Yellow Warbler. Selective harvesting at SDSF is not necessarily incompatible with yellow warbler occurrence. Because important riparian habitats along the Class I watercourses will be retained along with an adjacent 600-foot-wide late-successional riparian management area, the proposed project would not reduce the potential for yellow warblers to occur on the site. Therefore, the proposed project would result in no significant adverse impacts on this species and could result in a beneficial effect by ensuring that important habitats for yellow warblers would be retained and enhanced.

California Red-Legged Frog, Foothill Yellow-Legged Frog, and Southwestern Pond Turtle. The establishment of a 600-foot-wide late-successional forest management area along each Class I stream would reduce the level of stream sedimentation from logging activities elsewhere at SDSF. In addition, sedimentation remediation efforts would be implemented for each timber harvest operation. Thus, proposed activities will not have a substantial effect on the reproductive cycle of these species.

The buffer area would also ensure that relatively undisturbed adjacent upland habitats would be retained at SDSF. Therefore, the selective timber harvest program under the proposed project would have a less-than-significant impact on the California red-legged frog, foothill yellow-legged frog, and the southwestern pond turtle.

Mitigation: No mitigation is required.

Impact: Loss of Special-Status Species' Active Nest Sites from Timber Management. This impact is similar to that described under the No-Project Alternative. It is a potentially significant impact.

Mitigation:

- **Conduct Preharvest Surveys for Cooper's Hawk and Sharp-Shinned Hawk.** As a part of subsequent environmental documentation at the project level, to avoid removing active nests of special-status wildlife species, surveys should be conducted of each stand before harvest to determine whether these species are currently nesting onsite. If nests are found and harvesting activities could result in abandonment of active nest sites and death of eggs or young, harvesting activities should be postponed until the young have fledged.

Implementation of this mitigation measure would reduce this impact to a less-than-significant level.

Impact: Habitat Improvement for Aquatic Amphibians and Reptiles from Sediment Remediation Efforts. Sediment remediation efforts described in the project description, including stabilizing landslide areas, maintaining culverts, and revegetating eroding gullies, would reduce stream sedimentation, thereby improving the quality of aquatic habitats for California red-legged frogs, foothill yellow-legged frogs, southwestern pond turtles, and more common aquatic amphibians and reptiles. These efforts would have a significant beneficial

impact on these species and are more likely to occur under the proposed project than under the No-Project Alternative because increased harvest levels would provide a greater amount of available funding.

Mitigation: No mitigation is required.

Impact: Disturbance to Wildlife Populations from Public Access and Recreation at SDSF. The only element of the public use and recreation program under the proposed project that is different from the No-Project Alternative is the construction of a small 2-acre rustic campground. The campground would accommodate up to 40 people and would be used only by reservation between 12 and 20 times per year.

Although public use of SDSF would increase under the proposed project compared with the No-Project Alternative, the addition of a 2-acre campground would not result in a substantial change in wildlife occurrence or use of the forest. Therefore, the public access and recreation program under the proposed project would have a less-than-significant impact on wildlife.

Mitigation: No mitigation is required.

Alternative 2: Emphasize Watershed and Late-Succession Habitat Protection

Differences between Alternative 2 and the No-Project Alternative with the greatest potential to affect wildlife resources on the SDSF include the following:

- selective timber harvesting would only remove of trees smaller than 26 inches in dbh at 500 MBF per year on a cutting cycle of 25 years, increasing the average forest age from approximately 60 years to 66 years, over 10 years;
- late-succession forest development would accelerate because of special treatment within 600-foot-wide corridors adjacent to Class I streams and 300-foot-wide corridors adjacent to Class II streams; and
- use of cable or helicopter yarding would reduce erosion on 1,700 acres.

Watershed remediation, public use, and recreation elements are the same as those described under the proposed project and would increase relative to the No-Project Alternative.

Impact: Change in General Wildlife Use of SDSF from Timber Management. Alternative 2 would provide the greatest protection for wildlife resources at SDSF. Relative to the No-Project Alternative, this alternative would result in the harvest of fewer trees overall and retain a greater number of larger trees. This would serve to further enhance stands for structural diversity while also thinning dense stands and creating habitat edges and small openings.

The proposed late-successional forest management program also would further enhance late-successional characteristics at SDSF compared with the No-Project Alternative by including a 300-foot-wide corridor along Class II streams.

Cable or helicopter yarding to reduce erosion in some areas would provide additional benefit to wildlife by maintaining slope stability and further reducing the potential for stream sedimentation from erosion runoff.

Implementation of the timber management program under Alternative 2 would have no significant adverse impacts on general wildlife and would probably result in beneficial effects relative to the No-Project Alternative.

Mitigation: No mitigation is required.

Impact: Reduction in Special-Status Wildlife Species Use of SDSF from Timber Management. As with general wildlife, Alternative 2 would not have significant adverse impacts on special-status species and would not reduce special-status species' use of SDSF. Furthermore, because of habitat preservation and enhancement, Alternative 2 could have beneficial effects on special-status wildlife relative to the No-Project Alternative.

Mitigation: No mitigation is required.

Impact: Loss of Special-Status Species' Active Nest Sites from Timber Management. This impact is similar to that described under the proposed project. It is a potentially significant impact.

Mitigation:

- **Conduct Preharvest Surveys for Cooper's Hawk and Sharp-Shinned Hawk.** This mitigation measure is discussed above under the proposed project.

Implementation of this mitigation measure would reduce this impact to a less-than-significant level.

Impact: Habitat Improvement for Aquatic Amphibians and Reptiles from Sediment Remediation Efforts. Sediment remediation efforts described in the project description, including stabilizing landslide areas, maintaining culverts, and revegetating eroding gullies, would reduce stream sedimentation, thereby improving the quality of aquatic habitats for California red-legged frogs, foothill yellow-legged frogs, southwestern pond turtles, and more common aquatic amphibians and reptiles. These efforts would have a significant beneficial impact on these species and are more likely to occur under the proposed project than the No-Project Alternative because increased harvest levels would provide a greater amount of available funding.

Mitigation: No mitigation is required.

Impact: Disturbance to Wildlife Populations from Public Access and Recreation at SDSF. Levels of public access and recreation under Alternative 2 would be similar to those under the proposed project. Therefore, as with the proposed project, increased disturbance from public access and recreational activities, while greater than levels described under the No-Project Alternative, would have a less-than-significant impact on wildlife at SDSF.

Mitigation: No mitigation is required.

Alternative 3: Emphasize Forest Management Demonstration and Recreation

Differences between Alternative 3 and the No-Project Alternative with the greatest potential to affect wildlife resources on the SDSF include the following:

- harvest levels would increase to 2,000 MBF per year on an 18-year cycle using a variety of harvest methods, including clearcutting;
- rate of road construction would increase;
- rate of hardwood removal would increase;
- snags and downed logs would be retained and created in late-successional forest management areas along Class I streams;
- funding opportunities for watershed and fish habitat projects would increase;
- organized recreational activities would increase and include a hunting program; and
- the main forest road would be widened and paved, with permitted motorized use by the public.

Impact: Change in General Wildlife Use of SDSF from Timber Management. Alternative 3 is the least sensitive alternative to wildlife resources because of increased harvest levels and accelerated road construction and harvest of hardwoods. Harvesting under Alternative 3 could result in a change of wildlife diversity and composition toward species adapted to younger seral stages. However, the combination of increased structural diversity from a selective harvest program, addition of late-successional management areas, and removal of small patches of dense hardwoods would result in greater habitat diversity at SDSF, which could also result in greater species diversity and more stable wildlife populations overall. This is considered a less-than-significant impact of Alternative 3.

Mitigation: No mitigation is required.

Impact: Reduction in Special-Status Wildlife Species Use of SDSF from Timber Management. Although the timber harvest program is accelerated under Alternative 3, late-

successional riparian management corridors would be established similar to those described under the proposed project. These areas will eventually provide and maintain habitat for several potentially occurring special-status species, including marbled murrelets, long-eared owls, and yellow warblers. The sediment remediation efforts would be enhanced under this alternative because of greater available funding from harvesting activities, thus providing a greater level of protection for aquatic species than available under the No-Project Alternative. Habitat for Cooper's hawks and sharp-shinned hawks would decline throughout the forest compared with the No-Project Alternative, although not to levels that would preclude typical nesting densities for these species. Therefore, the timber management program under Alternative 3 would have a less-than-significant impact on special-status wildlife species.

Mitigation: No mitigation is required.

Impact: Loss of Special-Status Species' Active Nest Sites from Timber Management. This impact is similar to that described under the proposed project. It is a potentially significant impact.

Mitigation:

- **Conduct Preharvest Surveys for Cooper's Hawk and Sharp-Shinned Hawk.** This mitigation measure is discussed above under the proposed project.

Implementing this mitigation measure would reduce this impact to a less-than-significant level.

Impact: Habitat Improvement for Aquatic Amphibians and Reptiles from Sediment Remediation Efforts. The sediment remediation efforts under Alternative 3 are similar to those under the No-Project Alternative. Because of the accelerated harvest program under Alternative 3, however, funding levels would be substantially higher for remediation and other watershed enhancement efforts. Therefore, this is a beneficial impact of Alternative 3.

Mitigation: No mitigation is required.

Impact: Disturbance to Wildlife Populations from Public Access and Recreation on the SDSF. Public access and recreation would increase substantially under Alternative 3 relative to the No-Project Alternative. Other than hunting, most activity would be restricted to roads and trails. Although the increase of human disturbance could potentially discourage certain species from occurring at SDSF, in general, existing wildlife populations at SDSF are well habituated to various forms of human disturbance. Wildlife populations and use of SDSF would not be expected to change substantially under the recreation program proposed under Alternative 3 relative to levels described under the No-Project Alternative. This is a less-than-significant impact. Measures should be taken, however, to ensure that public use is restricted to roads and trails and that vegetation is not damaged by excessive trampling.

Mitigation: No mitigation is required.

Chapter 6. Public Safety, Public Services, and Land Uses

SETTING

This analysis was prepared using information from the Santa Cruz County General Plan; resource agency plans; aerial photograph interpretation; field observations; and discussions with land use planners, local recreation planners, and SDSF staff members.

Public Safety

Risk of Flood

Recent flooding and drainage problems in the Soquel Creek watershed have damaged property in the town of Soquel, especially mobile home parks located in the floodway, and various bridges located across creeks (Santa Cruz County Planning Department 1991). The Santa Cruz County Department of Public Works Flood Section works to prevent and rectify flooding problems. The section's activities include removing logjams, sandbagging danger areas, repairing pumps, and maintaining the levees in the county. In addition, the Santa Cruz County Flood Control District also conducts environmental enhancement projects, such as stream restoration and fishery projects, that contribute to flood control management.

U.S. Geological Survey gage data for lower Soquel Creek show that the Soquel Creek watershed produces short, peaked hydrographs. Elevated flows usually occur between November and March. During major rainfall events, peak flows in lower Soquel Creek have measured from 1,000 to more than 4,000 cubic feet per second (cfs), with occasional peaks as high as 12,000 cfs. After such events, streamflows quickly drop to base flows of less than 20 cfs (Jones & Stokes Associates 1993). The most recent estimate of the magnitude of the 100-year flood on Soquel Creek at Soquel is 13,100 cfs (Meyer pers. comm.).

Lower Soquel Creek in the vicinity of the village of Soquel has a history of repeated flood damage caused by relatively low stream channel capacity and debris log jams that form at bridge piers. The U.S. Army Corps of Engineers has estimated that a flow of 5,000 cfs would fill the Soquel Creek channel at Soquel. The recurrence interval for this flow is approximately 7 years (Swanson and Singer 1983).

Flooding in Soquel has occurred occasionally since record keeping began in 1890. Log jams at the Soquel Drive bridge have caused the stream to pond and overflow its banks. In January 1982, a log jam at the Soquel Drive bridge diverted most of the streamflow through the village, causing extensive property damage. Santa Cruz County has developed and implemented an emergency log jam prevention program to remove logs collecting at the upstream side of the bridge before they create a log jam. Emergency lighting and access areas may also be implemented under this program.

Santa Cruz County has been mapped by the Federal Emergency Management Agency (FEMA) as part of the National Flood Insurance Program. Flood insurance rate maps for Soquel Creek indicate that the upper watershed (including SDSF) is an area of minimal flooding. Downstream from the creek's confluence with Amaya Creek, the East Branch and mainstem Soquel Creek are located in the 100-year floodplain, however, including most of Soquel.

No other streams in the Soquel Creek watershed have floodplains designated by FEMA or have appreciable potential for flooding or flood damage.

Risk of Wildfire

Fires are infrequent at SDSF because the cool, damp climate at SDSF and forest regulations to prevent human-caused fires minimize the risk of fire. A 50-year fire history of the Santa Cruz Mountains, including the SDSF area, identifies five major fires between 1929 and 1979 (Greenley 1981). Some of those fires are believed to have been caused by past logging practices that used high fire-risk machinery and equipment. Modern logging methods and equipment are much safer, and the risk of fire from timber activities has been reduced greatly. In the last 30 years, only one fire is known to have occurred at SDSF, and that fire occurred in 1970 when an arsonist set a bridge on fire at the southwest edge of the forest. The most recent large fire in the Santa Cruz Mountains outside SDSF, the Lexington fire in July 1985, was also started by an arsonist.

Article 8 of the California Forest Practice Rules outlines rules for fire prevention and control (14 CCR Section 918). Those rules include operational guidelines for timber operations and equipment, inspections for fire, and information disclosure regarding fire control resources. Guidelines for timber harvest planning that include fire prevention measures are found in the California Forest Practice Rules.

Fire prevention activities planned specifically for SDSF will be included in a presuppression plan. This comprehensive plan will assess high-risk and hazard areas within the watershed, map fire defense improvements, identify prevention techniques, and evaluate available fire protection resources. Such measures at SDSF include construction and maintenance of fuel breaks, installation of water tanks, and two emergency helistats. Other fire prevention measures include implementation and enforcement of forest policies and forest user education. A prescribed

burn program is being evaluated as another fire control measure at the forest. Benefits and costs of a prescribed burn program will be evaluated in a subsequent planning document.

Public Services

Law Enforcement

SDSF management staff enforce forest regulations and policies. Staff members patrol the forest on a regular basis. CDF peace officers, authorized under the California Penal Code, enforce forest and fire laws and detain violators, and local law enforcement officers from the Santa Cruz County Sheriff's Department provide law enforcement and backup services to SDSF. The sheriff's office is located in the Government Center at Ocean and Water Streets in Santa Cruz. DFG wardens can also provide law enforcement services at SDSF and have primary jurisdiction to enforce fishing, hunting, and trapping restrictions. The primary illegal activities on or adjacent to the forest are trespass and vandalism, described below under "Existing Land Uses".

Fire Protection Services

SDSF staff members coordinate patrols of the forest with CDF fire protection staff. Patrols enforce fire prevention policies, educate forest users regarding those policies, and detect wildfires. Additional CDF personnel and volunteer units (when appropriate) patrol the forest on weekends and major holidays, especially during periods of high fire danger. CDF air flights in the Santa Cruz area are used to detect fires during extreme fire danger or after lightning storms.

CDF provides fire protection services for SDSF and the surrounding rural areas. Three local CDF fire stations are located near SDSF and provide initial response to fires in the forest: Soquel, Burrell, and Corralitos. The CDF Soquel station, located south of the forest near the SDSF offices, is operated seasonally (late May through October) and uses Olive Springs Road as the primary access route to the forest. Burrell station is located north of SDSF on Highland Way, approximately 4 miles west of the main forest entrance. Corralitos station is located on Eureka Canyon Road, approximately 10 miles east of the forest, and uses the Highland Way entrance for primary access to SDSF. Both of these stations are operated year-round. Fire service staff members and equipment resources that serve SDSF are listed in Table 6-1. CDF's resource tracking system, computer-aided dispatch (CAD), is used to dispatch the appropriate personnel and equipment to fires at SDSF.

During extreme fire danger at SDSF (usually July through October), SDSF staff follow the Red Flag Alert Plan coordinated by CDF's San Mateo-Santa Cruz ranger unit. This plan can include, but is not limited to:

- increasing patrols of SDSF,

Table 6-1. Fire Service Resources for the Soquel Demonstration State Forest

Station	Period of Service	Staff per Shift	Number of Volunteers		Equipment
Soquel Soquel-San Jose Road	May 1 - November 1	1 officer 2 firefighters	0	1	Type 3 wildland engine
Burrell Highland Way	Year-round	Summer: 1 officer 2 firefighters Winter: 2 officers	28	1 2 1 1 1	Type 3 wildland engine Type 2 structural engines Water tank Rescue vehicle 250-gallon-capacity attack vehicle
Corralitos Eureka Canyon Road	Year-round	Summer: 2 officers 4 firefighters Winter: 2 operators	15	2 2 1	Type 3 wildland engines Type 2 water tender and rescue engines Bulldozer
Alma Helitack Base	May 1 - November 1	2 officers 1 pilot 5 firefighters	0	1	Type 2 helicopter
Hollister Air Attack Base	May 1 - November 1	3 officers 2 pilots 2 firefighters	0	1 2	Air attack aircraft Type 3 air tankers

Source: Sutfin pers. comm.

- posting red flag alert signs,
- increasing forest visitors' access to fire prevention information and awareness of current conditions, and
- reducing the number of visitors in the forest by closing the area.

Emergency Medical Services

SDSF staff members coordinate with local CDF fire stations and the CDF Emergency Command Center for emergency medical response. CDF directs ambulance dispatching and other emergency medical services through the Felton Emergency Command Center. SDSF has two helispots that can be used for emergency response. The county sheriff's department organizes search and rescue operations for lost persons at SDSF when needed.

Medical services are strongly supported by SDSF patrol services. Forest personnel, including volunteers, can provide first aid to forest visitors when needed and coordinate with the emergency command center and CDF fire stations when additional medical service is required. The staff also works with the California Department of Parks and Recreation (DPR) to maintain trails, ensure visitor safety, and coordinate emergency response along the common boundary between SDSF and the state park.

Water Service

No potable water service is provided to forest users at SDSF. Users are encouraged to bring their own water to the forest. CDF does not intend to develop a water source at SDSF.

Solid Waste Removal

No solid waste service is needed at SDSF. The forest has a "pack it in, pack it out" policy for garbage, and SDSF does not supply garbage cans for forest visitors. Patrol units and volunteers inform visitors of this policy and keep litter at the forest to a minimum.

Sewage and Outhouse Facilities

SDSF does not have permanent outhouse facilities or a septic system but has provided portable outhouses as funding and installation and maintenance access are available. Portable outhouses are located at the entrance on Highland Way and at Badger Springs picnic site. The

need for additional permanent or temporary facilities will be addressed in the proposed SDSF Recreation Plan.

Land Use

Land Use Plans and Policies

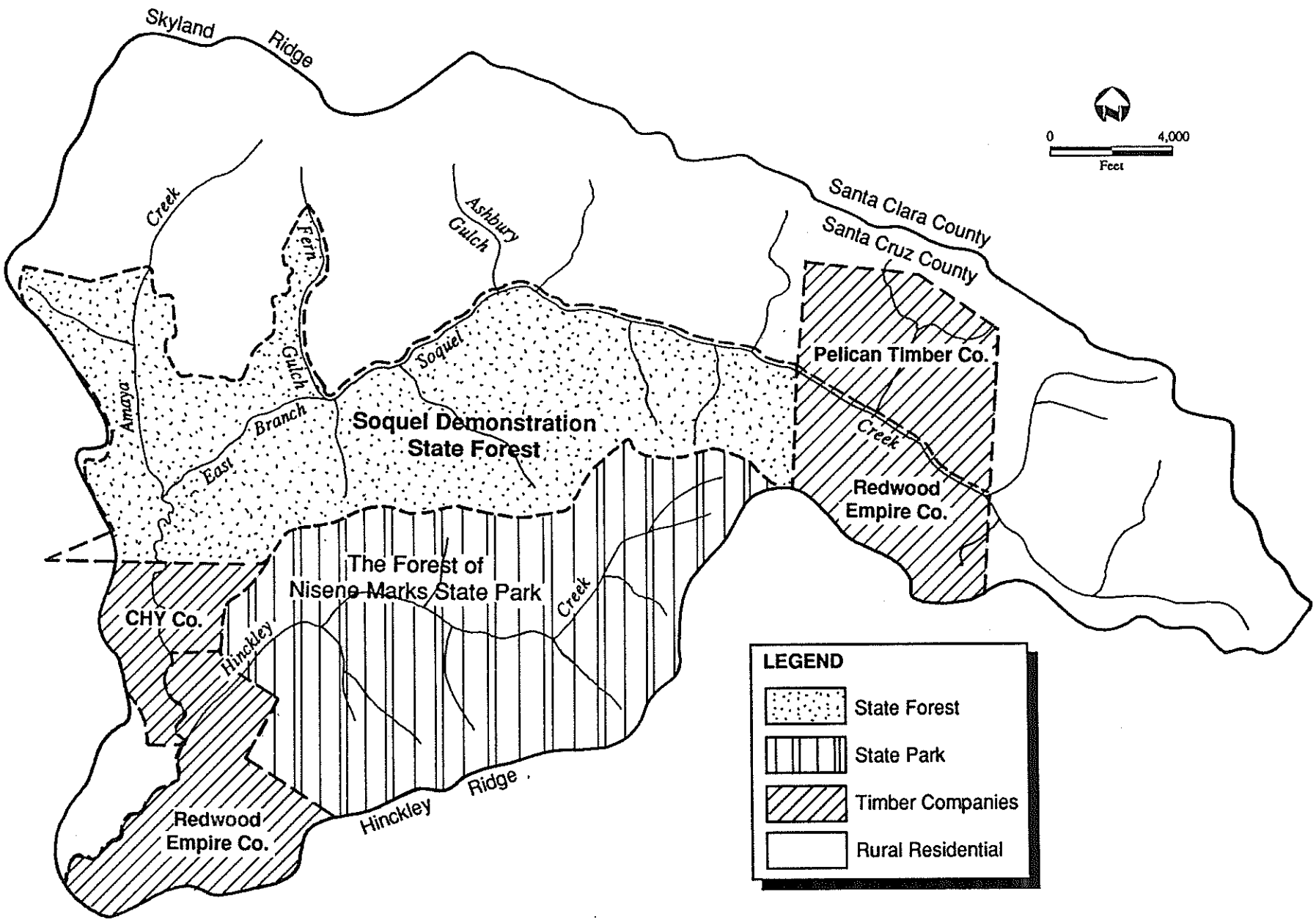
The Santa Cruz County General Plan designates land uses on and adjacent to SDSF. The plan identifies the goals and policies for land use in the county. These include protection of environmental resources, farmland, and timberland; encouragement of growth into urban areas; and maintenance of a growth management system that limits residential growth to what can be accommodated by available public service (Santa Cruz County Planning Department 1994). Most development in the county is taking place in the urban areas of Carbonera, Live Oak, Soquel, Aptos, and Pajaro Valley, which surround the incorporated cities of Scotts Valley, Santa Cruz, Capitola, and Watsonville. SDSF is located in the rural "Summit" planning area.

Existing Land Uses

The Santa Cruz County General Plan designates land in SDSF as "mountain residential". Objectives of this land use designation are to protect natural resources, retain the area's rural character, and maintain a healthy environment. SDSF is also zoned almost entirely as Timber Production Zone (TPZ). TPZ land is designated for growing and harvesting sustained-yield timber and other compatible uses, including watershed management, fish and wildlife habitat management, and outdoor education and recreation activities.

SDSF is bordered by both private and public property (Figure 6-1). The Forest of Nisene Marks State Park, a public recreation facility, borders SDSF along 4.0 miles of the Santa Rosalia Ridge to the south. Private land uses surrounding SDSF include forestland zoned for timber production, a rock quarry zoned for industrial and manufacturing uses, and rural-residential or agricultural uses (Demming pers. comm.). Directly east of the SDSF boundary is an approximately 450-acre parcel zoned TPZ and owned by Redwood Empire. This parcel includes SDSF's main entrance and parking area on Highland Way. Southwest of the forest is the 323-acre Olive Spring Quarry, owned by the CHY Company. North and west of the forest are smaller parcels in private ownership, zoned for rural-residential or agricultural uses. The largest of these is Spanish Ranch, which occupies 327 acres. Most of the other parcels range from 1 to 80 acres in size.

Conflicts with Adjacent Land Uses. Conflicts between public visitors at the forest and neighbors arise primarily from trespass violations on private property and roads. Trespassing on private or semiprivate roadways and private property is a major concern among residential neighbors. In addition, trespassing on the privately owned and maintained Comstock Mill Road,



Source: Chris Poole, 1992; Updated by Jones & Stokes Associates, 1995.

Jones & Stokes Associates, Inc.

Figure 6-1
Land Ownership in the East Branch Watershed

which connects the northwestern corner of SDSF to Soquel-San Jose Road, has occurred frequently and has also been a safety hazard for trespassing cyclists because of its narrow, winding roadway.

SDSF has received complaints from adjacent residences regarding trespass violations. Since its addition to the demonstration forest system in 1990, the forest has received two to eight complaints per year, with the peak of eight complaints in fiscal year 1992-1993. Complaints have declined since then, which can be attributed to implementation of aggressive measures by the SDSF staff to discourage entry and exit through private roads. These measures include erecting fences and gates, marking adjacent residential roadways with signs identifying "private road" or "dead end", marking onsite trails with "no exit" signs, distinguishing equestrian trails, and omitting all entrances and exits through these residential areas from SDSF maps.

An additional land use and access conflict exists at the Olive Springs Quarry gate on Hihn's Mill Road. Hihn's Mill Road is an unpaved road crossing private and public lands, including SDSF. Quarry owners are concerned about safety hazards and public liability for SDSF users who trespass on Hihn's Mill Road through the quarry operation site. Quarry managers have increased the height of the gates to deter the public from entering and exiting SDSF at this location; however, occasional violations still occur.

IMPACTS AND MITIGATION MEASURES

This section addresses public safety, public service, and land use impacts that would result from implementing the proposed project and alternatives and from the cumulative effect of the increasing use of SDSF by recreation visitors and the proposed project and alternatives. Because the GFMP calls for a more comprehensive recreation plan that will address public safety and needed services in more detail, the analysis presented in this chapter is general. Impacts of changes in forestry use of SDSF are addressed in Chapter 5, "Vegetation and Wildlife"; recreational land use impacts are addressed in Chapter 7, "Recreation and Visual Resources"; and related impacts involving noise and roadway access are addressed in Chapter 8, "Traffic and Noise".

Public Safety

Impact Assessment Methodology

This analysis was conducted using information from the watershed analysis presented in Chapter 3, "Geology, Soils, and Water Quality", and by review of previous studies of the East Branch watershed (Cafferata and Poole 1993) and a fire history analysis of the Santa Cruz

Mountains (Greenley 1981). Information obtained from conversations with local flood control and fire prevention agency staffs and with SDSF staff members contributed to the analysis.

Criteria for Determining Significant Impacts

Public safety impacts are considered significant if the proposed project or project alternative would:

- increase the risk of wildfire, flooding, and landslides at SDSF and in downstream communities; or
- increase the incidence of traffic hazards on roadways used to reach SDSF.

Alternative 1: No-Project Alternative

Impact: Increased Flood Damage. On streams in the Soquel Creek watershed, flood hazards have been increased by discharges of sediment and large, woody debris. The channel capacity of Soquel Creek below SDSF is inadequate to contain 100-year floodflows and the village of Soquel is located within the 100-year floodplain. However, measures contained in the California Forest Practice Rules would minimize these effects.

Impact: Risk of Wildfire. The risk of wildfire at SDSF would continue to be low under the No-Project Alternative. Although the number of forest visitors would increase, campfires and smoking would continue to be prohibited in the forest. Very few violations of these regulations have occurred in the past, and the frequency of these violations is not likely to increase under the No-Project Alternative.

Fire prevention and control measures outlined in the Public Resources Code and the California Forest Practice Act and adopted as part of the forest's presuppression plan mitigate potential increases in risk at the forest. The area's naturally low incidence of fire and improvements in modern timber operations also contribute to this conclusion. Thus, changes in the risk of wildfire caused by timber operations under the No-Project Alternative would be negligible.

Proposed Project

Impact: Increased Risk to Downstream Residences and Property from Flooding and Landslides at SDSF. Based on the watershed analysis presented in Chapter 3, "Geology, Soils, and Water Quality", the proposed project would have little effect on channel flooding. Also, as part of the GFMP, SDSF staff would monitor storm damage and remove accumulations of debris that could cause flooding problems by changing streamflows. Trash racks would be installed and

debris would be removed consistent with the fish habitat enhancement objectives at SDSF. The impact of the potential increase in peak runoff from proposed actions and the consequent risk of mobilization of large, woody debris is therefore considered less than significant.

Mitigation: No mitigation is required.

Impact: Risk of Wildfire. Under the proposed project, overnight camping and campfires would be allowed in designated campground areas by permit only; and campfires would be allowed only in constructed, cleared fire rings. Implementing the proposed project and increasing the level of public use could increase the risk of wildfire at SDSF. Changes in the risk of wildfire caused by timber operations under the proposed project would be negligible.

To offset risks of wildfire at SDSF, the GFMP directs SDSF staff and supporting CDF staff to implement a forest user education program by developing a forestry education center and educating forest users on fire prevention policies. Also, CDF fire protection staff would coordinate patrols to enforce fire prevention policies, including campfire permit requirements. Campfires would be prohibited during periods of extreme fire risk. Additional CDF personnel and volunteer units (when available) would patrol the forest on weekends and holidays, especially during periods of high fire danger. These measures would reduce the overall risk of wildfire at SDSF. This impact is considered less than significant.

Mitigation: No mitigation is required.

Alternative 2: Emphasize Watershed and Late-Succession Habitat Protection

Impact: Increased Risk to Downstream Residences and Property from Flooding and Landslides at SDSF. Impacts on public safety for Alternative 2 would be similar to those described above for the No-Project Alternative. The increase in flood risk in the watershed is considered less than significant.

Mitigation: No mitigation is required.

Impact: Risk of Wildfire. Under Alternative 2, no campfires would be permitted at SDSF. Although public use of the forest would increase compared to levels under the No-Project Alternative, the overall risk of wildfire at SDSF is not expected to increase substantially. Therefore, this impact is considered less than significant.

Mitigation: No mitigation is required.

Alternative 3: Emphasize Forest Management Demonstration and Recreation

Impact: Increased Risk to Downstream Residences and Property from Flooding and Landslides at SDSF. Impacts on public safety for Alternative 3 would be similar to those described above for the No-Project Alternative. This impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: Risk of Wildfire. Under Alternative 3, overnight camping and campfires would be allowed by permit only. SDSF staff would implement educational and enforcement measures similar to those described in the GFMP to reduce wildfires from campfires. Motorized vehicle use in the forest during fire season could substantially increase the risk of wildfire. Fire prevention measures would be outlined in the SDSF Recreation Plan and implemented by the SDSF staff before allowing motorized vehicles in the forest. These measures would likely include vegetation removal and control along the roadway. Because the overall risk of wildfire at SDSF would substantially increase under this alternative, this impact is considered potentially significant.

Mitigation:

- **Develop Additional Water Storage Facilities and Improve Access for Fire Suppression Equipment.** SDSF staff should improve access to wildfire hazard areas within the watershed as part of the SDSF Recreation Plan and provide additional water storage facilities where appropriate. Also, SDSF staff, working with CDF fire protection staff, should evaluate available fire suppression resources and maintain accessibility throughout the forest.

- **Develop Fuelbreaks along Roadways.** SDSF, as outlined in a presuppression plan, should plan various fire prevention activities, including the construction and maintenance of fuelbreaks along roadways open to vehicle traffic in SDSF.

- **Design Roads for Vehicle Traffic to Prevent Motor Vehicle Accidents.** SDSF should identify areas with potential increases in motorized vehicle traffic and provide roads to enhance traffic service and safety. Additionally, roads should be improved with clear turnouts and large, clear shoulders to reduce the risk of fire ignitions from cigarettes.

- **Prevent Off-Road Vehicle Traffic.** SDSF should identify potential access points for off-road vehicle traffic and, where appropriate, install locked gates at all intersections with major forest roads to prevent motorized use of restricted private roads and lands.

Implementing these measures would reduce this impact to a less-than-significant level.

Public Services

Impact Assessment Methodology

This analysis was conducted using information and materials obtained from local and state agencies. The county's general plan update report was reviewed, and conversations were conducted with local service providers, county planners, and SDSF staff members.

Criteria for Determining Significant Impacts

Public services impacts are considered significant if the proposed project or project alternative would:

- require substantial expansions of public utilities (e.g., wastewater collection and treatment; water treatment or supply; solid waste collection and disposal; and electrical, gas, or communication service) or

- require additional law enforcement, fire protection, or emergency medical staff and equipment to maintain acceptable response times.

Alternative 1: No-Project Alternative

Impact: No Change in Demand for Public Utilities. Implementation of the No-Action Alternative would not require substantial expansions of the range or scope of public utilities provided at SDSF. SDSF would continue its policies regarding solid waste, water service, and sewage service as described in the "Setting" section above. Therefore, no change to existing utilities would occur.

Impact: Increased Cumulative Demand for Police and Emergency Services. Increasing use of the forest by the public could result in an increase in the demand for emergency services. As the number of recreation users on the forest increases, the potential for injuries, accidents, and criminal activity increases. Current fire prevention and emergency medical service providers would be able to handle some increase in demand. Because CDF law enforcement services at the forest have been limited by available personnel and budget, this agency may not be able to absorb substantial increases in demand. In addition, the SDSF staff will further evaluate any changes in policing and medical service needs in the SDSF Recreation Plan.

Proposed Project

Impact: Demand for Public Utilities. Impacts on public utilities would be similar to those described above for the No-Project Alternative. No changes in existing utilities or infrastructure are planned. This is considered a less-than-significant impact.

Mitigation: No mitigation is required.

Impact: Increased Cumulative Demand for Police and Emergency Services. As described for the No-Project Alternative, increasing use of the forest by the public could increase the demand for emergency services. Because implementation of the proposed project would result in a potential increase in demand for law enforcement and emergency services, this impact is potentially significant.

Mitigation:

- **Monitor Demand and Response Capability of Law Enforcement and Emergency Services at SDSF and Adjust Services to Meet Changes in Demand.** SDSF should monitor the need for law enforcement (number and frequency of violations) and emergency services (number and frequency of emergency responses), and, if demand continues to increase, SDSF and CDF should adjust services to better meet that demand when feasible.

- **Improve Access for Year-Round Emergency Response.** SDSF should coordinate trail maintenance activities and seasonal road clearance to facilitate emergency response service throughout the forest during the entire year.

Implementing these mitigation measures would reduce this impact to a less-than-significant level.

Alternative 2: Emphasize Watershed and Late-Succession Habitat Protection

Impact: Demand for Public Services; Increased Cumulative Demand for Police and Emergency Services. Impacts on public utilities and services for Alternative 2 would be similar to those described above for the No-Project Alternative. As described under the proposed project, the impact of increasing cumulative demand for police and emergency services is potentially significant.

Mitigation:

- **Monitor Demand and Response Capability of Law Enforcement and Emergency Services at SDSF and Adjust Services to Meet Changes in Demand.** This mitigation measure is discussed above under "Proposed Project".

- **Improve Access for Year-Round Emergency Response.** This mitigation measure is discussed above under "Proposed Project".

Implementing these measures would reduce this impact to a less-than-significant level.

Alternative 3: Emphasize Forest Management Demonstration and Recreation

Impact: Demand for Public Services; Increased Cumulative Demand for Police and Emergency Services. Impacts on public utilities and services for Alternative 3 would be similar to those described above for the No-Project Alternative. The increase in recreation activity under Alternative 3 would be about 25% greater than that predicted for the No-Project Alternative; the effect of those changes would be of greater magnitude than that described for the No-Project Alternative. Any changes to public utilities or needed infrastructure under Alternative 3 would be addressed in the SDSF Recreation Plan; no changes are now planned. As described for the proposed project, the impact of increasing demand for police and emergency services is potentially significant.

Mitigation:

- **Monitor Demand and Response Capability of Law Enforcement and Emergency Services at SDSF and Adjust Services to Meet Changes in Demand.** This mitigation measure is discussed above under "Proposed Project".

- **Improve Access for Year-Round Emergency Response.** This mitigation measure is discussed above under "Proposed Project".

Implementing these measures would reduce this impact to a less-than-significant level.

Land Use

Impact Assessment Methodology

This analysis was conducted using information and materials obtained from local and state agencies. General plan policies and designations were reviewed and recent aerial photographs were used to verify existing land uses. Information obtained from conversations with open space and park district planners, county planners, and SDSF staff members contributed to the analysis.

Criteria for Determining Significant Impacts

Land use impacts are considered significant if the proposed project or project alternative would:

- be incompatible with adjacent land uses or
- conflict with adopted and proposed plans and policies in the area.

Alternative 1: No-Project Alternative

Impact: Conflicts with Adjacent Land Uses. Recreational use of SDSF is expected to continue to increase (see Chapter 7, "Recreation and Visual Resources"). Consequently, conflicts with adjacent land uses, primarily trespassing and vandalism, would continue to occur. Occasional trespassing would occur under the No-Project Alternative by outside users who have become familiar with the area and the private roads.

Under the No-Project Alternative, funding to support staff patrol of SDSF lands and efforts to discourage trespassing would be less than what has been available in the last year. Therefore, conflicts with adjacent land uses are predicted to increase as recreational demand increases because of population growth in the area.

Proposed Project

Impact: Conflicts with Adjacent Land Uses. Conflicts with adjacent land uses under the propose project would be similar to those described under the No-Action Alternative. Public use and development of recreational and educational facilities would increase under the proposed project. However, SDSF staff members and onsite patrol units will continue to enforce forest regulations and discourage visitor use of private roads and properties for access into the forest. The decline in the number of complaints received in the last year from that in previous years indicates the effectiveness of SDSF's enforcement of this policy. Also, construction of the new access road and parking lot would likely reduce trespassing along private roads. This impact is considered less than significant.

Mitigation: No mitigation is required.

Alternative 2: Emphasize Watershed and Late-Succession Habitat Protection

Impact: Conflicts with Adjacent Land Uses. The impact on land use under Alternative 2 is similar to that described above for the No-Project Alternative. This impact is considered less than significant.

Mitigation: No mitigation is required.

Alternative 3: Emphasize Forest Management Demonstration and Recreation

Impact: Conflicts with Adjacent Land Uses. Under Alternative 3, the number of recreation users would increase, motorized use of the main forest road would be allowed seasonally, and a new public entrance to the forest would be established. As a result, increased conflicts between SDSF visitors and neighbors are considered potentially significant. Conflicts associated with noise from road construction and hunting and changes in traffic on access roads are addressed in Chapter 8, "Traffic and Noise".

Mitigation:

- **Barricade All Roads and Trails along Hihn's Mill Road That Lead to Private Property.** To discourage SDSF visitors from illegally using private roads to enter or exit SDSF, CDF should install gates or other barriers wherever roads and trails leading to private property intersect with Hihn's Mill Road.

- **Install Signs Warning Visitors to Not Use Illegal Entrances.** CDF should install signs along private roads leading to SDSF that warn potential visitors to SDSF of the penalties resulting from illegal use of such roads.

- **Increase Enforcement of No Trespass Ordinance.** CDF should increase patrols along roads used to illegally access SDSF during periods of high public use.

Implementing these mitigation measures would reduce this impact to a less-than-significant level.

Chapter 7. Recreation, Education, and Visual Resources

ENVIRONMENTAL SETTING

Recreation and Education

Past and Present Use

The property that eventually became SDSF was transferred from the Pelican Timber Company to The Nature Conservancy in 1988. As private timberland, it was closed to public use. Recreation activities on the property consisted of limited use by equestrians, hikers, mountain bikers, and off-highway vehicle users. Users included the property owners, invited neighbors and guests, and some trespassers. They used the existing network of logging roads as recreational trails. Trespass by others was prevalent. Large target-shooting areas were established at the Highland Way parking area and near Sulphur Springs Road. Unauthorized motorcycle use, hunting, fishing, and campfires were common, and many gates were in disrepair. Other problems resulting from past use include damage to erosion control structures on forest roads and trails and accelerated erosion of meadow areas used as racetracks.

The Nature Conservancy replaced the no-trespass policy with a policy of free nonmotorized day use for recreation, nature study, and education. Recreational use subsequently increased to an estimated 872 visitor days per year as the public became aware of the available recreational opportunities. Equestrian use, mountain biking, and hiking accounted for approximately equal shares of the total use (Table 7-1). No recreation improvements were installed during The Nature Conservancy's brief stewardship of the property.

Public use increased at an average rate of 44% per year since the transfer of SDSF to CDF in 1990 (Table 7-1). Mountain biking, which increased tenfold over this period, accounted for most of this increase. Increasing participation in mountain biking at SDSF is attributable to the general recent increase in the sport's popularity and to increased awareness of the outstanding biking opportunities the area provides. Most mountain bikers enter SDSF through the adjacent Forest of Nisene Marks State Park; they often combine the trails of both facilities with adjoining roads to form long and challenging loop trails (University of California, Berkeley 1993). The principal limitation on the increasing popularity of mountain biking at SDSF is the steepness of SDSF trails and the resulting degree of difficulty for participants (Sutfin pers. comm.).

Table 7-1. Estimated Past Public Use at SDSF by Activity
(In Visitor Days)

Activity	1990	1991	1992	1993	1994
Mountain biking	312	200	1,000	2,120	3,240
Hiking	248	260	350	440	520
Equestrian	312	312	250	200	320
Other	0	0	25	90	120
Total	872	872	1,625	2,850	4,200

Source: Sutfin pers. comm.

Total attendance at the Forest of Nisene Marks State Park increased from approximately 68,000 visitor days in 1988-1989 fiscal year to 154,000 visitor days during the following year, in part because of great public interest in observing the effects of the Loma Prieta earthquake. Park attendance was 94,000 visitor days for the 1992-1993 fiscal year. Much of the increase in use is attributable to mountain biking, which accounted for more than 50% of the park's total recreation use in 1994 relative to less than 10% in 1989. (Waggoner pers. comm.)

Although the annual growth rate for mountain biking use at SDSF declined from 233% in 1992 to 52% in 1994, the absolute increase in visitor-days was relatively stable over this period, ranging from an increase of 700 days in 1991-1992 to 1,120 days in 1993-1994 (Table 7-1).

Although equestrian use was the leading recreation activity in 1990-1991, horseback riding has declined at SDSF over the past 3 years (Table 7-1). Hiking use at SDSF doubled between 1990 and 1994, while its share of total use declined (Table 7-1). Recreational mushroom gathering, which is allowed by permit only, is increasingly popular. Bird watching, other nature study, and dog training also account for minor amounts of public use.

According to a 1992 survey of 792 Santa Cruz County residents and other potential users of SDSF, 43% of the respondents had never visited SDSF; of those nonusers, 55% had never heard of the state forest and 28% were unaware that it was open to the public. Approximately 72% of SDSF's 1992 visitors were from Santa Cruz County, with 25% residing in the Summit community north of the forest, 12% in Santa Cruz, and 11% in Soquel. Santa Clara County accounted for 20% of the users. Nearly all equestrian users are neighbors of SDSF. Mountain bikers often travel farther to SDSF than other users; many of these users reside in Santa Clara County. (University of California, Berkeley 1993.)

Future Use

Projected recreation use levels at SDSF for 2005 are shown by alternative and activity in Table 7-2. These projections were developed for individual activities (mountain biking, hiking, equestrian use, and other) and are independent of improvements in facilities and services proposed in the GFMP. Use is likely to increase over the next decade based primarily on:

- the region's growing population,
- increasing awareness among the population of the area's recreation and education opportunities,
- proposed construction of a new access road and parking facilities located near Soquel-San Jose Road, and
- the increasing popularity of mountain biking and the outstanding biking opportunities provided by the existing trail network at SDSF and the adjoining state park.

Table 7-2. Projected Public Use at SDSF in 2005 by Activity
(Visitor Days)

Activity	Alternative 1: No Project	Proposed Project	Alternative 2	Alternative 3
Mountain biking	8,000	8,000	8,000	9,000
Hiking	1,350	1,350	1,350	2,350
Equestrian	350	350	350	500
Other	600	1,000	1,000	2,650
Total	10,300	10,700	10,700	14,500

The populations of Santa Cruz and Santa Clara Counties are projected to increase by 27% and 22%, respectively, between 1990 and 2010 (Horner 1994).

The remainder of this section describes projected changes in SDSF visitation under no-project conditions (i.e., assuming no new facilities are constructed, except for a new forest entrance and parking lot). Annual mountain biking use at SDSF is projected to continue to increase over the next 10 years, but at a slower rate. Annual increases in this use are projected to decline from an increase of 880 visitor-days from 1993-1994, to an increase of 200 from 2004-2005, accounting for a total of 8,000 visitor-days of use in 2005 (Table 7-2).

Hiking use is expected to increase faster than the regional population in response to increasing awareness of opportunities at SDSF by neighbors and urban residents. Hiking use increases will be moderate relative to those for mountain biking, however, because of the abundance of similar opportunities available at other regional open space preserves (e.g., Mid-Peninsula Regional Open Space District lands and Henry Cowell Redwoods, Big Basin Redwoods, and the Forest of Nisene Marks State Parks). Hiking use at SDSF is projected to increase by an average of 80 visitor-days per year over the period of the GFMP, accounting for a total of 1,350 visitor-days in 2005 (Table 7-2).

Equestrian use is expected to continue to be attributable mainly to neighbors of SDSF. The growth of such use will be limited by the slow rate of new residential construction planned for the Summit area (County of Santa Cruz 1991). More equestrians, however, are expected to travel from other origins to use SDSF in response to construction of improved parking and staging facilities, as proposed by The Nature Conservancy (California Nature Conservancy 1988). Equestrian use is projected to increase to 350 visitor-days by 2005 (Table 7-2).

Participation in all other activities at SDSF is projected to account for 600 visitor-days by 2005 (Table 7-2).

Total use at SDSF is projected to be 10,300 visitor-days in 2005. Approximately 75% of this use is expected to occur during the April-October nonwinter period; 65% of the use would occur on weekends while 35% would occur on weekdays. Attendance at SDSF in 2005 would thus average 81 people per day on nonwinter weekends, 18 per day on nonwinter weekdays, 37 per day on winter weekends, and eight per day on winter weekdays.

Cultural Resources

An archeological and historical survey and inventory of SDSF was made in 1991 (Dillon 1992). The investigation included a walking survey of SDSF, archival research, and extensive oral history interviewing. Six significant sites were found: three prehistoric archeological sites and three historic sites. These sites have been formally recorded with the California State Historic Preservation Office and their significance under the National Historic Preservation Act

has been evaluated. The survey report included recommendations for protecting these resources under CEQA.

The report concluded that future use of SDSF, including timber harvesting and recreation and education, would not constitute adverse impacts on these sites if a policy of avoidance is followed. The SDSF staff has adopted recommended measures to avoid disturbing those resources and may create educational opportunities (e.g., self-guided tours) for forest visitors centered around these resources and the prehistory and history of SDSF.

Visual Resources

The aesthetic value of an area is a measure of its visual character and scenic quality as perceived by people viewing the area. The overall impression that an individual retains after driving through, walking through, or flying over an area defines the area's scenic character (U.S. Bureau of Land Management 1980). Both natural and artificial landscape features contribute to the aesthetic value of a view. A landscape is influenced by geologic, hydrologic, botanical, wildlife, recreational, and urban features. Visual images and their perceived visual quality can vary significantly seasonally and even hourly as weather, light, shadow, and the elements that compose the view change.

General Site Description and Visual Character

SDSF has a softened angular landform with moderately steep (20%) to very steep slopes (60%), averaging a 30% incline. The overall landform of SDSF can be visualized as consisting of three major areas (Figure 7-1).

The largest area of the SDSF is a generally north-facing slope from its southern boundary along the Santa Rosalia Ridge to the East Branch, which also forms SDSF's northern boundary for over 3.5 miles. The forest's property is therefore dominated by an asymmetrical profile.

The western edge of SDSF is a steep east-facing slope, reaching from Amaya Ridge in the west to Amaya Creek and the East Branch. This area accounts for about 15% of SDSF's total land area.

The third area is Long Ridge, which extends southward from Skyland Ridge between Amaya Creek and Fern Gulch to the confluence of Amaya Creek and the East Branch. The lower elevations of Long Ridge are within SDSF; this area accounts for about 16% of the forest's land area.

The overall vegetation cover at SDSF is dense without any substantial visual breaks. Although the forest is a mixed hardwood and conifer forest, the view from a distance has the appearance of a homogenous conifer forest of redwoods and Douglas-firs. The forest's dark

green hue is accentuated by the fact that the forest is primarily located on a north-facing slope and generally in shade.

Offsite Viewpoints and Viewsheds

The predominant distant view of SDSF is the sweeping north-facing slope as seen from Highland Way, Loma Prieta Road above Highland Way, Long Ridge, Spanish Ranch, and Skyland Ridge. Although none of the roads near SDSF are designated "scenic corridors" by the county or the state, views from these roads are considered locally important.

Highland Way provides the most important viewpoints of SDSF because it is the only major roadway providing prominent views of SDSF to the general public. Approximately five prominent vista points with small turnout areas are located along the roadway. From these turnouts, one can obtain panoramic views to the south, southwest, and west, taking in most of the higher elevations of SDSF, the Spanish Ranch, the Long Ridge, and other ridges beyond. The viewer can occasionally glimpse the forest through roadside clearings and openings while traveling southeast along Highland Way. The viewing distance from Highland Way to SDSF varies from about 0.5 mile to 1.5 miles. Figure 7-2 displays cross sections of views from Highland Way (refer to Figure 7-1 for location); Photograph 1 of Figure 7-3 shows a view of the forest from Highland Way.

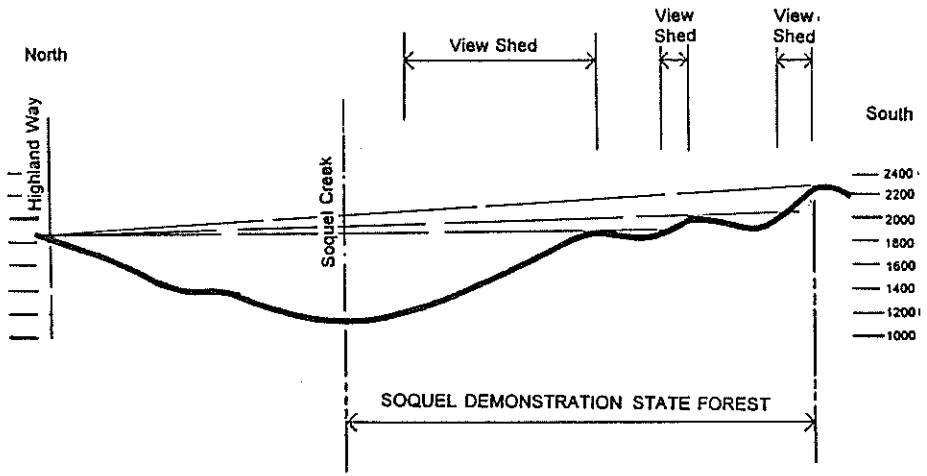
A large number of forest visitors approach SDSF from the Aptos area via Eureka Canyon Road and Highland Way. The forest is not visible from Eureka Canyon Road until it is within 1 mile of the road.

Soquel-San Jose Road, a well-traveled major collector road, is generally within 2,000 feet of SDSF's western boundary and borders the forest property at one point. The Amaya Ridge, however, cuts off all views of the forest from travelers on Soquel-San Jose Road.

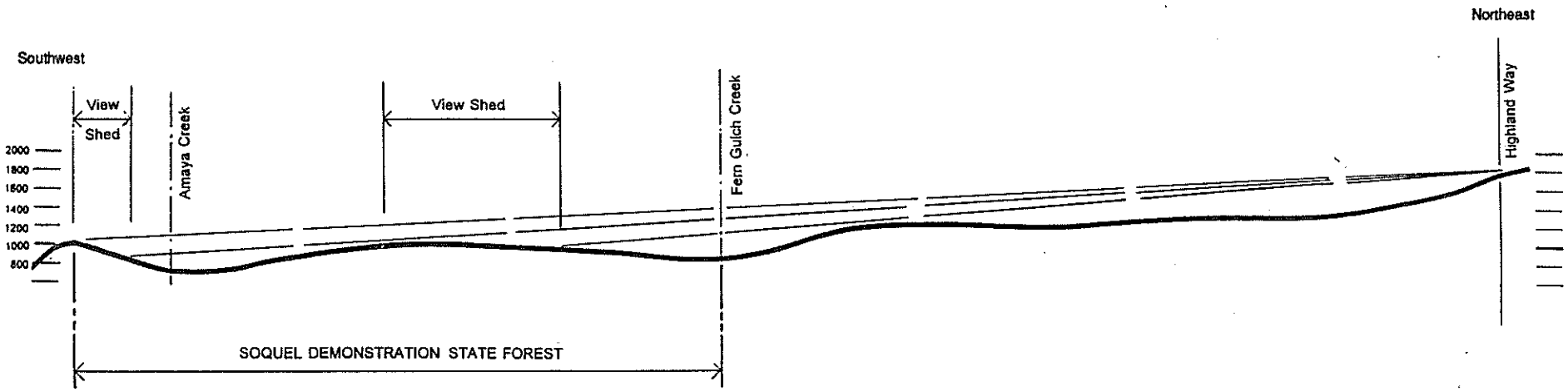
Views of the forest along residential roadways and from private residences vary, depending mainly on orientation. The view along Loma Prieta Road is generally to the southwest, facing many layers of ridges with SDSF and the Spanish Ranch in the foreground. The view is similar to that from Highland Way except that it is from a greater distance and at a higher elevation. Residences near Spanish Ranch usually are south facing and have a view of SDSF directly across the canyon. The general vista of dense, vegetated hills with small and infrequent disturbed areas, is of high quality (see Figure 7-3, Photograph 2). Most residences on Long Ridge are west facing and have only a limited view of SDSF slopes above Amaya Creek.

Onsite Viewpoints

Because of the forest's relatively dense vegetation, views within SDSF are generally at short range. Hihn's Mill Road and major trails provide an occasional medium-range view. The



Section B



Section A

Jones & Stokes Associates, Inc.

Figure 7-2
Cross Section of Views from Highland Way

Photograph 1

Photograph 2

Figure 7-3. Views of Soquel Demonstration State Forest from Viewpoints North of the Forest

most scenic spot in the forest is a relatively large flat area next to Soquel Creek and north of Hihn's Mill Road near Badger Springs. In contrast to views within the rest of the forest, the clearing has a spatial quality that provides a sense of repose (Figure 7-4, Photograph 3). A grove of old-growth redwoods across the road from the clearing is a well-known visual attraction as seen from Badger Springs.

Other onsite viewpoints are:

- Santa Rosalia ridge, especially at picnic area and helistat,
- Sulphur Springs meadow, and
- Hihn's Mill Road west of Sulphur Springs.

IMPACTS AND MITIGATION MEASURES

Recreation and Education

Impact Assessment Methodology

Direct impacts on recreation and education would occur from development of new facilities and access routes under the proposed project or any of the alternatives. Cumulative recreation impacts would occur under all alternatives because recreation use is projected to increase based on population growth in the area and increased demand for the kind of recreation resources that the forest provides.

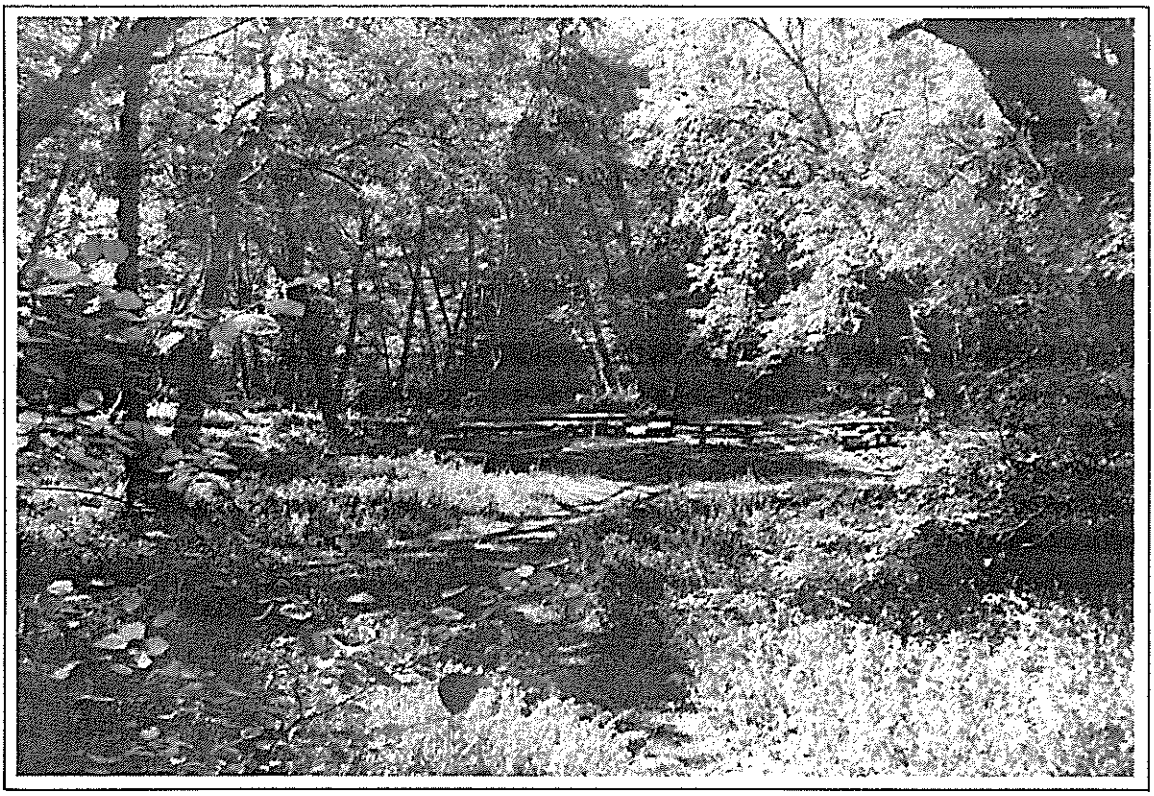
The GFMP calls for a comprehensive recreation plan that will specify facilities development, access and circulation, trail maintenance and construction needs, and other issues related to recreation planning at SDSF. Therefore, the recreation analysis presented in this chapter is general.

Information obtained from conversations with SDSF staff members and local park and open space planners, as well as reviews of existing recreation assessments and plans in the Santa Cruz Mountain area, formed the basis for the analysis.

Significance Criteria

Implementation of the proposed project or alternative would result in a significant recreation impact if it would:

- conflict with established recreational uses of an area,



Photograph 3

Figure 7-4. View of Badger Springs Picnic Area

- result in an impact on the quality or quantity of existing recreational opportunities, or

- conflict with local guidelines or goals related to existing and planned recreational uses.

Beneficial impacts would occur if the project or alternative resulted in an increase in the quality or quantity of existing recreational opportunities.

Direct recreation impacts are evaluated compared to projected baseline conditions described in the "Environmental Setting" section.

Alternative 1: No-Project Alternative

Impact: Cumulative Increase in Recreational and Educational Use at SDSF. As described above under "Future Use", recreational use at SDSF is projected to increase under the No-Project Alternative (Table 7-2). Management of the SDSF under the No-Project Alternative helps address the increased demand for recreation facilities in the region by improving access to the forest. However, education use levels would not greatly increase because the custodial staffing level under the No-Project Alternative would not support educational activities. Because the No-Project Alternative is considered the baseline for analysis, no impacts, beneficial or otherwise, would occur.

Proposed Project

Impact: Increased Recreational and Educational Use at SDSF. The proposed project would expand recreational use slightly over the baseline increase. A higher number of group visitors would use SDSF for recreation because of the educational programs conducted by SDSF and the rustic campground facility. The new access road would provide more convenient public access to SDSF from Soquel-San Jose Road for recreation visitors. The projected annual visitation in the "other" category (see Table 7-2) by 2005 is estimated to total 1,000 people, 400 more than that of the baseline projections. Camping use will occur in the summer between April and October, is assumed to average 25 people per month, and will most likely occur on weekends. Educational group use may occur year round with lower use occurring during winter months and about 50% of educational use occurring during the week (50% on weekends). By improving access to the forest, the proposed project will also attract more recreation visitors. Implementation of the proposed project would directly increase the diversity of recreation activity and slightly increase the quantity of recreation visitors at SDSF. Therefore, this is a beneficial impact on recreation at SDSF.

Mitigation: No mitigation is required.

Impact: Cumulative Increase in Recreational and Educational Use at SDSF. As described above under "Future Use", recreational use at SDSF is projected to increase under the No-Project Alternative, and implementation of the proposed project would add to that increase directly. The cumulative change in recreational use at SDSF relative to the change under the No-Project Alternative would not be significant. SDSF provides a regional recreation opportunity consistent with local recreation goals. Therefore, implementing the proposed project would result in a beneficial cumulative impact because it further addresses the increased demand for recreation and education facilities in the region.

Mitigation: No mitigation is required.

Alternative 2: Emphasize Watershed and Late-Succession Habitat Protection

Impact: Increased Recreational and Educational Use at SDSF. Implementation of Alternative 2 would expand recreational use at SDSF slightly over the baseline increase as described under the proposed project. This is a beneficial impact.

Mitigation: No mitigation is required.

Impact: Cumulative Increase in Recreational and Educational Use at SDSF. This impact is similar to that described for the proposed project and is considered beneficial.

Mitigation: No mitigation is required.

Alternative 3: Emphasized Forest Management Demonstration and Recreation

Impact: Increased Recreational and Educational Use at SDSF. Under Alternative 3, recreational and educational use at SDSF would be higher than that projected for the proposed project. Motor vehicles that are allowed on the main forest road will encourage more visitors to enter SDSF. Visitors will be able to take advantage of the easy access to visit parts of the forest, including an old-growth redwood grove. Paving the road would change the rustic nature of the forest but is not expected to substantially reduce the quality of recreation and education use at SDSF. On nonwinter weekends, visitors using the new vehicular access route are projected to average 36 people (20 cars at 1.8 persons per car) per day. The six amateur races may attract up to 100 people per event. Together, the vehicular access and the races would attract an additional 3,800 visitors per year. As described for the proposed project, Alternative 3 would also attract education groups and campground users to the forest.

Implementation of Alternative 3 would directly increase the diversity and quantity of recreation and education activity without reducing the quality of recreation experience at SDSF (see "Cumulative Increase in Recreational and Educational Use at SDSF" impact below). Therefore, this is a beneficial impact on recreation at SDSF.

Mitigation: No mitigation is required.

Impact: Reduced Opportunities for Recreating in a Rustic Environment. Under Alternative 3, paving the main forest road would reduce the rustic quality of equestrian and mountain bike activity in the most popular use corridor in SDSF. In addition, a paved surface would be less suitable for equestrian use than the existing unpaved road. Because of the many miles of roads and trails in SDSF that would remain unpaved under this alternative, however, and because an unpaved trail would be constructed parallel to the main road, adverse impacts on the rustic quality of recreation use on opportunities for recreation use would be less than significant.

Mitigation: No mitigation is required.

Impact: Cumulative Increase in Recreational and Educational Use at SDSF. As described above under "Future Use", recreational and educational use at SDSF is projected to increase under the No-Project Alternative, and implementation of Alternative 3 would add directly to that increase. The cumulative change in recreational and educational use at SDSF relative to the change under the No-Project Alternative would be substantial. Under Alternative 3, however, the cumulative use of SDSF would not detract from the recreation and education experience at SDSF. For example, on a peak-use weekend day, the total number of visitors per day would be approximately 250, which, given varied arrival and departure times, would not result in capacity use of SDSF's trail system over its 2,681 acres. Therefore, the cumulative effect would contribute to providing quality recreation and education in the Santa Cruz region; this is considered a beneficial impact.

Mitigation: No mitigation is required.

Visual Resources

Impact Assessment Methodology

This visual analysis uses a qualitative, descriptive approach on a broad scale for describing and evaluating SDSF's visual resources. Activities that change the existing features that characterize views of the forest would be considered impacts on visual resources. The following methods of data collection were used to prepare this analysis:

- ground-level field reconnaissance, including direct observation from important roads and vistas in and around SDSF;
- interpretation of U.S. Geological Survey topographic maps;
- interpretation of aerial photographs; and

- conversations with open space and park district planners and SDSF staff members.

Significance Criteria

Implementation of the proposed project or alternative would result in a significant visual impact if it:

- substantially changes the quality of scenic corridors or views from scenic roadways, trails, and recreation areas.

Alternative 1: No-Project Alternative

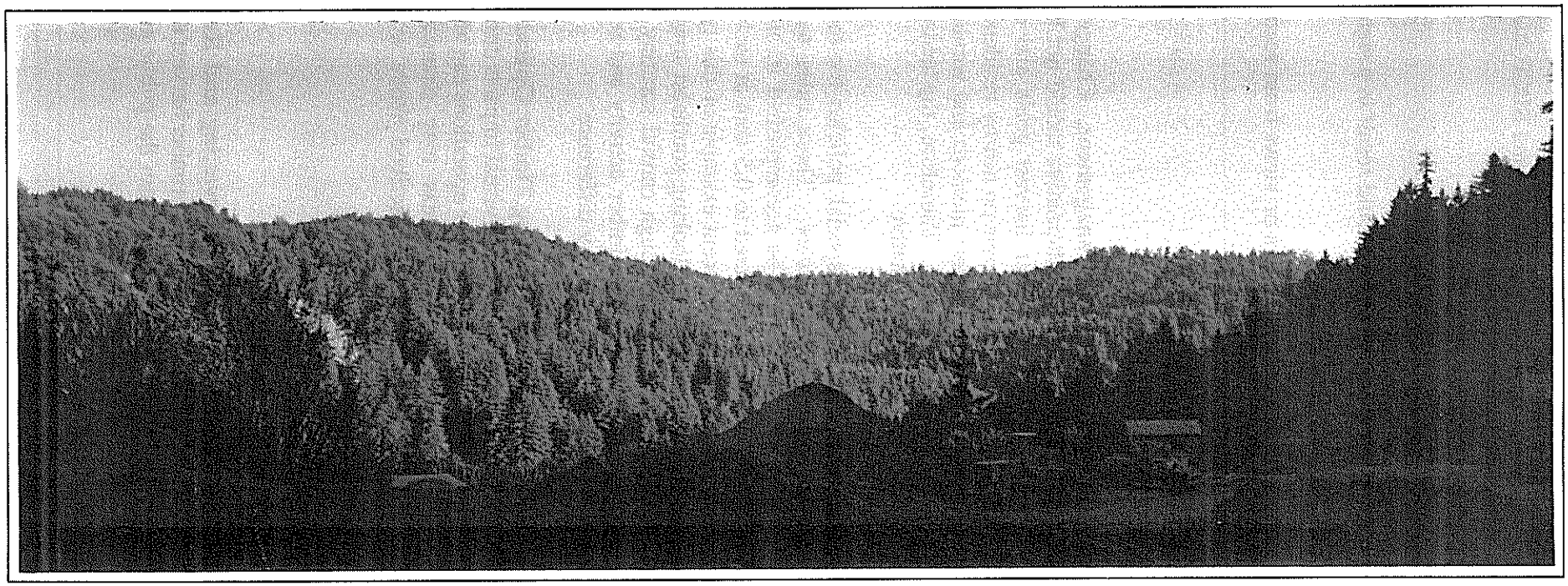
Impact: Change in Offsite Views from Timber Management. Changes in views of SDSF because of timber operations under the No-Project Alternative would not be noticeable. The Nature Conservancy plan calls for significantly lower harvest goals and no recreation development. Distant offsite views from the public access route on nearby residences would not likely evidence any visible change because the limited harvest methods and would not result in any discernible clearings or "holes" in the forest appearance. Therefore, the landscape at SDSF would not change substantially under the No-Project Alternative.

Additionally, logging operations at SDSF follow special policies for the Santa Cruz Mountains identified in the California Forest Practice Rules. These rules require that all harvesting use the selection method and logging cleanup be accomplished in an aesthetically pleasing way. The maximum clearing for logging is restricted to 0.5 acre at each harvest site. This minimizes the visual impact caused by logging. A recent example of this type of harvest method can be observed at the Olive Springs Quarry site looking southeast toward Redwood Empire's forestland (Figure 7-5, Photograph 4). Only through careful scrutiny can a viewer detect some darker areas in the distant view that indicate timber activity and related logging trails. Most casual onlookers would be unlikely to notice any difference.

Impact: Short-Term Impact on Visual Quality during Timber Operations. Timber harvesting operations can cause short-term or temporary adverse visual impacts during operation. Debris piles, equipment storage, and dust produced during timber operations can adversely affect a landscape. Also, onsite views of recently harvested areas may change dramatically immediately after timber operations. The harvest methods described above would minimize some short-term visual impacts.

Proposed Project

Impact: Change in Offsite Views from Timber Harvesting and Recreation and Education Development Activities. Visual impacts from SDSF's timber harvest activities under the proposed project would be minimal. Distant offsite views from the public access route on



Photograph 4

Figure 7-5. View of Recent Timber Operation on Redwood Empire Land Looking South along the East Branch

Highland Way and nearby residences would not likely evidence any visible change because the limited harvest methods and small-scale recreation development would not result in any discernible clearings or "holes" in the forest appearance.

The timber harvest standards prescribed under the proposed project would conform with the California Forest Practice Rules. The maximum clearing would be restricted to 1 acre. In addition, a goal of the GFMP is to demonstrate that silviculture treatments are compatible with aesthetic, biological, and recreation values. Methods used to minimize visual impacts of timber harvesting may include the following measures.

Offsite view measures:

- selecting harvest groups that have minimal visual exposure from roads and trails and
- feathering the edges of openings (to avoid straight lines).

Onsite view measures:

- disposing of slash piles by spreading and compacting material over skid trails and
- locating landings to have minimal visual exposure from roads and trails.

Recreation development at SDSF would include trail improvements and construction of a small, rustic campsite. Visual impacts of these activities would be minimal. The campground would not be easily visible from offsite vistas, and vegetation removed during construction of the campground and maintenance of trails would be kept to a minimum except as needed for fire protection.

Because views of the SDSF are not frequent and timber harvest methods and recreation development at SDSF under the proposed project would encourage long-term aesthetic values as described above, visual impacts resulting from the proposed timber harvesting and recreation development are considered less than significant.

Mitigation: No mitigation is required.

Impact: Short-Term Impact on Visual Quality during Timber Operations. Short-term impacts on visual quality at SDSF would be similar to those described above under the No-Project Alternative but may be more frequent. Because the visual effects during timber operations are temporary, this impact is considered less than significant.

Mitigation: No mitigation is required.

Alternative 2: Emphasize Watershed and Late-Succession Habitat Protection

Impact: Change in Offsite Views from Timber Harvesting and Recreational and Educational Development Activities. The effects of timber harvesting and recreation and

education development on visual resources under Alternative 2 would be similar to those described for the proposed project. Additional restrictions on timber harvesting along streams and in highly erodible areas under Alternative 2 would result in fewer and less critical effects on visual resources than under the proposed project. This impact is less than significant.

Mitigation: No mitigation is required.

Impact: Short-Term Impact on Visual Quality during Timber Operations. This impact is similar to that described above for the No-Project Alternative but may be more frequent because more timber would be harvested. This impact is less than significant because these effects are temporary.

Mitigation: No mitigation is required.

Alternative 3: Emphasize Forest Management Demonstration and Recreation

Impact: Change in Offsite Views from Timber Harvesting and Recreation and Education Development Activities. Increased timber harvest proposed under this alternative would use silvicultural methods, including the clear-cut method, which could result in obvious changes to the existing landscape. Timber clear cuts of up to 5 acres could result in visible openings in the forest appearance, depending on the locations of the harvest areas. The removal of vegetation over large areas under Alternative 3 could result in substantial changes to the quality of views from roadways (e.g., Highland Way), trails, and recreation and education areas at SDSF. The effects of increases in recreational use along roadways and trails and construction of the campground and new roads and trails would be similar to those described for the proposed project. Therefore, the timber management program under Alternative 3 would result in a potentially significant impact on visual resources at SDSF.

Mitigation:

- **Minimize Clear-Cut Size or Use Selection Method in Prominently Visible Areas at SDSF.** In areas of SDSF highly visible from vista points on public roads and major residential areas (Figure 7-1), clear cuts should be limited to no more than 0.5 acre or the selection harvest method should be employed. Additionally, edges around harvested areas should be feathered to prevent obvious human-made linear features in the landscape, and harvested areas should be replanted as soon as possible.

Implementation of the above mitigation measure should reduce the impact of timber harvesting under Alternative 3 on visual resources to a less-than-significant level.

Impact: Short-Term Impact on Visual Quality during Timber Operations. This impact is similar to that described above under the No-Project Alternative but may be more

frequent with the increase in timber harvesting under Alternative 3. This impact is still considered less than significant.

Mitigation: No mitigation is required.

Chapter 8. Traffic and Noise

SETTING

This chapter describes and analyzes the existing traffic and noise conditions in the SDSF area. The traffic setting presents a description of the existing transportation system, followed by an explanation of the methods used to analyze this system and the results of this analysis.

This section was prepared based on information provided in the draft GFMP; the Draft Supplemental Environmental Impact Report (SEIR) for Olive Springs Quarry, Mining Permit and Expansion (LSA Associates 1993); and Santa Cruz County planning documents. Additional data were obtained from the County of Santa Cruz Public Works Department (Sohriakoff pers. comm.) and discussions with SDSF staff.

Public Use of SDSF

When The Nature Conservancy replaced the no-trespass policy with a policy of free, nonmotorized day use of SDSF for recreation and education in 1988, public use of the forest increased substantially. As presented in Chapter 7, "Recreation, Education, and Visual Resources", total visitor use at SDSF was estimated to be 4,200 visitor-days in 1994. A 1992 survey of visitors indicated that about 72% were from Santa Cruz County, with 25% residing in the residential Summit community north of the forest, 12% in Santa Cruz, and 11% in Soquel. Santa Clara County accounted for 20% of forest visitors.

The GFMP's proposed construction of a new access and parking facilities, the region's growing population, increasing awareness of the area's recreational and educational opportunities, and the increasing popularity of mountain biking, are likely to result in increased use of SDSF. Total use at SDSF is projected to be 10,300 visitor-days in 2005. This increase is projected to occur even without changes or additions to SDSF's recreation and education facilities.

Traffic

Existing Transportation System

Figure 8-1 shows the regional transportation system serving SDSF. Regional access to SDSF is provided by State Route (SR) 1 and SR 17. Subregional access is provided via Soquel-San Jose Road and Summit Road. Local county roads leading to SDSF access points are Olive Springs Road, Highland Way, and Eureka Canyon Road.

Soquel-San Jose Road is a two-lane arterial extending from SR 1 at Soquel to Summit Road at the summit of the Santa Cruz Mountains. Summit Road is a two-lane arterial extending from SR 17 to Soquel-San Jose Road.

Olive Springs Road extends east from its intersection with Soquel-San Jose Road and provides reliable year-round access through the Olive Springs Quarry. This road connects with Hihn's Mill Road near the southwestern edge of the forest. Olive Springs Road is open to the public.

Highland Way, which extends east from Soquel-San Jose Road, provides the only public vehicular access to the eastern portion of SDSF. Vehicles are not allowed in the forest, but visitors can drive to the designated parking area off Highland Way. Recently, Highland Way has been an unreliable access road because of landslides, and has been frequently closed during the past 2 years near Rattlesnake Gulch because of landslide damage. The County of Santa Cruz is investigating the feasibility of permanently reopening this road and taking actions to prevent future landslides.

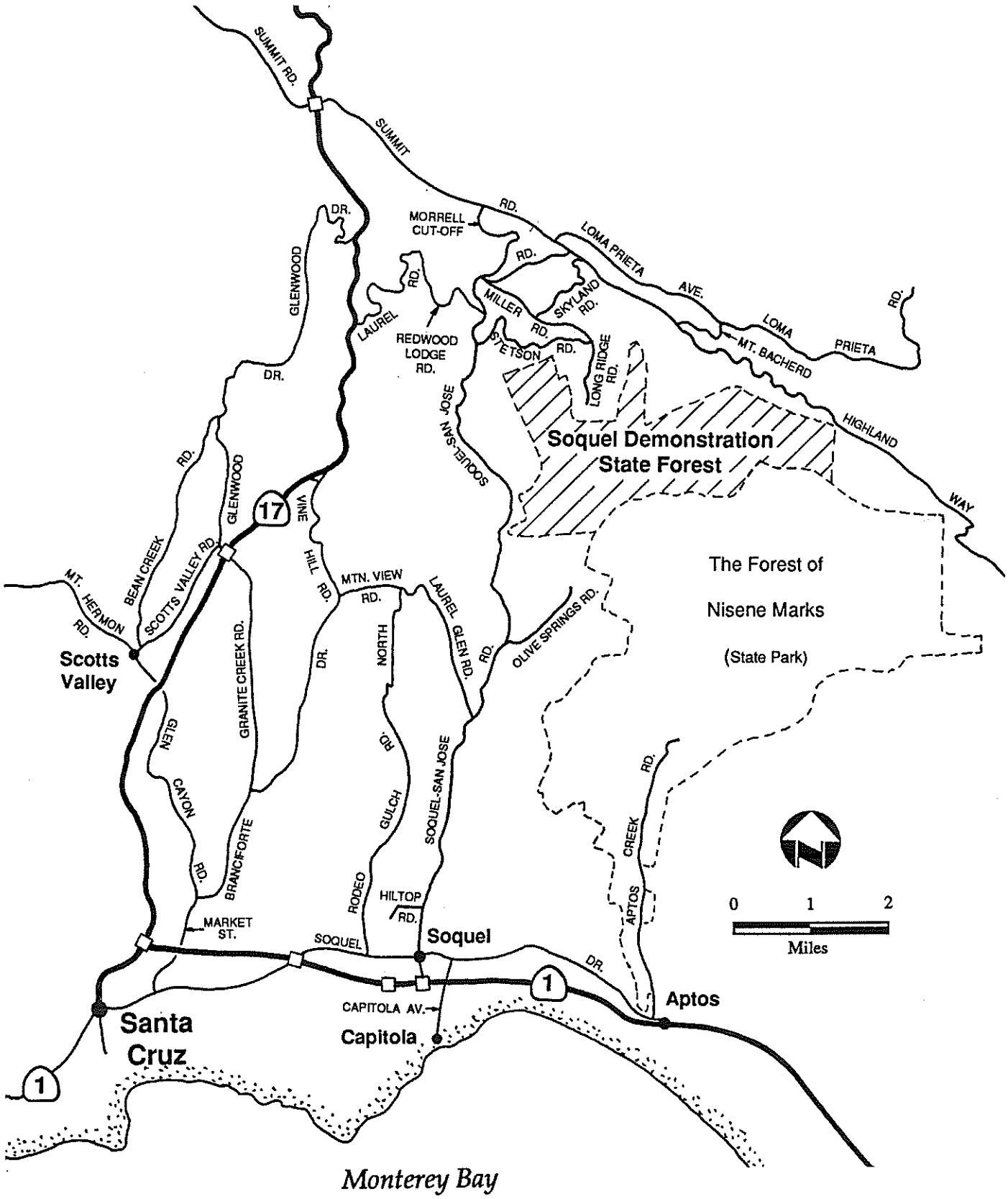
Eureka Canyon Road is an alternate route into the forest. This roads winds northward through the mountains from Corralitos and connects with Highland Road near SDSF's eastern boundary. Eureka Canyon Road is also subject to landslides. While Highland Way is closed, in the Rattlesnake Gulch vicinity, Eureka Canyon Road is the only public vehicular approach to SDSF.

The Aptos Creek Fire Trail, which extends through the Forest of Nisene Marks State Park, provides administrative access for SDSF staff and emergency personnel and nonmotorized (i.e., pedestrian and bicycle) public access.

Comstock Mill Road and Long Ridge Road, along with Hihn's Mill Road through the quarry, provide administrative and emergency access to SDSF.

Pavement Conditions

The Pavement Management System Inventory (County of Santa Cruz Public Works Department 1991) assigns a rating for each roadway in the county based on its ride and surface



Jones & Stokes Associates, Inc.

Figure 8-1
Transportation System

conditions. Olive Springs Road and Soquel-San Jose Road south of Olive Springs Road have high ratings, indicating good ride and surface conditions.

Existing Traffic Conditions

The quality of traffic service provided by a roadway is measured by its level of service (LOS). This method uses a rating system to describe the driving conditions for a particular roadway. The letters A through F represent the best to worst driving conditions, respectively.

Because all the critical roadway segments analyzed in this report are two-lane rural roadways, the analysis uses standard methods for two-lane rural highways as described in the 1985 Highway Capacity Manual (Transportation Research Board 1985). For a rural roadway, LOS A indicates the highest quality of traffic service, under which motorists can travel at their desired speed with almost no groups of three or more vehicles being encountered. LOS F represents heavily congested flow, with demand exceeding capacity and speeds being below capacity speed. The characteristics of traffic flow associated with each LOS for two-lane rural highways are described in Table 8-1.

The Santa Cruz County Congestion Management Program (Santa Cruz County Regional Transportation Commission 1992) defines acceptable service levels for roadways to be LOS D or better. Therefore, any roadway operating at LOS E or F is considered to be operating at an unacceptable level.

The following roadway segments were analyzed in this study:

- Soquel-San Jose Road north of Hilltop Road,
- Soquel-San Jose Road north of Olive Springs Road,
- Soquel-San Jose Road south of Summit Road,
- Summit Road west of Soquel-San Jose Road, and
- Olive Springs Road east of Soquel-San Jose Road.

Average daily traffic volume for Soquel-San Jose Road north of Olive Springs Road was obtained from the Draft supplemental EIR (SEIR) for Olive Springs Quarry, Mining Permit and Expansion (LSA Associates 1993). Average weekday and Saturday daily and peak-hour traffic volumes for the remaining critical segments were obtained from the County of Santa Cruz Public Works Department (Sohriakoff pers. comm.).

In this EIR, "existing conditions " refers to 1994 traffic conditions. The traffic counts obtained from the county and the SEIR for Olive Springs Quarry were conducted in 1990 and 1991. To estimate 1994 volumes, a growth rate of 0.8% per year was applied to these counts (Sohriakoff pers. comm.). Table 8-2 shows the average daily and peak-hour volumes for an average weekday and Saturday on the critical roadway segments. This table also shows the results of the LOS analysis for these roadways. Volumes and service levels projected for 2005

Table 8-1. Level of Service Definitions for Two-Lane Rural Highways

Level of Service	Description
A	Represents free-flow conditions. Passing demand is well below passing capacity, and almost no groups of three or more vehicles are observed. Drivers are delayed no more than 30% of the time by slow-moving vehicles.
B	Flow is stable. Passing demand equals passing capacity, and the number of groups forming in the traffic stream begins to increase. Drivers are delayed as much as 45% of the time.
C	Flow is stable, but it is susceptible to congestion due to turning traffic and slow-moving vehicles. Chaining of groups and significant reductions in passing capacity begin to occur. Drivers are delayed as much as 60% of the time.
D	Traffic flow approaches unstable conditions. Passing demand is very high, and passing capacity approaches zero. Passing becomes extremely difficult, and groups of 5-10 vehicles become common. Drivers are delayed as much as 75% of the time.
E	Operating conditions at capacity are unstable and difficult to predict. Passing is virtually impossible, and groups of vehicles become large when slower vehicles or other interruptions are encountered. Drivers are delayed more than 75% of the time.
F	Represents extremely congested flow. Traffic demand exceeds capacity, and speeds are below capacity speed.

Source: Transportation Research Board 1985.

Table 8-3. Estimated 2005 Traffic Volumes and Levels of Service on Roadways in the SDSF Project Vicinity

Roadway	Segment	Weekdays ADT	Weekdays Peak-Hour Traffic	Saturdays ADT	Saturdays Peak-Hour Traffic	Weekday LOS	Saturday LOS
Soquel-San Jose Road	North of Hilltop Road	11,070	1,070	12,340	910	D	D
	North of Olive Springs Road	3,960	NA	NA	NA	C	NA
	South of Summit Road	3,960	460	4,360	370	C	C
Summit Road	West of Soquel-San Jose Road	5,480	580	5,140	380	D	C
Olive Springs Road	East of Soquel-San Jose Road	920	90	930	80	B	B

Notes: ADT = average daily traffic.
LOS = level of service.
NA = data not available.

Source: LSA Associates 1993.

those specified in the adopted general plan. Therefore, this discussion and analysis will focus on the requirements of the updated draft general plan.

The two primary objectives of the noise element are:

- to promote land uses that are compatible with each other and with the existing and future noise environment and

- to prevent new noise sources from increasing the existing noise levels above acceptable standards and to eliminate or reduce noise from objectionable sources.

Policies in the noise element that relate to this project are as follows:

- Require new development to conform with the land use compatibility guidelines outlined in Figure 8-2.

- Require new development of residential or other noise-sensitive land uses where stationary noise sources, such as a quarry, exceed the standards set in Figure 8-3 to incorporate effective mitigation measures to reduce noise exposure to or below the recommended levels.

- For all new commercial and industrial developments that would increase noise levels above the maximum allowable standards given in Figure 8-2 or 8-3, the best available control technologies will be used to minimize noise levels. In no case shall noise levels exceed the standards of Figure 8-3.

Land Uses and Sensitive Receptors in the Project Area

SDSF is bordered by state-owned and private property. Land uses surrounding SDSF are described in Chapter 6, "Land Use, Public Safety, and Public Services".

Scattered mountain residences north and west of the forest are most sensitive to noise. The highest concentration of residences, about 25 dwellings, is along Comstock Mill Road. The Comstock Mill Road Association (CMRA) is an association of that represents the interests of landowners in this area. In a letter to CDF dated November 6, 1992, the CMRA expressed concern regarding use of Comstock Mill Road for access to SDSF and the potential noise associated with this use. Public access to the forest on Comstock Mill Road is currently discouraged, however, and would continue to be discouraged under the GFMP.

Existing Noise Conditions

The forest is isolated from significant continuous sources of noise such as freeway traffic or industrial operations. Except during occasional use of human-made sources of noise, such

LAND USE CATEGORY	EXTERIOR NOISE EXPOSURE L_{dn} or CNEL, dB					
	55	60	65	70	75	80
Residential hotels, and motels						
Outdoor sports and recreation, neighborhood parks and playgrounds						
Schools, libraries, museums, hospitals, personal care, meeting halls, churches						
Office buildings, business commercial, and professional						
Auditoriums, concert halls ampitheaters						
Industrial, manufacturing, utilities, and agriculture						

NORMALLY ACCEPTABLE
Specified land use is satisfactory, based on the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE
Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.

UNACCEPTABLE
New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

Source: Santa Cruz County Planning Department 1993.

Jones & Stokes Associates, Inc.

Figure 8-2
Land Use Compatibility for Community Noise Environments

	Daytime (1) (7 a.m. to 10 p.m)	Nighttime (1, 2) (10 p.m. to 7 a.m.)
Hourly L_{eq}, dB (3)	50	45
Maximum level, dB (3)	70	65
Maximum level dB - impulsive noise (4)	65	60

Notes: Levels represent measurements at the property line of the receiving land use. When the effectiveness of noise mitigation measures is being determined, the standard may be applied on the receptor side of noise barriers or other property line noise mitigation measures.

(1) Allowable levels shall be raised to the ambient noise levels where the ambient levels exceed the allowable levels. Allowable levels shall be reduced by 5 dB if the ambient hourly L_{eq} is at least 10 dB lower than the allowable level.

(2) Applies only where the receiving land use operates or is occupied during nighttime hours.

(3) Sound-level measurements shall be made with "slow" meter response.

(4) Sound-level measurements shall be made with "fast" meter response.

Source: Santa Cruz County Planning Department 1993.

Jones & Stokes Associates, Inc.

Figure 8-3
Maximum Allowable Noise Exposure for Stationary Noise Sources

as aircraft, vehicles, electrical generators, and chain saws, ambient sound levels in isolated forest settings are usually very low (on the order of 30 A-weighted decibels [dBA]) when no wind is blowing. Wind blowing through trees, however, can be a significant source of sound, with sound levels as high as 50-60 dBA possible when wind speeds are 10-15 mph (Miller 1982).

IMPACTS AND MITIGATION MEASURES OF PROJECT ALTERNATIVES

Traffic

Criteria for Determining Significant Impacts

According to Appendix G of the State CEQA Guidelines, a project will normally have a significant effect on the environment if it will:

- cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system.

Based on professional standards, a project will also normally have a significant effect on the environment if it will:

- result in a roadway facility operating at an acceptable LOS (for this EIR, defined as A, B, C, or D) to deteriorate to an unacceptable LOS (E or F);
- substantially alter present patterns of vehicle circulation or movement;
- result in effects on existing parking facilities or demand for new parking not provided by the project; or
- increase traffic hazards to motor vehicles, bicycles, or pedestrians.

Impact Assessment Methodology

To analyze the impact of the proposed project and the project alternatives on trip generation analysis was conducted for an average nonwinter weekday and weekend management activities generate traffic during the week, whereas recreation visitors more traffic on weekends. The number of trips generated was then analyzed to determ effects of the proposed project and the project alternatives on the roadway system

Alternative 1: No-Project Alternative

Impact: Addition of Log-Truck Traffic on the Roadway System. Under the No-Project Alternative, about 260 MBF of timber would be harvested per year. Harvests would occur approximately every 2 years in about a 6-week period. Harvests would occur only on weekdays. Based on a 4-MBF capacity of a logging truck, 130 truck loads would be expected during the biennial 6-week period. This translates to five truck loads, or 10 truck trips per day. This is about one truck trip per hour. Table 8-4 presents a summary of the trip generation analysis for each alternative.

Most trucks hauling logs from SDSF would use Olive Springs Road to reach Soquel-San Jose Road; some would use the Highland Way access road or the proposed new access. Once on Soquel-San Jose Road, approximately 50% of the trucks would travel north onto Summit Road to reach SR 17. The remaining trucks would travel south on Soquel-San Jose Road to SR 1. (Sutfin pers. comm.)

Impact: Congestion of the Roadway System from Other SDSF Use. As presented in Chapter 7, "Recreation, Education, and Visual Resources", the No-Project Alternative would result in 10,300 visitor-days per year by 2005. Approximately 75% of this use is expected to occur during the April-October nonwinter period. Approximately 65% of the use would occur on weekends, while 35% would occur on weekdays.

The No-Project Alternative would contribute 20 vehicle trips to the roadway system resulting from recreation and education use of SDSF on an average nonwinter weekday (Table 8-4). Fourteen additional trips generated by timber operation employees would be added to these visitor trips for a biennial 6-week period. During a 6-week timber operation, SDSF use would contribute an average of 34 vehicle trips per weekday. Assuming that these trips would occur within a 10-hour period, this alternative would add about three or four vehicles per hour to the roadway system. On an average nonwinter weekend day, 90 trips (or about nine per hour) would be generated by use of SDSF.

Impact: Congestion of the Roadway System from SDSF Use in Conjunction with Future Traffic Growth. To estimate 2005 traffic volumes, a growth rate of 0.8% per year was applied to existing traffic volumes. Table 8-3 shows the average daily and peak-hour volumes for an average weekday and Saturday on the critical roadway segments. This table also shows the results of the 2005 LOS analysis for these roadways. As shown in Table 8-3, all critical roadway segments would operate at LOS D or better.

Impact: Congestion of the Roadway System due to the New Access Road. The proposed entrance may result in redistribution of traffic because some visitors may use the new access road instead of Highland Way to reach SDSF. Because existing traffic is estimated to average about eight trips on weekdays and 33 trips on weekends, this redistribution would have a negligible effect on traffic volumes.

Table 8-4. Projected Daily Trips Generated at SDSF (2005)

	Nonwinter Weekdays			Nonwinter Weekends[a]
	Forest and Log Hauling		Recreation and Education	Recreation and Education
Scenario	Log Trucks[b]	Vehicles[c]	Visitors[d]	Visitors[d]
Alternative 1: No Action	10	14	20	90
Proposed Project	20	20	21	93
Alternative 2	18	20	20	90
Alternative 3	24	20	30	130

[a] No major timber management activities are anticipated to occur during weekends.

[b] Assumes two trips, one inbound and one outbound, per truck

[c] Assumes 10 employees for Alternative 1; 14 employees for the proposed project and Alternatives 2 and 3; average vehicle occupancy of 1.4 employees per vehicle; and two trips, one inbound and outbound, per vehicle.

[d] Assumes an average vehicle occupancy of 1.8 persons per vehicle and two trips, one inbound and one outbound, per vehicle.

Impact: Traffic Hazards Resulting from Vehicles Turning into and out of the New Access Road. Soquel-San Jose Road is a two-lane, winding road that includes numerous curves in the vicinity of the proposed new access point. Depending on the design and location of this new access, vehicles turning into and out of this access could cause increased traffic hazards for motorists and cyclists.

Impact: Increased Demand for New Parking. Public use of SDSF under the No-Project Alternative would result in increased demand for new parking. A 1-acre parking lot is planned to be constructed as part of the No-Project Alternative. The 1-acre lot will easily serve the increased demand for parking.

Proposed Project

Impact: Addition of Log-Truck Traffic to the Roadway System. The proposed project would involve ongoing timber harvesting in most areas of SDSF. The average timber harvest would be about 750 MBF per year. Harvests would occur approximately every 2 years during about an 8-week period. Harvesting would take place mainly on weekdays.

Based on a 4-MBF capacity of a logging truck, 375 truck loads would be expected during the biennial 8-week harvesting period, or approximately 20 truck trips per day (Table 8-4).

Compared to the No-Project Alternative, the proposed project would add five truck loads or 10 truck trips per weekday during an 8-week period, every 2 years. This is about one truck trip per hour and is considered a minimal increase. This impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: Congestion of the Roadway System from Other SDSF Use. The proposed project may include development of campgrounds, picnic areas, and trails. In addition, a new entrance to SDSF would be provided via Soquel-San Jose Road, at the southwestern corner of SDSF.

As presented in Chapter 7, "Recreation, Education, and Visual Resources", the proposed project would result in 400 additional visitor-days per year compared to the No-Project Alternative. Approximately 75% of this recreational use is expected to occur during the nonwinter period (between April and October). Approximately 65% of visits would occur on weekends.

As shown in Table 8-3, in addition to the log-truck trips discussed above on an average nonwinter weekday, the recreation facilities proposed for the project would add one vehicle trip to average daily traffic under no-project conditions. Additionally, about 20 vehicle trips per weekday are anticipated to be generated by timber operation employees during the biennial 8-week harvesting period.

Therefore, during an 8-week timber operation, the project would result in the addition of up to seven daily vehicle trips compared to no-project conditions. Assuming that these trips would occur within a 10-hour period, the proposed project would add about one vehicle trip per hour to the roadway system. This increase is considered minimal and is not anticipated to affect the operation of the roadway system.

As shown in Table 8-3, on an average nonwinter weekend day the proposed project would result in the addition of three trips compared to no-project conditions. This increase is also considered minimal. Therefore, this impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: Congestion of the Roadway System from SDSF Use in Conjunction with Future Traffic Growth. The proposed project is expected to add about two truck trips, and four vehicle trips per hour to the 2005 weekday traffic volumes, and nine vehicle trips per hour to the 2005 weekend traffic volumes. The analyzed roadways can adequately accommodate the projected traffic level. This impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: Congestion of the Roadway System due to the New Access Road. Similar to the No-Project Alternative, the proposed project would result in redistribution of traffic. Because traffic generated under the proposed project would result in a minimal increase over existing conditions, this impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: Traffic Hazards Resulting from Vehicles Turning into and out of the New Access Road. Soquel-San Jose Road is a two-lane, winding road that includes numerous curves in the vicinity of the proposed new access point. Depending on the design and location of this new access road, vehicles turning into and out of this access could cause increased traffic hazards to motorists and cyclists. This is considered a potentially significant impact because of the potential for increased traffic hazards.

Mitigation:

- **Provide Adequate Sight Distance and Install Appropriate Traffic-Control Devices.** In designing the new access point, CDF shall provide adequate sight distance on Soquel-San Jose Road at the new access point and install appropriate traffic control devices on Soquel-San Jose Road to regulate, warn, and guide traffic. The intersection design shall be approved by the Santa Cruz County Public Works Department.

Implementing this mitigation measure would reduce this impact to a less-than-significant level.

Impact: Increased Demand for New Parking. As described under the No-Project Alternative, the proposed parking lot is considered adequate to serve the increased demand for parking. Therefore, this impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: Increased Traffic Hazard Resulting from Addition of Truck Traffic to an Intersection with Limited Sight Distance. The intersection of Soquel-San Jose Road and Olive Springs Road has limited sight distance along Soquel-San Jose Road, which results in potentially hazardous driving conditions during periods of high use. Because the proposed project would add minimal traffic to this intersection, this impact is considered less than significant.

Mitigation: No mitigation is required.

Alternative 2: Emphasize Watershed and Late-Succession Habitat Protection

Impact: Addition of Log-Truck Traffic to the Roadway System. Under Alternative 2, about 500 MBF of timber would be harvested per year. Harvests would occur approximately every 2 years in about a 6-week period. Harvests would occur only on weekdays.

Based on a 4-MBF capacity of a logging truck, 250 truck loads would be expected during the biennial 6-week period. This translates to nine truck loads, or 18 truck trips per day per day. Table 8-4 presents a summary of the trip generation analysis for this alternative. This is about one additional truck trip per hour and is considered a minimal increase. This impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: Congestion of the Roadway System from Other SDSF Use. Public use and recreation facility development would be the same as that under the proposed project, except no forestry education center would be constructed and no motorized public use would be allowed.

Under Alternative 2, the public use level will be the same as under the proposed project. Employee trips resulting from timber operations are expected to be 20 vehicle trips per day, or about one trip per hour more than under no-project conditions. This increase is considered minimal. Therefore, this impact is less than significant.

Mitigation: No mitigation is required.

Impact: Congestion of the Roadway System from SDSF Use in Conjunction with Future Traffic Growth. Alternative 2 is expected to add about two truck trips and four vehicle trips per hour to the 2005 weekday traffic volumes, and nine vehicle trips per hour to the 2005 weekend traffic volumes. The analyzed roadways can adequately accommodate the projected level of traffic. This impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: Congestion of the Roadway System due to the New Access Road. As described under the proposed project, this impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: Traffic Hazards Resulting from Vehicles Turning into and out of the New Access Road. This impact would be approximately the same as under the proposed project. This is a potentially significant impact.

Mitigation:

- **Provide Adequate Sight Distance and Install Appropriate Traffic-Control Devices.** This mitigation is discussed above under "Proposed Project".

Impact: Increased Demand for New Parking. As described under the proposed project, this impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: Increased Traffic Hazard Resulting from Addition of Truck Traffic to an Intersection with Limited Sight Distance. As described under the proposed project, this impact is considered less than significant.

Mitigation: No mitigation is required.

Alternative 3: Emphasize Forest Management Demonstration and Recreation

Impact: Addition of Log-Truck Traffic to Roadway System. About 2,000 MBF of timber would be harvested per year. Harvests would occur approximately every 2 years in about an 18-week period. Harvests would occur only on weekdays.

Based on the 4-MBF capacity of a logging truck, 1,000 truck loads would be expected during the biennial 18-week period. This translates to 12 truck loads (or 24 truck trips) per day. Table 8-3 presents a summary of the trip generation analysis for this alternative. This alternative would generate two more truck trips per hour than the No-Project Alternative, which is considered minimal. Therefore, this impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: Congestion of the Roadway System from Other SDSF Use. Under Alternative 3, public motorized use of the main forest road would be allowed between April and October; nonmotorized use would occur year round. The campground would be open for public

use from April through October. SDSF would be used approximately six times a year for amateur races and runs.

Under Alternative 3, the recreation use level will be approximately 25% higher than that of the No-Project Alternative. Allowing motor vehicles that have permits to use the main SDSF roadway will encourage more users to visit the forest.

In addition, about 20 vehicle trips per day are anticipated to be generated by employees during biennial timber operations.

Therefore, Alternative 3 would generate more vehicular traffic than the No-Project Alternative. However, the increase to average daily traffic under Alternative 3 is not anticipated to affect the operation of the roadway system serving SDSF. This impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: Congestion of the Roadway System from SDSF Use in Conjunction with Future Traffic Growth. Alternative 3 is expected to add about two truck trips and five vehicle trips per hour to the 2005 weekday traffic volumes, and 13 vehicle trips per hour to the 2005 weekend traffic volumes. The analyzed roadways can adequately accommodate the projected traffic level. This impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: Congestion of the Roadway System due to the New Access Road. As described under the proposed project, this impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: Traffic Hazards Resulting from Vehicles Turning into and out of the New Access Road. This impact would be approximately the same as under the proposed project. This is a potentially significant impact.

Mitigation:

- **Provide Adequate Sight Distance and Install Appropriate Traffic-Control Devices.** This mitigation is discussed above under "Proposed Project".

Impact: Increased Demand for New Parking. As described under the proposed project, this impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: Increased Traffic Hazard Resulting from Addition of Truck Traffic to an Intersection with Limited Sight Distance. As described under the proposed project, this impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: Safety Conflicts between Motorized and Nonmotorized Recreation Users on the New Access Road. Accidents between vehicles and mountain bikes on roads open to vehicle traffic are a growing problem in the region. For example, as mountain biking has increased at the Forest of Nisene Marks State Park, the number of vehicle/cyclist accidents has risen (Sutfin pers. comm.). Bicyclists often travel at high speeds along descending paved roads. The potential for accidents on the new paved access road is considered a potentially significant impact.

Mitigation:

- **Install Speed Bumps.** CDF should install speed bumps along the main forest road to discourage cyclists and motorists from traveling at unsafe speeds.
- **Establish and Enforce 15 MPH Speed Limit.** CDF, in conjunction with the California Board of Forestry, should establish and rigorously enforce a 15 mph speed limit for cyclists and motorists.

Implementing these mitigation measures, in conjunction with constructing the parallel unpaved trail to reduce equestrian use of the paved main forest road, would reduce this impact to a less-than-significant level.

Noise

Impact Assessment Methodology

Potential noise impacts associated with logging operations have been evaluated based on information provided by SDSF staff. Data on sound levels have been estimated from reference materials and using methods suggested by CDF and U.S. Forest Service noise analysts.

Criteria for Determining Significant Impacts

According to the State CEQA Guidelines, a project will normally have a significant effect on the environment if it will:

- substantially increase the ambient noise levels for adjoining areas or
- expose people to severe noise levels.

In practice, more specific professional standards have been developed to implement the intent of the State CEQA Guidelines. These standards state that a noise impact is considered significant if the project would:

- generate noise that would conflict with local planning criteria or ordinances,
- substantially increase noise levels at noise-sensitive land uses, or
- propose land uses that are incompatible with baseline noise levels.

For this project, the significance of anticipated noise impacts is assessed by comparing predicted noise levels to the noise criteria defined in the Santa Cruz County draft general plan noise element. The potential reaction of the public to a change in noise conditions that would results from the project is also a factor in determining significance. Research into the human perception of changes in sound level indicates the following (Bies and Hansen 1988):

- a 3-decibel (dB) change is barely perceptible,
- a 5-dB change is clearly perceptible, and
- a 10-dB change is perceived as a doubling (or halving) of loudness.

Factors relating to the duration and frequency of project-related noise events are also considered when evaluating the significance of changes in sound levels.

Alternative 1: No-Project Alternative

Impact: Exposure of Residences North and West of SDSF to Noise from Tree-Felling Operations. Under the No-Project Alternative, a total of 520 MBF of timber will be harvested every 2 years. A typical biennial harvesting operation would result in the cutting of about 6 MBF from 90 acres and could take as long as 6 weeks.

The first step in the logging operation is the felling of trees, which is done with chain saws. A single chain saw will typically produce a sound level of about 83 dBA at a distance of 50 feet (U.S. Environmental Protection Agency 1971a). At any given felling site, several operators may be cutting trees. Assuming three chain saws are operating in one area, the total maximum sound level would be about 88 dBA at 50 feet. When saw noise is compared to the county's standards, that maximum sound level criterion of 65 dBA-L_{max} is used rather than the 1 hour L_{eq} because the highly variable nature of felling operations does not facilitate the calculation of an hourly L_{eq}.

Sound levels at various distances from a felling site based on the assumption that three saws are being operated are summarized in Table 8-5. In addition to attenuation of 6 dB per doubling of distance for a point source, anomalous excess attenuation and atmospheric attenuation totaling 1.7 dB per 1,000 feet are included in the calculations for Table 8-5. The shielding effects of topography and trees are not included.

Table 8-5. Estimated Noise from Three Chain Saws

Distance to Receptor (feet)	Sound Level at Receptor (dBA)
50	88
100	82
200	76
400	69
600	65
800	63
1,000	60
1,500	56
2,000	53
2,500	50
3,000	47
3,500	45
4,000	43
4,500	41
5,000	40
5,500	38
6,000	36

The following assumptions were used:

Basic sound level drop-off rate:	6.0 dB per doubling of distance.
Molecular absorption coefficient:	0.7 dB per 1,000 feet.
Anomalous excess attenuation:	1.0 dB per 1,000 feet.
Reference sound level:	88 dBA.
Distance for reference sound level:	50 feet.

Note: Shielding effects from topography and vegetation are not included in this calculation and would reduce sound levels substantially if present.

Table 8-5 indicates that saw noise would drop below the county's maximum sound level criterion of 65 dBA-L_{max} at a distance of about 620 feet. Shielding from topography and trees could easily cut this distance in half.

Impact: Exposure of Residences North and West of SDSF to Noise from Tractor Yarding Operations. After trees are felled, they will be yarded and loaded on delivery trucks. Yarding will typically be done with tractors, although yarding with horses, cable yarders, and helicopters may also occur. (Noise from cable and helicopter yarding is discussed below.)

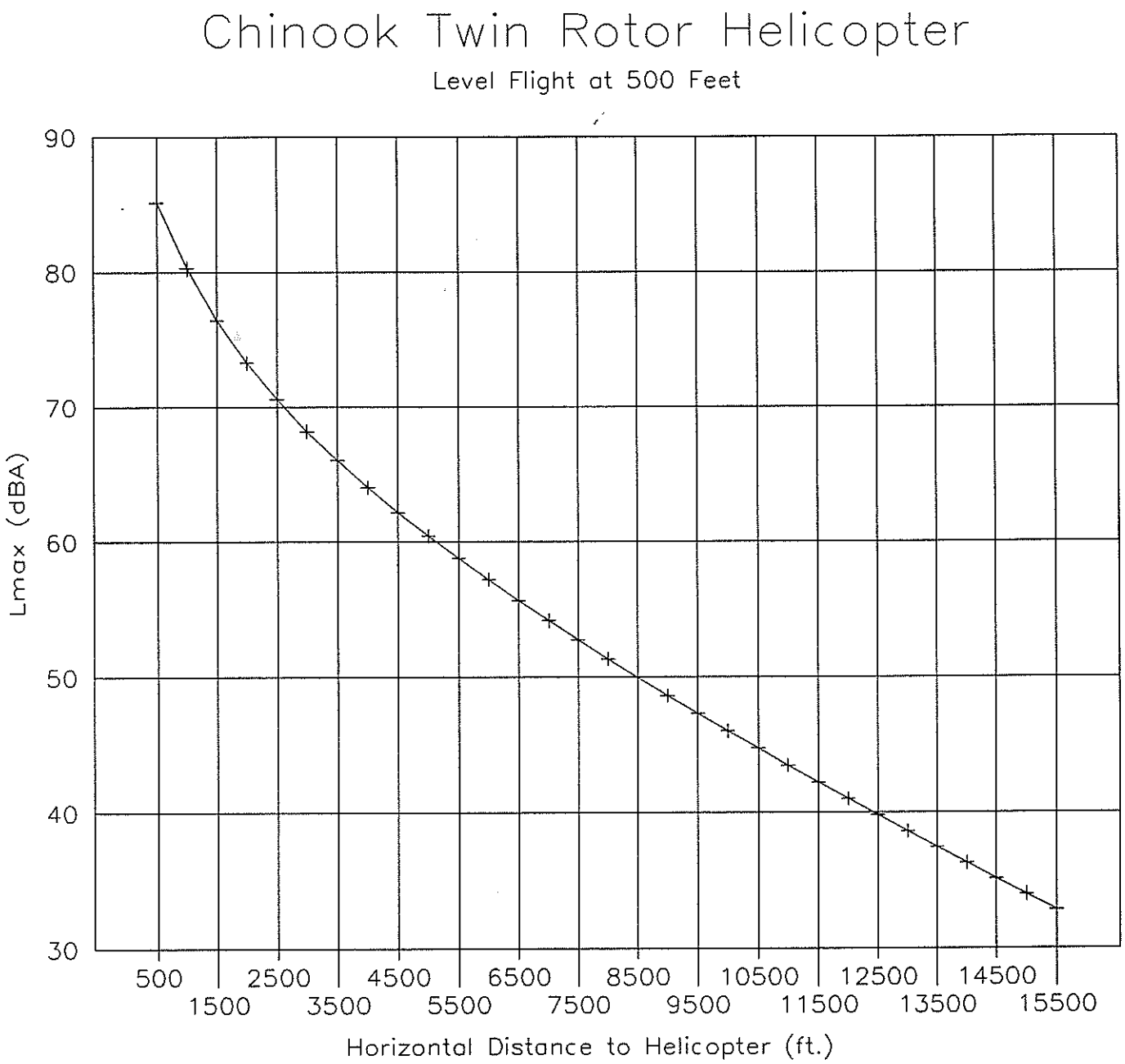
A single tractor will typically produce a sound level of about 88 dBA at a distance of 50 feet (U.S. Environmental Protection Agency 1971b). This is about the same as the sound level produced by the three chain saws evaluated in Table 8-5. Assuming no shielding from topography or trees, Table 8-5 indicates that tractor operations would drop below the county's maximum sound level criterion of 65 dBA-L_{max} at a distance of about 620 feet. Shielding from topography and trees could easily cut this distance in half.

Impact: Exposure of Residences North and West of SDSF to Noise from Cable Yarding Operations. Cable logging will be done in areas where slopes or lack of access preclude tractor or horse yarding. With cable yarding, felled logs are pulled to the loading position by a cable that is driven by a diesel engine. Although data on noise from cable yarding operations are not available, it is reasonable to assume that the size of the engine and the noise it generates is comparable to that of a tractor.

Unlike tractor yarding operations, however, an acoustic communication system called a "talkie tooter" is used. With this system, a series of whistle blasts is used for communication between workers. The pitched whistle blasts are, by design, audible over large distances. Therefore, whistle blasts will likely be distinctly audible at residences when cable yarding operations are within several thousand feet of residences.

Impact: Exposure of Residences North and West of SDSF to Noise from Helicopter Yarding Operations. Helicopters would be used to yard timber at locations where slopes or access preclude horse, tractor, or cable logging. Boeing Chinook or Sikorsky Skycrane helicopters would typically be used. Given the nature of the operation, the noise experienced by people on the ground would be periodic. When removing logs from the forest, the helicopter would hover to hook up logs, transport them to a loading area, and return to a different location to pick up more logs (Abshear pers. comm.) Typically, the area receiving the greatest exposure to noise is the log drop-off and landing area (Abshear pers. comm.), which is rarely located within 1 mile of the felling sites. The turn-around time for pick-up can vary between 2 and 5 minutes.

A large twin rotor helicopter, such as a Chinook, will produce a maximum sound level of about 89 dBA at a slant distance of 500 feet. Figure 8-4 depicts helicopter sound levels as a function of distance assuming level flight at 500 feet. Excess anomalous attention and atmospheric attenuation of 1.7 dB per are included, but shielding effects from topography are



Jones & Stokes Associates, Inc.

Figure 8-4
Noise as a Function of Distance for a Twin Rotor Helicopter

not. As shown in Figure 8-4, maximum sound levels in excess of 65 dBA may occur at distances within about 4,000 feet of the helicopter.

Impact: Exposure of Residences in the Area to Noise from Trucking Operations. A typical logging truck can carry about 4 MBF of timber. It is anticipated that as many as five truck loads of logs per day will leave the area during timber operations under the No-Project Alternative. Exposure of people to noise from logging trucks will be brief (a matter of seconds), will not exceed county standards, and will be limited to weekday and nonholiday periods.

Proposed Project

Impact: Exposure of Residences North and West of SDSF to Noise from Tree-Felling Operations. Under the proposed project, a maximum of 1,500 MBF of timber would be harvested every 2 years. A typical biennial harvesting operation would result in about 10 MBF being cut from 150 acres and could take as long as 2 months (Sutfin pers. comm.). The actual length of the harvesting period could be as short as about a month depending on the equipment available at the time.

This impact is the same as the impact described for the No-Project Alternative except that the duration would be longer because more timber would be harvested. This impact is considered less than significant for the following reasons:

- Few residences are located within 300-600 feet of potential felling sites, which means that county standards would typically not be exceeded at nearby residences.
- Felling operations would only occur once every 2 years and would be at a different location every 2 years.
- California Forest Practice Rules limit cutting operations to weekday and nonholiday hours between 7:00 a.m. and 9:00 p.m.
- Logging operations are common in the Santa Cruz Mountains, have occurred in the past on the project site, and in general should be consistent with the expectations of people living in the area.

Mitigation: No mitigation is required.

Impact: Exposure of Residences North and West of SDSF to Noise from Tractor Yarding Operations. All yarding for the 1995 harvest under the proposed project would be done with tractors. This impact would be the same as the impact described for the No-Project Alternative except that the duration would be longer because more timber would be harvested. This impact is considered less than significant for the following reasons:

- Few if any residences are located within 300-600 feet of potential yarding sites, which means that county standards would typically not be exceeded at nearby residences.

- Yarding operations would only occur once every 2 years and would be at a different location every 2 years.

- California Forest Practice Rules limit yarding operations within 300 feet of an occupied dwelling between the hours of 6:00 a.m. and 9:00 p.m.

- Logging operations are common in the Santa Cruz Mountains, have occurred in the past on the project site, and in general should be consistent with the expectations of people living in the area.

Mitigation: No mitigation is required.

Impact: Exposure of Residences North and West of SDSF to Noise from Cable Yarding Operations. This impact would be the same as the impact described for the No-Project Alternative except that the duration may be longer because more timber would be harvested. The maximum level of daytime noise allowed by Santa Cruz County is 70 dB (Figure 8-3). Warning horns have an estimated noise level of 100 dB at the source; this level would attenuate to the allowable standard of 70 dB at an average distance of approximately 1,200 feet (Miller 1982). This impact is considered less than significant for the following reasons:

- only a few private residences are located within 1,200 feet of areas in SDSF that would be yarded using cable systems (Figure 2-3),

- cable-yarding operations would be relatively infrequent at SDSF and of short duration, and

- the use of warning horns in conjunction with cable yarders is standard practice in the Santa Cruz Mountains.

Mitigation: No mitigation is required.

Impact: Exposure of Residences North and West of SDSF to Noise from Helicopter Yarding Operations. This impact would be the same as the impact described for the No-Project Alternative except that the duration would be longer because more timber would be harvested. The noise impact of helicopter operations at the felling sites is considered minimal for the following reasons:

- Exposure of people on the ground to helicopter noise at the felling sites will be brief for each loading operation and loading sites will shift throughout the day.

- Yarding operations would only occur once every 2 years and would be at a different location every 2 years.

- California Forest Practice Rules limit yarding operations within 300 feet of an occupied dwelling between the hours of 6:00 a.m. and 9:00 p.m.

The potential noise impact on residences located near the drop-off and landing area, however, is considered potentially significant because of the extended and repeated exposure that could occur at the area over several days.

Mitigation:

- **Locate the Timber Drop-Off and Landing Areas at Least 0.5 Mile from the Nearest Occupied Dwellings.** Forest staff shall locate the timber drop-off and helicopter landing area at least 0.5 mile from the nearest occupied dwellings.

Implementation of this mitigation measure would reduce this impact to a less-than-significant level.

Impact: Exposure of Residences in the Area to Noise from Trucking Operations. It is anticipated that as many as six to eight truck loads of logs with an average of three to four loads per day will leave the area. This impact is considered less than significant for the following reasons:

- Exposure of people to noise from logging trucks will be brief (a matter of seconds), will not exceed county standards, and will typically only occur three to four times a day.

- Yarding operations would only occur once every 2 years and would be at a different location every 2 years.

- California Forest Practice Rules limit trucking to weekday and nonholiday periods.

- Logging operations are common in the Santa Cruz Mountains, have occurred in the past on the project site, and in general should be consistent with the expectations of people living in the area.

Mitigation: No mitigation is required.

Alternative 2: Emphasize Watershed and Late-Succession Habitat Protection

Impact: Exposure of Residences North and West of SDSF to Noise from Tree-Felling Operations. Under Alternative 2, a total of 1,000 MBF of timber would be harvested every 2 years. A typical biennial harvesting operation would result in the cutting of about

6 MBF from 170 acres. This impact would be the same as the impact described for the No-Project Alternative except that the duration under Alternative 2 would be longer because more timber would be harvested. This impact is less than significant.

Mitigation: No mitigation is required.

Impact: Exposure of Residences North and West of SDSF to Noise from Tractor Yarding Operations. This impact would be the same as the impact described for the No-Project Alternative and the proposed project. Although less timber would be harvested than under the proposed project, less tractor yarding would be employed to avoid erosion. This impact is less than significant.

Mitigation: No mitigation is required.

Impact: Exposure of Residences North and West of SDSF to Noise from Cable Yarding Operations. This impact would be the same as the impact described for the No-Project Alternative except that the duration would be longer because more timber would be harvested and more cable yarding would be employed to avoid erosion from use of tractors. This impact is approximately the same as under the proposed project and is considered less than significant.

Mitigation: No mitigation is required.

Impact: Exposure of Residences North and West of SDSF to Noise from Helicopter Yarding Operations. This impact would be approximately the same as the impact described for the proposed project because, although less timber would be harvested in an average year, relatively more cable yarding would occur and more helicopter yarding may be employed to avoid erosion from the use of tractors. This impact is considered potentially significant.

Mitigation:

- **Locate the Timber Drop-Off and Landing Areas at Least 0.5 Mile from the Nearest Occupied Dwellings.** This mitigation measure is discussed above under "Proposed Project".

Implementation of the above mitigation measure would reduce this impact to a less-than-significant level.

Impact: Exposure of Residences in the Area to Noise from Trucking Operations. This impact would be the same as the impact described for the No-Project Alternative except that the duration would be longer because more timber would be harvested. This impact is considered less than significant as described for the proposed project.

Mitigation: No mitigation is required.

Alternative 3: Emphasize Forest Management Demonstration and Recreation

Impact: Exposure of Residences North and West of SDSF to Noise from Tree-Felling Operations. Under Alternative 3, a total of 4,000 MBF of timber would be harvested every 2 years. A typical biennial harvesting operation would result in the cutting of about 13 MBF from 300 acres. This impact would be the same as the impact described for the No-Project Alternative except that the duration would be longer because more timber would be harvested. As described under the proposed project, this impact is less than significant.

Mitigation: No mitigation is required.

Impact: Exposure of Residences North and West of SDSF to Noise from Tractor Yarding Operations. This impact would be the same as the impact described for the No-Project Alternative except that the duration would be longer because more timber would be harvested. As described under the proposed project, this impact is less than significant.

Mitigation: No mitigation is required.

Impact: Exposure of Residences North and West of SDSF to Noise from Cable Yarding Operations. This impact would be approximately the same as the impact described for the proposed project, although more timber would be harvested. As described under the proposed project, this impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: Exposure of Residences North and West of SDSF to Noise from Helicopter Yarding Operations. This impact would be the same as the impact described for the No-Project Alternative except that the duration would be longer because more timber would be harvested. As described under the proposed project, this impact is considered potentially significant.

Mitigation:

- **Locate the Timber Drop-Off and Landing Areas at Least 0.5 Mile from the Nearest Occupied Dwellings.** This mitigation measure is discussed above under "Proposed Project".

Implementation of the above mitigation measure would reduce this impact to a less-than-significant level.

Impact: Exposure of Residences in the Area to Noise from Trucking Operations. This impact would be the same as the impact described for the No-Project Alternative except that the duration would be longer because more timber would be harvested. As described under the proposed project, this impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: Exposure of Residences in the Area to Noise from Motorized Use of the Main Road. Under this alternative, motorized use by the public of the main forest road would be allowed. Because this road is isolated from surrounding residences and because intervening topography blocks sight lines between the road and residences, vehicle noise would be barely audible (if at all) at residences. This impact is therefore considered less than significant.

Mitigation: No mitigation is required.

Chapter 9. Citations

PRINTED REFERENCES

Barbour, M. G., and J. Major. 1977. Terrestrial vegetation of California. John Wiley and Sons. New York, NY.

Beedy, E. C., and S. L. Granholm. 1985. Discovering Sierra birds. Yosemite and Sequoia Natural History Association. Yosemite, CA.

Bies, D. A., and C. H. Hansen. 1988. Engineering noise control theory and practice. Unwin Hymand Ltd. London, England.

Bjornn, T. C., and D. W. Reiser. 1991. Habitat requirements of salmonids in streams. American Fisheries Society Special Publication 19:83-138.

Brode, J. M., and R. B. Bury. 1984. The importance of riparian systems to amphibians and reptiles. Pages 30-31 in R. E. Warner and K. M. Hendrix (eds.), California riparian systems: ecology, conservation, and productive management. University of California Press. Berkeley, CA.

Brown and Caldwell. 1981. Soquel Creek water quality investigation. Walnut Creek. Prepared for Soquel Creek Water District, Soquel, CA.

_____. 1982. Soquel Creek water quality investigation. Walnut Creek. Prepared for Soquel Creek Water District, Soquel, CA.

Burns, J. W. 1971. The carrying capacity for juvenile salmonids in some northern California streams. California Fish and Game 57(1):44-57.

Cafferata, P. H., and C. Poole. 1993. Watershed assessment for the East Branch of Soquel Creek. California Department of Forestry and Fire Protection. Sacramento, CA.

Cain, N. 1980. The rainfall intensity-duration control of shallow landslides and debris flows. Geographic Annual 62A (1-2):23-27.

California. Department of Fish and Game. 1987. Golden eagle status review. (W-65-R-2, Job No. II-17.) Nongame Wildlife Investigations. Sacramento, CA.

_____. Department of Forestry and Fire Protection. 1993. Fish population open file data. Soquel Demonstration State Sorest. Soquel, CA.

_____. Department of Forestry and Fire Protection. 1994a. Fish population open file data. Soquel Demonstration State Forest. Soquel, CA. Unpublished data.

_____. Department of Forestry and Fire Protection. 1994b. Stream survey open file data. Soquel Demonstration State Forest. Soquel, CA. Unpublished data.

_____. State Water Resources Control Board. 1987. Final report of the Forest Practice Rules assessment team. Sacramento, CA.

Carter, H. R., and R. A. Erickson. 1988. Population status and conservation problems of the marbled murrelet in California, 1892-1987. (Final Report, Contract FB7569.) California Department of Fish and Game. Sacramento, CA.

Central Coast Regional Water Quality Control Board. 1989. Water quality control plan. California State Water Resources Control Board. Sacramento, CA.

Clark, R. N., and D. R. Gibbons. 1991. Recreation. Pages 459-481 in W. R. Meehan (ed.), Influences of forest and rangeland management on salmonid fishes and their habitats. (American Fisheries Society Special Publication 19.) American Fisheries Society. Bethesda, MD.

Dillion, B. D, Ph.D. 1992. Archaeological and historical survey of Soquel demonstration state forest, Santa Cruz County, California. (CDF Archeological Reports No. 6.) Prepared for California Department of Forestry and Fire Protection.

Durgin, P. B., R. R. Johnston, and A. M. Parsons. 1989. Critical sites erosion study, volume I - Causes of erosion on private timberlands in northern California: observations of the interdisciplinary team. California Department of Forestry and Fire Protection. Sacramento, CA.

D. W. Alley & Associates. 1992. Recommended monitoring and logging guidelines for the Soquel Demonstration State Forest related to aquatic resources and flood control. Brookdale, CA. Prepared for Soquel Demonstration State Forest, Soquel, CA.

_____. 1994. Comparison of juvenile steelhead densities in 1981 and 1994 with estimates of total numbers of mainstem juveniles and expected numbers of adults returning to the San Lorenzo River, Soquel Creek, and Corralitos Creek, Santa Cruz County, California. Brookdale, CA. Prepared for City of Santa Cruz Water Department, City of Watsonville Water Department, Lompico County Water District, San Lorenzo Valley Water District, and Soquel Creek Water District.

Greenlee, J. M. 1981. Santa Cruz County fire history: maps. University of California, Santa Cruz. Santa Cruz, CA.

Grinnell, J., and A. H. Miller. 1944. The distribution of the birds of California. (Pacific Coast Avifauna Number 27.) Cooper Ornithological Society. Berkeley, CA.

Hamer, T. E., and E. B. Cummins. 1990. Forest habitat relationships of marbled murrelets in northwestern Washington. Wildlife Management Division, Nongame Program, Washington Department of Wildlife. Olympia, WA. Unpublished report.

Harris, S. W. 1991. Northwestern California birds. Humboldt State University Press. Arcata, CA.

Harvey and Stanley Associates. 1982. Final draft: fish habitat assessments for Santa Cruz County streams. Alviso, CA. Prepared for Santa Cruz County Planning Department, Santa Cruz, CA.

Hayes, M. P., and M. R. Jennings. 1986. Decline of ranid frog species in western North America: are bullfrogs (*Rana catesbeiana*) responsible? Journal of Herpetology 20:490-509.

_____. 1988. Microhabitat correlates of distribution among the California red-legged frog (*Rana aurora draytoni*) and the foothill yellow-legged frog (*Rana boylei*): implications for management alternatives. Pages 144-158 in Management of amphibians, reptiles, and small mammals in North America - proceedings of the symposium. (General Technical Report RM-166.) U.S. Forest Service, Rocky Mountain Range and Experiment Station. Fort Collins, CO.

Hicks, B. J., J. D. Hall, P. A. Bisson, and J. R. Sedell. 1991. Responses of salmonids to habitat changes. American Fisheries Society Special Publication 19:483-518.

Holland, D. C., and R. B. Bury. 1992. Status of the western pond turtle (*Clemmeys marmorata*) in 1991. In Presentation at the Western Section of the Wildlife Society Annual Meeting 1992. San Diego, CA.

Holland, R. F. 1986. Preliminary descriptions of the terrestrial natural communities in California. California Department of Fish and Game. Sacramento, CA.

Holland, V. L., D. Keil, L. Kelly, and M. Hanson. 1992. Preliminary biological assessment of Soquel Demonstration State Forest, Santa Cruz County, California. (Contract File 4904.) California Polytechnic State University. San Luis Obispo, CA.

Horner, E. R. 1994. California cities, towns, and countries basic data profiles for all municipalities and countries. Information Publications. Palo Alto, CA.

Jennings, M. R. 1988. Natural history and decline of native ranids in California. Pages 61-72 in H. F. DeLisle, P. R. Brown, B. Kaufman, and B. M. McGurty (eds.), Proceedings of the conference on California herpetology. Southwestern Herpetologists Society Special Publication 4:1-143.

Jennings, M. R., and M. P. Hayes. 1984. The frogs of Tulare. Outdoor California 45:17-19.

Jennings, M. R., M. P. Hayes, and D. C. Holland. 1992. A petition to the U.S. Fish and Wildlife Service to place the California red-legged frog and the western pond turtle on the list of endangered wildlife and plants.

Johnsgard, P. A. 1988. North American owls, biology and natural history. Smithsonian Institution Press. Washington, DC.

_____. 1990. Hawks, eagles, and falcons of North America. Smithsonian Institution Press. Washington, DC.

Jordan, M. E. 1986. Stream inventory data report. County of Santa Cruz. Santa Cruz, CA. Unpublished data.

Kolb, T. E., M. R. Wagner, and W. W. Cavington. 1994. Concepts of forest health. Journal of Forestry. Volume 92(7):10-15. July 1994.

Lewis, J., and R. M. Rice. 1989. Critical sites erosion study, volume II: site conditions related to erosion on private timberlands in northern California. Final report. California Department of Forestry and Fire Protection. Sacramento, CA.

Lisle, T. E. 1987. Using "residual depths" to monitor pool depths independently of discharge. (Research Note PSW-394.) U.S. Forest Service. Berkeley, CA.

LSA Associates. 1993. Final supplemental environmental impact report Olive Springs Quarry, Inc. mining permit and expansion. Point Richmond, CA. Prepared for Santa Cruz County, Santa Cruz, CA.

Manson, M. W., and J. A. Sowma-Bawcom. 1992. Geology, slope stability, and earthquake damage in Soquel Demonstration State Forest. California Department of Conservation, Division of Mines and Geology. Sacramento, CA.

Marcot, B. G. 1979. California wildlife habitat relationships program, North Coast/ Cascades Zone. Volume II - bird narratives. U.S. Forest Service. Fort Collins, CO.

Marshall, D. B. 1988. Status of the marbled murrelet in North America: with special emphasis on populations in California, Oregon, and Washington. (Biological Report 88[30]:1-19.) U.S. Fish and Wildlife Service. Portland, OR.

Meslow, E. C., and W. M. Wight. 1975. Avifauna and succession in Douglas-fir forests of the Pacific northwest. Pages 266-271 in D. R. Smith (technical coordinator), Management of forest and range habitats for nongame birds. Proceedings of a symposium, 1975 May 1-9, Tucson, AZ. (General Technical Report WO-1.) U.S. Forest Service. Washington, DC.

Miller, L. N. 1982. Noise control for buildings and manufacturing plants. Bolt, Beranek and Newman. Cambridge, MA.

Moore, K. R., and C. J. Henny. 1983. Accipiter nest sites in Oregon. Raptor Research 17:65-76.

Moyle, P. B., J. E. Williams, and E. D. Wikramanayake. 1989. Fish species of special concern of California. California Department of Fish and Game. Rancho Cordova, CA.

Natural Diversity Data Base. 1994. Survey of Huntington Lake, Mt. Givens, and Dogtooth Peak quadrangles. California Department of Fish and Game. Sacramento, CA.

Nature Conservancy, The. 1988. Management plan for Soquel Creek Demonstration Forest. San Francisco, CA.

Nelson, S. K. 1989. Development of inventory techniques for surveying marbled murrelets (*Brachyramphus marmoratus*) in the central Oregon coast range. (Publication Number 88-6-01.) Nongame Program, Oregon Department of Fish and Wildlife.

_____. 1990. Distribution of the marbled murrelet in western Oregon. (Publication Number 89-9-02.) Nongame Program, Oregon Department of Fish and Wildlife.

Norris, R. M., and R. W. Webb. 1990. Geology of California. John Wiley & Sons. New York, NY.

Orth, D. J. 1983. Chapter 4: Aquatic habitat measurements. Pages 61-84 in L. A. Nielson and D. L. Johnson (eds.), Fisheries techniques. American Fisheries Society. Bethesda, MD.

Paton, P. W. C., and C. J. Ralph. 1988. Geographic distribution of the marbled murrelet in California at inland sites during the 1988 breeding season. (Contract No. FG-7569.) California Department of Fish and Game. Sacramento, CA.

Paton, P. W. C., C. J. Ralph, H. R. Carter, and S. K. Nelson. 1990. Surveying marbled murrelets at inland forested sites: a guide. (General Technical Report PSW-120.) U.S. Forest Service, Pacific Southwest Research Station. Arcata, CA.

Pfankuch, D. J. 1978. Stream reach inventory and channel stability evaluation. U.S. Forest Service. Missoula, MT.

Poole, L. 1993. Stream channel inventory for the East Branch of Soquel Creek. Senior thesis. University of California, Santa Cruz, Department of Environmental Studies. Santa Cruz, CA.

Raleigh, R. F., T. Hickman, R. C. Solomon, and P. C. Nelson. 1984. Habitat suitability information: rainbow trout. (FWS/OBS-82/10.60.) U.S. Fish and Wildlife Service. Washington, DC.

Ralph, C. J., S. K. Nelson, M. M. Shaughnessy, and S. L. Miller. 1993. Methods for surveying marbled murrelets in forests. (Technical paper #1.) Pacific Seabird Group, Pacific Southwest Forest and Range Experiment Station, U.S. Forest Service. Arcata, CA.

Ralph, C. J., S. L. Miner, N. L. Nasland, B. O'Donnell, P. W. C. Paton, J. Seay, and S. W. Singer. 1990. Marbled murrelet research during 1989 in northern and central California, an interim report. (Technical Report 1990-8.) Nongame Bird and Mammal Section, California Department of Fish and Game. Sacramento, CA.

Remsen, J. V. 1978. Bird species of special concern in California. California Department of Fish and Game. Sacramento, CA.

Reynolds, R. T. 1983. Management of western coniferous forest habitat for nesting accipiter hawks. (General Technical Report RM-102.) U.S. Forest Service. Denver, CO.

Reynolds, R. T., E. C. Meslow, and H. M. Wight. 1982. Nesting habitat of accipiters in Oregon. Journal of Wildlife Management 46(1):124-138.

Rice, R. M. 1991. Hydrological and erosional analysis of the Soquel Creek watershed. Prepared for Barnum Timber Company, Arcata, CA. Unpublished report.

_____. 1993. A guide to data collection and analysis in support of appraisal of cumulative watershed effects in California forests. Arcata, CA. Unpublished report.

Rice, R. M., and J. Lewis. 1991. Managing erosion risks associated with logging and forest roads in northwestern California. Water Resources Bulletin 27(5):809-818.

Robbins, C. S., D. Bystrack, and P. H. Geissler. 1986. The breeding bird survey, its first 15 years, 1965-1979. (Resource Publication 157.) U.S. Fish and Wildlife Service. Washington, DC.

Santa Cruz, County of. Planning Department. 1994. General plan update: background report. Santa Cruz, CA.

_____. Planning Department. 1993. County of Santa Cruz draft general plan and local coastal program. Santa Cruz, CA.

_____. Public Works Department. 1991. County of Santa Cruz pavement management system inventory/condition data report. July 2, 1991. Santa Cruz, CA.

Santa Cruz County Regional Transportation Commission. 1992. Santa Cruz County congestion management program. November. Santa Cruz, CA.

Sealy, S. G., and H. R. Carter. 1984. At-sea distribution and nesting habitat of the marbled murrelet in British Columbia: problems in the conservation of a solitarily nesting seabird. Pages 737-756 in J. P. Croxall, P. G. Evans, and R. W. Schreiber (eds.), Status and conservation of the world's seabirds. (ICBP Technical Publication 2.)

Shapovalov, L., and A. C. Taft. 1954. The life histories of the steelhead rainbow trout (*Salmo gairdneri gairdneri*) and silver salmon (*Oncorhynchus kisutch*) with special reference to Waddell Creek, California, and recommendations regarding their management. (Fish Bulletin No. 98.) California Department of Fish and Game. Sacramento, CA.

Singer, S., and M. L. Swanson. 1983. Soquel Creek storm damage recovery plan: a reconnaissance level study with recommendations for watershed management. U.S. Soil Conservation Service. Aptos, CA. Unpublished report.

Soho, D., D. Holderman, and R. Eliot. 1994. Soquel Demonstration State Forest logging plan. California Department of Forestry and Fire Protection. Soquel, CA. Unpublished report.

Stebbins, R. C. 1972. California amphibians and reptiles. University of California Press. Berkeley, CA.

Storer, T. L. 1925. A synopsis of the amphibia of California. University of California Publications in Zoology 27:1-342.

Thelander, C. G. 1974. Nesting territory utilization by golden eagles (*Aquila chrysaetos*) in California during 1974. (Wildlife Management Branch Administrative Report No. 74-7.) Nongame Wildlife Investigations, California Department of Fish and Game. Sacramento, CA.

Titus, R. G., and D. C. Erman. In preparation. History and status of steelhead in California coastal drainages south of San Francisco Bay. Hilgardia (accepted for publication).

Transportation Research Board. 1985. Highway capacity manual. (Special Report 209.) National Research Council. Washington, DC.

University of California, Center for Environmental Design Research. 1993. Soquel Demonstration State Forest recreation study final report. Prepared for California Department of Forestry and Fire Protection, Soquel, CA.

University of California, Department of Landscape Architecture and Environmental Planning. 1995. Applied environmental geographic information system laboratory database. Unpublished data. Berkeley, CA.

U.S. Bureau of Land Management. 1980. Visual resource management program. (Stock No. 024-011-00116-6.) U.S. Government Printing Office. Washington, DC.

U.S. Environmental Protection Agency. 1971a. Noise from construction equipment and operations, building equipment, and home appliances. December 31, 1971. U.S. Government Printing Office. Washington, DC. Prepared by Bolt, Beranek and Newman.

_____. 1971b. Transportation noise and noise from equipment powered by internal combustion engines. December 31, 1971. U.S. Government Printing Office. Washington, DC. Prepared by Wyle Laboratories.

U.S. Soil Conservation Service. 1980. Soil survey of Santa Cruz County. Davis, CA.

Zeiner, D. C., W. F. Laudenslayer, Jr., K. E. Mayer, and M. White. 1990. California's wildlife. Volume. I - Amphibians and reptiles, Volume II - Birds, and Volume III - Mammals. California Department of Fish and Game. Sacramento, CA.

PERSONAL COMMUNICATIONS

Abshear, Chuck. Analyst. Jackson State Forest, Santa Rosa, CA. November 28, 1994 - telephone conversation.

Burbach, Marty. Wildlife biologist. California Department of Forestry and Fire Protection, Sacramento, CA. June 22, 1995 - field trip summary.

Demming, Mark. Principal planner. Santa Cruz County Planning Department, Santa Cruz, CA. January 1995 - telephone conversation.

Drinkard, Nancy. Forest practice inspector. California Department of Forestry and Fire Protection, Felton, CA. August 20, 1994 - meeting.

Goddard, Thomas. Resource planner. County of Santa Cruz, Santa Cruz, CA. October 28, 1994 - telephone conversation.

Marshall, Jack. Forest pest management specialist. California Department of Forestry and Fire Protection, Ukiah, CA. July 2, 1993 - Memorandum summarizing reconnaissance evaluation of current or potential pests at SDSF.

Meyer, Robert. Hydrologist. U.S. Geological Survey Water Resources Division, Sacramento, CA. October 28, 1994 - letter to Peter Cafferata, CDF forest hydrologist.

Pine, Bob. Environmental specialist. U.S. Fish and Wildlife Service, Sacramento, CA. November 2, 1994 - telephone conversation.

Sohriakoff, Jack. Traffic engineer. County of Santa Cruz Public Works Department. July 26, 1994 - memorandum with existing traffic volumes; August 8, 1994 - telephone conversation.

Suddjian, David. Consulting biologist. Santa Cruz, CA. September 10, 1994 - telephone conversation.

Sutfin, Thomas. Soquel demonstration state forest manager. California Department of Forestry and Fire Protection. November 1994 through May 1995 - telephone conversations; April 19, 20, and 21, 1995 - meetings.

Waggoner, Jerry. Park ranger. Forest of Nisene Marks State Park, Soquel, CA. November 4, 1994 - telephone conversation.

Appendix A. Scoping Report

Public Scoping Summary and Preliminary Description of Alternatives for the Program Environmental Impact Report for the General Forest Management Plan for Soquel Demonstration State Forest

Prepared for:

California Department of Forestry and
Fire Protection
1416 Ninth Street
Sacramento, CA 95814
Contact: Gary Brittner
916/653-9418

Prepared by:

Jones & Stokes Associates, Inc.
2600 V Street, Suite 100
Sacramento, CA 95818-1914
Contact: Nicholas Dennis
916/737-3000

March 28, 1994

This document should be cited as:

Jones & Stokes Associates, Inc. 1994. Public scoping summary and preliminary description of alternatives for the program environmental impact report for the general forest management plan for Soquel Demonstration State Forest. March 28. (JSA 93-215.) Sacramento, CA. Prepared for California Department of Forestry and Fire Protection, Sacramento, CA.

TABLE OF CONTENTS

Page

INTRODUCTION 1

PUBLIC COMMENTS ON THE SCOPE OF THE EIR 1
- Scoping Comments to Be Addressed in the EIR 2
- Scoping Comments That Will Not Be Addressed in the EIR 10

QUESTIONS ON THE CEQA PROCESS RECEIVED DURING THE SCOPING PERIOD 11

PRELIMINARY DESCRIPTION OF ALTERNATIVES TO THE PROPOSED ACTION 14
- Current Management Direction 14
- Watershed Protection and Late-Successional Forest Emphasis 15
- Forest Demonstration Emphasis 16

INTRODUCTION

This report summarizes public comments made at a workshop and in letters on the scope of the program environmental impact report (EIR) for the general forest management plan (Plan) for Soquel Demonstration State Forest (SDSF). It also contains responses to questions received on the California Environmental Quality Act (CEQA) process and a preliminary description of alternatives to the proposed action that will be analyzed in detail in the EIR.

PUBLIC COMMENTS ON THE SCOPE OF THE EIR

The period for receiving comments on the scope of the EIR extended from February 14, 1994 through March 18, 1994. Members of the public provided comments regarding information to be contained in the EIR at a public workshop held in Soquel on February 23, 1994, and in letters submitted during the scoping period. Eleven comments on the scope of the EIR were received at the workshop; these comments were summarized and made available to the public at the March 17, 1994 meeting of the SDSF Advisory Committee. In addition, scoping letters were received from the following agencies, organizations, and individuals:

1. Dave Johnston representing County of Santa Cruz Planning Department;
2. Donald W. Alley;
3. Charles E. Burton;
4. Mark Morenthaler representing Citizens for Responsible Forest Management;
5. Ida Hills;
6. Jerald W. Cloyd;
7. Thomas W. Mader representing Friends of Soquel Creek;
8. Steven W. Singer;
9. Brook A. Kraeger;

10. Jodi Frediani representing the Sierra Club, Santa Cruz Regional Group of the Ventana Chapter; and

11. Raymond J. Seto of Price, Postel & Parma representing Comstock Mill Road Association.

Scoping Comments to Be Addressed in the EIR

This section summarizes scoping comments that will be addressed in the EIR. Numbers in parentheses following the comments indicate the letter or letters from the above list that contained the comment. "PW" indicates the comment was received at the public scoping workshop.

Project Description

1. The EIR should clearly identify the activities that the EIR applies to and the locations of such activities. (1)

2. The EIR should clearly define "sustained yield" as it will be applied on SDSF. (1, 4, 10)

3. The EIR should clarify whether the objective of biotic resource protection actions is to enhance the biotic resources or to increase timber harvesting opportunities. (1)

4. Proposed actions to improve anadromous habitats in Soquel Creek should be described with greater specificity. (2)

5. The range of activities encompassed in the Plan and analyzed in the EIR should be clearly identified so that other activities requiring supplemental analysis for CEQA compliance can be readily determined. (4)

6. Proposed actions involving timber harvesting, recreation, land acquisition, and public access should be described with greater specificity so that they can be analyzed in the EIR as a series of related actions rather than as individual elements of the Plan to be analyzed separately in subsequent documents. (4)

7. Resource protection measures for riparian areas should be described with greater specificity. (4)

8. The basis for selecting planned harvest levels should be clarified. (4, PW)

9. Mitigation measures specified in the EIR should be more restrictive than those required by California Forest Practice Act rules if needed to avoid significant impacts. (7)

10. Planned actions to improve fish habitat in Soquel Creek should be described with greater specificity. (7)

11. Planned actions should be described with greater specificity. (8, PW)

12. Planned actions to control feral pigs should be described with greater specificity. (8)

13. Planned actions to create new snags should be described with greater specificity and the impacts of such actions should be assessed. (8)

14. The EIR should specify mitigation measures to avoid or reduce potentially significant, as well as significant, impacts. (PW)

15. The EIR should include a monitoring plan that specifies the timing and approach for all monitoring activities. (PW)

16. Mitigation monitoring should be an ongoing activity. (PW)

17. Resource monitoring standards set in the EIR should be as specific as possible. (PW)

Project Alternatives

1. The EIR should analyze an alternative under which no logging is proposed for Amaya Creek drainage. (1)

2. Alternatives for which timber harvesting would be more intensive than in the draft Plan are inconsistent with AB 1965. (4)

3. An alternative calling for less timber harvesting than the draft Plan should be analyzed. (4, PW)

4. An alternative calling for less recreation than the draft Plan should be analyzed. (4)

Soil Erosion, Landsliding, and Water Quality

1. Mitigation measures should include harvest-exclusion and trail-exclusion zones in sensitive areas. (2)

2. Road construction or reconstruction in Amaya Creek drainage could result in increased erosion and landsliding. (2)

3. Steep trails should be closed in winter; otherwise, excessive erosion would result. (2, 4)

4. Timber harvesting could result in increased erosion and landsliding. (2)

5. A monitoring plan should identify sources of erosion, landsliding, and sedimentation. (2)

6. The EIR should take into account offsite effects including effects on water quality. (4)

7. Because of the predominance of highly erodible soil conditions, timber harvesting will increase soil erosion. (4)

8. Planned timber harvesting and road construction could increase landsliding. (4)

9. Planned timber harvesting could increase sedimentation and siltation in Soquel Creek. (4)

10. Planned timber harvesting could adversely affect sag ponds. (4)

11. Proposed fishery habitat improvement actions may be infeasible; minimizing human disturbance to stream channels and riparian areas is a preferable strategy. (4)

12. Road and trail construction could result in increased erosion. (4)

13. The EIR's mitigation and monitoring plans should consider the potential for erosion and landsliding in SDSF to increase sedimentation and flooding in lower Soquel Creek. (7)

14. Standards for acceptable rates of soil loss should be specified in the monitoring plan. (8)

15. Logging or road construction in Amaya Creek drainage at elevations lower than 1,000 feet above sea level could result in erosion and landsliding. (8)

16. Impacts of Plan implementation on water quality should be assessed in the EIR. (11)

17. The EIR should assess cumulative impacts on the Soquel Creek watershed. (PW)

Biotic Resources

1. Impacts of recreation use on forest resources should be assessed. (1)

2. Mitigation measures should include harvest-exclusion and trail-exclusion zones in biologically sensitive areas. (2)

3. Fishery enhancement measures should emphasize erosion control and prevention. (2)

4. Procedures and standards for monitoring changes in steelhead spawning and rearing habitat should be specified in the EIR. (2)

5. Vertebrate species classified by the state as species of special concern that could be affected by timber harvesting include:

   - western yellow-legged frog,
   - red-legged frog,
   - western pond turtle,
   - sharp-shinned hawk,
   - Cooper's hawk,
   - golden eagle,
   - long-eared owl,
   - merlin,
   - yellow warbler, and
   - coho salmon. (2)

6. Planned timber operations could affect habitat for steelhead trout. Potentially affected bird species include piscivorous birds such as belted kingfisher, green-backed heron, great blue heron, and common merganser; insectivorous birds such as American dipper; and riparian birds such as black phoebe, chestnut-backed chickadee, ruby-crowned kinglet, rufous-sided towhee, warbling vireo, yellow-rumped warbler, yellow warbler, Wilson's warbler, and wood duck. (2)

7. Timber harvesting could disturb nesting birds in riparian areas. (2)

8. Log-truck traffic along Hihn's Mill Road could kill substantial numbers of California newts and Pacific giant salamanders. (2)

9. Proposed harvest-exclusion zones adjacent to class 3 and 4 stream classes and sag ponds are inadequate. (2)

10. Uncontrolled use of picnic areas in riparian areas would damage riparian resources. (2)

11. Timber harvesting could affect the microclimate of the forest understory and adversely affect the biota that occupy the understory and forest floor. (2, 4)

12. Timber harvesting could increase opportunities for invasion and colonization by undesirable exotic plant species such as broom. (2, 8)

13. A monitoring plan should assess changes in habitat quality and the populations of species of special concern. (2)

14. Baseline assessments of aquatic habitats should be conducted before harvesting operations begin. Existing information on aquatic habitats is inadequate to evaluate the effects of proposed actions and determine whether such actions comply with mitigation standards. (2)

15. Planned timber harvesting would conflict with community goals to protect mature redwood trees. (4)

16. Planned timber harvesting could increase sedimentation and siltation in Soquel Creek and adversely affect fish habitat. (4)

17. Planned timber harvesting could adversely affect sag pond communities and associated species of special concern such as the red-legged frog and western pond turtle. (4)

18. Proposed fishery habitat improvement actions may be infeasible; minimizing human disturbance to stream channels and riparian areas is a preferable strategy. (4)

19. Baseline information on anadromous fish populations in Soquel Creek is unreliable and better information should be developed for use in the EIR. (4)

20. Trail construction could degrade riparian areas. (4)

21. Road construction could result in use of currently inaccessible portions of SDSF and adversely affect the forest biota. (4)

22. The EIR should specify how potential effects on fish habitat (including habitat for the endangered tidewater goby) will be mitigated and monitored. (7)

23. Current baseline information on bird and fish populations is inadequate to assess project impacts. (7, 8)

24. Planned actions could adversely affect amphibian and reptile species (e.g., western pond turtle, western toad, and newt) that use wetland and upland areas during different stages of their life cycles. (8)

25. Timber harvesting could adversely affect interior forest species (e.g., passerine birds, herbaceous plants, and cryptogams) by reducing canopy cover or increasing forest edge. (8)

26. Timber harvesting could adversely affect flora and fauna that depend on moist, shaded, humus-rich soils. (8)

27. Impacts on steelhead trout and aquatic invertebrates of siltation resulting from logging or road construction should be assessed. (8)

Land Use, Public Safety, and Public Services

1. Impacts on adjacent properties of recreation use at SDSF should be assessed. (1)

2. Increased recreation use could result in increased criminal activity near SDSF. (2)

3. Increased log-truck traffic could damage public roadways. (2)

4. Potential impacts of landsliding in SDSF (and particularly in Amaya Creek drainage) on flood risks in the village of Soquel should be assessed. (2)

5. The EIR should take into account offsite effects, including effects on nearby roads and adjacent private property. (4)

6. Planned timber harvesting could result in increased flooding and endanger downstream residents and property. (4, 8)

7. Planned timber harvesting and road construction could increase landsliding and endanger local residents and their property. (4)

8. Campground use could increase needs for waste removal and police patrols. (4, 5)

9. Increased recreation access could result in increased participation in undesirable activities such as shooting and hunting. (4)

10. Increased public use could result in increased fire risks unless SDSF is closed during periods of high fire danger. (4)

11. Allowing overnight use could increase fire risks. (4)

12. Road construction could result in use of currently inaccessible portions of SDSF, thus increasing fire risk. (4)

13. Construction of a forestry education center could consume significant amount of energy, fuel, and water. (4)

14. Construction of loop trails for bicycles would provide an alternative San Jose-Soquel Road and reduce the risks of collisions with automobil 6)

15. The EIR's mitigation and monitoring plans should consider the al for erosion and landsliding in SDSF to increase sedimentation an in lower Soquel Creek. (7)

16. Logging or road construction in Amaya Creek drainage a on er than 1,000 feet above sea level could result in erosic slid nd increased flooding in downstream communities. (8)

17. Planned recreation use and construction of a new en oul re risks, public safety, and the need for sanitary service be

18. Impacts of Plan implementation on public safety d assessed in the EIR. (11)

19. Impacts of road closures resulting from recent asses ess are (including emergency access) to SDSF need w

20. The EIR should assess trespass onto adjacent private property and use of unauthorized entrances resulting from public use of SDSF. (PW)

Traffic, Noise, and Air Quality

1. Increased recreation use could result in increased traffic congestion near SDSF. (2)

2. Logging and log-hauling could increase noise levels near SDSF. (2)

3. Increased log-truck traffic could increase airborne dust levels. (2)

4. The EIR should take into account offsite effects on nearby roads. (4)

5. Planned timber harvesting could increase log-truck traffic on Summit and San Jose-Soquel Roads. (4)

6. Planned timber harvesting could result in elevated noise levels. (4)

7. Construction and operation of a forestry education center could result in increased congestion of local roads. (4)

8. Planned recreation use and construction of a new entrance could affect traffic levels. (9)

9. Impacts of Plan implementation on traffic and circulation, noise, and air quality should be assessed in the EIR. (11)

Recreation and Visual Resources

1. Future recreation use levels should be projected and analyzed. (2)

2. Harvesting large redwood trees could adversely affect visual resources. (2)

3. Harvesting mature redwood trees would result in an irreversible adverse effect on visual resources. (4)

4. Road construction required to implement planned timber harvesting would adversely affect visual resources. (4)

5. Construction of loop trails will attract substantially increased bicycle use. (6)

6. Impacts of planned actions on the views from Highland Way need to be analyzed; Highland Way is a designated scenic corridor. (PW)

Cultural Resources

1. Increased recreation use could result in damage to archeological sites. (4)

Scoping Comments That Will Not Be Addressed in the EIR

The following comments received during the scoping period are not relevant to the scope of the EIR either because the likelihood of the purported impact on the environment is negligible or because the issue raised by the comment is unrelated to the environment and thus not subject to CEQA compliance.

1. Campground use could affect the amount of water available for public water supplies. (4, 5)

If a campground is constructed at SDSF and water service is provided to the campground, the water source would be Badger Springs, a tributary to the East Branch of Soquel Creek. Peak consumptive use of water by campground users is unlikely to exceed 500 gallons (67 cubic feet) per day, which would detract negligibly from streamflows in Soquel Creek and water supplies available for diversion from Soquel Creek.

2. Increased recreation opportunities at SDSF could induce a substantial number of people to move to the local area. (4)

Implementing the SDSF Plan would directly result in no new jobs. Enhanced recreation opportunities and increased visitation could result in a small increase in local jobs, but relative to current employment levels in the Soquel-Capitola area, this effect would be extremely small. Any new jobs indirectly resulting from Plan implementation would be relatively low-paying and thus more likely to be filled by local residents than by people attracted to the area by the prospect of such job opportunities. In the absence of a substantial employment effect, Plan implementation would not induce growth in the local community.

3. A forestry education center could require acquisition of land at a large cost to taxpayers. (4)

CEQA states that socioeconomic effects of projects are not considered significant environmental effects, but a socioeconomic effect that results in physical changes may be considered in determining the significance of the physical changes. Allocations of public

funds for a forestry education center would not result in physical changes subject to CEQA compliance.

QUESTIONS ON THE CEQA PROCESS RECEIVED DURING THE SCOPING PERIOD

1. What is the environmental review process for activities conducted pursuant to the Plan? How will CDF determine whether future actions are "covered by" the program EIR?

   All projects conducted pursuant to the Plan will be evaluated relative to the program EIR using the environmental checklist presented in this report or a similar checklist to determine whether the project could substantially affect the environment. Projects such as timber harvesting operations or trail construction that are located and designed consistent with the conditions and mitigation measures specified in the EIR will generally be considered to have no significant environmental impacts. Conversely, projects inconsistent with the EIR's conditions and mitigation measures will generally be considered as having potential to result in significant environmental impacts. Such projects would require additional analysis and documentation (i.e., either a negative declaration or an EIR) to comply with CEQA.

2. How and by whom will the EIR alternatives be formulated?

   Formulation of alternatives generally continues throughout the process of preparing an EIR. The alternatives are formulated by the EIR preparer in consultation with the lead agency (California Department of Forestry [CDF]) based on input from other agencies and the public. This report includes preliminary descriptions of the alternatives to be analyzed in the EIR; they represent modifications to and refinements on the descriptions contained in the notice of preparation for the EIR. The alternatives as described in the draft EIR will include modifications and refinements relative to those contained in this report. Those alternative descriptions could again be revised in the final EIR based on comments received on the draft EIR.

3. What are the differences between CEQA and the California Forest Practice Act regarding the need for public hearings?

   The California Forest Practice Act specifies that, in counties such as Santa Cruz for which special forest practice rules have been adopted, a public hearing shall be held on any timber harvesting plan (THP) for which the county board of supervisors or planning commission requests a hearing. Santa

Cruz County Board of Supervisors has a standing request for public hearings on all THPs submitted for lands in the county.

CEQA encourages, but does not require, public hearings on proposed projects. The State CEQA Guidelines specify that, if a hearing is held, it should use the draft EIR as the basis for discussion.

4. Will using the CEQA process for environmental compliance be less expensive for taxpayers than using the Forest Practice Act process?

The average cost of preparing a THP has increased substantially in recent years primarily because of the increased scope and stringency of environmental assessment requirements. One way that the California Board of Forestry has responded to the financial burden on landowners associated with increased THP costs has been the authorization of nonindustrial timber management plans (NTMPs) whereby owners of less than 2,500 acres who exclusively use uneven-aged forest management can develop long-term plans that apply to their entire ownership, rather than annually preparing THPs that apply only to that year's operations. NTMPs are expected to reduce the per-acre costs of planning harvesting operations by allowing environmental impact assessment for an entire property to be conducted once instead of requiring the services of environmental specialists in every year that harvesting occurs. CDF believes that similar economies associated with comprehensive planning are achievable at SDSF through the CEQA process.

6. Will environmental impact analysis occur for subsequent forest management plans?

The current Plan is expected to be in force for approximately 10 years. After that time, CDF will review its management objectives relative to the policies and guidelines in the current Plan and determine whether changes to the Plan are needed to achieve its objectives. If the proposed changes in management could result in substantial effects on the environment, additional CEQA analysis and documentation would be required. Such analysis and documentation could involve a modification or amendment to the current EIR, a negative declaration, or a new EIR.

7. Will actions undertaken by CDF on SDSF in the past, such as helipad construction, be analyzed in the EIR?

Before they were implemented, previous actions at SDSF were reviewed to assess their consistency with the interim management plan prepared for Soquel Creek Forest by The Nature Conservancy and to determine whether they were subject to CEQA. To date, no actions implemented at SDSF by

CDF have been subject to CEQA. The EIR will consider past actions at SDSF in the context of cumulative impact analyses for watershed and biotic resources.

8. The THP process was designed specifically to regulate timber harvesting. Will use of the CEQA process result in the loss of any environmental benefits that currently result from the THP process?

   The CEQA scoping process ensures that all potentially significant project impacts are considered. Impacts of specific projects that are not disclosed in the program EIR must be revisited in a subsequent CEQA document before the project can be implemented. Compared to the CEQA process, the THP process is relatively narrow in scope because its environmental analysis is restricted to a prescribed set of potential impacts.

9. Is having CDF review and make decisions to accept or reject THPs that CDF prepares for SDSF a conflict of interest?

   CDF is not unique in being an agency with regulatory responsibility for its own actions. For example, a division of California Department of Parks and Recreation (the State Office of Historical Preservation) regulates cultural resource protection within the State Park System and the U.S. Fish and Wildlife Service regulates endangered species protection within the National Wildlife Refuge System. The California Legislature explicitly dismissed as inconsequential the potential for conflicts by authorizing CDF to have dual responsibility for preparing and reviewing THPs for state forests. Other state agencies, including California Department of Fish and Game and the Regional Water Quality Control Board, also participate in THP review and have authority to reject THPs.

10. Will the public have an opportunity to review the EIR preparer's recommendations for additional specificity in the Plan?

    CDF and the EIR preparer will work together to develop the project description for the EIR throughout preparation of the draft EIR. The principal opportunity for commenting on the adequacy of the project description will occur during the public review period following circulation of the draft EIR in late 1994.

11. Who is responsible for approving the EIR?

    As lead agency, CDF will be responsible for certifying the final EIR. Gary Brittner is the agency contact for CDF.

12. How can an EIR be prepared when proposed actions are not described with adequate specificity to reliably assess their impacts?

    The State CEQA Guidelines state that the degree of specificity required in an EIR should correspond to the degree of specificity of the underlying actions described in the EIR. For example, EIRs for specific projects should be more detailed than program EIRs for general plans. A program EIR on a general plan should focus on the secondary effects of plan implementation (e.g., the effects on soil erosion of timber harvests proposed in the SDSF Plan), but the program EIR need not be as detailed as a subsequent CEQA document on a specific project.

13. Will public meetings be held to discuss concerns regarding the impacts of specific projects?

    Public hearings are expected to be held to discuss all future THPs submitted for SDSF. Hearings will be conducted for other projects, such as construction of a new entrance to SDSF, if CDF determines that they would facilitate CEQA compliance.

PRELIMINARY DESCRIPTION OF ALTERNATIVES TO THE PROPOSED ACTION

This section describes three project alternatives proposed for detailed analysis in the SDSF Plan EIR.

Current Management Direction

The principal objectives of current management direction as specified in the interim management plan for Soquel Creek Forest prepared by The Nature Conservancy include providing resource protection, recreation, and educational use. The direction provided in the interim plan describes the no-action alternative for the EIR. Planned actions include:

- restoring degraded reaches of Soquel Creek, Amaya Creek, and Fern Gulch by removing log and boulder jams and other activities;
- controlling invasions of exotic plants along Soquel Creek;
- controlling feral pigs;

- restoring native wetland vegetation adjacent to springs and sag ponds;
- removing debris from springs;
- stabilizing actively eroding areas;
- developing public access from adjacent public roads including a new access and parking area off Highland Way and a new southern access at an unspecified location;
- establishing a trail system connecting with the Santa Rosalia ridgeline and with the Forest of Nisene Marks State Park; and
- providing environmental education and study opportunities for the public.

The interim plan calls for timber harvesting to fund operations, maintenance, taxes, resource enhancement, and access improvements but does not quantify a timber harvesting objective. Assuming an annual budget of $100,000 is needed to support a part-time forest manager and meet other expenses, approximately 200 thousand board feet (MBF) of timber would need to be harvested annually to achieve financial self-sufficiency.

Recreation activities allowed under the interim plan include hiking, equestrian use, bicycling, and picnicking. Although the plan suggests the possibility of allowing camping, campground construction is given relatively low priority. Although the interim plan does not quantify projected recreation use levels, considering the low priority given to recreation relative to resource protection objectives, it is likely that somewhat lower limits on recreation use and, in particular, on bicycling use would be imposed under the current plan than under the proposed action.

The interim plan does not propose that any facilities be constructed to support its education program.

Watershed Protection and Late-Successional Forest Emphasis

Under this alternative, resource protection would receive highest priority. Emphasis would be placed on minimizing erosion, landsliding, and sedimentation and on accelerating development of late-succession forest structures.

No roads would be constructed or reconstructed. Timber would be harvested only in geologically stable areas with relatively low erosion hazard that could be accessed from existing roads. No landings would be constructed; logs would be loaded immediately after

they were yarded to a road. To encourage development of late-succession forest structures, timber would be harvested selectively by only removing trees with diameter at breast height of less than 26 inches, protecting all dominant trees (i.e., trees that extend above the general level of the forest canopy), and retaining at least 100 square feet of basal area per acre. (Basal area is the aggregated horizontal cross-sectional area of trees measured 4.5 feet above ground.)

Assuming that a total of 1,000 acres would be suitable for harvesting and that an average of 7.5 MBF per acre could be sustainably removed on a 15-year cutting cycle, the average annual harvest under this alternative would be approximately 500 MBF.

No new entrances, trails, picnic areas, or campgrounds would be constructed.

Forest Demonstration Emphasis

This alternative would emphasize demonstration of innovative forest management techniques. It would be characterized by relatively high management and facility costs and high timber revenues. Adverse environmental impacts would be minimized by constructing high-standard roads, implementing a wide range of slope-stabilization techniques, and installing drainage structures where needed. Logging systems would include tractors, cable yarders, and helicopters.

Timber management would involve various silvicultural systems including limited regeneration harvesting (e.g., clearcutting). Such harvesting would require amendment of existing forest practice rules. Timber harvest levels would average approximately 75% of annual growth or 2,000 MBF per year. Streamside management zones would be managed consistent with forest practice rules.

Extensive environmental remediation such as restoration of native vegetation and removal of barriers to fish passage would occur.

Hihn's Mill Road would be paved and extended to a new entrance on San Jose-Soquel Road; public use of motorized vehicles would be allowed on this road. Additional recreation improvements would include a campground with water service and sanitary facilities. Recreation use levels would be substantially higher than under other alternatives.

Appendix B. Fisheries Habitat Information

Table B-1

East Branch Soquel Creek in SDSF

Drainage: East Branch Soquel Creek

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

Survey Dates: 06/13/94 - 07/22/94

Confluence:

UNITS MEASURED #	HABITAT TYPE	HABITAT OCCURRENCE %	MEAN LENGTH ft.	TOTAL LENGTH ft.	TOTAL LENGTH %	MEAN WIDTH ft.	MEAN DEPTH ft.	MAXIMUM DEPTH ft.	MEAN AREA sq.ft.	TOTAL AREA sq.ft.	MEAN VOLUME cu.ft.	TOTAL VOLUME cu.ft.	MEAN RESIDUAL POOL VOL cu.ft.	MEAN SHELTER RATING	MEAN RT. BANK VEGETATED %	MEAN LT. BANK VEGETATED %	MEAN CANOPY %
91	LGR	23	79	7195	24	11	0.5	1.6	778	70793	374	34043	0	25	41	29	77
40	HGR	10	79	3146	11	10	0.6	2.0	681	27250	408	16314	0	38	20	26	84
11	CAS	3	26	284	1	7	0.4	1.6	188	2065	75	820	0	37	7	7	87
1	BRS	0	9	9	0	0	0.3	0.3	3	3	1	1	0	0	0	0	50
3	GLD	1	42	125	0	16	0.4	1.3	682	2046	378	1133	0	12	37	57	87
49	RUN	13	54	2640	9	10	0.7	1.6	524	25665	341	16728	0	20	33	29	74
45	SRN	11	170	7638	26	11	0.7	2.3	1581	71134	1215	54674	0	35	35	35	81
44	MCP	11	53	2319	8	12	1.1	3.3	646	28435	790	34756	450	33	37	33	85
32	STP	8	85	2711	9	11	1.0	3.3	761	24359	750	23993	476	45	18	15	80
15	LSR	4	43	646	2	12	1.3	14.8	497	7455	690	10348	479	62	21	45	94
29	LSBk	7	59	1702	6	12	1.8	6.2	765	22171	1595	46242	1239	46	36	25	78
16	LSBo	4	32	514	2	12	1.5	4.3	353	5645	589	9426	388	36	18	12	68
4	PLP	1	20	78	0	14	2.1	5.6	301	1203	869	3476	623	83	3	1	76
1	BPR	0	18	18	0	10	0.7	1.6	172	172	114	114	0	50	40	10	5
3	BPL	1	28	83	0	21	0.9	2.3	580	1739	726	2179	416	107	50	27	70
5	DPL	1	30	149	1	14	1.3	3.9	418	2089	468	2338	252	48	20	6	79
3	7.1	1	117	351	1	0	0.0	0.0	0	0	0	0	0	0	0	0	0

TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
392	29606	292224	256583

Table B-2

Amaya Creek

Drainage: East Branch Soquel Creek

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

Survey Dates: 06/13/94 - 07/22/94

Confluence:

UNITS MEASURED #	HABITAT TYPE	HABITAT OCCURRENCE %	MEAN LENGTH ft.	TOTAL LENGTH ft.	TOTAL LENGTH %	MEAN WIDTH ft.	MEAN DEPTH ft.	MAXIMUM DEPTH ft.	MEAN AREA sq.ft.	TOTAL AREA sq.ft.	MEAN VOLUME cu.ft.	TOTAL VOLUME cu.ft.	MEAN RESIDUAL POOL VOL cu.ft.	MEAN SHELTER RATING	MEAN RT. BANK VEGETATED %	MEAN LT. BANK VEGETATED %	MEAN CANOPY %
49	LGR	35	73	3565	44	6	0.4	1.6	367	17964	133	6525	1	26	63	58	75
5	HGR	4	58	288	4	7	0.3	1.3	234	1172	77	387	0	36	161	31	69
14	RUN	10	50	707	9	6	0.4	1.0	297	4154	111	1548	0	21	53	51	77
17	SRN	12	120	2043	25	6	0.4	1.3	644	10952	249	4225	0	52	74	71	78
21	MCP	15	27	567	7	8	0.8	3.0	211	4429	172	3605	98	46	43	49	68
3	STP	2	86	258	3	4	0.4	1.6	369	1108	243	730	122	30	13	15	98
6	LSL	4	23	135	2	8	0.8	2.6	175	1051	144	862	46	64	38	48	73
5	LSR	4	17	87	1	7	0.7	1.6	113	563	77	386	40	64	30	30	70
5	LSBk	4	28	142	2	8	0.8	2.3	196	980	157	784	76	44	54	84	91
9	LSBo	6	26	236	3	8	0.9	3.3	193	1741	173	1559	99	34	44	47	79
6	PLP	4	16	98	1	11	1.3	4.9	178	1071	241	1443	182	45	30	38	91
1	BPB	1	27	27	0	5	1.0	2.0	127	127	125	125	83	10	25	5	100

TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
141	8152	45312	22179

Table B-3. Number of Pool Habitats in the East Branch by Pool Habitat Type and Residual Depth

Habitat Type	0-1.5 Ft.	1.6-2.0 Ft.	2.1-3.0 Ft.	3.1-4.0 Ft.	4.1-5.0 Ft.	>5.0 Ft.
MCP	19	17	6	0	0	0
STP	9	15	8	0	0	0
LSP-R	6	3	3	1	1	1
LSP-B	1	8	9	5	3	1
LSP-Bo	5	5	3	1	0	0
PLP	1	1	1	0	1	0
BP-R	1	0	0	0	0	0
BP-L	2	1	0	0	0	0
DPL	1	1	1	1	0	0
Total percentage	32%	36%	22%	6%	4%	1%

Note: Percentages do not total 100 due to rounding.

Source: California Department of Forestry and Fire Protection 1994b.

Table B-4. Number of Pool Habitats in Amaya Creek by Pool Habitat Type and Residual Depth

Habitat Type	0-1.5 Ft.	1.6-2.0 Ft.	2.1-3.0 Ft.	3.1-4.0 Ft.	4.1-5.0 Ft.	>5.0 Ft.
MCP	16	4	1	0	0	0
STP	3	0	0	0	0	0
LSP-L	4	1	1	0	0	0
LSP-R	4	0	0	0	0	0
LSP-B	4	1	0	0	0	0
LSP-Bo	6	1	2	0	0	0
PLP	4	0	1	0	1	0
BP-Bo	0	1	0	0	0	0
Total percentage	75%	15%	9%	0%	2%	0%

Note: Percentages do not total 100 due to rounding.

Source: California Department of Forestry and Fire Protection 1994b.

Table B-5

East Branch Soquel Creek in SDSF

Drainage: East Branch Soquel Creek

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE

Survey Dates: 06/13/94 - 07/22/94

Confluence:

UNITS MEASURED	HABITAT TYPE	# UNITS SILT/CLAY DOMINANT	% TOTAL SILT/CLAY DOMINANT	# UNITS SAND DOMINANT	% TOTAL SAND DOMINANT	# UNITS GRAVEL DOMINANT	% TOTAL GRAVEL DOMINANT	# UNITS SM COBBLE DOMINANT	% TOTAL SM COBBLE DOMINANT	# UNITS LG COBBLE DOMINANT	% TOTAL LG COBBLE DOMINANT	# UNITS BOULDER DOMINANT	% TOTAL BOULDER DOMINANT	# UNITS BEDROCK DOMINANT	% TOTAL BEDROCK DOMINANT
91	LGR	1	1	1	1	46	51	19	21	21	23	2	2	1	1
40	HGR	0	0	0	0	14	35	11	28	7	18	7	18	1	3
11	CAS	0	0	0	0	3	27	0	0	1	9	7	64	0	0
1	BRS	0	0	0	0	0	0	0	0	0	0	0	0	1	100
3	GLD	0	0	0	0	3	100	0	0	0	0	0	0	0	0
49	RUN	0	0	4	8	29	59	9	18	5	10	1	2	0	0
45	SRN	0	0	3	7	28	62	6	13	7	16	1	2	0	0
44	MCP	5	11	12	27	13	30	5	11	4	9	3	7	2	5
32	STP	3	9	4	13	13	41	4	13	3	9	3	9	2	6
15	LSR	0	0	7	47	4	27	1	7	2	13	1	7	0	0
29	LSBk	9	31	9	31	7	24	0	0	1	3	0	0	3	10
16	LSBo	0	0	9	56	4	25	0	0	1	6	2	13	0	0
4	PLP	0	0	1	25	2	50	0	0	0	0	1	25	0	0
1	BPR	1	100	0	0	0	0	0	0	0	0	0	0	0	0
3	BPL	2	67	0	0	0	0	1	33	0	0	0	0	0	0
5	DPL	3	60	0	0	1	20	0	0	0	0	1	20	0	0
3	7.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table B-6

Amaya Creek

Drainage: East Branch Soquel Creek

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE

Survey Dates: 06/13/94 - 07/22/94

Confluence:

UNITS MEASURED	HABITAT TYPE	# UNITS SILT/CLAY DOMINANT	% TOTAL SILT/CLAY DOMINANT	# UNITS SAND DOMINANT	% TOTAL SAND DOMINANT	# UNITS GRAVEL DOMINANT	% TOTAL GRAVEL DOMINANT	# UNITS SM COBBLE DOMINANT	% TOTAL SM COBBLE DOMINANT	# UNITS LG COBBLE DOMINANT	% TOTAL LG COBBLE DOMINANT	# UNITS BOULDER DOMINANT	% TOTAL BOULDER DOMINANT	# UNITS BEDROCK DOMINANT	% TOTAL BEDROCK DOMINANT
49	LGR	0	0	2	4	5	10	38	78	3	6	1	2	0	0
5	HGR	0	0	0	0	2	40	2	40	0	0	1	20	0	0
14	RUN	1	7	3	21	6	43	3	21	1	7	0	0	0	0
17	SRN	0	0	3	18	1	6	10	59	3	18	0	0	0	0
21	MCP	6	29	10	48	2	10	1	5	1	5	0	0	0	0
3	STP	0	0	1	33	2	67	0	0	0	0	0	0	0	0
6	LSL	3	50	2	33	1	17	0	0	0	0	0	0	0	0
5	LSR	3	60	2	40	0	0	0	0	0	0	0	0	0	0
5	LSBk	2	40	1	20	1	20	0	0	0	0	0	0	1	20
9	LSBo	2	22	4	44	2	22	0	0	0	0	1	11	0	0
6	PLP	2	33	3	50	1	17	0	0	0	0	0	0	0	0
1	BPB	0	0	0	0	1	100	0	0	0	0	0	0	0	0

Appendix C. Background Information on Acoustics

Appendix C. Background Information on Acoustics

Sound Terminology

Sound travels through the air as waves of minute air pressure fluctuations caused by some type of vibration. In general, sound waves travel away from the sound source as an expanding spherical surface. The energy contained in a sound wave is consequently spread over an increasing area as it travels away from the source. This results in a decrease in loudness at greater distances from the sound source. The following terms are commonly used in acoustics.

Decibel

Sound-level meters measure the pressure fluctuations caused by sound waves. Because of the ability of the human ear to respond to a wide dynamic range of sound pressure fluctuations, loudness is measured in terms of decibels (dB) on a logarithmic scale. This results in a scale that measures pressure fluctuations in a convenient notation and corresponds to our auditory perception of increasing loudness.

A-Weighted Decibels

Most sounds consist of a broad range of sound frequencies. Because the human ear is not equally sensitive to all frequencies, several frequency-weighting schemes have been used to develop composite decibel scales that approximate the way the human ear responds to sound levels. The "A-weighted" decibel scale (dBA) is the most widely used for this purpose. Typical A-weighted sound levels for various types of sound sources are summarized in Figure C-1.

Equivalent Sound Level

Time-varying sound levels are often described in terms of an equivalent constant decibel level. Equivalent sound levels (L_{eq}) are used to develop single-value descriptions of average sound exposure over various periods of time. Such average sound exposure values often include additional weighting factors for annoyance potential attributable to time of day or other considerations. The L_{eq} data used for these average sound exposure descriptors are generally based on A-weighted sound-level measurements.

Sound Source	Sound Level (dBA)	Response
Carrier deck jet operation >	140	
Civil defense siren (at 100 feet) >	130	Painfully loud
Jet takeoff (at 200 feet) >	120	Threshold of feeling and pain
Riveting machine at 1 foot) > Rock music concert >	110	
Pile driver (at 50 feet) > Ambulance siren (at 100 feet) >	100	Very loud
Heavy truck (at 50 feet) >	90	
Pneumatic drill (at 50 feet) > Freight cars (at 50 feet) > Garbage disposal in home >	80	
Freight cars (at 100 feet) > Freeway traffic (at 50 feet) > Vacuum cleaner (at 10 feet) >	70	Moderately loud
Air conditioning unit (at 20 feet) >	60	
Speech in normal voice (at 15 feet) >	50	
Residence–typical movement of people, no TV or radio >	40	Quiet
Soft whisper (at 5 feet) >	30	
Recording studio >	20	
	10	
	0	Threshold of hearing

Jones & Stokes Associates, Inc.

Figure C-1
Weighted Sound Levels and Human Response

Day-Night Average Sound Level

Average sound exposure over a 24-hour period is often presented as a day-night average sound level (L_{dn}). L_{dn} values are calculated from hourly L_{eq} values, with the L_{eq} values for the nighttime period (10:00 p.m.-7:00 a.m.) increased by 10 dB to reflect the greater disturbance potential from nighttime noises.

Community Noise Equivalent Level

The community noise equivalent level (CNEL) is also used to characterize average sound levels over a 24-hour period, with weighting factors included for evening and nighttime sound levels. L_{eq} values for the evening period (7:00 p.m.-10:00 p.m.) are increased by 5 dB, while L_{eq} values for the nighttime period (10:00 p.m.-7:00 a.m.) are increased by 10 dB. For given set of sound measurements, the CNEL value will usually be about 1 dB higher than the L_{dn} value. In practice, CNEL and L_{dn} are often used interchangeably.

Percentile-Exceeded Sound Level

The sound level exceeded during a given percentage of a measurement period is the percentile-exceeded sound level (L_x). Examples include L_{10}, L_{50}, and L_{90}. L_{10} is the A-weighted sound level that is exceeded 10% of the measurement period, L_{50} is the level exceeded 50% of the period, and so on. L_{90} is often considered to represent the ambient sound level.

Ambient Sound

Ambient sound is the all-encompassing sound associated with a given community site, usually being a composite of sounds from many sources, near and far, with no particular sound being dominant.

Equivalencies between Various Sound Descriptors

The L_{dn} value at a site calculated from a set of measurements taken over a given 24-hour period will be slightly lower than the CNEL value calculated over the same period. Except in situations where unusually high evening sound levels occur, the CNEL value will be within 1.5 dB of the L_{dn} value for the same set of sound measurements.

The relationship between peak hourly L_{eq} values and associated L_{dn} values depends on the distribution of traffic over the entire day. There is no precise way to convert a peak hourly L_{eq} value to an L_{dn} value. However, in urban areas near heavy traffic, the peak hourly L_{eq} value is typically 2-4 dB lower than the daily L_{dn} value. In less heavily developed areas, the peak hourly L_{eq} is often equal to the daily L_{dn} value. For rural areas with little

nighttime traffic, the peak hourly L_{eq} value will often be 3-4 dB greater than the daily L_{dn} value.

Working with Decibel Values

The nature of the decibel scale is such that the individual sound levels for different sound sources cannot be added directly to give the combined sound level of these sources. Two sound sources producing equal sound levels at a given location will produce a composite sound level that is 3 dB greater than either sound alone. When two sound sources differ by 10 dB, the composite sound level will be only 0.4 dB greater than the louder source alone.

Most people have difficulty distinguishing the louder of two sound sources if they differ by less than 1.5-2.0 dB. Research into the human perception of changes in sound level indicates the following:

- a 3-dB change is just perceptible,
- a 5-dB change is clearly perceptible, and
- a 10-dB change is perceived as being twice or half as loud.

A doubling or halving of acoustic energy will change the resulting sound level by 3 dB, which corresponds to a change that is just perceptible. In practice, this means that a doubling of traffic volume on a roadway, doubling the number of people in a stadium, or doubling the number of wind turbines in a wind farm will, as a general rule, only result in a 3-dB, or just perceptible, increase in noise.

Outdoor Sound Propagation

There are a number of factors that affect how sound propagates outdoors. These factors, described by Miller (1982), are summarized below.

Distance Attenuation

As a general rule, sound from localized or point sound sources spreads out as it travels away from the source and the sound level drops at a rate of 6 dB per doubling of distance. If the sound source is long in one dimension, such as traffic on a highway or a long train, the sound source is considered to be a line source. As a general rule, the sound level from a line source will drop off at a rate of 3 dB per doubling of distance. If the intervening ground between the line source and the receptor is acoustically "soft" (e.g., ground vegetation, scattered trees, clumps of bushes), an attenuation rate of 4.5 dB per doubling of distance is generally used.

Attenuation from Barriers

Any solid structure such as a berm, wall, or building that blocks the line of sight between a source and receiver serves as a sound barrier and will result in additional sound attenuation. The amount of additional attenuation is a function of the difference between the length of the sound path over the barrier and the length of the direct line of sight path. Thus, the sound attenuation of a barrier between a source and a receiver that are very far apart will be much less than the attenuation that would result if either the source or the receiver is very close to the barrier.

Molecular Absorption

Air absorbs sound energy as a function of the temperature, humidity of the air, and frequency of the sound. Additional sound attenuation on the order of 1 to 2 dB per 1,000 feet can occur.

Anomalous Excess Attenuation

Large-scale effects of wind speed, wind direction, and thermal gradients in the air can cause large differences in sound transmission over large distances. These effects when combined result in anomalous excess attenuation, which can be applied to long-term sound-level estimates. Additional sound attenuation on the order of about 1 dB per 1,000 feet can occur.

Other Atmospheric Effects

Short-term atmospheric effects relating to wind and temperature gradients can cause bending of sound waves and can influence changes in sound levels at large distances. These effects can either increase or decrease sound levels depending on the orientation of the source and receptor and the nature of the wind and temperature gradient. Because these effects are normally short-term, it is generally not practical to include them in sound propagation calculations. Understanding these effects, however, can help explain variations that occur between calculated and measured sound levels.

Guidelines for Interpreting Sound Levels

Various federal, state, and local agencies have developed guidelines for evaluating land use compatibility under different sound-level ranges. The following is a summary of federal and state guidelines.

Federal Agency Guidelines

The federal Noise Control Act of 1972 (Public Law 92-574) established a requirement that all federal agencies administer their programs to promote an environment free of noise that jeopardizes public health or welfare. EPA was given the responsibility for:

- providing information to the public regarding identifiable effects of noise on public health or welfare,
- publishing information on the levels of environmental noise that will protect the public health and welfare with an adequate margin of safety,
- coordinating federal research and activities related to noise control, and
- establishing federal noise emission standards for selected products distributed in interstate commerce.

The federal Noise Control Act also directed that all federal agencies comply with applicable federal, state, interstate, and local noise control regulations.

Although EPA was given major public information and federal agency coordination roles, each federal agency retains authority to adopt noise regulations pertaining to agency programs. EPA can require other federal agencies to justify their noise regulations in terms of the federal Noise Control Act policy requirements. The Occupational Safety and Health Administration retains primary authority for setting workplace noise exposure standards. The Federal Aviation Administration retains primary jurisdiction over aircraft noise standards, and the Federal Highway Administration (FHWA) retains primary jurisdiction over highway noise standards.

In 1974, in response to the requirements of the federal Noise Control Act, EPA identified indoor and outdoor noise limits to protect public health and welfare (communication disruption, sleep disturbance, and hearing damage). Outdoor L_{dn} limits of 55 dB and indoor L_{dn} limits of 45 dB are identified as desirable to protect against speech interference and sleep disturbance for residential, educational, and healthcare areas. Sound-level criteria to protect against hearing damage in commercial and industrial areas are identified as 24-hour L_{eq} values of 70 dB (both outdoors and indoors).

The FHWA has adopted criteria for evaluating noise impacts associated with federally funded highway projects and for determining whether these impacts are sufficient to justify funding noise mitigation actions (47 FR 131:29653-29656, July 8, 1982). The FHWA noise abatement criteria are based on peak hourly L_{eq} sound levels, not L_{dn} or 24-hour L_{eq} values. The peak 1-hour L_{eq} criteria for residential, educational, and healthcare facilities are 67 dB outdoors and 52 dB indoors. The peak 1-hour L_{eq} criterion for commercial and industrial areas is 72 dB (outdoors).

The U.S. Department of Housing and Urban Development has established guidelines for evaluating noise impacts on residential projects seeking financial support under various

grant programs (44 FR 135:40860-40866, January 23, 1979). Sites are generally considered acceptable for residential use if they are exposed to outdoor L_{dn} values of 65 dB or less. Sites are considered "normally unacceptable" if they are exposed to outdoor L_{dn} values of 65-75 dB. Sites are considered unacceptable if they are exposed to outdoor L_{dn} values above 75 dB.

State Agency Guidelines

In 1987, the California Department of Health Services published guidelines for the noise elements of local general plans. These guidelines include a sound level/land use compatibility chart that categorizes various outdoor L_{dn} ranges into up to four compatibility categories (normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable) by land use. For many land uses, the chart shows overlapping L_{dn} ranges for two or more compatibility categories.

The noise element guidelines chart identifies the normally acceptable range for low-density residential uses as less than 60 dB and the conditionally acceptable range as 55-70 dB. The normally acceptable range for high-density residential uses is identified as L_{dn} values below 65 dB, and the conditionally acceptable range is identified as 60-70 dB. For educational and medical facilities, L_{dn} values below 70 dB are considered normally acceptable and L_{dn} values of 60-70 dB are considered conditionally acceptable. For office and commercial land uses, L_{dn} values below 70 dB are considered normally acceptable and L_{dn} values of 67.5-77.5 are categorized as conditionally acceptable.

These overlapping L_{dn} ranges are intended to indicate that local conditions (existing sound levels and community attitudes toward dominant sound sources) should be considered in evaluating land use compatibility at specific locations.

The California Department of Housing and Community Development has adopted noise insulation performance standards for new hotels, motels, and dwellings other than detached single-family structures (24 CCR T25-28). These standards require that "interior CNELs with windows closed, attributable to exterior sources, shall not exceed an annual CNEL of 45 dB in any habitable room".

Caltrans uses the FHWA criteria as the basis for evaluating noise impacts from highway projects.