harvested for consumptive use. Deer habitat capability is targeted to increase 20 to 25 percent (depending on subspecies) by 2030. An increase in hunting use is implied.



C. Resource Use and Opportunities

1. Adjacent Ownership

Opportunity exists to obtain optimum landownership patterns for both public and private ownership. The Forest will conduct a land ownership adjustment program that includes purchases, exchanges, and donations to reduce conflicts caused by intermingled holdings. Management activities will become less encumbered, and costs will go down. The likelihood of trespass by either public or private owners will decrease sharply as adjustment progresses.

2. Air Quality

The Eldorado can take the opportunity to attain high air quality levels for the Forest except in Class I wilderness airsheds. Pollutants from outside sources, unless controlled at their point of origin in the future, will prevent attainment of Class I conditions for Desolation and Mokelumne Wilderness. Forest managers will mitigate air polluting activities to achieve air quality goals on National Forest land and prevent or minimize the penetration of activity smoke into surrounding populated areas.

3. Biomass

The Forest is potentially a vast source of unused biomass. None is being presently recovered other than for firewood. Full utilization of biomass in the future would provide an excellent opportunity to eliminate energy deficits and reduce hazardous fuel loadings in the Forest.

4. Chaparral

The opportunity to deal with chaparral is limited because of the low net acreage in this forest type. Most chaparral stands will be left undisturbed to retain their wildlife benefits.

5. Diversity

The timber program will affect diversity most. Harvesting will continually change the structure and composition of Forest vegetation. Changes can be designed to improve and redistribute seral stages to benefit early, mid, and late successional wildlife species habitats. No seral stage will be altered to the point that it comprises less than 5 percent of the total vegetation composition of the Forest.

6. Facilities

Facilities opportunities center mainly around the Forest Development Transportation System, including roads and trails. The network will be nearly built to completion by the end of the first decade, providing access to suitable timber stands to be managed on a long-term sustained yield basis. Other roads and trails serving recreation and general purpose uses will also be substantially in place. Some portions of the Forest, however, will remain sparsely roaded or unroaded. Emphasis will shift to dispersed recreation in these natural surroundings, accessed by designated four-wheel drive roads as well as trails for two-wheel cyclers, equestrians, cross-country skiers, snowmobilers, mountain bicyclists, and hikers.

7. Fire and Fuels

A current plus 20 percent fire program will provide the Forest an opportunity to minimize wildfire losses to calculated tolerable limits. The public's individual safety and property will be protected. Scheduled outputs of resource goods and services will be achieved without disruption.

Prescribed fire will be employed to reduce natural and activity fuels buildup. The ability to implement new wilderness fire management policy offers the Eldorado an opportunity to utilize fire, as an additional tool, to meet wilderness management objectives. The Forest will be able to take advantage of planned and unplanned (lightning) ignitions to duplicate the ecological role of fire in the wilderness.

8. Fish

The Eldorado fishery has 377 miles of stream that can be improved to increase trout populations and pounds of fish. In some cases, fish releases from reservoirs can be regulated to provide more beneficial yearlong instream flows for trout -- even though total annual water volumes are reduced. The ultimate development of several proposed hydroelectric power projects will bring an attendant opportunity to enhance two story (cold water/warm water) lake fish populations and total pounds of fish available for harvest. Thus, total fishing success should occur for a greater number of people.

9. Forest Pests

Forest pest management will remain an integral part of the program of work. An Integrated Pest Management (IPM) approach will continue to be implemented by Forest managers to prevent or reduce pest related problems.

10. Fuelwood

Fuelwood demand for home heating is increasing with population growth. An upward trend in conventional gas and electric heating costs has made firewood a desirable alternative source of energy. The Eldorado anticipates being able to meet the demand for this product, but the Forest must make logging residue more available to prospective fuelwood gatherers. More innovative sources, including byproducts of precommercial thinning and other timber stand improvement activities, must be made available to the public.

11. Geology and Groundwater

The Forest must exercise leadership to prevent mass earth movement or unacceptable soil loss associated with future resource management activities. Completion of an Order 3 Geologic Resource Inventory will assist Forest managers in preventing erosion or major geological failures. Interdisciplinary team specialists will have the opportunity to incorporate accurate geologic data into project design when the GRI becomes available.

12. Historical and Cultural

Protection of historical and cultural resources is a major concern. In the past, inadequate field identification of sites and dissemination of information has led to significant impacts on cultural properties. The Eldorado will take the opportunity to reverse that trend by employing a systematic integration of inventories with evaluations, protection measures, and site monitoring with respect to ongoing resource management activities. The Forest will also initiate a public awareness program to reduce inadvertent damage that occurs through recreational pursuits or deliberate loss by vandalism.

13. Hydroelectric Projects

Hydroelectric development is generally compatible with management of the Forest. Once adverse impacts are successfully mitigated or sensitive environmental areas are avoided by hydro proponents, there is usually ample opportunity to design recreation, wildlife, and other resource amenities into the project. Such benefits will be brought out by continued Forest Service participation in the EIS and FERC licensing processes related to hydroelectric development. Each successive compatible project reduces energy deficits and dependence on depletable energy reserves such as coal, oil, and gas. Hydroelectric power generation obviously offers a much cleaner source of energy than fossil fuels it may replace.

14. Lands

Part of the lands program revolves around permitted uses that confer exclusive or incompatible uses to those that are open for general public enjoyment. In certain locations permitted use of an area or site does allow for enjoyment of non-conforming uses by the general public and other Forest users. Future accomplishment of land ownership adjustment will provide opportunity to reduce the number of special use permits that now serve the private needs of intermingled owners.

Another task that needs to be substantially completed during the first decade is the land line location (LLL) program. When backlogs are finally surveyed and posted, the Eldorado will be provided the opportunity to resolve existing boundary discrepancies and reduce potential trespass.

15. Law Enforcement

Field staffing lags behind law enforcement organization needs. Added emphasis on employee responsibility, improved professional training, and other management prerogatives have narrowed the gap, but the Forest organization is currently inadequate to provide a crime prevention program that measurably reduces unlawful acts against the Forest Service or National Forest visitors.

Opportunity for significant improvement exists but fulfillment seems limited. Cooperative efforts with local, state, and other government agencies will likely be maintained or strengthened. This cooperation is vital to the Eldorado law enforcement program. Forest Service internal law enforcement support services are established exclusive of planning. They are subject almost entirely to annual funding with no solid interrelationship to concurrent forest activities.

16. Minerals

Withdrawals will be reviewed to determine their continued need. The Forest will recommend withdrawals that should be rescinded where they are no longer warranted. In turn, some new withdrawals will be recommended, mainly to cover proposed land designations such as research natural areas and special interest areas. The Forest will be able to present a more accurate accounting of Eldorado lands that are open to mineral entry by lease and claim as a result of this review action.

17. Range

Range opportunities fit into three areas: (1) range condition, (2) range trend, and (3) long-term supply for forage. The Forest currently has 2,437 acres of range in poor condition. The Eldorado will implement improvement projects to restore this condition to

good before the land becomes irreversibly damaged. Another 1,605 acres are now in a downward trend that can be reversed by resting the areas from livestock grazing until they recover. Finally, a concurrent emphasis on evenaged silviculture will increase projected long-term forage supply above the present background capacity of 10,474 AUM's.

18. Recreation

The Forest will take the opportunity to meet both short-term and long-term demand for developed recreation. Capacity may be increased by enlarging existing sites or building new sites. The recent trend for operation and maintenance indicates that private concessionaires will operate National Forest facilities under contract. Fees commensurate with recreation amenities will be charged to visitors, but the Forest anticipates providing a quality standard of maintenance at all developed sites administered by the Forest Service, Licensee/Permittee, or private contractor.

Land managers will employ Forest Plan standards and guidelines to meet dispersed recreation demands. The ROS system of dispersed area management will form the basis for future decisions on kinds and extent of dispersed use. The Forest has the overall dispersed recreation capacity to meet long-term demand; however, people quotas as well as geographic and season-of-use controls may become more prevalent in an attempt to reduce user conflicts.

19. Riparian

The Forest will take the opportunity to reduce or eliminate impacts to riparian vegetation. Standards and guidelines for the streamside management zone incorporate direction that protects riparian strips 100-feet on both sides of Class I, II and III streams, lakeshores, and wetlands. Watershed improvement projects are scheduled to further protect and enhance riparian strips. Treatment and mitigation will be blended into project EA's that affect riparian vegetation, followed by monitoring and evaluation of the results of project activities.

20. Sensitive Plants

Eight sensitive plant species are known and two sensitive plant species are suspected to occur on the Forest. The Eldorado will afford them protection under law to ensure that these species do not become threatened and endangered. Species management guides will be prepared for all of these species.

21. Soils

The impacts on the soil resource will become greater as the level of uses of Forest lands and products increase. The potential for adversely affecting soil productivity will be reduced through proper evaluation of present soil conditions to determine if soil charac-

teristics are compatible with the planned activity. Standards and guidelines for soil resource protection will be utilized to minimize potential impacts within acceptable levels. Opportunities to improve soil productivity on impacted ground will also be identified and treated.

22. Special Areas

The Eldorado proposes an ambitious contribution to the establishment of special areas. Two candidate RNA's are recommended for approval by the Chief of the Forest Service and two other are proposed for nomination by the Forest Supervisor. Nine geological, botanical, and archaeological special interest areas have been identified for approval by the Regional Forester under authority delegated to him by the Chief. Two trails totaling 32 miles are candidates for national recreation trail designation. Adoption of the Forest Plan affords the opportunity to preserve the special features which make these candidate areas and trails unique.

23. Timber

A prime opportunity resulting from intensive timber management practices is the replacement of many poorly stocked stands with fully stocked stands of thrifty conifers that will obtain an optimum growth rate. Mortality losses will be recovered at the same time. The Forest will gradually become regulated on suitable timber sites.

The Forest will provide a continuous supply of wood fiber to the forest products industry and ultimately the consumer. Vegetation manipulation by timber harvest practices provides many fringe benefits to other resources such as creating suitable wildlife habitat and providing road access for recreation.

Fuelwood demands will be met, and biomass recovery shows favorable but untested opportunity.

24. Visual

Current Visual Resource Management technology offers an opportunity for the Forest to intensively manage commodity resources without significantly altering the landscape. The Forest will establish and meet a series of Visual Quality Objectives which assure that visitors will be afforded views of natural looking landscapes seen from Sensitivity Level 1 and 2 roads, trails, streams, and areas of concentrated public use.

25. Water

The Forest will continue to produce high quality water for recreational, agricultural, industrial, and domestic purposes. The Best Management Practices (BMP's) will continue being implemented on the Forest to insure production of this high quality water. See

Appendix F Water Quality Management for a listing of these (BMP's). Hydroelectric development will tend to dominate Forest activities in the first decade of the Plan. The Forest Service will work jointly with proponents to take advantage of opportunities to develop this energy source to the maximum extent compatible with other resource use and protection of the environment.

The ability to increase water production is somewhat limited. Snow-pack management in red fir timber stands and other direct improvement projects to watersheds and streams will provide modest increases in the water quantity output.

26. Wild and Scenic Rivers

The Eldorado will nominate one candidate wild and scenic river. The Rubicon River will be nominated to the national system.

The North Fork of the Mokelumne above Salt Springs Reservoir is being studied and a recommendation for designation, if any, will be made in the Stanislaus National Forest Plan. That portion of the river on the Eldorado will be managed to protect its values until a decision is made.

It has been determined that the North Fork of the Mokelumne River west from Salt Springs Reservoir to Tiger Creek Reservoir is eligible for inclusion in the national system. A suitability study will be scheduled and undertaken to evaluate alternative courses of action for this stretch of river.

27. Wilderness

The Caples Creek area was carried forward in the 1984 California Wilderness Act as a Further Planning Area. This Act designated nearly 20,000 acres of additional Mokelumne Wilderness inside the boundary of the Eldorado. All other RARE II roadless areas are released for multiple use management under the terms of the California Wilderness Act.

The Eldorado proposes splitting the Caples Creek further planning area into wilderness and general forest emphasis. The general Forest emphasis will provide a regulated timber harvest that contributes to the Eldorado's allowable sale quantity. If Congress designates a portion of Caples Creek as a wilderness, the Forest Service will recommend to the FERC that the proposed foottrail hydroelectric project is inconsistent with National Forest purposes; however, the project could still be permitted in the wilderness with presidential approval.

28. Wildlife

Wildlife opportunities are realized by performing direct habitat improvements and receiving the fringe benefits of other resource activities such as timber harvesting and prescribed burning of natural fuels. Opportunities can also be gained from acquiring lands that are key habitat for wildlife species such as deer.

The Forest proposes all of these means to maintain viable populations of native species. Management indicator species will be monitored when land altering activities take place. A sufficient proportion of Forest vegetation will be retained in each seral stage to assure viability.

Recovery plans will be implemented and site specific management plans will be prepared for the threatened and endangered bald eagle and peregrine falcon. Management for two sensitive species, the spotted owl and goshawk, will be carried out at 32 designated spotted owl habitat areas and 51 designated goshawk habitat areas.

29. Woodland

The most important concern about woodland is the possible conversion of California black oak to conifer forest following regeneration cutting of timber stands. Retention of black oaks, especially in deer winter range, is needed for mast production. An additional concern relates to potential loss of conifer timber growth if black oaks are retained in the canopy of the mixed conifer strata.

The Forest will employ standards and guidelines that provide a stocking level requirement for black oaks.

