

CALIFORNIA FOREST IMPROVEMENT PROGRAM

ENVIRONMENTAL IMPACT REPORT :

SUPPLEMENT TO THE FINAL EIR

STATE CLEARINGHOUSE #79050318

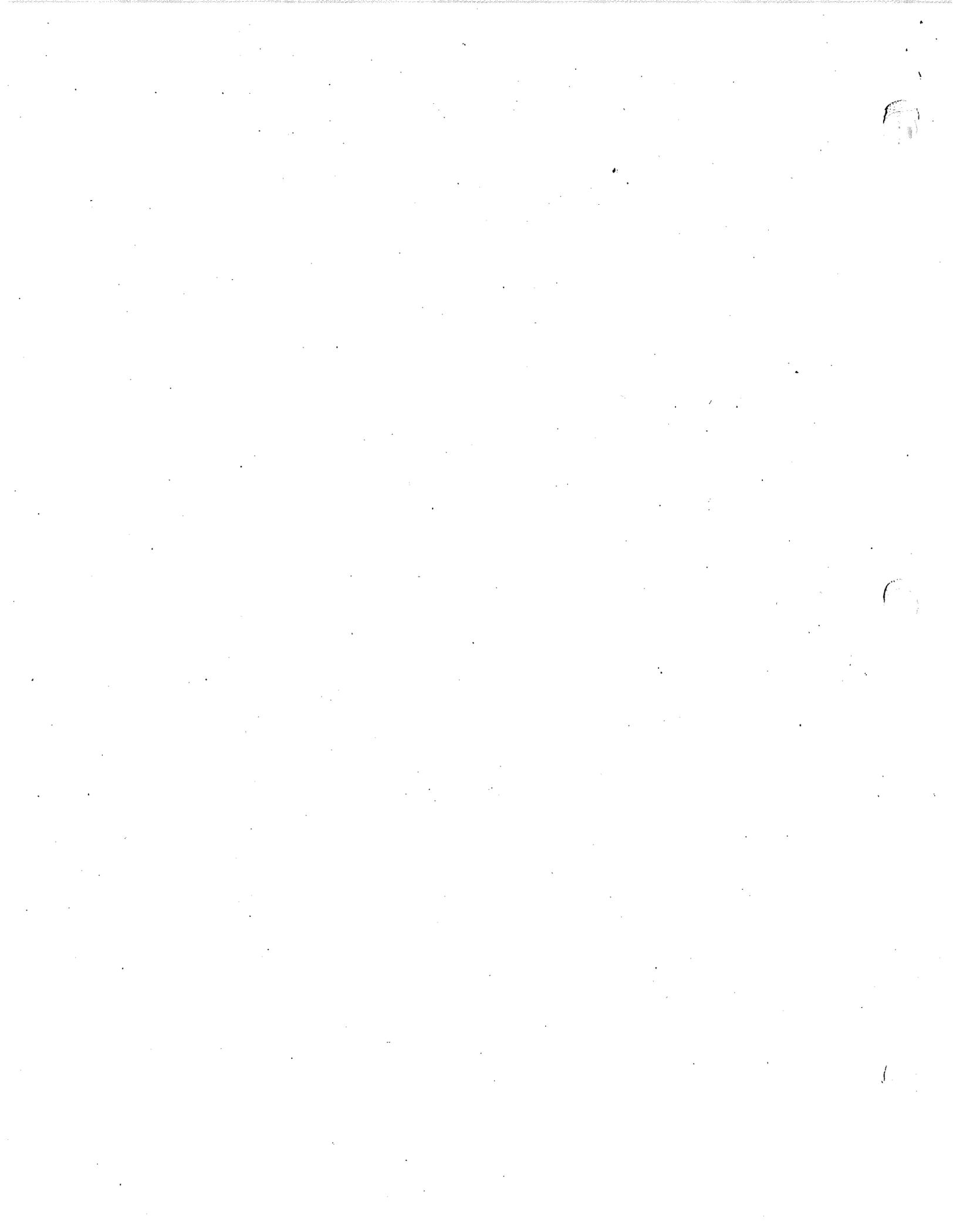
FILED JUNE, 1990

Harold Walt
Director
Department of Forestry and Fire Protection

George Deukmejian
Governor
State of California



Gordon K. Van Vleck
Secretary for Resources
The Resources Agency



FORWARD

This document is the final EIR adopted by the California Department of Forestry and Fire Protection. Changes have been made to correct typographical or editorial errors, to address comments from commenting agencies and the public, and to update data that has been made available since publication of the draft EIR. Appendices I and J have been added to include agency and public comments, and responses to comments.



TABLE OF CONTENTS

	<u>PAGE</u>
EXECUTIVE SUMMARY	1
I. PROJECT DESCRIPTION	3
A. General	3
B. Criteria Affecting Participation	4
1. Physical Availability and Funding	4
2. Landowner Eligibility	5
3. Cost Share Variation	5
II. ENVIRONMENTAL SETTING	6
A. Topography	7
B. Climate	10
1. Precipitation	10
2. Rain	10
3. Snow	12
4. Temperature	12
5. Winds	12
6. Smog	18
C. Water	18
D. Vegetation	19
1. Plant Communities	19
2. Forested Area Affected by Project	27
E. Wildlife	29
1. Coastal Wildlife	30
2. Fish Communities	31
3. Terrestrial Wildlife	31
F. Rare, Threatened and Endangered Species	32
G. Soils	34
H. Archeology/Cultural/Historical Resources	34
1. Data Sources	35
III. ELIGIBLE FOREST IMPROVEMENT PRACTICES	36
A. Reforestation and Timber Stand Improvement ...	36
1. Site Preparation	36
2. Planting/Reforestation	37
3. Clean and Release	38
4. Follow-up Treatment	39
5. Pre-commercial Thinning (PCT)	40
B. Wildlife Habitat Practices	40
1. Stream Clearance	40
2. Brush Habitat Improvement	41
3. Oak Woodland Habitat Enhancement	41
4. Revegetation Along Stream Channels	41
5. Wet Meadow Fencing Practice	42
C. Land Conservation Practices	42

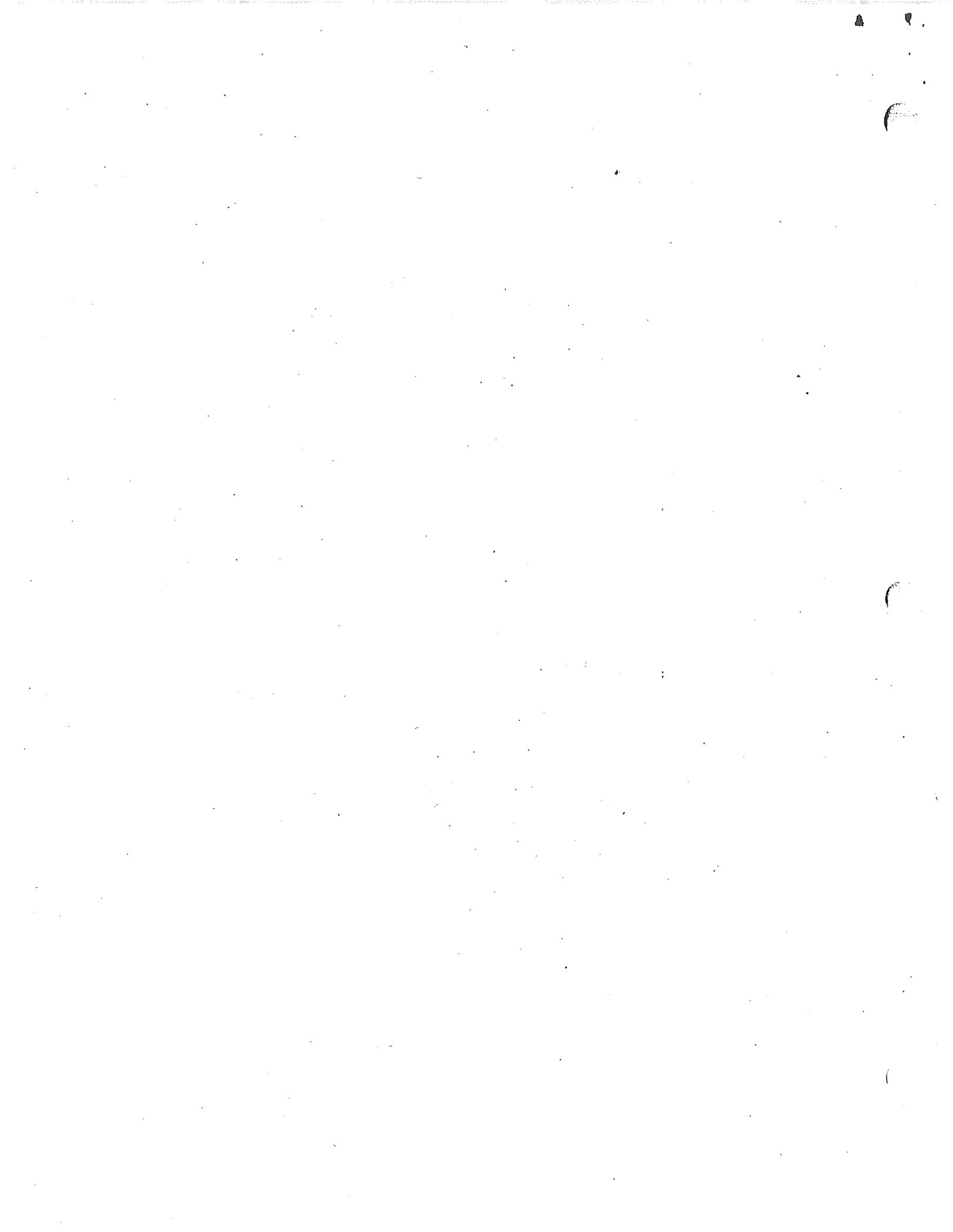


TABLE OF CONTENTS (Continued)

	<u>PAGE</u>
IV. ENVIRONMENTAL EFFECTS	43
A. Physical and Biological Variables	43
1. Vegetation	43
2. Hydrology	44
3. Water Quality	46
4. Soil	47
5. Air Quality	49
6. Wildlife	49
7. Rare, Threatened or Endangered Species ...	51
8. Archeology, Cultural, Historical Resources	52
9. Noise	52
B. Additional Effects of Specific Projects or Practices	52
1. Brush Habitat Improvement	52
2. Thinning Practice	53
3. Clean-and-Release	53
4. Stream Clearance	54
5. Revegetation Along Stream Channels	54
6. Wet Meadow Fencing	55
7. Land Conservation Practices	55
8. Pesticide Use	55
C. Cumulative Effects	57
1. Individual CFIP Practices within a Single Project	57
2. Multiple CFIP Projects	57
3. CFIP Projects and other Projects	58
D. Adverse Impacts Which Cannot Be Mitigated	59
V. MITIGATION MEASURES AND CEQA COMPLIANCE	60
A. General	60
B. Physical and Biological Variables	
1. Vegetation	61
2. Water Quality	62
3. Soil and Erosion	63
4. Air Quality, Fire Hazard	65
5. Wildlife	65
6. Rare, Threatened or Endangered Species ...	66
7. Archeological, Cultural, Historical, and Resources	67
C. Mitigation of Additional Effects of Specific Projects or Practices	67
1. Brush Habitat Improvement	67
2. Precommercial Thinning	68
3. Clean and Release	68
4. Stream Clearance	69
5. Revegetation Along Stream Channels	69
6. Wet Meadow Fencing	69
7. Land Conservation Practices	70
8. Pesticide Use	71



TABLE OF CONTENTS (Continued)

	<u>PAGE</u>
VI. MITIGATION OF CUMULATIVE EFFECTS	73
VII. ALTERNATIVE PRACTICES	74
A. The No Project Alternative	74
B. Loan Program Alternative	75
C. Current Project Alternative	80
VIII. ENERGY RELATIONSHIPS	80
IX. SIGNIFICANT IRREVERSIBLE EFFECTS	81
X. GROWTH INDUCING EFFECTS	81
XI. LONG-TERM IMPACTS	82
XII. INSIGNIFICANT EFFECTS	82
BIBLIOGRAPHY	83
APPENDICES A - K	

APPENDICES

- A. Title 14, California Code of Regulations, Article 8, Resource Protection Guidelines
- B. Environmental Checklist and Checklist Instructions
- C. Forest Resource Improvement Management Plan Format and Instruction Sheet
- D. CFIP Application
- E. Project Approval Flow Chart
- F. List of Persons Consulted
- G. Cost Comparisons for Site Preparation, Release, and Thinning
- H. Conditions of Pesticide Application
- I. Agency and Public Comments
- J. Response to Comments
- K. Notice of Determination, June 12, 1990

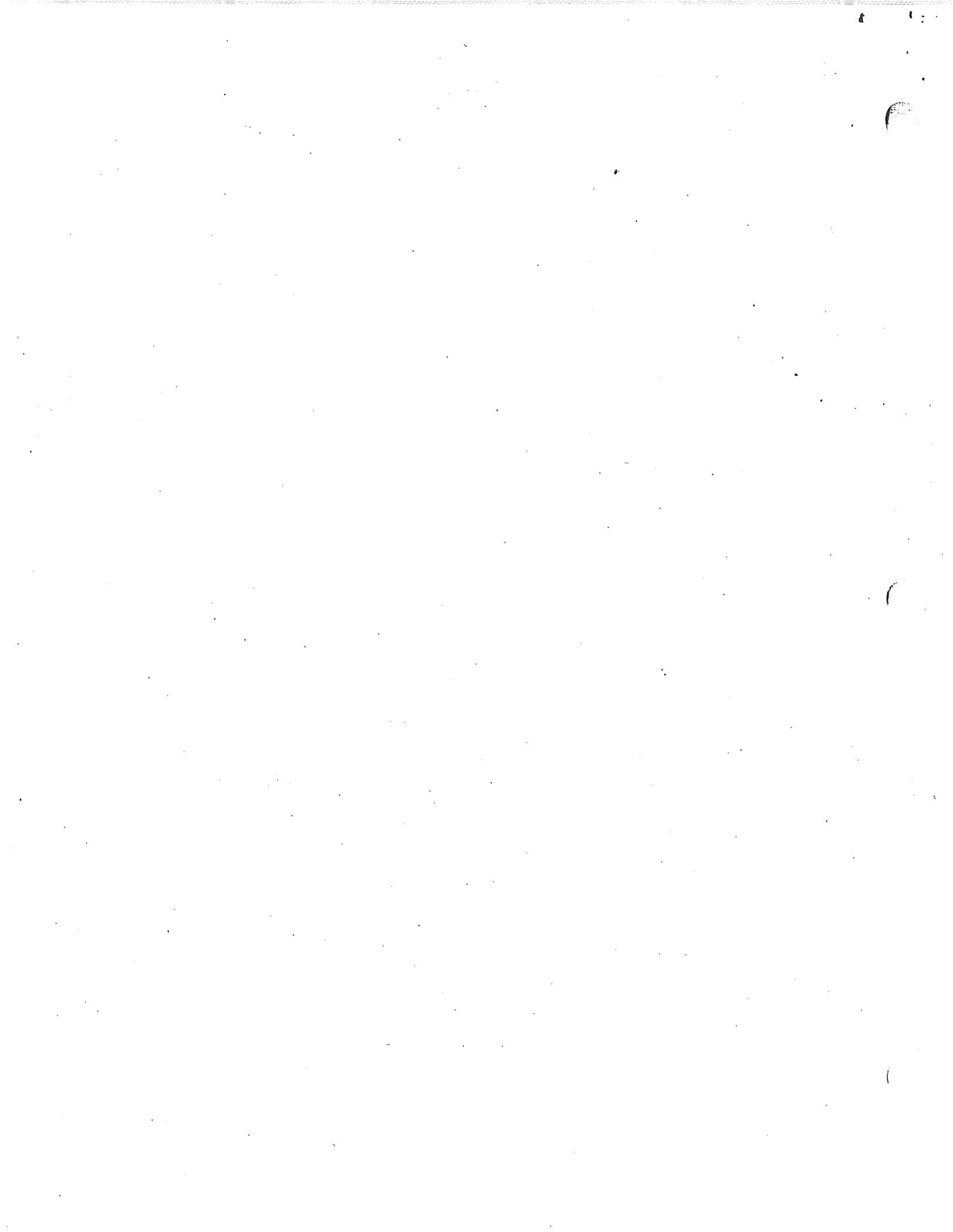


TABLE OF CONTENTS (Continued)

TABLES

<u>Table</u> <u>No.</u>		<u>Page</u>
1	Area Available for Treatment by Practice	4
2	CFIP Budget by Fiscal Year	4
3	Acreage Committed to CFIP Per Year	5
4	Average Annual and Monthly Rainfall	15
5	Comparison of Plant Communities, Vegetation Types, and Forest Cover Types	22
6	Cover Types by Vegetation Class	27
7	Area of Productive Forest by Site Class and Ownership	28
8	Area of "Unproductive" Forest, California	29
9	Wildlife Directly or Indirectly Affected by CFIP Practices	50
10	Silvicultural Accomplishments in California ...	76
11	Timber Stand Improvement Practices, 1986	77
12	Forest Improvement Accomplishments	78
13	Planted and Thinned CFM Acres, 1982-1986	79

MAPS AND FIGURES

Map 1 - Description	6
Map 2 - Natural Vegetation	23
Figure 1-1 - Topography of California	8
1-2 - Geomorphic Provinces	9
1-3 - Climates of California	11
1-4 - Rain Shadows	13
1-5 - Mean Annual Precipitation	14
1-6 - Temperature	16
1-7 - Wind Patterns	17
1-8 - Water-Yield Zones of California	20



EXECUTIVE SUMMARY

Summary of the Supplemental EIR

The changes in the following supplemental EIR to the Final Environmental Impact Report for Proposed Administrative Regulations for the California Forest Improvement Program (CFIP), Clearinghouse No. 79050318, are primarily limited to the inclusion of clean-and-release practices, the clarification of mitigation procedures for archeological impacts, information about California Natural Diversity Data Base for identifying potential habitat for threatened or endangered species, incorporation of a section on vegetation effects and mitigation, addition of a cumulative effects section, additional discussion of pesticide effects and mitigation, and minor editorial and organizational changes to improve readability and increase consistency between chapters. It also includes reference to several statutes established since the writing of the original EIR which mitigate potential project effects.

Program Description

The California Forest Improvement Program is a state funded program which cost-shares various projects designed to improve the forest resource system. Nonindustrial forest landowners with between 20 and 5,000 acres are eligible. Projects include reforestation, timber stand improvement, fish and wildlife habitat enhancement, and land conservation. Specific practices which are to be funded by the preferred alternative include management plan preparation; site preparation; planting; young growth stand improvement, including clean and release treatments (excluded from the existing program) and precommercial thinning; forest land conservation measures including erosion control, revegetation, road repair and stabilization and drainage facility improvement; and fish and wildlife habitat improvement including stream clearance, revegetation, and fencing of wet sites or key wildlife areas.

Potential Impacts

Potential impacts include changes in vegetation species composition, disturbance of wildlife and changes in wildlife habitat, soil impacts and erosion from land clearing activities associated with site preparation, water quality effects from sedimentation and herbicides, air quality impacts from burning or herbicide use, impacts to threatened or endangered wildlife species or to rare, threatened or endangered plant species, disturbance or damage to archeological sites, and effects on local economies.

Mitigation

The Resource Protection Guidelines (14 CCR 1545-1545.9) designate standard mitigations for wildlife, lakes and streams, meadows and wet areas, and other hazards. A checklist will be used by the Registered Professional Foresters (RPF) who review the management plan to identify potential impacts. This checklist identifies the specific Resource Protection Guideline and other mitigations needed to address the impact.

Where potential impacts are not adequately identified by the checklist, additional study may be required. Mitigations which avoid or reduce the impact to levels below significance are summarized in the following paragraph.

Since most projects are limited to high-site lands (14 CCR 1533) which are productive and where vegetation will re-establish quickly, vegetation and soil impacts will be short-term and in most cases the site will achieve its natural successional climax vegetation at a faster rate. All planted species must be adapted to the site and subject to the Director's approval. Since the average site is 37 acres and projects are scattered across the state impacts to vegetation should not be significant. Impacts to water sources will be avoided by prohibiting use of heavy equipment within at least 50 feet of streams or lakes, and prohibiting slash or debris from entering streams and lakes; by mitigating soil erosion impacts, and by mitigating pesticide use effects. No activities will be allowed in wet meadows, marshes or other wet areas. Wildlife habitat will be altered to later successional seres in most reforestation projects, but the small average size will mitigate most effects. Additional mitigations are discussed which will be used as needed. The allocation of between 10 and 15% of the program's funds to wildlife and land conservation projects also mitigates impacts from past activities. Rare, threatened or endangered wildlife and plant habitat will be identified using the best available information sources, such as the California Natural Diversity Data Base, and surveys will be done where necessary to avoid impacts. Special Treatment Area designations will be used to protect these areas. Pesticide contamination will be avoided with buffer zones around streams, lakes and wells. All pesticides will be used in accordance with label directions, and state and local regulations. Applicators will be required to identify pesticides and rates to be used. Archeological resource impacts will be mitigated by consulting with the appropriate Information Center of the California Archeological Inventory, conducting surveys where necessary, and protecting areas with Special Treatment Area designations where needed. The size of these projects precludes significant long-term effects on local populations and resources.

Rejection of Other Alternatives

The preferred alternative was selected because of the public and private benefits to forest resource systems over the no project alternative. Although reforestation practices would possibly occur without the program, assistance to small landowners in rehabilitation of forest areas is important, especially in light of recent wildfires (1987 and 1988). The loan program alternative (PRC 4796 and 4797) was rejected due to the complexity of designing a program, and the limitation of eligibility to landowners of 5,000 acres or more, along with the fact that these landowners are more likely to already be doing these improvements.

I. PROJECT DESCRIPTION

(A) General

The California Forest Improvement Program (CFIP) is a forestry incentive program that provides forest landowners funds for reforestation, timber stand improvement, soil conservation, and improvement of wildlife habitat. CFIP's purpose is to encourage private and public investments in forest lands and resources within the state to ensure adequate future high quality timber supplies, related employment and other economic benefits, and to protect, maintain, and enhance the forest resource for the benefit of present and future generations.

Individuals, groups, associations, and corporate landowners, who own between 20 and 5,000 acres of land in California are eligible.

CFIP will reimburse up to 75 percent of forest improvement costs when a reforestation plan is approved, and up to 90% under special conditions approved by the Board of Forestry.

Basic qualifications and eligibility are spelled out in Sections 1525 et. seq. 1545.9, CCR 14. They describe:

1. eligibility;
2. application procedures and evaluation criteria;
3. cost-sharing guidelines;
4. project review and evaluation;
5. program administration;
6. rejected application reconsiderations;
- and 7. resource protection guidelines.

The level of program activity depends mostly on the availability of funds and the degree of voluntary participation of forest landowners. Funding and participation will determine the scope of the program and the area treated and thus the program's impact on the environment.

Funding and participation are not treated as alternatives because they are speculative (14 CCR 1514(h)).

(B) Criteria Affecting Participation

(1) Physical availability and funding

Table 1 shows the best estimates available of the physical opportunities for reforestation and stand improvement work in the State. These figures give the maximum number of acres which will be treated. Over time, additional acreage of opportunity will be created by wildfires and the growth and development of young forest stands. Because there is a large existing need and the future amounts of land needing treatment can only be roughly estimated, future need is not included. The allotted dollars are shown in Table 2, and the number of acres committed to treatment per year are shown in Table 3.

Table 1. Area Available 1/ for Treatment
by Practice

Region	Pre-commercial Thinning (M acres)	Reforestation <u>2/</u> (M acres)
North Coast <u>3/</u>	27 <u>4/</u>	329 <u>5/</u>
Other	187	381
State Total	214	710

Source: Bolsinger, 1979 "Non-Industrial Private Lands."

1/ Ownerships of "farmer and miscellaneous private," somewhat overstated due to limitations on ownership size.

2/ Some of this area probably subject to F.P. Act, therefore overstated.

3/ Del Norte, Humboldt, Mendocino, and Sonoma Counties.

4/ Does not include stands on North Coast logged since 1965-67 (see p. 76), therefore probably understated.

5/ Various assumptions (see p. 86), because not measured since 1965-67.

Table 2. Budget by Fiscal Year
(CDF unpublished data)

<u>Fiscal Year</u>	<u>Allotted Dollars</u>
80/81	\$ 1,291,364
81/82	2,336,581
82/83	1,795,436
83/84	2,428,112
84/85	2,648,815
85/86	2,226,291
86/87	1,043,600
87/88	996,657
88/89	1,815,340
89/90	(est.) 1,980,000

Table 3. Acreage Committed to CFIP Per Year

<u>Fiscal Year</u>	<u>No. of Projects</u>	<u>Total Acres</u>	<u>Average No. Acres Per Year</u>
80/81	144	5,621	- 39
81/82	228	7,883	- 35
82/83	181	5,647	- 31
83/84	285	8,521	- 30
84/85	278	9,972	- 36
85/86	219	11,350	- 52
86/87	128	4,618	- 36
87/88	114	4,143	- 36
88/89	152	6,808	- 45
<hr/>			
TOTALS	1,729	64,623	(Ave. 37 Ac/Project)

(2) Landowner Eligibility

The project is tailored to meet the reforestation, timber stand improvement, land conservation, and fish and wildlife improvement needs of forest lands where the owner owns less than 5,000 acres. If the land is not in a Timber Preserve Zone (TPZ), only ownerships greater than 20 acres are eligible for timber related practices.

(3) Cost Share Variation

Adjustment of the cost share grant percentage of total cost affects both landowner participation in the program and the number of acres which can be treated each year given available funds. Lowering the percentage permitted for a practice reduces the incentive for that practice, but might increase the number of acres that could be treated given constant funds. Small adjustments in percentage cost share rate might have no net effect on acreage treated.

California's experience with the federal Agriculture Conservation Program (ACP) and the Forest Improvement Program (FIP) indicates that cost share rates of about 60 percent of total treatment cost (including overhead) do not generate significant landowner participation. Although the low cost share rate is probably not the only cause of low landowner participation in the federal programs, the number of acres treated per year in CFIP would probably be small if the program had a cost share rate of less than 65 percent.

Because the reasons for landowner participation are largely unknown, a variation in the state vs. landowners cost share percentage is not offered as an "alternative". The most recent rates established by the Board of Forestry, as authorized by the regulations, have a base cost share rate of 65 percent for

all practices (with a 75-90 percent cost share authorized if certain conditions are met). The Board of Forestry reviews changes to these rates annually based on evaluation of data from preceding years. (See Section 1530 of the regulations.)

The setting of maximum dollar per acre costs can also affect participation, especially if the maximum rates are set lower than actual costs. This could have the effect of reducing the actual cost share below 65 percent. Per acre costs will be reviewed annually.

Because these factors are also speculative, they are not included as "alternatives". However, they are intended to be within the scope of the EIR. It is not intended to have EIR's for cost share percentage or maximum per acre costs changes in the future because this EIR defines a "maximum" program.

At the present time it appears that the amount of money available to finance the program will be the most limiting factor on participation.

II. ENVIRONMENTAL SETTING

California has great physiographical variety. Its 158,297 square miles stretch 780 miles north to south and from 150 to 350 miles east-west (see Figure 1-1). Mountain ranges cover over one-half of the state's surface, with the remaining land area composed of valley and desert landscapes. The state's border with the Pacific Ocean creates a 1,200 mile-long coastline of rugged cliffs, sea-carved terraces, and sandy beaches.

To a large extent, environmental factors within California determine the location of forests, agriculture, pastures, recreational, and oftentimes, industrial and urban areas. In addition, climate, topography, vegetation, wildlife, people, the presence of rivers or reservoirs, and soil patterns contribute to the determination of the environmental effects of any particular land management practice.

Environments are dynamic and never cease to evolve. Change is the only constant characteristic. The living and nonliving elements of an environment continually carry out physical, chemical, and biological processes that result in cyclic or cumulative changes. Cycles may be daily, seasonal (such as California's wet and dry seasons), annual, or much longer. Cumulative changes can be seen in the evolution of a land form, a species, and in the patterns of the environment. Thus, it is difficult to measure or analyze the spatial and temporal boundaries of a given environment at any point in time. The dimensions of California's environment are immense.

Map 1

Map 1 is a U.S.D.I. base map, scale 1:1,000,000 showing private and public lands, and an acetate overlay of forested lands.

This indicates the general area where the project could take place (private, forested land).

Due to cost, Map 1 is not reproduced, but is available for inspection at the California Department of Forestry and Fire Protection in Sacramento.

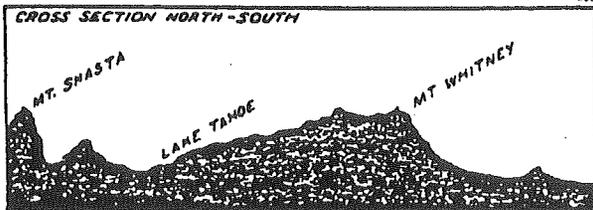
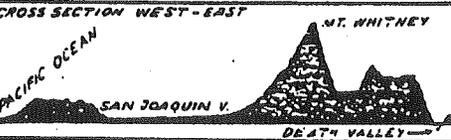
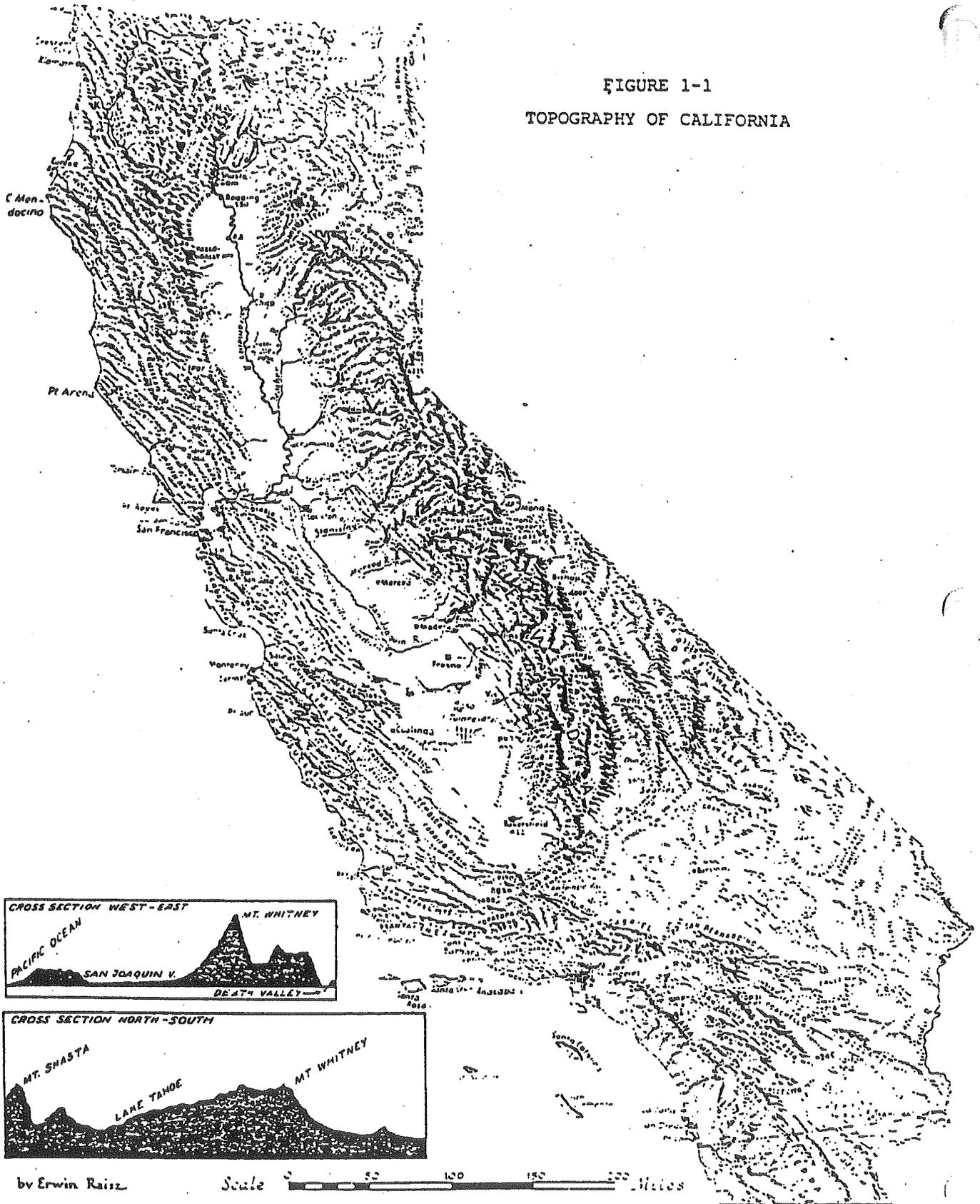
(A) Topography

California has 58 counties as political units. The State can also be divided into fairly distinct geomorphic provinces dependent on the geological and climatic history of each area (see Figure 1-2). The Sierra Nevada is a huge granitic mountain range on the State's eastern side, which has a gently sloping western slope, while the sheer eastern face drops off abruptly. The Central Valley lies on the western side of the Sierra Nevada, a vast sedimentary alluvial plain which is the drainage basin for most of California's rivers flowing out of the mountains. On the eastern side of the Sierra, the Basin-Ranges form an area of parallel mountains and basins which experience harsher climatic extremes.

The northern area of California is composed of the Klamath Mountains, the Cascade Range, and the Modoc Plateau. The Klamaths have a rugged, complex topography with high peaks and deeply carved canyons. The Cascades are a chain of volcanic cones dominated by Mount Shasta at an elevation of 14,162 feet. The Modoc Plateau is an interior draining platform consisting of a thick accumulation of lava flows and tuff beds with many small volcanic cones. Along the State's border with the Pacific Ocean are a series of more or less parallel mountain ranges and valleys which compose the Coast Ranges. Many active fault zones, including the San Andreas Fault, occur throughout the length of these ranges.

In the southern part of California, the Transverse Ranges are distinguished by a strong east-west trend in contrast to the north-south pattern of all other geomorphic regions. This area is also a series of ranges and valleys running parallel away from the coast. California's most southern mountains are the Peninsular Ranges with a geological profile like the granitic Sierra Nevada, but a topography similar to the Coast Ranges. A low-lying basin, the Colorado Desert, is directly east of these ranges. Part of the desert lies below sea level. The Mojave Desert stretches across the southeastern part of California, a vast area of isolated mountains separated by expanses of dry plains. Off the coast of California are two groups of islands, the Farallon Islands, and the Channel Islands.

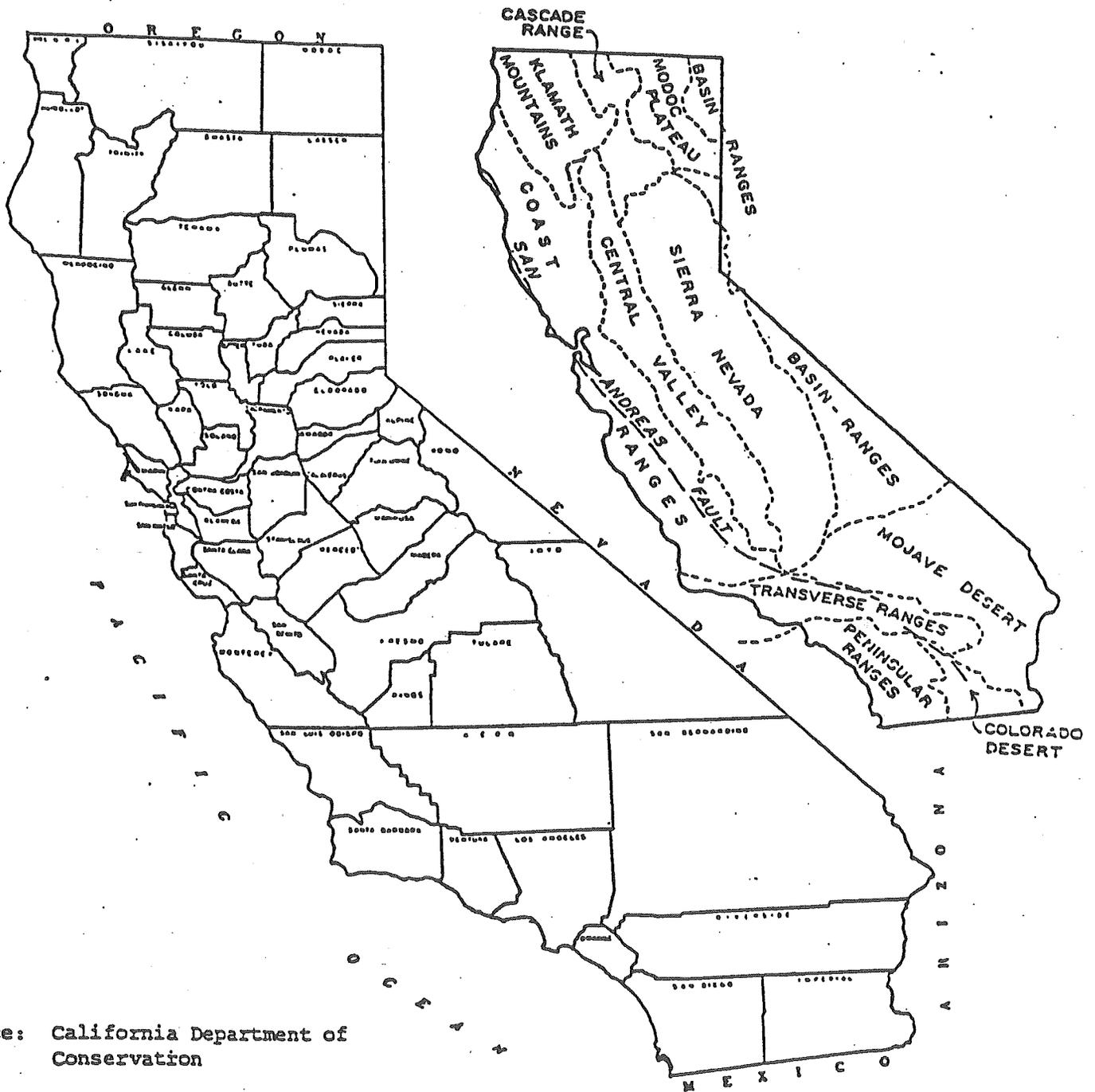
FIGURE 1-1
TOPOGRAPHY OF CALIFORNIA



by Erwin Raisz

Scale 0 50 100 150 200 miles

Figure 1-2
County Map
Geomorphologic Provinces



Source: California Department of Conservation

(B) Climate

Because of the strong influence of the Pacific Ocean, Coast Ranges, and Sierra/Nevada-Cascade axis, climatic zones run north-to-south. This is contrary to the central and eastern United States, which have climates determined by continental conditions. California's climate varies from Mediterranean (most of the state), to steppe (scattered foothill areas) to alpine (high sierra) to desert (Colorado and Mojave Deserts). Figure 1-3 shows the distribution of these climates in the state.

The Sierra Nevada and Cascades act as barriers to the passage of air masses. During the summer, the state is protected from much of the hot, dry air masses that develop over the central United States. Because of this barrier, and its western border with the Pacific Ocean, the state has a generally milder summer climate than the rest of the country.

In the winter, the same barrier blocks the cold, dry air masses from the United States interior. Winters in California are also milder than would be expected at these latitudes.

(1) Precipitation

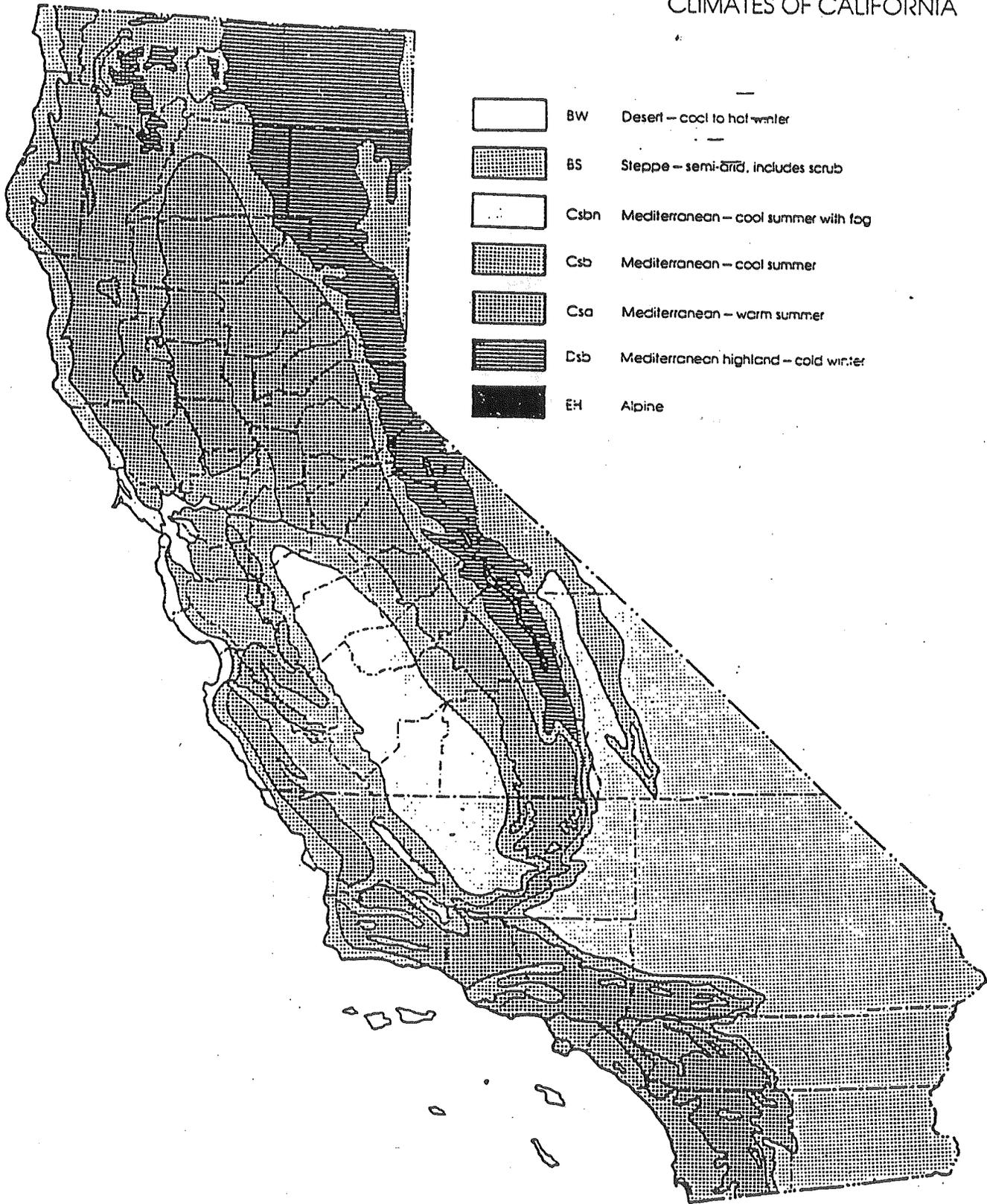
California has wide variations in yearly precipitation, and is subject to periodic winter droughts. These periodic droughts and "excess" water years can profoundly affect forest cover and the establishment of vegetation.

(2) Rain

Along with a generally temperate climate, California experiences only two distinct seasons, rainy and dry, instead of the usual four-season cycle. Low pressure areas develop in the Gulf of Alaska, far north of California, and are stationary during the summer months. Rainfall at this time is rare, although local mountain thunderstorms, with intense or no precipitation, may occur.

In the winter, Pacific west winds begin to move southeasterly bringing cold weather, strong breezes, and cyclonic storms to California. This rainy season usually occurs between October and May. The exact distribution of rain depends more on regional characteristics such as distance from the ocean, the elevation, slope, and steepness of local mountains, and their direction in relation to the moisture bearing winds.

FIGURES 1-3
CLIMATES OF CALIFORNIA



For example, the immediate coast and westerly slopes of the state's mountains receive more rain than the eastern and southern slopes. These eastern slopes fall in typical "rain shadows" (see Figure 1-4). Precipitation also decreases in California from north to south because the Pacific westerlies lose force and moisture as they move into southern California (see Figure 1-5).

A record of average annual and monthly precipitation at weather stations throughout California is shown in Table 4.

(3) Snow

Snow is the major form of precipitation in high, forested mountainous areas, and is the chief source of water for California's vast agricultural production and urban settlements. The snow season is from October to May, the same time as rain falls on the lowlands of the state.

Snow can be expected in the Sierra Nevada at any elevation above 2,000 feet during these months. Above 4,000 feet, it will remain on the ground for long periods of time, and at even higher elevations snow is usually present all year. Mount Shasta and peaks in the Klamath Mountains also experience heavy winter snow. The coast ranges are usually free of snow. Occasionally, these peaks may be snow-capped for a few days or weeks, but in most coastal areas snow quickly melts. Southern California ranges, particularly the San Bernardino Mountains, receive more snowfall than the Coast Ranges because of their higher elevations.

(4) Temperature

Temperatures vary widely within the state and its forested regions. Temperature data is in Figure 1-6.

(5) Winds

Wind patterns are shown in Figure 1-7. Along with the major seasonal Pacific westerlies the winds also follow daily patterns important in the mountain regions. These result from air density differences brought about by solar heating during the day and radiative cooling at night. Two types of "diurnal" winds are land-sea breezes, and mountain-valley winds.

FIGURE 1-4
 RAIN SHADOWS
 (West-East Cross Section)

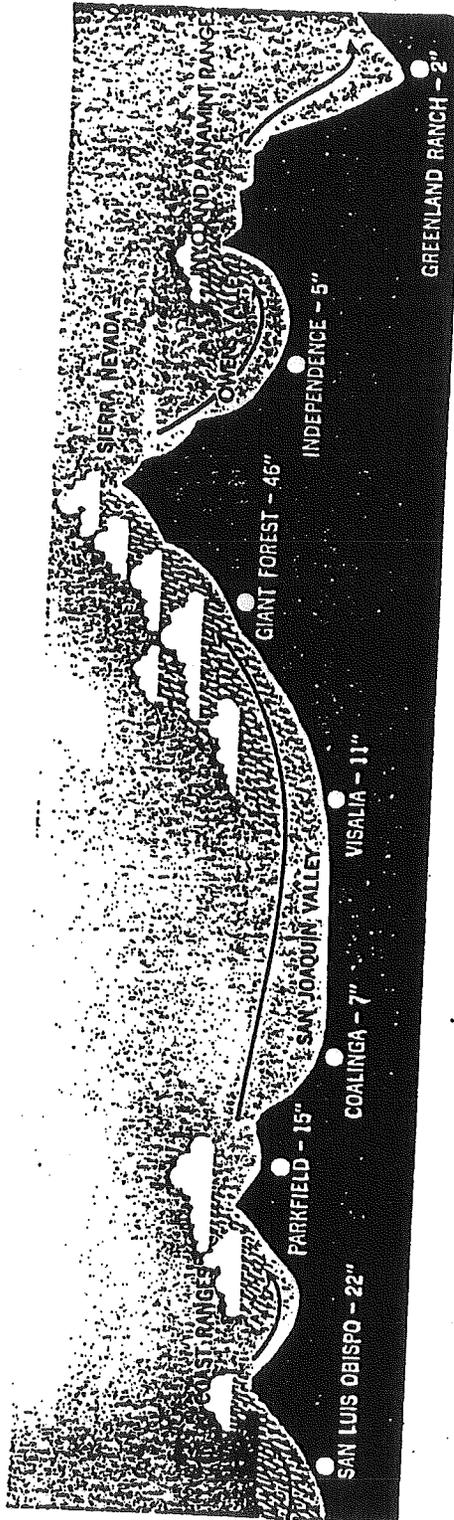
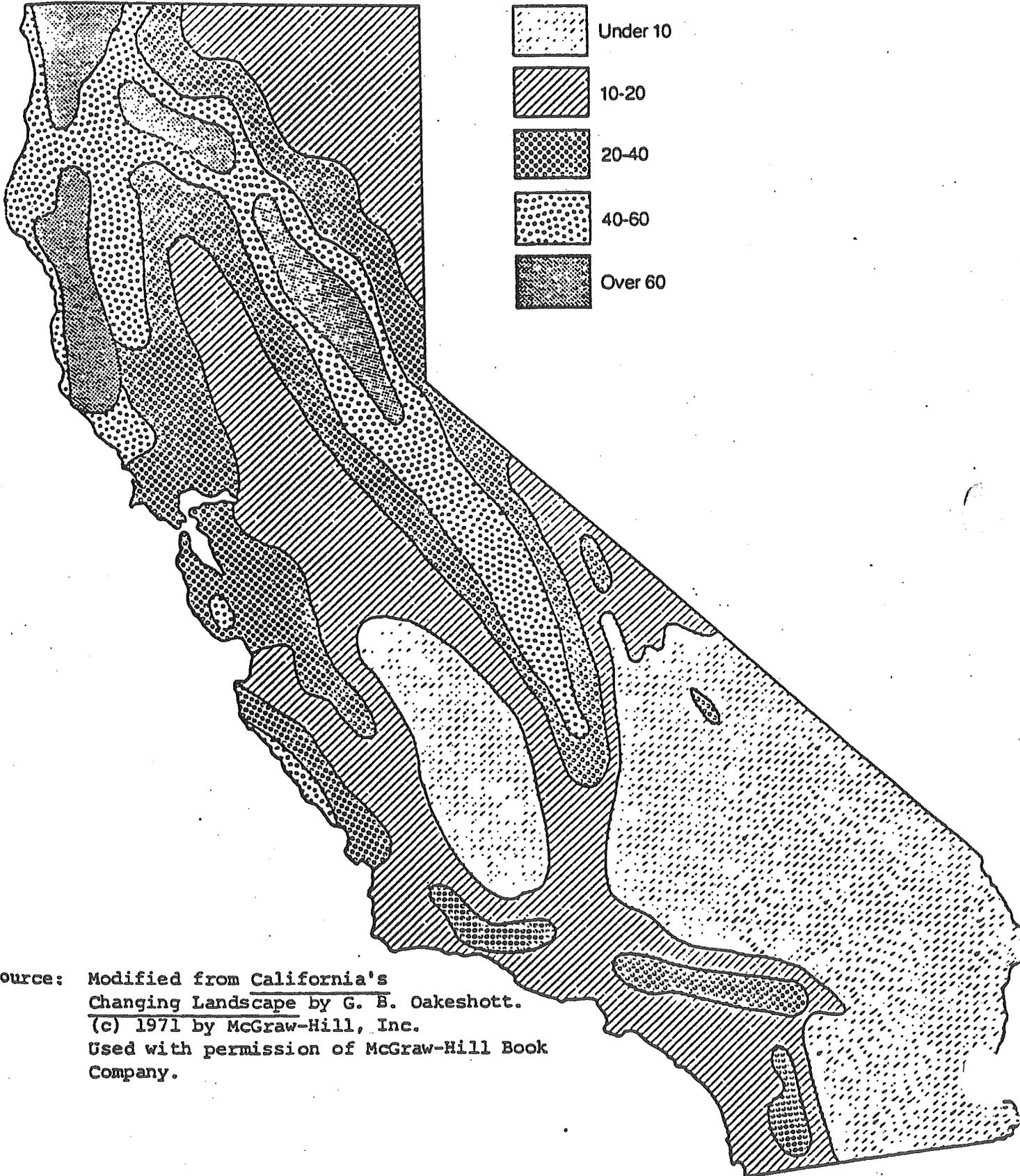


FIGURE 1-5
Mean Annual Precipitation
(in inches)



Source: Modified from California's Changing Landscape by G. B. Oakeshott.
(c) 1971 by McGraw-Hill, Inc.
Used with permission of McGraw-Hill Book Company.

TABLE 4
AVERAGE ANNUAL AND MONTHLY RAINFALL

	Elevation	Annual	J	F	M	A	M	J	J	A	S	O	N	D
Alturas	4365	12.97	1.73	1.46	1.40	1.09	1.27	1.03	.26	.21	.42	1.10	1.34	1.66
Bakersfield	489	6.36	1.02	1.12	1.11	.75	.35	.09	.01	.01	.07	.37	.43	1.03
Barstow	2142	4.72	.85	.59	.82	.20	.01	T	.13	.36	.16	.26	.42	.90
Big Bear	6800	37.19	5.50	7.29	7.08	3.02	.30	10	.67	.44	.85	1.71	2.87	7.36
Bishop	4108	5.76	1.42	.89	.73	.29	.30	.09	.10	.11	.17	.27	.40	.99
Blythe	266	4.33	.49	.51	.46	.15	.02	.03	.24	.81	.38	.27	.28	.39
Bridgeport	8420	10.47	1.57	1.78	1.08	.64	.42	.45	.51	.32	.24	.64	.96	1.86
Burbank	699	13.88	2.35	3.06	2.25	1.21	.27	.07	T	.02	.29	.52	.98	2.86
Chico	230	26.60	4.75	4.56	3.55	2.10	1.15	.42	.01	.07	.20	1.56	2.48	5.75
Coalinga	676	6.92	1.06	1.31	1.34	.98	.21	.04	.01	.01	.27	.26	.49	1.54
Crescent City	45	65.36	10.71	9.30	7.81	4.15	2.97	1.76	1.53	.31	1.24	8.09	7.13	10.36
Davis	51	16.58	3.17	3.15	2.37	1.22	.57	.15	T	T	.05	.87	1.41	3.62
Escondido	660	17.59	2.70	3.56	2.70	1.38	.25	.10	.01	.20	.27	.98	1.42	4.02
Eureka	43	39.53	6.94	5.99	5.26	3.07	1.98	.82	.12	.16	.88	2.74	5.09	6.48
Fort Bragg	80	37.65	6.68	5.88	5.16	2.60	1.64	.64	.06	.01	.31	2.89	4.38	7.62
Fresno	294	9.31	1.37	1.66	1.63	.96	.28	.11	.01	T	.05	.66	.75	1.63
Greenland Ranch	-168	1.90	.14	.29	.21	.17	.07	.01	.11	.19	.12	.10	.16	.33
Indio	11	3.91	.50	.47	.28	.11	.02	.01	.14	.41	.52	.26	.35	.84
King City	320	11.17	2.43	2.37	1.88	.92	.14	.09	.02	.01	.05	.26	.61	2.39
Long Beach	34	13.80	2.31	3.40	2.03	.80	.09	.06	T	.05	.23	.45	1.21	3.17
Los Angeles	312	14.54	2.38	3.37	2.36	1.17	.26	.07	T	.02	.27	.50	1.03	3.11
L. A. Int. Airport		12.37	2.01	2.75	1.91	.96	.30	.07	T	.02	.21	.43	1.10	2.61
Markleeville	5546	19.17	3.68	2.39	1.99	1.48	.75	.61	.29	.32	.19	1.39	2.41	3.67
Modesto	91	12.44	2.17	2.18	2.04	1.10	.45	.07	.02	T	.13	.67	1.01	2.60
Needles	913	4.75	.71	.27	.47	.33	.03	.01	.25	.94	.32	.33	.32	.77
Oakland	440	17.47	3.73	2.94	2.36	1.31	.64	.16	T	.03	.10	.82	1.68	3.70
Oroville	272	28.77	5.38	4.92	4.20	2.10	1.26	.39	.01	.01	.22	1.44	3.11	5.73
Oxnard	45	15.41	3.15	3.08	2.43	.94	.11	.06	T	.04	.11	.48	1.11	3.90
Palmdale	2655	6.12	.82	1.01	.98	.28	.06	.02	.11	.02	.07	.23	.78	1.74
Palm Springs	411	7.07	1.22	1.32	.75	.25	.02	.03	.29	.27	.40	.33	.47	1.72
Paso Robles	700	14.36	3.04	2.62	2.21	1.04	.30	.10	.06	.01	.01	.42	1.09	3.46
Pt. Piedras Blancas	32	19.28	3.80	3.82	3.51	1.28	.32	.04	.03	.01	.03	.91	1.53	4.00
Porterville	393	11.47	2.16	2.02	2.10	1.14	.31	.09	.01	.01	.02	.54	.89	2.18
Red Bluff	350	21.57	3.73	3.53	2.61	1.79	1.06	.46	.02	.05	.33	1.49	2.27	4.23
Redding	577	38.60	7.14	5.81	5.13	3.10	1.75	1.18	.11	.06	.26	2.44	3.75	7.83
Riverside	820	11.96	1.79	2.58	2.00	.91	.18	.04	.01	.20	.11	.60	.87	2.67
Sacramento	25	18.09	3.62	2.96	2.60	1.48	.70	.13	.01	.01	.24	.81	1.83	3.70
Salinas	70	14.75	2.92	2.83	2.32	1.15	.36	.09	.03	.06	.04	.63	1.24	3.08
San Bernardino	1094	18.97	2.89	4.14	2.98	1.67	.32	.11	.04	.19	.20	.98	1.42	4.03
Sandberg	4517	12.09	2.67	2.29	1.59	.87	.26	.03	.02	.08	.18	.55	.83	2.72
San Diego	19	9.90	1.90	1.94	1.52	.70	.29	.05	.04	.09	.10	.44	.89	1.94
San Fernando	950	18.63	3.64	4.09	3.07	1.27	.18	.10	.01	.05	.24	.54	1.34	4.10
San Francisco	52	21.78	4.70	3.64	3.04	1.51	.68	.15	.01	.02	.28	.95	2.36	4.44
San Francisco Apt.	8	17.98	3.88	3.06	2.65	1.19	.47	.12	.01	.02	.11	.75	1.55	4.17
San Jose	95	13.35	2.59	2.56	2.13	1.03	.39	.05	T	.03	.05	.69	1.09	2.74
San Luis Obispo	300	22.44	4.38	4.50	3.43	1.60	.37	.20	.04	.04	.07	.83	1.73	5.25
Santa Ana	133	15.93	2.70	3.42	2.49	1.20	.23	.05	.02	.06	.24	.60	1.37	3.55
Santa Barbara	120	18.17	3.65	3.80	3.16	1.17	.26	.10	.04	.06	.06	.60	1.23	4.04
Santa Catalina	0	12.88	1.98	2.97	1.88	.93	.26	.07	T	.04	.14	.76	.90	2.95
Santa Maria	238	14.49	3.02	2.49	2.55	.99	.21	.20	.04	.03	.13	.72	1.06	3.05
Santa Monica	0	12.87	2.21	2.84	2.49	.74	.06	.01	.01	.01	.21	.31	1.08	3.10
Santa Rosa	167	29.40	5.74	5.08	4.21	2.14	1.00	.35	.02	.01	.09	1.55	3.15	6.06
Scottia	139	48.71	8.53	7.12	6.56	2.93	1.88	.77	.05	.05	.38	3.88	6.80	9.76
Stockton	11	14.62	2.75	2.76	2.28	1.03	.53	.07	.01	T	.11	.71	1.38	2.99
Susanville	4148	14.92	2.53	2.50	1.62	.88	.80	.72	.15	.09	.29	.97	1.71	2.66
Tahoe	6228	31.35	6.12	5.29	4.07	1.96	1.20	.64	.26	.10	.34	2.10	3.56	5.71
Victorville	2750	6.36	1.13	1.10	1.11	.48	.06	.00	.05	.18	.16	.34	.53	1.24
Yosemite N. Park	3985	37.62	6.41	6.80	5.33	3.17	1.37	.50	.24	.07	.38	2.00	3.84	7.41

FIGURE 1-6
TEMPERATURE

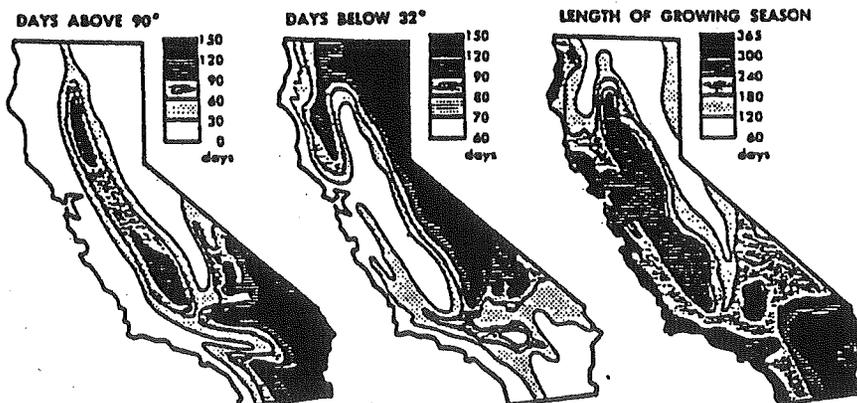
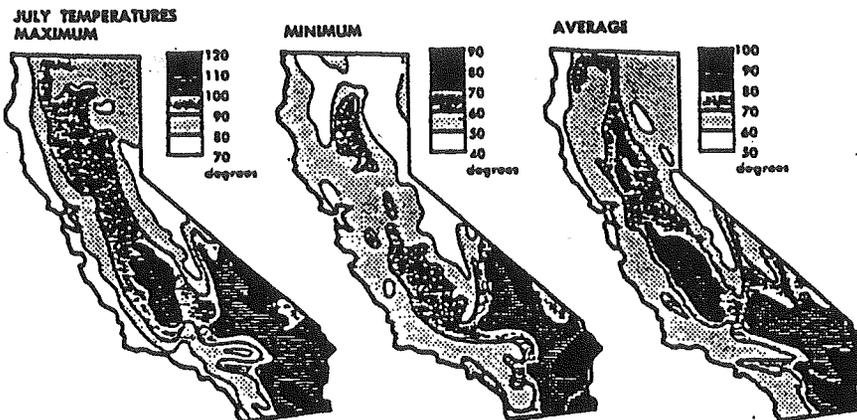
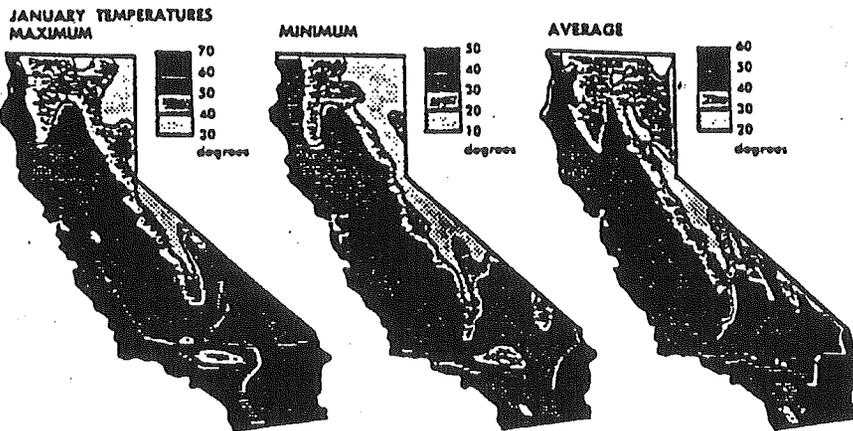
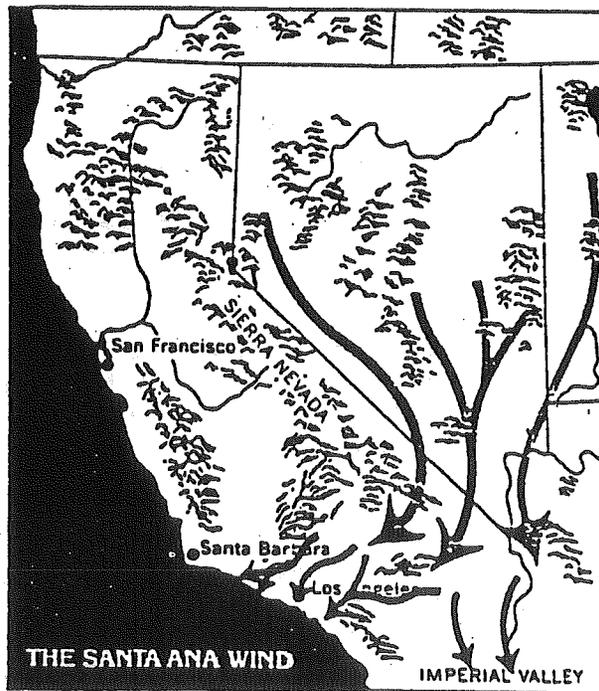
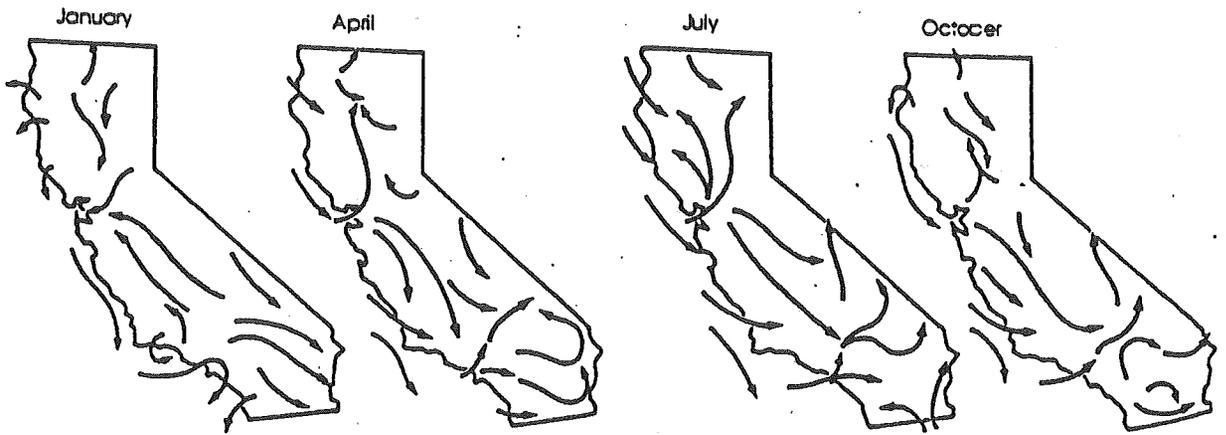


FIGURE 1-7
WIND PATTERNS



Land-sea breezes occur because land heats and cools more quickly than water. Onshore breezes occur when warm land air rises, and the cool ocean air moves onshore to replace it. At night, the breeze moves offshore, from the cooling land to the warmed ocean.

Mountain-valley breezes form in a similar way. Solar heating of the land during the day creates rising warm air, which tends to move upslope following the terrain. At night, the air flow is reversed as radiation cools the land and chills the air above it. This cooled air drops down into the lowlands from the higher slopes.

"Santa Ana", "chinook", or "foehn" winds are caused by high pressure areas in the interior (Oregon, Nevada, Utah, and Arizona). High pressure can be "trapped" in the interior while low pressure exists in the Central Valley or offshore California. Strong winds then flow through the mountain passes from desert regions. As they move down slope the winds accelerate, heat and become extremely dry. Severe forest fires often occur under Santa Ana conditions.

(6) Smog

Atmospheric conditions that create temperature inversions and permit stagnant air masses to remain for long periods of time allow the concentration of pollutants and fog to increase. This aggravates smog over urban, industrial, and agricultural areas. California's smog is occasionally aggravated by its daily and seasonal wind patterns. Sea-land breezes may remove smog from a coastal area during the day as cold dense air moves onshore, but push it back during the night as the land breeze gently flows offshore.

Mountain-valley breezes may also create smog. At night, the air drains downslope, but during the day winds reverse and blow upslope, carrying the polluted air. Mountain areas may experience late afternoon or early evening smog for this reason. By the morning, however, cold dense night time air has traveled downslope and polluted valleys or mountain basin areas. This may cause ground level inversions to form as the land radiates heat.

Smog damage to forests has been severe in the mountains of southern California and has been noted elsewhere in the state. Closed mountain basins or valleys such as the Tahoe basin, and Yosemite Valley are areas with high smog potential.

(C) Water

Water resources have been necessary for California's historical growth and agricultural production. Local sources of water, stream run-off, springs, groundwater, and storage reservoirs all depend on watersheds where rain or snow fall. About 85 percent of developed water supplies are used in agriculture, but water has been essential to urban growth also. Huge water transportation projects bring water from forested areas to southern California, the Bay Area, and other localities.

The estimated mean annual surface run-off is 71 million acre feet. Figure 1-8 shows the watershed origin of the run-off. About 82 percent of California's water yield comes from forested areas, some of which are potentially affected by this project.

These same watersheds provide replenishment of underground water basins with a storage capacity of 1.3 billion acre feet (DWR, 1975).

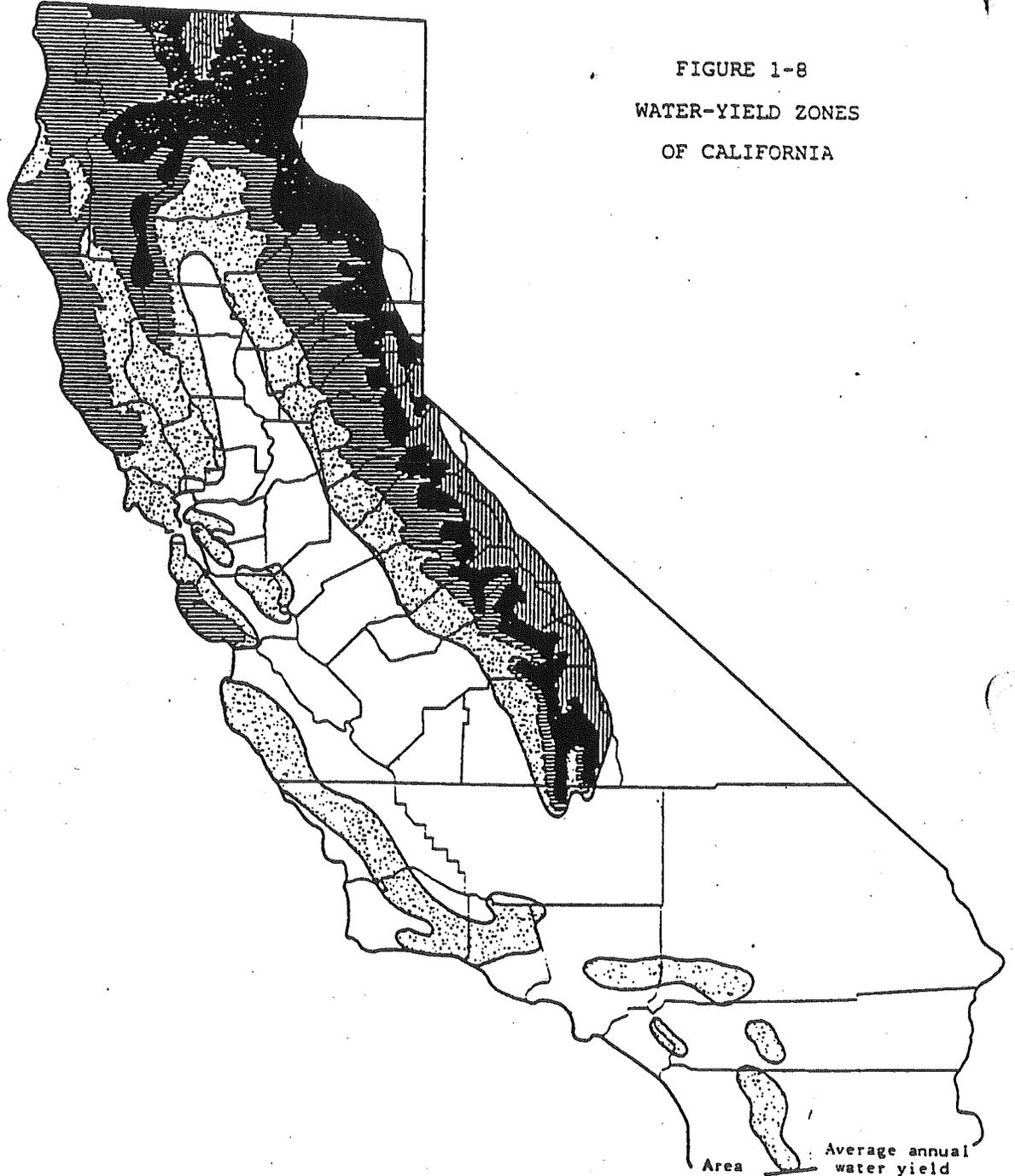
(D) Vegetation

(1) Plant communities

Plants constitute the base of terrestrial productivity because of their ability to carry out photosynthesis, and recycle nutrients and minerals essential to an ecosystem. Plants serve as food and shelter for wildlife, control erosion, and maintain watershed integrity. Plants affect microclimate, that is the climate near the ground, by reducing solar radiation, reducing temperature extremes, increasing relative humidity by transpiration; add humus to the soil, acting as windbreaks; and modify the environment in many other subtle ways. Thus, plants often determine the kinds and numbers of wildlife in an area. Plants also enrich the environment from an aesthetic point of view.

The flora of California has evolved within an "ecological island" created by the state's eastern and northern mountain ranges, southern desert barrier, and western flank guarded by the Pacific Ocean.

FIGURE 1-8
 WATER-YIELD ZONES
 OF CALIFORNIA



	Area (million (acres)	Average annual water yield (million) (acre feet)	(percent)
Woodland-brush-grass zone-----	18	9	12
Lower conifer zone-----	12	23	32
Snow zone: Commercial forest-----	9	27	38
Alpine-----	3	9	13
TOTAL-----	42	68	95
ENTIRE STATE-----	101	71	100

One of the most varied floras in the world has evolved within California's boundaries. The state's plant communities are known to include 167 families, 1,139 genera, and 6,007 species (Ornduff, 1974). This rich diversity reflects the state's varied climate, topography, soils, and hydrography, for each of these factors contributes to the evolution of every plant species.

Man's activities also affect vegetation and plant communities. The introduction of annual grasses, exotic plants such as Scotch broom and eucalyptus, and certain insects and diseases such as white pine blister rust have profoundly changed the landscape. Grazing, use of fire, logging, agricultural clearing, mining, water development, urbanization, and other human activities have resulted in both short-term and long-term changes.

The reason for narrow biogeographical ranges can be climatic factors, soil characteristics, or other such environmental constraints. The reason is not always clear however. Some endemics are "fossil" species whose ranges were at one time much more widespread. For instance, Sierra redwood (Sequoiadendron giganteum) had an extensive pre-Pleistocene distribution which was reduced in the ancient past. Why it has never been able to successfully reinvade its previous range or increase its numbers, and is now restricted to the southern Sierra Nevada is not well known.

Many classifications of California's vegetation have been proposed. This discussion follows Griffin and Critchfield (1972) which is incorporated by reference. Table 5 correlates five systems. As shown, California's vegetation is very complex. Climate plays a major role in the distribution of these zonal plant communities, although differences in soil parent material or frequent fires may locally override climatic effects. All of these types are "forest" covered by the project. Types marked (*) on the Table are where the bulk of commercial forestland (CFL) occurs. The practices of reforestation, thinning and clean and release are most likely to occur here, although some areas of other types might qualify under excellent growth conditions or specialized forest management plans.

Griffin and Critchfield (1972); contains detailed maps that can be approximately matched to the "forest land" of Statutes 1978, Chapter 1181. The location of the project may be on private land in ownerships of less than 5,000 acres in areas shown on the maps (see also Maps 1 and 2). It is most likely that the practices will occur in the areas shown on the maps of the following genera:

<u>Abies</u>	(true firs)
<u>Arbutus</u>	(madrone)
<u>Alnus</u>	(alder)
<u>Libocedrus</u>	(incense-cedar)
<u>Lithocarpus</u>	(tanoak)
<u>Pinus</u>	(pine)
<u>Quercus</u>	(oak)
<u>Sequoia</u>	(redwood)

Table 5.

Comparison of plant communities,¹ vegetation zones,² vegetation types,³ and forest cover types⁴

Plant communities	Related vegetation units
Foothill Woodland	California oakwoods (K), Digger pine-oak type (SAF)
Northern Oak Woodland	Oregon oakwoods (K), Interior valley zone (F&D), Oregon white oak type (SAF)
Southern Oak Woodland	
Northern Juniper Woodland	Juniper steppe woodland (K), <i>Juniperus occidentalis</i> zone (F&D), Western juniper type (SAF)
Pinyon-Juniper Woodland	Juniper-pinyon woodland (K), Pinyon-juniper type (SAF)
* Mixed Conifer Forest (Yellow Pine Forest)	West of the Sierra Nevada-Cascade crest: Mixed conifer forest (K); Mixed conifer zone, <i>Abies concolor</i> zone (F&D); Pacific ponderosa pine type, Ponderosa pine-sugar pine-fir type, California black oak type (SAF)
westside-pine phase	
eastside-pine phase	
mixed phase	
white fir phase	
* Red Fir Forest	East of the Cascades: Ponderosa shrub forest (K), <i>Pinus ponderosa</i> zone (F&D); Interior ponderosa pine type, white fir type (SAF)
* Lodgepole Forest	Red fir forest (K), <i>Abies magnifica shastensis</i> zone (F&D), Red fir type (SAF)
Subalpine Forest	Lodgepole pine type (SAF)
Bristlecone Pine Forest	Lodgepole pine-subalpine forest (K), <i>Tsuga mertensiana</i> zone (F&D)
* Mixed Evergreen Forest	Great Basin pine forest (K); Bristlecone pine type, Limber pine type (SAF)
* Douglas-fir Forest	California mixed evergreen forest (K), Mixed evergreen zone (F&D), Oak-madrone type (SAF)
* Redwood Forest	<i>Tsuga heterophylla</i> zone (F&D), Pacific Douglas-fir type (SAF)
* North Coastal Coniferous Forest	Redwood forest (K), Redwood type (SAF)
* Closed-cone Pine Forest	Cedar-hemlock-Douglas-fir forest (K); <i>Picea sitchensis</i> zone, <i>Tsuga heterophylla</i> zone, Port-Orford-cedar variant (F&D); Sitka spruce type, Port-Orford-cedar/Douglas-fir type (SAF)
	Pine-cypress forest (K)

¹Munz (1959).

²Franklin and Dyrness (1969).

³"Potential natural vegetation types"—see Kuchler (1964).

⁴Society of American Foresters (1954).

* See Text

The California Woodlands include the Foothill Woodland which covers a vast area around the Central Valley and at lower elevations in the Coast Ranges. This mixture of open savanna and denser woodland vegetation usually forms a transition between the grassland of the valley plains and the Mixed Conifer Forest of the mountains. Many of its shrubs and herbs are endemic. Blue oak and digger pine are found in this community. Pure blue oak savannas spread down into the valleys while digger pine woodland reaches higher within the forests on rocky spots. The other endemic trees are valley oak and California buckeye. Many valley oak stands which were originally found on the deeper soils of the bottomlands of the Central Valleys have largely disappeared due to agricultural development. In the Sierra Nevada-Cascade foothills the "live oak" in the community is Quercus wislizenii; in the south Coast Ranges it is Q. agrifolia.

In the north Coast Ranges (where blue oak gives way to Oregon white oak), the woodland is Northern Oak Woodland, which occupies the drier, warmer slopes and canyon bottoms within the Mixed Evergreen and Douglas-fir Forests. Oregon white oak is a dominant in the Northern Oak Woodland, but occurs in other types.

In Southern Oak Woodland, coast live oak is important. Engelmann oak is also found here, but it is relatively limited, mostly to San Diego County. Like several other southern California plant communities, the Southern Oak Woodland is botanically related to regions to the east. The Juglans californica stands in the Southern Oak Woodland are similar to Juglans major in oak woodlands of Arizona and New Mexico.

Interior Woodlands are the Northern Juniper Woodland which occur to the east of the Mixed Conifer Forest. Western juniper is typically the only tree present. In places, this community is a narrow zone between forested slopes and sagebrush flats. In other areas, such as the lava flows of the Modoc Plateau, it is an extensive, well developed community. Many of its plants are typical of interior regions.

South of Lake Tahoe, these desert-border woodlands shift to the Pinyon-Juniper Woodland, a phase of a huge pinyon and juniper community in the southwestern United States and northern Mexico. These woodlands occupy the zone between the conifer forest of the higher mountains and the desert scrub of the alluvial fans and valleys. The species of juniper and pinyon involved vary geographically and include Juniperus osteosperma, J. californica, Pinus monophylla, and in the south, P. quadrifolia.

The Mixed Conifer Forest is the Montane Forest formation of the Sierra-Nevada-Cascades in California, bordered by the Foothill Woodland on the west and the juniper woodlands on the east.

The Mixed Conifer Forest contains variable combinations of ponderosa pine, incense-cedar, sugar pine, Douglas-fir, white fir and California black oak. In warm, dry western portions of the forest, ponderosa pine usually dominates the community. In places, the westside-pine phase is only a narrow transition belt between the Foothill Woodland and the truly mixed phase of the forest at middle elevations. The mixed phase is always a conspicuous part of the forest, but at higher elevations white fir gradually dominates the mixture, below the Red Fir Forest. In the southern Sierra Nevada the relict groves of giant sequoia occur in the Mixed Conifer Forest.

To the east relatively pure pine stands reappear. In the northeast ponderosa pine dominates the eastside-pine phase on the Modoc Plateau. From Lassen County southward, Jeffrey pine increasingly replaces ponderosa pine in the eastside-pine phase.

In the Klamath Mountains, Mixed Conifer Forest appears locally in typical form, but hardwoods increase in dominance, and the Mixed Conifer Forest merges with the Mixed Evergreen Forest.

In southern California, the Mixed Conifer Forest on the higher ridges is a more typical form than the disjunct stands of the south coast ranges. Douglas-fir is absent in southern California and big cone Douglas-fir replaces it only in local, lower-elevation situations. Coulter pine also occurs.

The Mixed Conifer Forest and the higher-elevation forests are not clearly separated formations; both are characterized by tall conifers. The Red Fir Forest is dominated by almost pure stands of red fir over large areas, although Jeffrey and western white pines occur. In the Cascades, red fir is gradually replaced by noble fir, and other northern conifers just entering California in the Siskiyou Mountains include Pacific silver fir, subalpine fir, Alaska-cedar, and Engelmann spruce.

The Lodgepole and Subalpine Forests lie between the Red Fir Forest and timberline. Lodgepole pine communities occur lower around lakes and wet meadows. Characteristic subalpine trees in California are whitebark pine and mountain hemlock.

The desert ranges of southeastern California are high enough to support forest above the Pinyon-Juniper Woodland and are covered by open Bristlecone Pine Forest.

Coastal Forests include the Redwood Forest which extends from southernmost Oregon to Monterey County. It is restricted to a narrow belt along the coast thought to coincide with the limit of inland penetration of summer fog. Douglas-fir, madrone, pepperwood and tan-oak are associated trees.

The Mixed Evergreen and closely related Douglas-fir Forests are very important in the Klamath Mountains and north Coast Ranges east of the Redwood Forest. Madrone and tan-oak are conspicuous in the Mixed Evergreen Forest, less important in the Douglas-fir Forest. Giant chinquapin is widely scattered, and several oaks, particularly canyon live oak, are important in the type.

In a way, the Mixed Evergreen Forest reappears in the Mixed Conifer Forest of the northern Sierra Nevada. There is a large distribution of madrone, a smaller distribution of tanoak, a small population of giant chinquapin. Many understory plants from the coastal forest also appear in the mesic, northern Sierra Nevada region.

Douglas-fir is not important south of the Santa Cruz Mountains, and the Mixed Evergreen Forest of the south Coast Ranges becomes more of a mixed hardwood forest without conifers, although Coulter pine is a minor element in places. Tanoak and madrone drop out, and the southern extremes are essentially a coast live oak forest.

The North Coastal Coniferous Forest is a heterogeneous group of forest types with large areas in the Pacific Northwest, but smaller areas in their California southern extremes. Spruce occurs between the coast and the Redwood Forest, while grand fir continues further inland into the redwood belt. Western hemlock is scattered in the Redwood Forest and locally dominates the Douglas-fir Forest. Western red-cedar is restricted to very moist, boggy habitats north of Humboldt County.

The Closed-cone Pine Forest consists of disjunct stands of closed-cone pines and closed-cone cypresses, which are scattered along the coastline and on the southern California islands. A special phase grows on sterile, podzolized soils in Mendocino County. Bishop pine grows in pure stands in a number of areas. Monterey pine forms relatively pure stands with scattered coast live oaks.

A series of more inland closed-cone pine-cypress communities is like the coastal Closed-cone Pine Forest. In these inland stands, knobcone pine replaces bishop and Monterey pines and Sargent and MacNab cypresses replace the Mendocino cypress.

Distinctive Riparian Forests are found along portions of many streams. Many dominant species are involved over a wide elevational range. One type is a group of distinctly "California" communities, California sycamore, California boxelder, Fremont cottonwood, and several willows are important at lower elevations along larger streams flowing from the lower portion of the Mixed Conifer and Mixed Evergreen Forests through the Foothill Woodland, out into the valleys. At higher elevations bigleaf maple may be

present, and white alder becomes dominant. On fertile valley plains, valley oak may be part of the Riparian Forest. Hinds walnut is important along the lower Sacramento River.

In a second type of riparian community, species from the north dominate, such as red alder along coastal streams. Black cottonwood grows along coastal streams and at higher elevations in the mountains. Oregon ash is another species here.

A third type includes species that are related to widespread continental communities such as narrowleaf cottonwood, water birch, and velvet ash. Colonies of western hackberry survive in moist spots and are related to this group.

(2) Forested area affected by project (see also Map 1).

California's total land area is about 100 million acres of which 32 million acres are forested types (see Table 6).

Table 6. Cover Types by Vegetation Class 1/

Land Use or Vegetation Type	Thousand Acres
Conifer	23,013
Hardwoods	9,547
Grasslands	9,557
Shrublands	19,151
Alkali desert scrub and other desert areas	21,278
Alpine barren and rock	2,120
Urban, industrial and agricultural <u>2/</u>	15,211
Water <u>2/</u>	1,348
TOTAL	101,225

1/ CDF, 1988

2/ CDF, Unpublished data

This project is confined to private "forest land" or land which is at least 10 percent occupied by forest trees of any size, or formerly having had such tree cover and not currently zoned for uses incompatible with forest resource management. Certain

practices, i.e., reforestation, thinning, and clean and release are further confined to "commercial forest land" (CFL) 1/. In addition the reforestation, thinning, and clean and release are directed to or biased toward high site lands. The project is all directed only to small private owners. The acreage of CFL in this ownership by site class is shown in Table 7. Table 8 shows acreage of "unproductive" forest types.

The ownership of the broader "forest land" class which includes hardwood rangelands and is eligible for Land Conservation and Fish and Wildlife Enhancement practices is not actually known. However, the proportionate ownership is probably roughly the same. That is, approximately 40 percent of private "forest land" is owned by owners of less than 5,000 acres. Because of differences in definition, survey methods, and turnover in ownership, the land area and forest types affected can only be approximated.

1/ Land capable of producing 20 cubic feet per acre per year of industrial wood and not withdrawn from timber utilization ("industrial wood" excludes fuelwood).

Table 7, Area of Productive Forest by Site Class and Ownership

Forest Survey CFL Site Class <u>1/</u> (based on cu. ft. growth)	Site Class <u>1/</u> (14 CCR 1060) (based on height of trees)			Area in private land ownerships smaller than 5,000 acres -----thousand acres-----	Total Area in Public and Private Ownership -----
	Rwd	DF	Pine, Fir		
	165	I, II, III	I		
120-164	III	II, III	III	721	2,401
85-119	IV, V	III, IV	IV	792	3,566
50-84	V	IV, V	V	1,033	5,786
20-49	V	V	V	504	2,637
				-----	-----
			Subtotal CFL	3,551	16,254
Productive Reserved and Deferred <u>2/</u>					1,645
Site Unknown				45	45
				-----	-----
			Total Productive Forest	3,596	17,944

Source: Bolsinger 1979

1/ Based on forest survey site class.

2/ Not including RARE II

Table 8. Area of "Unproductive" Forest,
California, 1975 ^{1/}

Forest Type Groups	All Areas Public and Private (Thousand Acres)
Douglas fir	275
Ponderosa pine	2,314
True firs	1,601
Redwood	5
Lodgepole pine	641
Commercial hardwoods	1,319
Chaparral ^{2/}	7,586
Pinyon-juniper	2,696
Oak woodland	5,779
Total	22,216

^{1/} Bolsinger, 1979

^{2/} "Chaparral" is shown as forest land. Under the FIP definition probably only two million acres of this land is capable of tree growth.

(E) Wildlife

California wildlife is as diverse as the rest of its environmental features. As with plants, topographic and climatic isolation has made California's animal life distinct from eastern United States forms and only similar to a few counterparts from Canada or Mexico.

Known fauna in California include over 200 species of mammals (10 of the world's 19 orders), of which 30 are carnivorous, 88 are rodents, 10 are hoofed animals, 16 are insectivores, 24 are bats or other flying mammals, and 24 are marine mammals. There are 132 species of fish, 34 snakes, 38 lizards, 8 turtles, 21 species of frogs or toads, and 17 species of salamanders. There are five families of crustaceans, eight families of mollusks, and most of the United States' 24 insect orders can be also found in this state. The birds have been the most successful in crossing California's ecological barrier: over 500 avian species live here.

Since the 1850s, changes in faunal composition have occurred due to human development. Between 1850 and 1910, there was a massive change in species numbers and diversity rivaling the post-glacial extinctions (Dasmann, 1965). The abundance of wildlife was reduced drastically by unregulated subsistence and commercial hunting and trapping. Mining, logging, and livestock grazing and agriculture altered much natural habitat. Conversion of wetlands and wild areas caused the retreat of wildlife populations to isolated areas.

It is difficult to discuss California's wildlife in great depth because of the enormity and complexity of the state's species composition. (In the case of insects, it involves an unknown number of species, though probably less than 50,000.) Any species of biota plays a vital role in the stability and productivity of any community of interacting species, for each provides food sources for many other invertebrates, fish, reptiles, amphibians, birds and mammals. The species which feed on invertebrates in turn become prey for other species of predators, creating a "food chain" of great complexity.

With respect to flora (plants) the complexities of cover, nesting or reproduction, water relationships, etc., are also involved.

This discussion is a general outline of California's vertebrate species and those related to "forests" (Statutes 1978, Chaptered 1181). Only the major communities are mentioned and described by common species and some species of special interest (such as those which are rare or endangered). It is necessary to remember that each community has an extensive web of species interactions and ecological dependencies. What affects one species will affect numerous coexisting species.

Coastal wildlife; fish communities, terrestrial wildlife, and rare and endangered species are treated (see also U.S.D.A., n.d.).

(1) Coastal Wildlife

California's long border with the Pacific Ocean is home for the coastal fauna. Included in this habitat are the rocky cliff walls, sea terraces, sand or pebble beaches, tidepools, lagoons, reefs, salt marshes, estuaries, and the open sea. Marine and coastal fish and wildlife are not ordinarily affected by forest conditions. Exceptions include sedimentation or water pollution originating in forests that may affect estuaries or wetlands, and certain species where terrestrial or forest type habitat is needed for reproduction or nesting such as herons and egrets, and all anadromous fish. A possible effect would be species that require open areas, where tree planting or vegetation introduction might have an adverse effect such as western sandpipers, pelicans, or other nesters on rocky or sandy places.

(2) Fish Communities

Fish diversity is meager in California. There are only 25 endemic species, 58 other native species, and 49 introduced species. Ecological isolation has had the opposite effect on fish that it has had on plants and animals.

Most freshwater fishes are adaptable and are found in a variety of habitats with wide ranges, although each species has environmental limits on its population size and distribution.

Coldwater streams contain primarily trout such as rainbow, golden, and cutthroat trout. Warmwater streams do not contain trout, but are home for such species as bass, catfish, sunfish, bluegill, crappie, bullhead, perch, carp, minnows, and suckers.

Streams, ponds, lakes, and reservoirs may contain only trout, only warmwater species, or a combination of both. Many species were planted for fishing purposes.

Anadromous fish are ocean species that migrate inland and upstream to lay their eggs, thus some species live in both cold and warm waters at different times in their lives. The eggs hatch in freshwater streams, and the young gradually move downstream while growing, mature at sea, and then return upstream to repeat the reproductive cycle. Anadromous species include such species as trout, salmon, American shad, and striped bass. All forests, because of their effect on hydrology and water quality, are important to fish and aquatic organisms. However, riparian forest and other streamside vegetation is particularly important because of its effect on temperature, bank erosion, shelter within the water (roots), and provision of food (directly through leaf and litter fall; and indirectly as habitat for terrestrial/aquatic organisms).

(3) Terrestrial Wildlife

Terrestrial wildlife can usually be associated with a "habitat" or plant community. However, various habitats may be seasonally used for various purposes. The California Wildlife Habitat Relationships System, administered by the Department of Fish and Game, describes the management status, distribution, life history, and habitat requirements of the state's wildlife species.

The lower, drier oak woodland, grassland and desert habitats are characterized by rodents (mice, rats, ground squirrels, gophers), insectivores (shrews and bats), and hares and rabbits. Mammals include fox, cats, elk, antelope, skunk, and deer. Riparian areas here and higher, are important for animals such as beaver, opossum, weasels, and otter. Birds of grasslands and deserts include owls, hawks, vultures, and occasionally eagles; numerous passerines, hummingbirds, swallows, quail,

etc. Wet areas or marshes attract migratory ducks, geese, swans, and contain resident ducks, quail, herons, blackbirds, and crows. Many birds of the generally treeless areas still depend on trees for nesting such as woodducks, woodpeckers, swallows, hawks, owls and others. Two unusual birds of this zone are the yellow billed cuckoo (a tree nester) and the roadrunner (a shrub dweller). Desert and grassland areas are also habitat for reptiles and amphibians.

The Foothill, Northern and Southern Oak, and Northern and Pinyon-juniper Woodlands are within the area of this project. (These areas coincide roughly with the Upper Sonoran Life Zone by which fauna are often described.)

Shrews, rats, woodrats, chipmunks, gophers, squirrels, rabbits, skunks, weasels, cats, deer, fox, badger, coyote, porcupines, and bats are among the mammals found here.

Raptors are common. Species of quail, dove, poorwill, hummingbird, swift, many woodpeckers, crow, flycatcher, and passerine families and groups abound.

Reptiles such as lizards, snakes, and amphibians (salamanders) are fairly common.

The mountain forests are sometimes called the Transition Zone for describing wildlife. Most of the mammals described in other zones have species or variants in this Zone which is the principal project area for reforestation, thinning and "commercial forest" projects. Chipmunks are more common and additional mice and squirrels such as flying squirrels are found. Some different weasels such as mink, wolverine, marten and fisher live here. Bear, deer, porcupine, mountain lion, and elk are more common. Raptors peculiar to or more common in the type include goshawk, golden eagle, sharpshinned and Cooper's hawks, and various owls. Grouse, mountain quail and pileated and other woodpeckers are residents. Conifer tree dwellers such as pewee, grosbeaks, crossbills, juncos, Stellar's jays, sapsuckers, nutcrackers, chickadees, nuthatches, and creepers are fairly common. Rattlesnakes and more amphibians including tree frogs occur.

(F) Rare, Threatened and Endangered Species

Under the California Environmental Quality Act (Section 15380, Title 14, CCR) a species of animal or plant shall be presumed to be rare or endangered if it is listed in:

- Sections 670.2 or 670.5, Title 14, CCR,

OR

- Title 50, Code of Federal Regulation, Sections 17.11 or 17.12 pursuant to the Federal Endangered Species Act as rare, threatened or endangered.

A species or subspecies not included in any listing identified above shall nevertheless be considered to be rare or endangered if the species can be shown to meet the criteria as follows:

1) "endangered" when its survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition, disease or other factors;

2) "rare" when:

(a) although not presently threatened with extinction, the species is existing in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens;

(b) the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered "threatened" as that term is used in the Federal Endangered Species Act. This definition shall not include any species that have been determined to be a pest by the Director of Food and Agriculture or by the Director of Health Services.

The State of California under the authority of the Fish and Game Commission Code 1904-7 listed 67 animal species as threatened or endangered, and 187 plant species as rare, threatened or endangered with two additional plants as candidate species (1988). Since these lists are extensive and subject to change, they are not included here. The California Natural Diversity Data Base (CNDDDB) under the Department of Fish and Game provides updated information on confirmed locations of populations of these species.

The U.S. Fish and Wildlife Service has 56 threatened and endangered animals and 25 plants listed. Not all federally listed species are included on state lists, but they are included in CNDDDB listings.

The California Native Plant Society (CNPS) has compiled an extensive list of plant species which are prioritized into five categories. The top three categories include 891 species; 657 other species are designated as needing more information or are on a watchlist (1988). Although all species in the top three categories are not listed by the state, they may be subject to consideration under CEQA if they comply with the definitions provided by the California Endangered Species Act (Fish and Game Code 2067) of rare and endangered plants. CNDDDB includes CNPS listed species.

(G) Soils

Soil is the basic resource of forest lands. Soil serves as the medium for plant growth, and stores mineral nutrients and water. Soil is defined as the aggregate of weathered minerals and decaying organic matter which covers the earth in a thin layer. The upper boundary is "atmosphere", the lower boundary is "geology or rock". Soil forms from the interaction between the underlying parent rock, climate, vegetation, organisms and time. Once damaged or lost through erosion, soil reclamation can be expensive and lengthy if possible at all. Protecting the integrity of soils is necessary to insure long term productivity of the land.

Most forest soils in California are residual soils. They have developed in place from the underlying parent rock. The physical and chemical properties of these soils are therefore dependent on the parent rock. The ability of a soil to withstand significant damage is dependent on the soil type, depth, slope, climate and season of activity as well as the methods and equipment used.

Soil science is a relatively young science and forest soil classification and mapping is an ongoing project within the state. Hundreds of forest soils have been identified, but more are discovered and reclassification goes on continually. Regional offices of CDF have up-to-date data on the forest soils within each Forest District. Maps of the State Soil-Vegetation Survey, compiled by the University of California, the Soil Conservation Service, and CDF, are available for most forest areas. These maps show soil "series" depth, slope, erosion hazard, fertility, soil profile and structure, pH, suitability for vegetation, general climate under which the soil formed, particle size distribution, etc. From these characteristics practices can be designed to protect soil resources.

(H) Archeology/Cultural/Historical Resources

As with its natural features, California's archeological, cultural and historical resources are rich, diverse, and varied.

The prehistoric and early historic Native American populations of California represented all seven of the North American language "families". There were about 100 different ethnic groups ("tribes"). In addition to these modern Indian "tribes", there were many ancient prehistoric cultures known only through archeological studies of cultural resources. Some of these sites are more than 10,000 years old.

Most of the Native American populations and permanent settlements were along the Coast, major rivers, and in the valleys more associated with grasslands and woodlands than conifer forests. However, forest lands were used in summer and the woodland oaks represented a principal food supply in the form of acorns.

The higher mountains, dense timber, rolling hills, plains between streams and most of the deserts did not have permanent settlements.

Nonetheless, significant archeological resources do exist on forest and commercial forest land, or closely associated therewith. Riparian forests often contain significant archeological resources such as village sites.

The Spanish-Mexican historical period was not much connected with forest land and especially not with commercial forest land in the interior. The Spanish-Mexican settlements were along the coast and coastal valleys. They were associated with commercial forest only in southern California, the Central Coast and around the Bay Area. Several forest related camps, mills, etc., from this period are historic sites, however.

The early American era was strongly associated with forest land and forest exploitation. The location of mines, emigration routes, and towns were often associated with timberland. Early demand for wood led to the establishment of lumber camps, sawmills, wood cutting and other activities, some of which are of historical interest.

(1) Data Sources

Identification of recorded cultural resources located within the project's potential area of environmental impact is the first step in compiling complete cultural resource information and guarding against inadvertent damage to cultural resources.

National Register of Historic Places is published annually by the State Office of Historic Preservation as part of the Federal Register and is updated periodically.

California Historical Landmarks (1975) published by the State Department of Parks and Recreation lists all California Historical Landmarks with a brief description of each.

The California Inventory of Historic Resources (1976), is useful for identifying cultural properties not already included in the previously mentioned publications. This book contains listings based on local and regional surveys as well as the only published compilation of California State Points of Historical Interest.

Local historical societies or similar organizations provide information not found in the publications mentioned.

California State Archeological Site Survey: Current archeological site information is obtained from the regional Information Center of the California Archeological Inventory for each project.

The Information Centers maintain records on (a) the location of known archeological sites for their areas of responsibility, and (b) the absence of such sites, either because field surveys of the area have encountered nothing or because the area has never been subjected to a scientific study to locate cultural resources. The Centers also serve as a repository for archeological survey and excavation reports. Based upon this knowledge, the Centers make suggestions for mitigation or avoidance of potentially adverse effects. The Information Centers also review the National Register and State Historical Landmark listings.

Consultation with Local Ethnic Groups: There may be situations in which a project could impact cultural resources of particular interest or value to a local ethnic or cultural group. Typical examples are: archeological or other sites which have religious and spiritual value to Native Americans; burial sites; cemeteries; or other features, including vegetation, to which an ethnic community may attach particular significance.

III. ELIGIBLE FOREST IMPROVEMENT PRACTICES

(A) Reforestation and Timber Stand Improvement

(1) Site preparation

Site preparation is the control of vegetation competing with planted trees and is necessary under California's climatic conditions in order to prepare a proper seed bed for seeding and to control competing vegetation for both seeding and planting. Without site preparation, reforestation often fails due to lack of moisture for planted trees over the summer and fall, or excessive shade for the trees planted.

Another method of site preparation is by hand treatment or grubbing. This method is used for small scattered areas for "interplanting", in rocky areas or steep areas where equipment cannot be operated, and certain other specialized circumstances. Treatment of cut stumps with herbicides to prevent resprouting may be recommended.

Site preparation is usually done with heavy machinery because hand clearing is very expensive. Crawler tractors equipped with accessory equipment are ordinarily used. Accessory equipment used with tractors includes blade, brush rakes, anchor chains, balls, sheep's foot rollers and crushers, and, in the case of light brush or grass, plows and discs. Mechanical clearing is usually limited to slopes less than 70 percent. Most tractor clearing occurs on slopes of less than 30 percent.

Prescribed burning can be used to remove existing undesirable vegetation. It can provide a nutrient rich bed for seedling growth and may allow planting to begin earlier in the season due to higher soil temperature on some barren sites. Herbicides may be used to desiccate brush prior to burning. Burning may also be necessary to remove litter left by other methods of site preparation.

Brush and hardwood cleared material is rarely used for industrial wood products. Cleared material must often be disposed of by burning. Burning of brush that has been crushed or desiccated in place is sometimes practiced. Compaction is accomplished by crushing, lopping and felling, rolling, etc. Where brush has been windrowed only the windrows are burned. However, it is sometimes best to crush the brush and broadcast burn the area. Local CDF offices and adjacent landowners should be advised of burning schedules.

(2) Planting/Reforestation

As soon as possible after site preparation, the area is planted or seeded. The two methods commonly used in artificial reforestation are (a) direct seeding (sowing the area to be reforested with seeds), and (b) planting nursery-grown seedlings. The choice of the method depends on several important factors such as expense, time required, availability of seedlings, and chances of success (Stoddard, 1978).

Direct seeding has not been too successful in California because of rodents and birds eating the seed, germination failures, and failure of seedlings to survive the long, hot, dry summers. However, with the proper ground preparation and the use of chemical repellents, which discourage birds and rodents from eating the seed, survival is more successful. This is especially true on recently logged or thoroughly scarified land where mineral soil or churned-up humus provides a favorable seed bed. Douglas-fir is the species most often seeded.

Planting of nursery-grown stock gives the best results. Seedlings can be grown to the proper size with proper root development in nursery beds at a reasonable cost.

Survival of ponderosa pine (one or two year old bare root stock) has been very successful in past years. Other species readily available as nursery stock include Douglas-fir, Jeffrey and sugar pine, and coast and sierra redwood. White fir and red fir are also available. Eucalyptus, incense cedar and coulter pine might be used on certain sites. Planting of species valuable for fish and wildlife might be done on certain sites. Planting may be by hand or machine. In hand planting, each seedling may be given protection by placing it in the shade of a stump, log, rock, etc., or other moisture holding spot. This can aid survival.

Nursery stock and seed are identified by seed zone source, i.e., elevation and latitude. Then the planting stock is matched to the area planted (CDF, 1970). Because of this practice, local genetic strains are preserved and no "monoculture" or genetic degradation occurs.

Planting is usually accomplished in late winter or early spring at a time when the nursery stock will produce good root growth and slightly before the natural "spring flush" of growth. Fall planting is used in some areas where spring access is difficult. Fall planting is usually not as successful as spring planting.

In case of total or partial failure of seedlings or planting, an area may be reseeded or replanted either in whole or in part in ensuing years.

(3) Clean and Release

The elimination of unwanted competing vegetation such as hardwood trees, brush or grasses from an immature stand of trees is known as cleaning. The resulting effects of increased vigor and growth by the remaining trees are known as release. The purpose of clean and release is to regulate the composition of mixed stands to the advantage of the desired species. This often results in a radical change in the species composition of the stand after such treatment (Smith, 1962).

Cleanings are the earliest types of operations that can be applied to new stands after establishment. They are best made as soon as those individuals that need help are threatened with injury (Smith, 1962). Studies have shown that early release, one or two years after planting, is essential not only for seedling survival, but also for maximizing growth. Waiting three years before releasing conifers usually results in growth losses that will never be made up (Fiddler and McDonald, 1986).

Clean and release may be accomplished by mechanical or chemical means. Mechanical methods include scalping, felling, crushing, girdling, mowing, burning or chipping. Chemical methods include ground or aerial spraying, injection or a combination of mechanical and chemical methods such as cut and daub where the stem is actually cut and a chemical is applied to the wound. Both determined by an evaluation of actual on-site conditions by the RPF.

These on-site conditions include such specifics as size of the parcel to be treated, conifer stocking, age, size, density, volume and species of the vegetation to be treated. Conifer stocking determines the amount of release necessary. That is, as the number of trees per acre increases, so does the amount of treatment necessary. For example, it has been found that when releasing conifers, a radius of at least five feet is required before conifers show any significant response (Fiddler and McDonald, 1986). It is important to consider the size, age, density and volume of the vegetation to be treated. As these factors increase so must the intensity and consequently, the cost of the treatment. If it is a non-sprouting species, mechanical treatment is effective. If however, the species is a vigorous sprouter, then a chemical or combination chemical/mechanical method might be more appropriate.

Manual treatments appear costly but may be worthwhile for controlling non-sprouting species. They are especially effective if applied when weeds are young and not well established (Fiddler and McDonald, 1986). Chemical methods can be effective against sprouters if applied during times of vigorous growth, thus severely depleting the plant's root reserves and thereby limiting its ability to resprout (Smith, 1962).

Costs of manual conifer release typically range from \$100-350 per acre depending upon site conditions (Colonna, 1986). More detailed cost information is contained in Appendix G.

The benefits of manual or mechanical release are many. Removal of competing vegetation guarantees sunlight and growing space. This in turn promotes sun needle formation, development of side branches, increases in photosynthetic activity resulting in diameter, height and volume growth and overall increased vigor. These factors combine to increase conifer dominance potential which, in turn, will suppress brush resprouting. In addition, the cut brush acts as a mulch, retaining moisture and decomposing to condition the soil and decrease erosion potential (Colonna, 1986).

Chemical release is often the most cost-effective method, especially on medium to large projects. Typical direct contract costs of mechanical methods for site preparation, release, and precommercial thinning ranged from \$70 to \$180 per acre; typical project sizes were 90 to 200 acres (USDA 1988). Typical direct contract costs for manual treatments ranged from \$200-\$400 per acre. Herbicide application direct contract costs ranged from \$50 per acre for aerial applications over typically large areas (650 acres) to costs of \$60 and \$110 per acre for ground machine and hand applied methods, respectively, on smaller projects (220-240 acres). Combined manual and hand applied chemical treatment costs were \$240 and \$330 per acre. Refer to Appendix G for a complete summary of these costs. Comparable total costs and cost-effectiveness of different release methods depend on individual site characteristics such as topography and species composition as well as total project size.

Herbicides are effective against sprouting species. Field trials have shown chemicals to give effective and lasting results for up to three years after a single application (Fiddler and McDonald, 1986). Herbicides can be applied by only one person, thus eliminating or lessening the cost of hiring a labor crew.

(4) Follow-up treatment

In some cases regrowth of vegetation originally cleared may be rapid enough to interfere with the seed or planted trees. In this case, hand clearing, herbicide treatment, or mechanical methods of clearing may be used in spaces between planted rows of trees or around individual trees depending on the type of plantation and the nature of the regrowth.

Control of competing vegetation by deer, cattle, or sheep browsing may be possible if brush species are palatable (e.g. deerbrush, grasses). Some tree species (e.g. Douglas-fir) may also be very palatable, so grazing may not be advisable in these cases. If this form of biological control is used, animals should be carefully managed, utilization should be closely monitored, and seedlings should be protected if necessary.

Follow-up treatment is sometimes necessary because of insect or rodent attack. Troublesome insects include grasshoppers, pine tip moth, needle miners, and pine reproduction weevils. Insects are controlled by baits, sprays, or release of young trees from competing vegetation. Mice, rabbits, porcupines, gophers, and squirrels are sometimes problems and must be controlled with rodenticides. Deer sometimes heavily browse young trees. Deer are sometimes controlled by fencing, use of repellents, or protection of individual trees.

(5) Pre-commercial thinning (PCT)

Pre-commercial thinning is the reduction of the number of stems in an over crowded young stand of trees of commercial species (usually conifers) to a predetermined number, spacing, or basal area in order to achieve a high rate of growth on the remaining trees. Removal of non-commercial trees or other unwanted competing woody vegetation is often accomplished at the same time so that a stand of optimally spaced conifers results.

Pre-commercial thinning project criteria and priority selection procedures are designed so that this operation will be performed on the higher site lands in all coastal and interior forest districts.

The removal of trees (thinning) is usually accomplished by using chain saws or hand tools, but heavy equipment such as crushers, hydro-axe, bulldozers, feller-bunchers or other machines are sometimes used provided that planned residual numbers of healthy, undamaged trees can be left.

(B) Wildlife Habitat Practices

CFIP may be used to fund fish and wildlife habitat improvement work which includes but is not limited to stream clearance, re-establishment of desirable vegetation along stream channels and elsewhere, measures to encourage habitat diversity, restoration of anadromous fisheries, and fencing to protect wet areas and other key wildlife habitat areas from livestock (14 CCR 1527).

(1) Stream clearance

This practice is the removal of log jams and woody debris from rivers or streams used for spawning by anadromous fish. (Slash or debris resulting from logging operations since 1976 will not be funded. Since 1976, prevention measures for the cleanup of logging debris have been required by the Forest Practice Act and Rules.)

Log jams and debris are removed from streams by hand methods such as cutting with a chainsaw and removal of smaller pieces, hand winches (come-alongs), and jacks. Mechanical equipment such as mini-yarders, tractors or automotive winches, skyline or high lead yarders and other equipment are also used. The material removed is usually moved above the high water mark and burned to reduce fire hazard.

(2) Brush habitat improvement

This practice is the opening of forage lanes and the creation of low brush or grass openings that provide "edge effect" for deer and other big game animals (Burcham, 1949).

This practice is accomplished by hand work, heavy machinery, chemicals, and burning (similar to the site preparation phase of the reforestation practice). One difference is that there is less need for complete clearing. This allows leaving crushed vegetation for erosion control or the use of winter burning under relatively safe fire conditions. An example of the latter is strip burning of chamise (standing or crushed) in the winter. This practice may be appropriate on forest land that is nontimber land, low site (V) timber land, oak woodlands, and natural brush fields. Planting grass, herbs, and browse suitable for wildlife will be cost-shared.

(3) Oak woodland habitat enhancement

Oak woodland habitat improvement may include understory brush manipulation (thinning or patch-cutting), oak tree thinning in dense stands, and oak regeneration management (e.g. planting acorns or seedlings, propagation or protection of stump sprouts). Mechanical methods, ground application of herbicides, or low intensity burns may be used to manage brush.

Thinning dense stands of oaks to about 50 percent canopy cover may improve habitat for some game species (Passof, et.al. 1985). Oak should generally provide at least 25 percent canopy cover for wildlife enhancement purposes. Recommendations can be obtained from local farm advisors, California Department of Fish and Game personnel, or extension specialists. Oak regeneration may be enhanced by proper selection and handling of acorns, and by proper management of seedlings (e.g. reduction of competing vegetation, if necessary, and seedling protection in some cases).

When managing for deer habitat on north slopes, it is desirable to have 70 percent brush and conifer cover and 30 percent grass and forbs for summer range. On south slopes 30 percent brush and conifer, and 70 percent open grass and forbs are desirable for summer range.

(4) Revegetation along stream channels

This practice is the planting of riparian trees and shrubs along streams, rivers, and other wet areas. Species to be used besides appropriate commercial conifers include: willow (Salix), alder (Alnus), cottonwood and populus (Populus), sycamore (Platanus), walnut (Juglans), oak (Quercus), blackberry and wildrose, Atriplex, and other species adapted to various riparian habitats.

Only existing bare areas, eroding areas, and sloughing banks will be planted. Machinery will not be used in this practice.

(5) Wet meadow fencing practice

Fencing to protect wet meadows, other wet areas, and key wildlife habitat from domestic stock should be done where necessary. Fencing is usually done by hand methods or with light machinery such as post-hole diggers, post drivers and light winches.

C. Land Conservation Practices

Forest land conservation practices include but are not limited to erosion control, road repair, stabilization of abandoned roadbeds, and improvement of drainage facilities to reduce soil erosion and sedimentation.

Several practices will be cost shared for erosion control. Most of the practices are directed toward control of erosion from rural roads on private land:

- Installation and repair of failed or undersized culverts.
- Installations of fords to replace poor live stream crossing culverts or bridges.
- Outsloping and berm removal on low standard roads.
- Installation of dips and waterbars.
- Cleaning and reconstruction of side ditches.
- Installation of subdrains for control of slides and mass wasting.
- Installation of checks in ditches.
- Revegetation and mulching of eroding fills, slides, and cut banks.
- Reshaping and vegetating cut banks.
- Abandonment of unnecessary and eroding roads or skid roads by installation of water bars, check dams, and traffic barriers.

These practices will be cost shared only on private roads necessary for long-term management of a property.

For revegetation by a Registered Professional Forester (RPF) of slides, slumps or nonroad related erosion control, a plan will be required. Engineering plans for rip-rap, cribs or excavation work approved by a registered engineer will be required when appropriate.

These practices are accomplished manually or with light and heavy equipment such as tractors, graders, jackhammers, back hoes, cement mixers, pickup and dump trucks, and similar equipment. Materials used are not usually recoverable.

Revegetation is accomplished with species such as rye grass, barley, vetch, and various shrubs and trees.

No new road construction is allowed under the practice. No paving or gravelling is allowed under the practice, except as needed to protect a stream crossing or erosion control device.

Any of the above practices such as erosion control structures or revegetation required by the Forest Practice Act and Rules will not be cost shared on current THPs (Timber Harvesting Plans).

IV. ENVIRONMENTAL EFFECTS

(A) Physical and Biological Variables

(1) Vegetation

CFIP reforestation projects, wildlife improvement and land conservation projects include practices that can significantly alter the existing vegetation with respect to plant growth form, canopy cover, vertical structure, and species composition. Most of these vegetation attributes are dynamic, so adverse effects produced by CFIP projects are relatively short-term and not, therefore, significant.

Many reforestation projects replace brush with conifer trees. However, since many of California's chaparral brush species which are found on conifer lands are prolific seeders and have long seed viability, the CFIP program will not produce a significant change or impact on species populations or gene pools in the long-term. High-site lands that can support good conifer stand growth receive priority eligibility ranking for CFIP reforestation projects (14 CCR 1533), therefore, on many sites CFIP projects speed up processes which would occur under natural succession. Wildlife or land conservation projects may, on the other hand, increase the herbaceous components or even the brush, in some cases.

Various projects may affect the amount, pattern, and structure of vegetation canopy, especially brush. Where reforestation of brushy areas is intended, cover may change from dense canopy to little or no canopy cover immediately after treatment. However, the canopy will usually begin to close again within 5 to 10 years, and will provide multiple canopy layers as trees mature and brush grows between them. Subsequent follow-up treatments may reduce brush but will not leave a bare site. Wildlife habitat projects may change the amount and arrangement of brush cover, depending on wildlife or fishery needs. Herbaceous seedlings in brushy or forested areas can increase structural diversity. These practices include beneficial effects to wildlife by increasing community diversity and rejuvenating brush species.

CFIP projects can alter the existing species composition and species diversity of a site. Reforestation planting practices must use commercial tree species on at least 90% of the areas. Tree planting activities may produce a stand which is more uniform in species composition than a natural stand, although natural regeneration and establishment by brush tends to increase species diversity in a relatively short time. The relatively small size, on the average, of CFIP projects will preclude significant program impacts from mono-cultures. However, where large projects could result in significant effects, mono-cultures will be avoided. Most CFIP projects utilize native species, but non-native species may be introduced to a site. Any species planted must be silviculturally adapted to the site and subject to the Director's approval (14 CCR 1545.7).

Vegetation removal or disturbance can also damage rare, threatened or endangered plant species. These impacts will be avoided.

(2) Hydrology

The hydrologic regime of an area is the result of a complex interaction between climate, topography, vegetation, soils, and geology. Making changes in the type and amount of vegetation on a site results in changes in the local water cycle. These effects differ in the duration and significance of impacts depending on local circumstances and the size and severity of a given project.

Since the parcels selected for treatment under this project are relatively small with respect to hydrological functions, most impacts, positive or negative, will be relatively insignificant in terms of the entire watershed. Most hydrologic impacts could not be measured off site with the existing hydrologic monitoring network. This is because the effects are less than the inherent errors in water measurement, variability in climate, and the inability to monitor all activities in a watershed.

Baring the ground by removal of the layer of brush litter in site preparation, or habitat improvement, can affect local water yields. The layer of decaying organic materials which carpets the soil in undisturbed areas, absorbs the impact of falling raindrops and holds the water for absorption by the soil. In most undisturbed areas, especially on deep soils and gentle slopes, there is no overland flow, even during periods of intense rainfall. The cushioning and absorbing ability of the litter generally exceeds the rate of precipitation. Removing this protective layer results in increased run-off and overland flow once the soil has become thoroughly saturated. If not properly managed, this may cause erosion problems.

Some brush clearing machines (e.g. tomahawk) do not expose soils. The brush is clipped off at ground level or ground into a mulch which is left in place to protect the soil.

Removing most of the existing brush or vegetation results in a reduction in the rate of evapotranspiration and an increase in water yield. The vegetation canopy intercepts a portion of incoming precipitation, catching it on leaves and stems where it evaporates back into the atmosphere. If evaporated, water never reaches the ground to become surface or subsurface flow. Transpiration is the process by which water vapor is passed from vegetation mostly through the leaves. The water usually is from the ground by translocation from the roots. Transpiration which removes water from ground water reduces net yield from a watershed.

Grasses, shrubs, and trees have differing amounts of water demands. Ordinarily deep-rooted trees have higher water demand than brush, and brush has a higher demand than grass. Changing the long term vegetative cover results in a change in the long term water demand on the watershed. Benefits from increased water yields should be weighed against potential erosion effects. Measures should be taken to minimize erosion impacts of surface flows.

Most watersheds show a definite response to cover alteration, although the magnitude of the response varies considerably because of complex interrelationships. Usually, there is a first year increase in water yield after clearing, but this increase invariably declines over time unless the site is kept bare.

In general,

- (a) Reducing tree cover increases water yield.
- (b) Converting brush to grass increases water yield.
- (c) Establishment of tree cover on sparsely vegetated land decreases water yield. Regrowth of brush decreases water yield.

(d) When the existing brush or hardwoods are removed, there will be an immediate reduction in the amount of water lost through interception, evaporation, and transpiration. In areas where the existing vegetation is completely removed, there may be increased surface run-off due to removal of the brushfield litter. This will result in a short-term increase in water yield.

(e) In areas now well covered with brush, the long-term impact will be a steady decline in water yield, from the first year increase, back to a level close to or less than the original yield in the case of reforestation, or similar to the original yield in habitat improvement.

(f) For areas that have been substantially damaged by wildfire, the effects of reforestation or wildlife improvement are the same as above, except that the fire-caused effects are often more severe, and more subject to erosion. Therefore, reforestation may be very beneficial to these sites in terms of reducing run-off impacts.

(3) Water Quality

Water quality in good condition forested upland areas is generally excellent. The water is typically low in dissolved or suspended matter except in flood periods, high in oxygen content and relatively low in temperature. Sediment transport, while varying with the seasons, has usually reached an equilibrium level based on climate, soil, slope, ground cover, etc. Any disturbance of the soil or vegetation in an area can disturb this equilibrium and have an impact on water quality.

The use of fire can result in less water absorption, increased erosion, and deposition of burned material (ashes) in water. However, these impacts are short-term and burns hot enough to trigger hydrophobic phenomena are rare.

Water quality degradation may result from reforestation and habitat improvement through stream sedimentation, and nutrient loading.

Removal of ground cover, road building, and use of heavy equipment can result in erosion and increased sediment load in adjacent streams. Soil erosion impacts are discussed in more detail under "Soils".

Sediment entering streams causes turbidity, which may make the water unsuitable for other uses. Clogging of spawning gravels with organic debris or finer particles may adversely affect the survival of salmon, steelhead, and other fish.

Removal of streamside vegetation, which shades the stream from intense solar radiation, may raise the average temperature of the water to levels detrimental to local fish species. This is discussed more fully in the fish section.

Water quality may be affected by contamination with pesticides. Contamination can result from improper use, drift, or accidental spills. Improper use can include failure to follow label instructions, precautions or restrictions with respect to target species, soil types, proximity to surface water or aquifers, application rates, timing, and required equipment; handling directions; and storage and disposal.

Herbicide drift is the transport of pesticide to nontarget areas. The potential for drift increases under conditions of high winds, low humidity, or high temperatures, from using high volatility pesticides, or from using high pressure sprays or fine-holed nozzles.

The greatest risks from drift are associated with aerial applications. Since most CFIP projects are small, aerial applications occur on very few projects, so program effects will not be significant. However, where aerial spraying does occur, effects will be minimized by requiring strict compliance with state, federal, and local regulations and permits governing the aerial application of herbicides, by the use of buffers where appropriate, and by monitoring drift during treatment if required by project description.

Pesticide movement into surface water or aquifers or downslope to other vegetation depends on the persistence and mobility of the chemical, soil textures and organic content, and factors such as slope and run-off. Residues which adhere to soil particles may still be transported into water under erosional forces, or with heavy precipitation or flooding. Potential movement into water shall be mitigated.

Accidental spills may also occur which could result in direct contamination of waterways, soils and vegetation, or in residues that get carried in later. The potential for direct contamination of water by accidental spills will be minimized by requiring that all mixing, loading and temporary storage on site of materials be done away from any running or ephemeral watercourses. Potential impacts from spills or accidents shall be mitigated.

(4) Soil

Surface soil movement is the most obvious impact of reforestation and habitat improvement. The process of clearing the site of unwanted vegetation and the use of various types of equipment for clearing, planting, and follow-up treatment all can lead to erosion before the new plant cover is fully established. The amount of soil movement depends on the method of clearing, soil characteristics (as evidenced by soil series), climate (especially type and intensity of precipitation), slope, and the density of plants, debris, and litter remaining after clearing.

In areas of unstable slopes, mass movement of soil may result from clearing if the hazardous or unstable condition is not detected during the site selection process. In some cases dry season soil movement, or wind erosion, can be a problem after vegetation is removed. Because of the planting season, roads may have to be traveled when they are still in a wet condition, or have snow banks left from winter. Road and trail construction for access to reforestation areas or the use of existing roads and trails during the wet season can result in direct soil movement and erosion, or indirect erosion by the damaging of erosion control structures along roads or trails.

Sometimes the opening of old roads, or the construction of new roads, results in increased use of new activities such as ORV use, horseback riding, or hiking. These new or expanded uses can cause soil erosion from roads, trails, and adjacent areas.

The vegetation to be cleared is often compacted to reduce moisture content by drying so the vegetation can be burned cleanly.

Cleared vegetation ("slash") either in place or in windrows, is unsightly and is a fire hazard. Disposal is usually required by chipping or burning. If windrowed, the windrows can be burned.

If desiccated or crushed, brush can be burned in place. Fire has less impact on the soil than mechanical clearing, as it does not move the surface soil horizons and may have less erosion potential. Burning may temporarily raise the level of available soil nutrients, although "hard" burns may severely disrupt soil micro-organisms and result in temporary soil sterility. This sometimes occurs when windrows are burned.

On areas damaged by fire the adverse impacts have mostly occurred prior to the installation of the practice.

Soils can be compacted by heavy equipment, especially if the equipment is operated while the soils are wet. This effect is relatively insignificant because most use of heavy equipment will be a "single pass" operation. That is, repeated travel over the same area will not occur. Clearing usually occurs in the dry season when soils are less susceptible to compaction.

Mechanical clearing of vegetation removes soil and organic material and thus may lower site quality. When properly done clearing does not actually remove soil from an area. Some soil is moved around and displaced, but if brush is windrowed, soil and litter are only moved a few feet. Providing erosion does not occur, differences in site productivity cannot be detected. Brush rakes are better than dozer blades for clearing because less soil is moved.

(5) Air Quality

The burning of standing, crushed, windrowed vegetation and material requiring disposal adversely affects air quality.

Application of herbicides results in some drift, even when very carefully done, which affects air quality. Herbicides may be aerially applied to desiccate brush for site preparation on those areas where slope, accessibility, or other factors render mechanical clearing, or ground herbicide application impractical.

Operation of equipment adversely affects air quality through exhaust fumes and raising of dust.

(6) Wildlife

Practices of these projects may be deliberately directed at certain wildlife species, either to increase (+) or decrease (-) their populations. Other practices may indirectly affect wildlife habitat and species.

The potential impacts on individual wildlife species depend upon the condition and vegetation of a site before treatment and the time frame used to evaluate habitat effects. Habitat may be disturbed and impacted initially but improved in the long run, or the reverse may be true.

The reforestation and habitat improvement practices will temporarily disrupt wildlife during the clearing and/or burning operations. Some wildlife and micro-organisms will be killed.

Site preparation and clean and release practices may decrease important browse species such as Ceanothus species and oaks and eliminate effective cover. Impacts will depend on the amount of vegetation actually removed, on the species composition and age of the brush with respect to its forage quality, on density with respect to access and escape cover value, and on availability of other brush stands or vegetation types nearby. Impacts will be mitigated with Resource Protection Guidelines (14 CCR 1545 (d)) and other measures.

In the case of reforestation, the long-term effect will be to favor wildlife that inhabit conifer forests to the detriment of wildlife inhabiting brush, openings, hardwoods, or grass and herbs.

For most wildlife improvement practices, wildlife inhabiting dense brush and hardwoods will be disfavored in favor of wildlife inhabiting young brush, and grassy or herbaceous openings.

The site features which strongly influence habitat quality for many wildlife species and which are most likely to be affected by CFIP practices are vegetation type, canopy cover and structure, brush cover and litter availability. Many CFIP projects will favor early successional species for a brief period to be replaced by later successional habitats and species. Table 9 describes potential direct and indirect effects of CFIP practices.

The Boreal Zone containing Alpine Forest and fell-fields is not apt to be affected by this project, except for land conservation or wildlife practices which will be to improve environmental conditions.

TABLE 9

Wildlife Directly or Indirectly
Affected by CFIP Practices

<u>Name</u> (+/-)	<u>Reason Affected</u>
Mice (<u>Peromyscus</u> sp) (-) and gophers	Poisoned to protect tree seed. Usually disfavored by conifer forest except for one or two species.
Porcupine (<u>Erethizan dorsatum</u>) (-)	Killed to protect trees.
Squirrels, chipmunks (<u>Scuirius</u> , <u>Eutamias</u>) (-)	Killed to protect seed; robbed of seed for use in project. May be favored in long-term by conifer forest.
Predatory animals and birds (-)	May be affected by loss of rodents or birds. Sometimes accidentally poisoned secondarily. Sometimes favored by increased populations of birds, mammals fostered.
Quail (<u>Oreortyx</u> sp.) (+)	Favored by brush treatment, fish and wildlife practices, game improvement.
Pheasant (+)	Favored by brush treatment, fish and wildlife practices, game improvement.
Pigeon (<u>Columba</u> sp.) (+)	May be favored by brush treatment, fish and wildlife practices, game improvement. May be disfavored by brush control.
Turkey (<u>Meleagris</u> sp.) (+)	May be favored by brush improvement, fish and wildlife practices, game improvement.
Passerines (±)	Habitat favored (+) or destroyed (-).

Woodpeckers (±)	Habitat favored (+) or destroyed (-).
Passerines, Jay, Crows (-)	Poisoned by treated seed.
Rattlesnakes (-)	Killed by woods workers.
Woodrat (<u>Neotoma</u> sp.) (±)	Poisoned to protect seed and trees. May be favored by forest in long run. Disfavored by hardwood control.
Deer (+)	Favored by wildlife practices, usually initially favored by clearing for reforestation. Long-term disfavored by conifer forest.
Woodpeckers, creepers, nuthatch, chickadee, grosbeak, grouse, owl, goshawk, siskin, etc. (+)	Some are disfavored by brush control. Many will be favored over long-term by conifer forest.

(7) Rare, Threatened or Endangered Species

CFIP projects have the potential to kill or disrupt rare and endangered wildlife or plants. Reforestation and wildlife improvement has more potential for harm to rare and endangered plants than for harm to wildlife. Without control over the size and shape of clearings, or the vegetation composition after clearing, it is possible habitat can be made worse rather than better.

Rare, Threatened or Endangered plant species may be impacted by physical site disturbances (including mechanical and manual methods) which can damage or destroy individual plants and alter habitat. Herbicides can also directly damage or destroy existing plants. Potential impacts on particular species depends on project location, treatment methods, and in some cases season. Extent of impacts depend on: actual plant damage, whether plants are annual or perennial, on availability and condition of seed supplies or other means of reproduction, and on impacts to plant habitat (including adjacent vegetation litter, soil condition).

Threatened or endangered wildlife species may be impacted directly by damage to individual animals or by destruction of habitat. Species potentially affected will depend on project location, treatments and methods, and size of the area. Impacts to individuals on-site or nearby depend on species mobility, territory size, home ranges, and adaptability to different habitat types.

(8) Archeology, Cultural, Historical Resources

Clearing or burning as in the reforestation and wildlife improvement practices has potential for disturbing cultural resources.

Operation of equipment and soil disturbance is most likely to affect lithic scatters, archeological campsites and possibly historic roads or trails.

Burning could destroy buildings or other cultural structures.

Vegetation materials or sites with ethnic significance could be disturbed.

(9) Noise

The operation of equipment such as tractors, chainsaws, etc., is noisy and can reach irritating levels in any of the projects or alternative practices. However, most of the practices will occur in rural areas and the duration of the noise is over short periods. Mitigation of noise will not be needed unless the project is very close to residences, in which case CDF may request that the applicant notify residents of adjoining properties, and/or limit the noise to certain hours of the day or days of the week (14 CCR 1532.1).

(B) Additional Effects of Specific Projects or Practices

(1) Brush Habitat Improvement (Additional Effects)

The environmental effects of this practice are similar to site preparation for reforestation. Although usually designed for big game, the practice results in habitat diversity which encourages game birds such as quail, doves, and pigeons.

Erosion hazards may be high if steep ground is cleared. Clearing fires may escape control with severe damage possible.

Increased deer and elk population can be detrimental to orchards, conifer restocking, and agriculture in adjoining areas or along deer migration routes. An imbalance between summer and winter range may develop resulting in deer die-off. Excessive populations of rodents sometimes develop in lanes or clearings. Many of the adverse effects have already occurred when the practice is installed on areas that have been damaged by wildfires or other catastrophic events.

(2) Thinning Practice

The environmental effects of thinning are slight. The species composition of the stand is usually little altered. The principal effect is to grow larger trees faster, which is usually environmentally acceptable. Short-term aesthetics may be displeasing. Low growing vegetation (brush, forbs, grasses, etc.), if at all affected, is usually enhanced, which is mostly desirable for wildlife. Hydrologic impacts are slight or none. Erosion is usually not a problem even when thinning is done by machines because of the vegetation left standing and the large amounts of litter left after thinning, unless the slash is burned. Rare and endangered plants are not likely to be encountered in stands for which thinning is practicable. Surface soil is not usually disturbed.

The principal adverse environmental effect is the creation of large amounts of "slash" which is a fire hazard and may encourage buildup of damaging insect and pathogen populations. Ips beetles and Dendroctonus beetles breed in slash and stumps from thinning. Insect populations can "buildup" to levels where the residual standing trees or trees in adjacent stands are attacked by beetles leading to localized insect epidemics. If thinning is done from June to October (hot weather) there is less risk of insect population buildup. Lopping slash to allow the slash to dry out and rot quickly also mitigates against beetle attack.

There have been cases where thinning appears to have increased susceptibility of trees or virulence of root rot pathogens, especially in pine and true firs. If root disease problems are suspected, borax can be painted or spread on stumps to prevent thinned stumps from becoming infected.

(3) Clean-and-Release

Clean and release practices may include manual, mechanical, and chemical treatments within stands of growing trees to reduce competing species such as grasses, brush, or hardwood tree species. Since the target conifer crop is already in place, clean and release treatments do not denude the site or significantly increase the potential for erosion. They also do not include intensive ground disturbance since this could damage the established desired trees. These practices therefore will not produce significant adverse impacts such as erosion or sedimentation associated with vegetation removal. However, where factors such as slope, soil type, treatment method, and any other pertinent factors combine to pose potential erosion hazards to water quality, potential impacts will be mitigated for that project.

The most significant potential impact of clean-and-release is the decrease of wildlife habitat. Ceanothus brush species and mast producing hardwood trees such as oaks and madrone are often targeted for reduction because they compete with conifers. Removal of these plants can impact local food supplies, fawning cover for deer, and hiding and escape cover for several species.

The value of a brush stand to local wildlife will be evaluated in the initial study. The removal of brush will not result in significant impacts where good condition brush is abundant in adjacent areas. Brush removal efforts which are limited to areas immediately next to trees will also leave enough brush and cover on site to mitigate adverse effects.

The Department of Fish and Game will be invited to be part of the interdisciplinary team which will review and comment on potential effects of the project and recommend mitigations. If departmental personnel are unavailable, other fish and/or wildlife experts will be consulted. Potential adverse effects to wildlife will be mitigated.

(4) Stream Clearance

The environmental effects of stream clearance are intended to be beneficial to fish life. However, if the removal is not carefully done, adverse effects such as stream bed erosion, stream bank undercutting, creation of fire hazards, destruction of fish holding pools, creation of turbidity, or other adverse effects may occur. Operation of heavy equipment in or along streams always has the potential for environmental damage.

(5) Revegetation Along Stream Channels

The re-establishment of riparian vegetation is usually beneficial to aquatic life, including fisheries, and provides important habitat features for many terrestrial species. The re-establishment of riparian vegetation along major streams, rivers, and wet areas would provide essential wildlife habitat (California Dept. of Fish and Game, 1965).

Certain plants (phreatophytes) are very high water users (through transpiration) in riparian zones. In desert and semi-desert areas these plants are often killed and controlled to prevent water loss for downstream diversion for human use. There are classic conflicts between riparian vegetation and water conservation, such as along the Colorado River. Therefore, the planting of phreatophyte type vegetation in forested areas might also decrease water yields. Phreatophyte species include: Populus, Salix, Tamarisk, alfalfa, bamboo, etc.

Planting of dense vegetation along streams often results in the loss of fishing opportunity. The usual conflict is between shrubs (willows, ceanothus, alder) and fly fishing. However, the increased fish production will mitigate significant impacts to recreational fishing.

Watercourses that are covered or brushy are usually less aesthetically pleasing than more open or tree lined streams. Some bare or open areas provide streamside access, recreation, scenic vistas and recreation opportunities.

(6) Wet Meadow Fencing

The environmental effects of this practice are minimal. Fences represent some hazard to wildlife, humans, and domestic stock, especially if not well marked and maintained. Fences tend to disrupt the natural aesthetic scene by causing straight lines including vegetation changes in straight lines by differential grazing pressure. The straight line of fence is often in marked contrast to natural lines or the interfingering of natural vegetation. There is a possibility that the fences might be used to include rather than exclude domestic stock in wet areas. This might result in excessive utilization and damage to vegetation, water quality degradation, erosion, tearing down of stream banks, and creation of animal wallows.

(7) Land Conservation Practices

These practices are intended to have beneficial environmental effects by reducing erosion, bettering water quality and improving land productivity.

However, if poorly designed or maintained, or in the case of failure of a structure or erosion control device, sometimes more environmental damage can be done than would have occurred without the structure.

Channeling and increasing water flow through ditches and structures can cause erosion if the structures do not perform as expected.

The materials used are committed and cause secondary effects such as gravel and iron mining, rock quarries, timbering, and the use of fuels.

(8) Pesticide Use

Hazards from pesticides include impacts to water quality, air quality, threatened and endangered species, nontarget vegetation, wildlife, riparian areas, and human health. Impacts may result from improper use of pesticides, from spray drift, from accidental spills, or from contact with pesticide residues.

Improper use can include failure to follow label instructions, precautions or restrictions on herbicide use with respect to target species, soil types, adjacent vegetation; proximity to surface water or aquifers; use of the area by livestock; application rates, timing, and required equipment; handling directions for health safety; and storage and disposal.

Herbicide drift is the transport of pesticide to nontarget areas. The potential for drift increases under conditions of high winds, low humidity, or high temperatures, from using high volatility pesticides, or from using high pressure sprays or fine holed nozzles.

The greatest risks from drift are associated with aerial applications. Since most CFIP projects are small, aerial applications occur on very few projects, so program effects will not be significant. However, where aerial spraying does occur, effects shall be mitigated.

Herbicide residues can occur on vegetation, in soils, and in water. Most pesticides are broken down under chemical action, light activity, and micro-organism activity. Persistence varies with soil organic content and micro-organism activity, and climate. While herbicides such as 2,4-D, triclopyr (Garlon), dalapon, and fosamine usually last less than a month in soils, others may last up to a year (e.g. hexazinone or Velpar) or more (e.g. picloram or Tordon) (USFS 1988). Long persistence will not pose a significant effect of the program for most reforestation projects because project site selection favors high site lands which have relatively deep, medium textured soils with medium to high organic contents; decomposition of the most commonly used forestry herbicides will be fairly rapid in these soils. However, pesticides may persist for longer periods on projects with thinner or less fertile soils, cooler or drier microclimates, or with specific pesticides.

Pesticide movement into surface water or aquifers or downslope to other vegetation depends on the persistence and mobility of the chemical, soil textures and organic content, and factors such as precipitation, slope and run-off. Residues which adhere to soil particles may be transported into water under erosional forces, or with heavy precipitation or flooding.

Human safety hazards to the public from direct contact with treated vegetation will not be significant because this program applies to private land where public use is limited or absent. Applicators and field workers may, however, be exposed to pesticides. Potential exposure of applicators is highest during mixing and loading activities. Health hazards will be mitigated by requiring strict adherence to all laws and pesticide label instructions, including those pertaining to application practices, use of protective clothing and equipment, handling and safety precautions, clean-up instructions, re-entry schedules, and pesticide storage.

Impacts to most mammalian species of wildlife from direct spraying will be minimal because these species tend to flee or take cover when humans enter the site. Impacts to fish will be minimal when pesticides are used in compliance with label instructions which prohibit use on or near water. Buffer zone requirements which will be specified as needed on a site-specific basis will mitigate the potential for spray drift into water. However, some wildlife, especially invertebrates may be exposed to pesticide residues or may ingest vegetation that has been treated.

Accidental spills may also occur which could result in direct contamination of waterways, soils and vegetation, or in residues that get carried into water. The potential for direct contamination of water by accidental spills will be minimized by requiring that all mixing, loading and temporary storage on site of materials be done away from any running or ephemeral watercourses.

(C) Cumulative Effects

Cumulative effects refer to two or more individual effects which, when considered together, are considerable, or which compound or increase other environmental effects (CCR 15355). An assessment of cumulative effects should include an appropriate time frame for evaluating past, present, and future projects, and should consider the effects of any activities occurring within a spatial context or range of distance appropriate to a particular type of impact. Three basic types of potential cumulative effects are considered.

(1) Cumulative effects of individual CFIP practices within a single project will be minimal due to the following factors:

(a) Inspections of former CFIP projects have shown few adverse effects and high landowner compliance with management plans and resource conservation regulations (Chapter 9:5, Division 1.5, Title 14 CCR). Contractors, landowners, and RPFs have also been very cooperative in addressing adverse individual effects. By limiting the potential for on-site impacts, the potentials for off-site and cumulative impacts are also reduced.

(b) Most CFIP projects are relatively small in size, so the scope of individual practices is limited.

(c) Program conditions requiring mitigation of equipment-induced soil effects, avoidance of streamside corridors, prohibition of funding new roads, and avoidance of impacts to water supplies will prevent significant adverse cumulative effects on watershed quality and stability, riparian resources, recreational and aesthetic values, and forest productivity.

(d) Since individual practices generally occur at different points in time or are dispersed across an area, and since most potential adverse effects of individual practices diminish quickly on high-site land because vegetation quickly restabilizes and organic litter accumulates, the combination of individual effects should not result in significant cumulative effects.

(2) Effects of multiple CFIP projects will not produce significant adverse cumulative effects for the following reasons:

(a) CFIP projects are generally small, i.e. 37 acre average (CDF, unpublished), so total potential acreage affected is limited.

(b) The limited statewide acreage under CFIP treatments is relatively dispersed throughout the state, so projects are not generally close enough in density to result in cumulative effects. Where they are close together, cumulative adverse effects will be mitigated by appropriate adjustments to project size, treatments, timing, or other project conditions.

(c) Potential individual project site impacts recover quickly as vegetation and natural organic material grows and accumulates on site. Multiple projects occurring in the same area are distributed over time and will not have significant cumulative impacts. Where CFIP projects result in a mosaic of different vegetation types or seral stages, wildlife habitat may be enhanced.

(3) Cumulative adverse effects resulting from CFIP project effects combined with effects of other projects in the area will not be significant when mitigated.

(a) CFIP projects are generally small, so their incremental effects on other activities should not be significant.

(b) Many reforestation projects occur in areas which have already been cut over, so CFIP projects that re-establish native vegetation will lessen present and future impacts of other past practices.

(c) CFIP projects on conifer forestlands are prioritized by the selection process to favor high site timberland with highly productive soils. Vegetation growth capacity is therefore high, so adverse impacts to vegetation cover are short-lived due to the fast recovery rate.

(d) Cumulative effects on soil stability and water quality, traffic, noise, dust and aesthetics will not be significant because domestic water supplies will be avoided, no new roads will be funded, and changes in local labor markets will be minimal and short term. Reforestation and land conservation projects may, in fact, mitigate erosion impacts from non-CFIP activities upslope or in adjacent areas through vegetation restoration or correction of on-site drainage patterns.

(e) In areas with heavy development pressures, CFIP projects may enhance wildlife habitat because project conditions require that the landowner will not develop the project land for uses incompatible with forest resource management for ten years after project agreement; therefore CFIP projects maintain forest habitat for wildlife.

(f) Since habitats and ranges for wildlife species often extend beyond project boundaries, the review of project effects on wildlife includes consideration of adjacent habitat availability. Cumulative effects are therefore very important and shall be mitigated.

(D) Adverse Impacts Which Cannot Be Mitigated

The following effects will occur under the program. However, impacts will not be significant or will be mitigated to levels below significance.

(1) There will be short-term (1-5 years) adverse impact on the scenic and aesthetic qualities of those areas which will be cleared mechanically and/or burned for reforestation and wildlife habitat improvement.

(2) Site preparation activities and vegetation changes will result in an unavoidable short-term reduction in the local populations of small mammals and birds. The areas can be expected to be recolonized from adjacent areas.

(3) Disposal of brush and slash by burning will cause a temporary degradation of the ambient air quality in the local air basin. This impact will exist during the actual burning operation and for a short time afterwards. It is mitigated by less potential for wildfires under uncontrolled conditions. Many of the forest fires of 1987 and 1988 were limited in extent by using CFIP projects as fuelbreaks or as safety areas to stage personnel.

(4) Using pesticides, including herbicides, will result in some air pollution due to drift.

(5) Some mammals, birds, or invertebrate species of wildlife may be affected by pesticides from direct exposure, contact with treated soils or vegetation, or from ingesting plant materials or other exposed species. Vegetation and fauna killed by pesticides will be irretrievably lost.

(6) Use of heavy equipment and land conservation activities will result in a certain amount of unavoidable soil compaction, damage to soil microflora and erosion. These impacts will be kept to a minimum by the mitigation measures required, but cannot be eliminated completely. By providing "land conservation practices" there may be a reduction in the total amount of erosion.

(7) A water repellent layer, or sterile areas, may form in the soil in areas where brush has been piled and burned. This impact will be restricted to a small portion of the total area.

(8) There may be a short-term reduction in deer and big game browse when brush is cleared. If the existing brush is old and degenerate, this impact will be minor. The reduction in available browse will last until the cut back brush resprouts, and some will be lost permanently under conifer management. This is mitigated somewhat by provision of wildlife habitat practices.

(9) Some undiscovered archeologic resources such as lithic scatterings and nonpermanent camp sites may be disturbed.

(10) There is a short-term commitment of labor and material resources to wildlife habitat improvement, land conservation practices, reforestation and timber management that can only be recovered in the long-term. Some projects will fail and the resources committed will be lost.

The project may increase employment opportunities in rural areas. There will be a "quality of life" improvement in rural areas due to wildlife enhancement and land conservation projects.

Some effects, such as improved roads and road access, and familiarity with an area by forest workers may increase recreational use of the lands treated. This may also have a slight growth inducing effect.

V. MITIGATION MEASURES AND CEQA COMPLIANCE

(A) General

This program EIR, the Resource Protection Guidelines (14 CCR 1545 et seq., Appendix A), and an environmental evaluation of each proposed project consisting of an Environmental Checklist (Appendix B) supported by the Management Plan and Project Description (Appendix C), and Application (Appendix D) will be used to comply with CEQA. The Resource Protection Guidelines are designed to mitigate the environmental effects identified in the program EIR and the Environmental Checklist will indicate what, if any, additional CEQA documentation will be required. The guidelines, the checklist and any other mitigation prescribed for a project, will be part of the cost share agreement: violation of either will constitute a breach of contract.

Applications for cost sharing agreements will include an environmental checklist and management plan certified by an RPF. Upon receipt of an application, the CDF Forest Advisor will inspect the project areas to assure that the responses to the checklist and the supporting material included in the plan accurately reflect conditions on the ground (see also 14 CCR 1532.1 and 1532.2). To protect natural and historical resources CDF requests comments from the Department of Fish and Game, the Regional Water Quality Control Board, the local Archeology Information Center and Native American Heritage Commission, county planning departments (if they request notice), and any other interested parties. The checklist (Appendix B) and the management plan will determine if CEQA documentation is required in addition to that provided by this Program EIR. The flow chart (Appendix E) describes the manner in which projects will be approved.

If the checklist indicates that all of the significant environmental effects of the proposed project have been addressed by the Program EIR, then no additional CEQA documents shall be necessary.

If the checklist indicates that the proposed project may result in one or more significant effects not addressed in the Program EIR or may result in unusually severe effects, then additional documentation will be needed unless the project is Categorically Exempt (14 CCR 15100 through 15124) from documentation under CEQA. If the project is not categorically exempt, then the applicant shall conduct an Initial Study on the additional or unusually severe effects. Based on results of the Initial Study, the applicant may file a Negative Declaration if, when considered along with additional proposed mitigation measures, no significant effect will occur. If a significant effect would occur, the applicant shall prepare a draft EIR in accordance with the CEQA Guidelines solely on any significant effect not covered by the Program EIR. Such draft EIR may incorporate by reference relevant portions of the management plan and this Program EIR including the short-term versus long-term effects, significant irreversible effects, growth inducing effects, energy relationships, and project alternatives unless unusual circumstances dictate that additional evaluation of these subjects is necessary.

The Department will keep on file a record of the determination of CEQA compliance on applications for cost sharing. (See Appendices B, C and D for a review of the environmental checklist, management plan instructions, and application form.)

B. Physical and Biological Variables

(1) Vegetation

Any potential adverse effects that result from altering species composition and encouraging trees over brush or other vegetation species shall be mitigated by the project selection process. This includes prioritization of high site timber lands and lands which have been damaged by fire, flood, insects or other natural causes. Since high site lands would support predominantly tree cover under natural succession, the long-term effect of CFIP projects is essentially to speed up that process. CFIP projects which favor damaged sites will produce a beneficial effect by restoring and increasing vegetative cover.

Monocultures on large areas will be discouraged due to the potential biological and economic adverse impacts. Mixed species plantings, maintenance of residual vegetation stands, the establishment of a mosaic of vegetation, or the use of strongly feathered or intermingled project area boundaries will be used to mitigate adverse effects.

CFIP projects may introduce non-native species to the site. The condition that all species be silviculturally adapted to the site and subject to Director's approval (14 CCR 1545.7) will mitigate the potential for introducing invasive or otherwise detrimental exotic weed species.

Potential adverse effects to rare, threatened or endangered plants will be avoided by designating Special Treatment Areas where no practice will be allowed unless it explicitly benefits the threatened resource. The best available information such as the California Natural Diversity Data Base will be consulted on the potential presence of these plants and a rare plant survey will be utilized, if needed, to determine the area needing protection.

(2) Water Quality

RPFs will identify those areas critical for domestic water supplies when responding to relevant Environmental Checklist questions (e.g. No. 7), and when preparing management plans. Mitigation of any adverse effects on domestic water supplies will consist of identifying sensitive areas and either tailoring proposed projects to protect such water supplies or, if necessary, prohibiting all activities within sensitive areas (14 CCR 1545(f)). Any alternative mitigation would be less protective.

The use of heavy earth-moving equipment will be prohibited within 50 feet slope distance of streams or lakes or with a wider protection zone if required pending project review (14 CCR 1545.1(c)). No equipment will be serviced next to streams, lakes wet meadows, marshes, or other wet areas (14 CCR 1545.1). This will minimize the potential for accidental spills of toxic substances to enter waterways.

Initial study review teams for all CFIP projects which include the use of pesticides shall include the local regional water quality control board. These boards shall be given sufficient review time to evaluate potential effects of proposed pesticide use for the specific project site conditions.

The potential impacts to water quality from improper pesticide use will be minimized by: 1) requiring that all application conditions and methods, handling, storage, and waste disposal conform to pesticide label instructions and to all other pertinent state, federal, and local regulations; 2) including general guidelines for pesticide use in the description of those projects using pesticides (see Appendix H); 3) requiring notification of CDF by the landowner of the pesticides to be used and the rates; and 4) by strict compliance with permit conditions by the Agricultural Commissioner issued under the California Department of Food and Agriculture regulations for the use of any restricted pesticide.

Drift hazards will be minimized by requiring use of low-volatility pesticides, where available and adequate to do the job; by site specific permit conditions for restricted use pesticides where required by local, state and federal laws; by requiring strict adherence to label instructions and with all pertinent laws and codes which the applicator is held responsible for knowing; and by establishing appropriate buffer zone requirements for

permanent waterways and surface water as needed and on a project-specific basis after consideration of recommendations by the project review team which will include the regional water quality control board.

Since most CFIP projects are small, aerial applications occur on very few projects, so program effects will not be significant. However, where aerial spraying does occur, effects shall be mitigated by requiring strict compliance with all state, federal, and local regulations and permits governing the aerial application of pesticides. Unless specifically allowed by permit, no application of restricted pesticides will be applied when wind speed exceeds 10 mph (3 CCR 6460).

Potential drift from run-off and erosion will be mitigated by selection of the least toxic pesticides that can achieve the desired effect, and by the use of conservation practices that minimize soil disturbance and erosion hazards. These may include contour windrowing of scalped brush (14 CCR 1545.3), temporary waterbars, mulching cleared areas, or other site-specific measures required after input from interdisciplinary team.

Direct contamination of water by accidental spills will be avoided by requiring that all mixing, loading and temporary storage on site of materials be done away from any running or ephemeral watercourses. Potential impacts from spills or accidents will be mitigated by requiring in the project description a plan which identifies downstream users (if applicable) who must be notified in the event of substantial contamination of water bodies, how and when they will be notified, and who will be responsible for cleaning up the spill. Spills will be confined, cleaned up and/or excavated, and disposed of according to all applicable laws. General guidelines for spill cleanup will be included in the "Conditions of Pesticide Application" (Appendix H). Spills will be cleaned up immediately and toxic materials will be disposed of in accordance with all state, federal and local laws.

(3) Soil and Erosion

Site preparation for reforestation or wildlife habitat improvement such as land clearing can cause erosion, which can cause lowered water quality if eroded materials reach streams. Equipment operation can result in degrading water quality by oil spills, etc.

Since there will be no new road construction, erosion from this source will not be discussed here.

Potential adverse impacts of most of the reforestation projects on conifer timberlands will be mitigated by the selection process favoring the better quality, higher sites which for the most part, have a low potential for erodibility. Higher site forest soils generally are characterized by deep profile, high

percolation rates, a reasonably high organic matter content, and high field capacity. Good forest soils do not have a hard pan, therefore water movement into the substratum is not inhibited.

Many oak woodland soils, however, are poorer, relatively shallow rocky soils. Although these soils may be more susceptible to erosion when disturbed, management activities for wildlife habitat enhancement are not likely to entail excessive disturbance. If mechanical equipment is used for brush manipulation or site preparation, steep slopes and extremely thin soils will be avoided.

Land clearing for site preparation will be done during the dry season (14 CCR 1545.3(b)), therefore problems associated with heavy equipment, wet soils, and erosion are unlikely.

A crawler tractor equipped with a blade or brushrake is well adapted for removing brush where slope and absence of rock outcrops permit safe and effective operation. Tractor clearing is normally limited to gentle or moderate slopes (0-30%). Tractors can sometimes be used on steeper slopes having stable soils.

Brush removed with bulldozers will be piled in windrows along the contour of the land on all slopes (14 CCR 1545.3(a)). Usually an unavoidably small amount of soil is removed with vegetation when the bulldozer method of clearing is used. This residual soil accumulation remains in place after the windrowed woody vegetation has been burned, leaving effective water bars for continued control of erosion. Careful planning of the clearing operation along with competent operation of machinery can greatly reduce soil movement resulting from erosion. The bulldozer clearing method will not be used in situations where effective contour windrowing of cleared material cannot be accomplished.

Cross ditching or terracing could have been proposed as mitigating measures. These alternatives were rejected because there is more disturbance, risk of "upset" is increased, and aesthetic effects are large.

No heavy equipment will be allowed on potential or active slide areas (14 CCR 1545.3(c)) as identified in the applicant's plan (see Environmental Checklist Question No. 2). It would be possible to allow heavy equipment on some of these areas after analysis of the site and additional mitigation. However, few such sites would warrant an exception for timber production purposes. It seems preferable to err on the side of protection because of the significant risk of mass movement. Planting of trees, shrubs, and grass on slide areas by hand methods will be allowed for erosion control (land conservation practice) and wildlife habitat improvement.

No activities other than wildlife improvement or land conservation practices will be permitted on marshes, wet meadows or other wet areas (14 CCR 1545.2). Activities associated with these projects will be mitigated to prevent damage to these sensitive wet sites.

(4) Air Quality, Fire Hazard

By compacting, crushing, or desiccating cleared vegetation it can be burned at a time when fire hazard, that is the risk of fire escaping, is less. Leaving the desiccated or dried brush greatly increases fire hazard which is not tolerable after the trees are planted. Rodents also proliferate in the downed brush.

All burning will be done in accordance with local air pollution regulations and under burning permits where required by season or locality (14 CCR 1545.4).

Wildlife habitat improvement burning will be in the winter season (nonfire hazard season) only. Adequate wildlife habitat improvement can usually be obtained in winter burns without the "risk of upset" associated with hotter summer burns.

Impacts from pesticide spray will be mitigated by the use of the least toxic pesticides adequate for the job, and by recommending the use of low volatility herbicides where appropriate and the use of water as a carrier where allowed.

(5) Wildlife

The plant species used for reforestation, land conservation, and wildlife enhancement are usually native to the site, so impacts to wildlife from type conversions are not generally significant. Where nonnative species are used, they are required to be silviculturally adopted to the site by the Director (14 CCR 1545.7) and will not be invasive or detrimental to native vegetation.

Most CFIP reforestation projects are also small (37 acres average - CDF data, unpublished), so long-term impacts to wildlife and habitat from changes in existing vegetation will be insignificant. Where large stands of brush are cleared, impacts will be mitigated by using small or irregular patches where appropriate. This can produce a beneficial "edge effect" for many wildlife species and can enhance the mix of cover and foraging areas. Furthermore, the increase in herbaceous forage that often accompanies brush clearing and conifer stand thinning, as well as the new brush growth that follows brush control, increases available forage for many wildlife species.

Potential adverse effects from site preparation and clean and release practices may also be mitigated by one or a combination of the following:

- retention of some black oaks on site (14 CCR 1545 (d)) or other mast producing plants.
- retention of individual 1-3 acre patches of brush cover (Motroni, personal communication);

- limiting brush removal efforts to areas immediately around crop trees, leaving brush in between (Mapes, personal communication);
- planting vegetation to provide roadside screening on or adjacent to site (Motroni);
- manipulation of adjacent or nearby brush stands to improve access (14 CCR 1545 (d)) or to rejuvenate browse (Motroni);
- seeding adjacent areas with legumes to provide high quality forage;
- leaving brush piles for bird or small mammal use.

Snags with visible evidence as nesting or roosting sites for rare, endangered, or threatened bird species will be retained (14 CCR 1545) (see Environmental Checklist Question No. 3).

There will be little or no increased water temperatures deleterious to fish life from reforestation practices because riparian vegetation will be left (14 CCR 1545(a), 1545(e)).

Slash and debris will be kept out of streams. Accidental deposits will be cleaned up (14 CCR 1545.1).

Mitigation for fish and wildlife is also accomplished within the total "program" by offering fish and wildlife and land conservation practices.

In the case of reforestation after wildfires, the CFIP practices will mitigate the adverse effects of fires.

(6) Rare, Threatened or Endangered Species

In order to more fully protect rare, threatened and endangered species, the California Natural Diversity Data Base will be consulted for evidence of species occurrence in the project area. If necessary, a field survey will be performed by qualified personnel. If such species are present, a Special Treatment Area (14 CCR, Section 1545.8) will be designated and no forest improvement practices will be performed thereon unless they clearly benefit the protected species.

In order to comply with the Federal Endangered Species Act with respect to pesticide application, supplementary bulletins to pesticide labels which may restrict pesticide use in designated areas shall be consulted by the pest control applicator. Product labels will direct the user to these bulletins. All pesticides shall be used in compliance with these bulletins.

(7) Archeological, Cultural, and Historical Resources

To complete the Environmental Checklist and management plan required for each project, either the RPF or the CDF forester will submit a records search and project review to the appropriate Information Center of the California Archeological Inventory. The Information Center will check the project area for known archeological, historical, or cultural sites. The Information Center will review the state's archeological records, the National Register of Historic Places, California Historic Landmarks, and the California Inventory of Historic Resources. In addition, the Information Center will comment on the likelihood that undiscovered cultural resources are present and the potential for adverse effects associated with project activities. They will provide CDF with recommendations concerning the need for a field inspection. The Information Centers may recommend a field inspection be made by a professional archeologist, or perhaps, a field survey by the RPF and/or the CDF forester. It may also be suggested that no field survey is necessary. The recommendations made by the Information Centers will be implemented or modified for cause by CDF archeologists prior to any project-related activities which could harm such resources. If any significant archeological, historical, or cultural resources are identified on or near project areas, Special Treatment Areas will be designated to protect the resources in the manner described in Appendix K of the California Environmental Quality Act (CEQA). A copy of the project map and a brief project description will be sent to the Native American Heritage Commission for their review.

C. Mitigation of Additional Effects of Specific Projects or Practices

(1) Brush Habitat Improvement

Only winter burning will be allowed in this practice and in accord with fire protection regulations (14 CCR 1545.4).

Heavy equipment will not be used within fifty feet of the stream transition zone along "blue-line streams" (14 CCR 1545.1).

Applicants will be encouraged to plant grass, herbs, and shrubs to prevent erosion.

With respect to pesticides, one of the objections to the use of herbicides has been the possible contamination of elk and deer from browsing on treated brush prior to deer season. Some herbicide labels provide for nonuse of the meat of animals after browsing on herbicide treated material. Label restrictions and permit procedures will be followed (14 CCR 1545.4). A RPF will be required to consider impacts on deer and elk meat when approving herbicide prescriptions.

(2) Precommercial Thinning

No heavy equipment may be used for thinning within 7 feet of the stream and lake transition line (14 CCR 1545.1(c)).

Slash created by thinning operations will be treated as required by area Fire Control Officers of CDF in high risk areas (14 CCR 1545.4).

Thinning in ponderosa and Jeffrey Pine will only be allowed between June 15th and November 1st, due to insect hazards unless the risk of beetle infestation is reduced by chipping, burning, or lopping thinning slash (14 CCR 1545.9) (see Environmental Checklist Question No. 12 and 13). Any burning will be in compliance with state and local laws and regulations. (14 CCR 1545.4)

Measures to control root rot pathogens will be allowed for cost sharing where indicated as necessary by the RPF.

An absolute prohibition on thinning during the insect problem season of November 1st through May 1st, could be imposed. This is not necessary if chipping, lopping, or slash burning is accomplished.

(3) Clean and Release

Although potential erosion and sedimentation impacts are minimal under most of the program, potentially significant adverse effects of specific projects will be mitigated by erosion control guidelines (14 CCR 1545.3) such as brush windrowing, or restrictions on use of heavy equipment. Other potential mitigations include waterbars on or off-site, temporary road-closures, or seeding herbaceous species adjacent to the planted area.

Potential significant adverse effects to browse supplies and cover for wildlife will be mitigated by one or a combination of the following:

- retention of some black oaks on site (14 CCR 1545 (d)) or other native mast producing species;
- retention of individual 1-3 acre patches of brush cover within the project area (Motroni, personal communication);
- limiting brush removal efforts to areas immediately around crop trees, leaving brush in between (Mapes, personal communication);
- planting vegetation to provide roadside screening leading to or adjacent to the site (Motroni);
- temporary road closures to reduce access to site;

- manipulation of adjacent or nearby brush stands to improve access (14 CCR 1545 (d)) or to rejuvenate browse and improve quality (Motroni);
- seeding adjacent areas with leguminous herbaceous species to provide high quality forage;
- leaving brush piles for bird and small mammal use.

(4) Stream Clearance

Heavy equipment, such as tractors, will not be operated within 50 feet of the stream and lake transition line (14 CCR 1545.3(c)).

Hand methods will be used where winch lines or equipment would tear down stream banks.

Material removed will either be scattered as in a lopping practice or piled and burned in openings following applicable air pollution control and fire prevention permit regulations (14 CCR 1545.4).

For any operation in live streams appropriate Department of Fish and Game permits (Fish and Game Code, Section 1600 et seq.) will be required (14 CCR 1545.1).

Other stream clearance practices such as removal of natural rock barriers or silt deposits, spawning gravel cleaning, or addition of spawning gravel have not been proposed because of their potential for environmental damage and the complexity of coordination with other departments which would be warranted.

CEQA compliance for this practice will be coordinated with the Department of Fish and Game.

(5) Revegetation Along Stream Channels

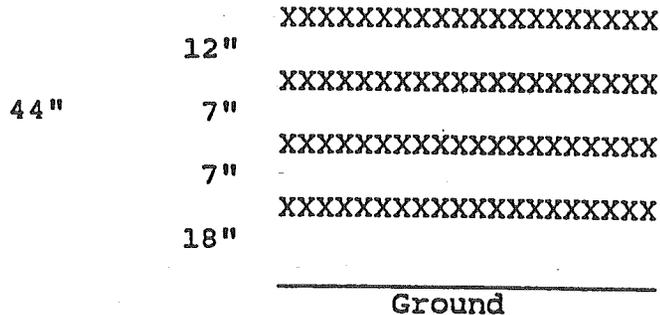
Planting should reduce erosion, and enhance habitat for aquatic and terrestrial species.

Applicants will be encouraged to consider phreatophyte problems and the effects of this practice on fishing, recreational access and water yield. Some research suggests that cottonwood species may transpire more water than other riparian species.

(6) Wet Meadow Fencing

Fences may be required on wet meadows to exclude livestock in order to protect plantings, enhance soil recovery or plant establishment, protect water sources, or achieve other wildlife enhancement objectives.

Fences will be designed after consultation with Fish and Game or other wildlife professionals. Maximum fence height and minimum height of the bottom wire will be selected so as not to impede local wildlife use. The following design is one example of a fence that can be used for these purposes: four strands of barbed wire at intervals, starting from the surface of the ground of 18" - 7" - 7" - 12" for an overall height of 44 inches. The 18 inch lower intervals allows deer and antelope to crawl under the fence. Diagram of suggested specifications:



(7) Land Conservation Practices

Any stream crossing, "blue-line stream" culverts, stream bank work, or stream crossings will be done in compliance with Department of Fish and Game Code, Section 1600, et seq. (14 CCR 1545.1).

For road work, a road plan shall be prepared for the property, so that permanent roads can be identified and unnecessary roads can be abandoned.

For culvert repair and replacement, complete specifications shall be provided.

For culverts larger than 30 inches in diameter, all concrete work engineering specifications shall be drawn.

Revegetation of any bare areas greater than 500 square feet created by the project will be required, if necessary, to reduce erosion, stream sedimentation, or soil loss. The Roads Handbook (DOC, 1978), will also be used as a guideline document.

The environmental checklist will be used to insure that proper CEQA documentation and compliance is achieved.

In areas where the practices are covered by local ordinances, local governments will be responsible agencies and CEQA compliance will be coordinated with local governments.

(8) Pesticide Use

The application of chemicals will be allowed for site preparation, trees and planting, clean and release, and follow-up practices. Only chemicals registered for use in the state will be allowed and the application of such chemicals will conform to federal statutes and regulations (including the Federal Insecticide, Fungicide and Rodenticide Act, and the Endangered Species Act), California Food and Agriculture Code, and local ordinances (14 CCR, Section 1545.5). In addition, anyone recommending the use of chemicals for any of these practices must be a licensed pest control advisor. The application of such chemicals will be done by a licensed pesticide applicator or directly by the landowner.

Existing federal, state, and local regulations and permitting programs will be used to mitigate the environmental effects of pesticide applications (14 CCR 1545.5). The California Department of Food and Agriculture (CDFA) and county agricultural commissioners have primary responsibilities in regulating and monitoring the use of pesticides. CDFA programs include the registration and classification of pesticides, adoption of pesticide use and worker safety regulations, licensing of agricultural pest control operators and advisors and pesticide dealers, environmental and pesticide residue monitoring, use reporting, and product quality surveillance. The CDFA and commissioners are jointly responsible for enforcement of use and worker safety regulations. Commissioners operate permit and surveillance programs under the Director of Agriculture's supervision.

The Federal Environmental Protection Agency (EPA) registers pesticide labels and establishes pesticide tolerance levels on agricultural products. It has entered into a cooperative agreement with the state in which EPA has delegated substantial parts of its pesticide use enforcement responsibilities to the state. Registration by the CDFA establishes the legal uses to which a pesticide may be put. The CDFA classifies pesticides as restricted, exempt, or nonrestricted. Nearly all uses of restricted pesticides require a permit from a county agricultural commissioner. A permit is also required before a nonrestricted pesticide is put to an "agricultural use", unless the local commissioner has determined that pesticide can be used without "undue hazard" under local conditions. "Exempt" pesticides are immune from the permit requirement and from special local regulation, but are subject to general state and county regulation. The commissioners are also responsible for local enforcement of the pesticides law.

The CDFA and county regulatory programs are subject to the provisions of the Food and Agricultural Code. All pesticide uses will be subject to the regulatory controls of CDFA, agricultural commissioners, pest control advisors, and pest control applicators. Any necessary permits will be required (14 CCR 1545.5).

The potential impacts from improper use will be minimized by 1) requiring that all applications conform to pesticide label instructions and to all other pertinent state, federal, and local regulations; 2) including general guidelines for pesticide use in the description of those projects using pesticides (Appendix H); 3) requiring notification of CDF by the landowner of the pesticide to be used and the rates; 4) site-specific permit requirements by the agricultural commissioner governing the use of any restricted pesticide.

Drift hazards will be minimized by requiring the use of low-volatility pesticides, where available and adequate to do the job; by requiring compliance with site specific permit conditions for restricted use pesticides; by requiring compliance with all pertinent laws and codes which the applicator is held responsible for knowing; and by establishing appropriate buffer zone requirements for permanent waterways and surface water as needed and on a project specific basis after consideration of recommendations by the project review team which will include the regional water quality control board and the Department of Fish and Game. Unless specifically allowed by permit, no restricted pesticides will be aerially applied when wind speed exceeds 10 mph (3 CCR 6460).

Potential impacts of drift from run-off and erosion will be mitigated by selection of the least toxic pesticides that can achieve the desired effect, and by the use of conservation practices that minimize soil disturbance and erosion hazards. These may include contour windrowing of scalped brush (14 CCR 1545.3), temporary waterbars, mulching cleared areas, or other site specific measures required after input from the interdisciplinary team.

Hazards to applicators and field workers will be mitigated by requiring strict adherence to all instructions on the label, including application practices, use of protective clothing and equipment, handling and safety precautions, cleanup instructions, re-entry schedules, and pesticide storage. After applicators have applied pesticides, no workers shall enter treated areas before pesticide sprays have dried or pesticide dust has settled. Longer re-entry prohibitions will be complied with if indicated by pesticide label. Conditions for pesticide use will be provided which will include general safety guidelines.

Where local water quality boards can demonstrate the need to monitor potential impacts to water quality from pesticide application treatments, CDF will consider recommendations and specific methodologies for monitoring submitted during the initial study and review process. Monitoring methods will provide immediate feedback so that practices may be altered to mitigate impacts. Methods may include spray cards, dye tracing, or other direct measurements of pesticide drift.

Direct contamination of water by accidental spills will be avoided by requiring that all mixing, loading and temporary storage will be done well away from any water body or drainage with direct access to such body. Adverse impacts from unavoidable accidents will be mitigated by requiring in the project description a plan which identifies downstream users (if applicable) who must be notified in the event of substantial contamination of water bodies, how and when they will be notified, and who will be responsible for cleaning up the spill. Spills will be confined, cleaned up and/or excavated, and disposed of according to all applicable laws. General guidelines for spill cleanup will be included in the "Conditions of Pesticide Application" (Appendix H). Spills will be cleaned up immediately and toxic materials will be disposed of in accordance with all state, federal and local laws.

In addition to abiding by federal, state and local regulations, and label instructions, the following guidelines will be adhered to for Special Treatment Areas. No chemical applications will be allowed in designated Special Treatment Areas unless such application would clearly benefit the protected resource. The applicant will use manual/mechanical methods or no treatment. Special Treatment Areas which might require restrictions on pesticide use include sensitive resources such as rare, threatened, and endangered species, wet meadows, marshes, and other wet areas, or any other areas designated as such (14 CCR 1545, 1545.1, 1545.2, 1545.8). Chemical treatments may be preferred over mechanical vegetation control methods for Special Treatment Areas to protect archeological, cultural or historical resources.

VI. MITIGATION OF CUMULATIVE EFFECTS

Cumulative effects will be minimal due to project sizes, distribution, initial study process, and natural recovery process. Evaluation by interdisciplinary review team, including local planning departments if necessary, will provide information needed to avoid cumulative impacts. The review by interdisciplinary teams during the project initial study will address the potential of past projects to result in cumulative effects with proposed projects and those likely to occur in the future and the potential of other local activities to combine with CFIP projects to produce cumulative effects. This review of individual proposed projects will provide for mitigation of effects that might otherwise occur from a combination of projects. These mitigations are then made a part of the project conditions to receive cost sharing. Where potential effects are identified, management plans will be modified to reduce effects to levels below significant threshold for that area.

Project sites are visited by unit foresters during the course of the project and spot checked afterwards; unforeseen effects are mitigated by contacting the contractor(s) and/or landowner and designing actions to address those effects.

VII. ALTERNATIVE PRACTICES

(A) The No Project Alternative

Historically, vast acreages of forest land were not reforested following harvesting, wildfires, damage by insects, disease or other natural disasters. As a result, an estimated five million acres of public and private land in the state are greatly below their potential production of forest resources. These areas are understocked or occupied by damaged or diseased trees or inhabited by less desirable species (those species of less market value for sawtimber and other forest products). Some of these lands have fish and wildlife habitats that have been adversely affected or threatened with erosion. In many areas where regeneration has occurred, the present forest stands could yield greater supplies of timber and other forest resources if thinning or other forest improvement practices were instituted (PRC 4790(b)).

Other than lands reforested pursuant to the Z'berg-Nejedly Forest Practice Act of 1973 (Section 4511) following timber harvesting operations, only a small amount of nonindustrial forest land is restocked. This is the result of several obstacles facing the private forest investor. These obstacles include: the extraordinarily long time required for such investments to produce income, the risk of loss due to fire, insects or disease, lack of forestry expertise or knowledge of the potential benefits of improved forest resource management; the difficulty of transferring capital invested in forest resource improvements to other investment opportunities or needs, once the initial investment has been made; and the fact that some forest resource investments such as erosion control measures may not produce any income recognizable to the landowner (PRC 4790(f)).

Investments in public and private land are essential if adequate future timber supplies are to be available and if the forest resource system is to be maintained. These investments will also lessen fire hazard and improve watershed protection following the destruction of vegetative cover by fire, wind, flood, insect or disease (PRC 4790(h)).

Under the "no project" alternative, all the practices proposed will be carried out to some degree anyway. The practices proposed are ongoing management practices on both public and private forest land.

The federal government cost shares these projects on private land through the existing Conservation Reserve Program (CRP), Agricultural Conservation Program (ACP), Forestry Incentive Program (FIP) and other programs that may be added such as the new program called Forest Stewardship Program (FSP). Acreages treated by ACP and FIP are shown in Tables 12 and 13. Cooperative Forest Management program funding for reforestation practices began to drop in the mid-1970s. After CFIP was established, federally

funded activities on private land decreased even more. The average annual allocation for acres planted under FIP and ACP for the years 1982 to 1986 was 658 (Table 13, CDF, unpublished data) acres compared with 9,978 acres in 1977 (Table 12). The no program alternative would have a significantly strong adverse impact on current reforestation efforts on nonindustrial private forest land if CFIP funding were not available because federal program allocations have decreased dramatically. Federal agencies also finance these practices on federal land; see Tables 10 and 11 for area treated.

Many private timber growers also carry out the practices on private lands. Most of these investors are industrial concerns who generally own more than 5000 acres of forest land, and therefore, are not eligible for CFIP.

Considerable reforestation is required on lands harvested subject to the Forest Practice Act. This work will continue under the "no project" alternative, and cannot be funded by the project.

Under the No Project Alternative, these investments will be reduced although many of the proposed practices would be carried out to some degree. The amount of land treated by forest land conservation measures and fish and wildlife improvement practices is not known, but it is clear that these practices are presently undertaken though probably to a limited extent.

(B) Loan Program Alternative

Because of the complexity of designing a loan program, the loan authority is not addressed in these regulations. Owners of more than 5,000 acres of forest land are eligible for loans only. This reduces the area of land eligible from about 18 million acres to seven million acres, because only owners of small parcels are eligible for grants.

Although the project would be delayed somewhat, development of a loan program would provide more even treatment of different kinds of private landowners. Because large owners own more high site lands, it is probable that better sites would be treated than in the project as proposed. Whether more or less acres would be treated under the project would depend on the funds available and large landowner participation. Landowner participation would depend on the interest rate of the loans, their payback periods and provisions and the cost of borrowing money elsewhere in the economy. Large owners are already accomplishing more of the practices proposed in the project than small landowners, but considerable amounts of seeding and planting accomplished may be required by the Forest Practice Act. This latter planting and seeding would not be eligible.

Table 10.

Silvicultural accomplishments in California, July 1, 1975 - September 30, 1976, by ownership^{1/}

Silvicultural treatment	National Forest	Other public	Forest industry and other private timber growers	Farmer and miscellaneous private	Total of available data
Planting and seeding	31,450	1,750	26,888	5,250	65,338
Site preparation for planting	28,903 ^{1/}	NA	NA	NA	28,903
Site preparation for natural regeneration	3,046	1,205	2,141	160	6,552
Treatment for release	36,430	212	12,739	1,572	82,471
Precommercial thinning	31,518				
Planting of genetically-improved trees	3,050	NA	NA	NA	3,050
Pruning	1,230	NA	NA	NA	1,230
Fertilizing	21	NA	NA	NA	21
Prescribed burn to control understory	555	NA	NA	NA	555
Total of available data	136,203	3,167	41,768	6,982	188,120

^{1/} Bolsinger, 1979

NA = Not available.

TABLE 11. Timber Stand Improvement Practices, 1986 Survey (Acres) 1/

	National Forest	Forest Industry

Vegetation Control		
Herbicides	0	19,900
Manual/Mechanical	21,400	300
Precommercial Thin	11,600	6,600
Fertilize	1,100	4,600
Prescribed Fire In Understory	5,200 <u>2/</u>	140

1/ CDF, 1988

2/ Includes some burning to improve wildlife habitat

Table 12. Forest Improvement Accomplishment - 1977^{1/}

Tree Planting on Private Land	<u>Acres</u>
Cutover Land ^{2/}	39,495
Other Industry	18,350
C.F.M. ^{3/}	<u>9,978</u>
Total	<u>67,823</u>

Direct Seeding on Private Land	
Forest Industry	690
Nonindustrial	900
C.F.M. ^{3/}	<u>392</u>
Total	<u>1,892</u>

Timber Stand Improvement (thinning, release and pruning) on Private Land	
Forest Industry	15,000
Other Industry	1,500
Nonindustrial	8,500
C.F.M. ^{3/}	<u>5,480</u>
Total	<u>30,480</u>

^{1/} Best available CDF data - 12/13/78.

^{2/} Planting required by the Forest Practice Act, all owners.

^{3/} Cooperative Forest Management (CFM) program includes practices funded under federal ACP and FIP programs.

TABLE 13. Planted and Thinned CFM 1/ Acres, 1982 - 1986 2/

Year	Acres Planted			Acres Thinned			Total
	ACP	FIP	Total	ACP	FIP	Total	
1982	418	333	751	333	689	1022	1773
1983	379	430	809	294	704	998	1807
1984	305	258	563	139	653	792	1355
1985	355	331	686	323	308	631	1317
1986	152	330	482	456	715	1171	1653

1/ Cooperative Forest Management Program

2/ CDF, unpublished data

(c) Current Project Alternative

Continuing the current project as it exists is the preferred alternative because it will enhance forest resources, increase the supply of forest products for the future, provide assistance in recovery efforts from wildfire and other damage, and promote wildlife and land conservation practices. Impacts associated with the current alternative are minimal and can be mitigated.

Since the California Forest Improvement Program was implemented in 1980 through December 31, 1989, 37,629 acres have been reforested, 18,973 acres have been thinned, 225 wildlife habitat improvement projects and 301 land conservation projects have been implemented and 919 forest management plans developed for a total of 288,091 acres.

As a result of the catastrophic fire season of 1987, which burned 19,000 acres of nonindustrial forest lands, and a fairly severe season in 1988, this program has been critical for reforestation and the reduction of fire hazard. About twenty-five percent of the 1988 CFIP budget was spent on reforestation of burned areas.

Failure to make these necessary investments in forest resources will lead to decreased yields of forest products which will, in turn, raise prices for forest products. This would also have the effect of increasing unemployment in the forest products and related industries, drastically altering the economies of those counties relying on the timber industry (PRC 4790(i)).

Although federal programs such as the Forest Improvement Program (FIP), the Agricultural Conservation Program (ACP), and the Conservation Reserve Program (CRP) can be used for reforestation, funding and implementation have been considered inadequate for California's reforestation needs. History has shown that California receives a disproportionately low level of funds for these programs.

VIII. ENERGY RELATIONSHIPS

This project invests energy for the short-term to make long-term energy gains. Consumptive uses are fuel for transportation, energy investments in materials and the use of petro-chemicals as pesticides and carriers.

The long-term purpose of the project is to favor renewable resources of timber and wildlife, and prevent erosion and water quality degradation which are all energy conserving in the long run. Some fuel wood could be developed by the project which is conserving of petroleum, natural gas, and nuclear fuels.

The production of timber is energy conserving in that forests are solar energy factories, operating at about three percent of incoming solar radiation, with low capital costs that automatically store the solar produced fuel in the form of tree trunks, limbs, and roots.

Wood in use is also very energy conserving. The manufacture of wood products takes less energy than competing building materials. Wood and paper manufacturing can be made almost internally energy sufficient. Wood is a good insulating material and waste products can be used as fuels. Any initial fuel waste such as burning slash or brush reduces the potential for wildfires which constitute a much more extreme level of unnecessary energy consumption. An increasing conservation practice is to utilize the woody residues from timber stand improvement projects. Woody residues are converted to wood chips. These chips are graded into various qualities. The best grades go to paper, then manufactured boards such as waferboard, fiberboard, hardboards, and the lowest grade is hog fuel. Chips for hog fuel are increasingly used to generate electricity and working steam in cogeneration energy facilities. California is the nation's leader in generating electricity from burning wood. Annually over 600 MW of electrical power and 5 million pounds of steam/hour are generated using over 6,600,000 tons of hog fuel.

IX. SIGNIFICANT IRREVERSIBLE EFFECTS

The only irreversible effects are the commitment of materials and labor to the land conservation practices. Construction of erosion control facilities and road improvements are not likely to be removed.

The timber management and wildlife habitat improvement practices are surficial and temporal. They can be overwhelmed by natural conditions and if not maintained or provided continuous management, would revert to natural conditions within time spans of 10 to 300 years.

Increased public use of the areas treated may lead to irreversible effects of increased fire hazard, and health and safety hazards.

X. GROWTH INDUCING EFFECTS

Growth inducement is limited in this project. Only a small fraction of the state's lands will be affected and then only on a relatively nonintensive basis that will not alter the basic nature of the land. Additional commercial timber and wildlife will be provided for the future. This timber when harvested at different times will not contribute to growth such as suburbanization, sprawl, long-term employment, the provision of goods and services, or major new infrastructure. It will maintain present production capacities.

The project will generate some short-term economic activity in employment, transportation, and use of products.

The project will tend to stabilize present employment opportunities in rural areas, and increase employment opportunities for rural people in some degree. There will be a "quality of life" improvement in rural areas due to timber stand improvement, wildlife enhancement, and land conservation projects.

Due to improvement of public access, road improvement, and other more subtle effects such as knowledge of forest workers and the public, recreation use of the lands treated is likely to increase. This has a slight growth inducing effect.

XI. LONG-TERM IMPACTS

(A) There will be a long-term change in the vegetation pattern on portions of the sites. The natural succession of brush to conifers will be hastened by reforestation. This is the objective of this project, and losses among the target brush species are unavoidable.

(B) Similarly, the wildlife habitat practices are aimed at long-term conversion of older, tall brush to low growing browse and grass and forbs. This will cause changes in wildlife on the site affected, although vegetation changes are not permanent.

(C) In burned areas now relatively barren or with standing dead forests, there will be a long-term positive aesthetic change, as well as maintenance of productive capacity due to minimization of soil erosion.

(D) There will also be a long-term change in the wildlife species present at the sites due to reforestation. The species now present in the existing brush fields will be replaced by species which are adapted to a coniferous forest environment. However, since most reforestation projects occur on high site timber lands where shifting patches of early and late successional plant communities occur naturally, these are part of the fauna which are native to the site.

XII. INSIGNIFICANT EFFECTS

The following effects of this project has been found to be insignificant:

- Light and glare
- Population effects
- Housing
- Traffic and circulation
- Public services
- Utilities
- Human health, except accidents of workers.

BIBLIOGRAPHY

- ADAMS, R.A. and GILDEN. 1978. Planting California Forest Land. University of California, Division of Agricultural Sciences. Leaflet 2925. 43 pp. (Revision of 1976)
- ADAMS, R.S. 1978. Reforestation Studies--1976. State of California, Department of Forestry. 33 pp.
- ANDERSON, B.R. 1975. Weather in the West, American West Publishing Co., Palo Alto, CA.
- ANDERSON, HENRY W. 1963. Managing California's Snow Zone Lands for Water. U.S. Forest Service Research Paper PSW-6. 28 pp.
- ARVOLA, T.F. 1978. California Forestry Handbook. State of California, Department of Forestry, Sacramento. 233 pp.
- BOLSINGER, CHARLES L. 1978. Forest Area and Timber Resources of the San Joaquin Area, California. U.S. Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland PNW-75. 71 pp.
- BOLSINGER, CHARLES L. 1979 (Mss). California's Forest-Trends, Problems and Opportunities. Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.
- BUONGIORNO, JOSEPH AND DENNIS TEEGUARDEN. 1973. Economic Model for Selecting Douglas Fir Reforestation Projects. Hilgardia, University of California, Division of Agricultural Sciences. Vol. 42, No. 3.
- BURCHAM, L.T. 1949. Suggestions for Improving Wildlife Habitat on California Brush Ranges. State of California, Department of Natural Resources, Division of Forestry. 14 pp.
- CALIFORNIA CODE OF REGULATIONS (CCR), Title 14 (Var.), CEQA Guidelines, Board of Forestry Regulations, CDF Regulations, etc. Secretary of State, Sacramento, CA.
- CALIFORNIA CODE OF REGULATIONS (CCR), Title 3, Chapter 6, Pesticides and Pest Control Operations.
- CALIFORNIA DEPARTMENT OF CONSERVATION. 1978. Erosion and Sediment Control Handbook. 198 pp.
- CALIFORNIA DEPARTMENT OF CONSERVATION, et al. 1969. Soil Vegetation Surveys in California. Dept. of Conservation, Division of Forestry. 30 pp.
- CALIFORNIA DEPARTMENT OF FINANCE. 1976. California Statistical Abstract. State of California, Department of Finance. 146 pp.

- CALIFORNIA DEPARTMENT OF FISH AND GAME. 1961. Improving Chamise Brushlands for Deer and Other Game. Game Management Leaflet No. 4. 27 pp.
- CALIFORNIA DEPARTMENT OF FISH AND GAME. 1965. California Fish and Wildlife Plan. Sacramento, CA. 4 volumes
- CALIFORNIA DEPARTMENT OF FISH AND GAME. 1976. At the Crossroads (California Rare and Endangered Wildlife.) Sacramento, CA.
- CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE. 1977. Laws and Regulations (Pesticides) Study Guide. State of California, Department of Food and Agriculture. 33 pp.
- CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE. 1978. Report on Environmental Assessment of Pesticide Regulatory Programs (Draft). State of California, Department of Food and Agriculture. 4 volumes.
- CALIFORNIA DEPARTMENT OF FORESTRY. 1977. Some Dealers in Seed and Nursery Stock of Trees Native to California. State of California, Department of Forestry. 9 pp.
- CALIFORNIA DEPARTMENT OF FORESTRY AND FIRE PROTECTION. 1988. California's Forests and Rangelands: Growing Conflict Over Changing Uses. 348 pp.
- CALIFORNIA DEPARTMENT OF NATURAL RESOURCES. 1960. The Brush Problem on California Livestock Range. Division of Forestry. 30 pp.
- CALIFORNIA DEPARTMENT OF PARKS & RECREATION. 1975. California Historic Landmarks. n.p.
- CALIFORNIA DEPARTMENT OF WATER RESOURCES. 1975. California's Ground Water. Bulletin No. 118.
- CALIFORNIA DIVISION OF FORESTRY. 1968. Road Construction Handbook, No. 2310. Sacramento, CA.
- CALIFORNIA DIVISION OF FORESTRY. 1970. California Tree Seed Zone Map. Sacramento, CA. 1 pp.
- CALIFORNIA FOREST PEST CONTROL ACTION COUNCIL. 1965. Deer Enclosures--An Aid to Measure Forest Damage. State of California, Division of Forestry. 13 pp.
- CALIFORNIA LAWS. (Various) Public Resources Code.
- CALIFORNIA LEGISLATURE. 1978. Chapter 1181, Statutes of 1978. California Forest Improvement Act (AB 3304).
- CALIFORNIA, STATE OF, EMPLOYMENT DEVELOPMENT DEPARTMENT. 1978. Return on Employment Effects of the Governor's Reforestation Program.

- CALIFORNIA STATE LAND COMMISSION. 1978. Final Environmental Impact Report, Watershed and Forest Rehabilitation Project. California State Lands Commission. 68 pp.
- COLONNA, ANDREW J. 1986. A contractor's perspective on designing and implementing a successful vegetation control without herbicides. In: Proceeding of the Eighth Annual Forest Vegetation Management Conference, November 5-6, 1986, Sacramento, CA.
- DASMANN, R.F. 1965. The Destruction of California. Collier Books, New York.
- DODGE, MARVIN, et al. 1976. An Investigation of Soil Characteristics and Erosion Rates on California Forest Lands. Department of Conservation, Division of Forestry. 105 pp..
- DURRENBERGER, R.W. 1972. Patterns on the Land. Geographical, Historical and Political Maps of California. 4th edition. National Press Books, Palo Alto, CA.
- DURRENBERGER AND JOHNSON. 1976. Patterns on the Land. 5th Addition, Mayfield Publishing Co., Palo Alto, CA.
- EDEN, C.J. 1978. Forest Nurseries: Annual Report 1976-77. California Department of Forestry, Sacramento, CA. 9 pp.
- FIDDLER, GARY O. AND MCDONALD, PHILIP M. 1986. Alternative treatments for releasing seedlings: A Study Update. In: Proceeding of the Eighth Annual Forest Vegetation Management Conference, November 5-6, 1986, Sacramento, CA.
- FRANKLIN, JERRY F. and DRYNESS. 1969. Vegetation of Oregon and Washington. U.S. Forest Service, Pacific Northwest Forest and Range Experiment Station, PNW-80. Portland, Oregon. 216 pp.
- GARRISON, GEORGE A., et al. 1977. Vegetation and Environmental Features of Forestry and Range Ecosystems. USDA, Forest Service Agricultural Handbook No. 475. 68 pp.
- GRIFFIN, JAMES R., and CRITCHFIELD, WILLIAM B. 1972. The Distribution of Forest Trees in California. USDA, Forest Service Research Paper PSW-82.
- HEINZER, R.F. and WHIPPLE, M.A. 1970. The California Indians. University of California Press. Berkeley and Los Angeles. 492 pp.
- KUCHLER, A.W. 1964. Potential Natural Vegetation of the U.S. American Geographic Society. Publications 36. 149 pp.
- MALAIN, ROBERT J. 1978. Major Forest and Rangeland Issues in California. State of California, Department of Forestry. 22 pp.

- McLEAN, DONALD D. 1956. Upland Game of California. State of California, Department of Fish and Game. 39 pp.
- MELLON, KNOX. February 1, 1979. Identification of Historical and Cultural Resources (Response to NOP, Letter to Paul Cox). Department of Parks and Recreation.
- MUNZ, PHILLIP A. 1959. A California Flora. University of California Press. Berkeley and Los Angeles. 1681 pp.
- NORTH CAROLINA, STATE OF, ADMINISTRATIVE CODE. 1978. Section 0900, Forest Development Program.
- OAKESHOTT, G.B. 1971. California's Changing Landscape. A Guide to the Geology of the State. McGraw-Hill Book Co. New York.
- ORNDUFF, R. 1974. An Introduction to California Plant Life. University of California Press, Berkeley.
- PASSOF, PETER, et al. 1985. Preliminary Guidelines for Managing California's Hardwood Rangelands. University of California, Cooperative Extension. 92 pp.
- PILLSBURY, NORMAN H. 1978. Hardwood Stand Density Characteristics for Central Coast in California. U.S. Department of Agriculture, Central Coast Resource Conservation and Development Area: California. 32 pp.
- POWELL, W.R. (ed). 1974. et seq. Inventory of Rare and Endangered Vascular Plants of California. Special Publication No. 1. California Native Plant Society. Berkeley.
- RINEHART, ELTON R. February 2, 1978. Riparian Forests-- Sacramento River, (Response to NOP, Letter to Paul Cox). State Reclamation Board.
- ROBERTS, VICTORIA. February 13, 1979. (Draft) Documenting Indian Heritage Resources and Concerns in Accordance with Environmental Law and Policy (Response to NOP, Letter to Paul Cox). Native American Heritage Commission.
- ROBIE, RONALD. March 15, 1979. Forest Residues and Water Quality. (Response to NOP, Letter to Paul Cox). Department of Water Resources.
- SCHLOBOLM, DEAN F. August 1978. Economic Implications of Forest Resources Improvement for the Small Timber Owner. (Unpublished)
- SCOTT, VIRGIL E., et al. 1977. Cavity-Nesting Birds of North American Forests. USDA Handbook No. 511. 112 pp.
- SEDJO, RODGER A. and DAVIS OSTERMEIER. 1977. Resources for the Future; Policy Alternatives for Non-industrial Private Forests.

- SMITH, DAVID M. 1962. The Practice of Silviculture. John Wiley & Sons, Inc. New York. 577 pp.
- SOCIETY OF AMERICAN FORESTERS. 1954. Forest Cover Types of North America. Washington, D.C. 67 pp.
- SOCIETY OF AMERICAN FORESTERS (SAF). 1958. Forestry Terminology. Society of American Foresters, Washington, D.C. 97 pp.
- STODDARD. 1978. Essentials of Forestry Practice (Third Edition). John Wiley and Sons, Inc. 387 pp.
- STREEBY, LARRY. 1977. Economic Aspects of Reforestation Planning on Woodland Properties. Oregon State University Extension Service. Extension Bulletin 834. 12 pp.
- TABER, RICHARD D. and DASMANN, RAYMOND F. 1958. The Black Tailed Deer of the Chaparral. State of California, Department of Fish & Game, Game Management Branch. Game Bulletin No. 8. 163 pp.
- UNITED STATES BUREAU OF LAND MANAGEMENT. 1978. Federal Lands. Responsibility Map. 1 Map.
- UNITED STATES DEPARTMENT OF AGRICULTURE. N.D. Checklist of Birds, Mammals, Fish, Reptiles, Amphibians Present on Forest and Rangelands in California. USDA, Forest Service, California Region.
- UNITED STATES DEPARTMENT OF AGRICULTURE. 1974. (Final EIS) Forest Reestablishment of National Forests in California. USDA, Forest Service, California Region. 222 pp.
- UNITED STATES DEPARTMENT OF AGRICULTURE. 1975. Draft Environmental Statement, Agricultural Conservation Program. USDA, Agricultural Stabilization and Conservation Service. USDA-ASCS-ES (Adm.) 75-1-D. 74 pp.
- UNITED STATES DEPARTMENT OF AGRICULTURE. 1976. California Forestry Incentive Program, State Program Handbook. Agricultural Stabilization and Conservation Service. Davis, CA.
- UNITED STATES DEPARTMENT OF AGRICULTURE. 1976. Rural Environmental Programs, FIP Operating Procedure. Agricultural Stabilization and Conservation Service. Washington, D.C.
- UNITED STATES DEPARTMENT OF AGRICULTURE. 1978. Forest Statistics of the United States. USDA, Forest Service. 133 pp.
- UNITED STATES DEPARTMENT OF AGRICULTURE. 1978. California Rural Land Use (statistics). USDA, Soil Conservation Service Photocopy, 20 pp.

- UNITED STATES DEPARTMENT OF AGRICULTURE. 1978. Final Environmental Statement, Vegetation Management with Herbicides. USDA, Forest Service. 2 vols.
- UNITED STATES DEPARTMENT OF AGRICULTURE, AND U.S. ENVIRONMENTAL PROTECTION AGENCY. 1976. Apply Pesticides Safely: A Guide for Commercial Applicators.
- UNITED STATES DEPARTMENT OF AGRICULTURE, FOREST SERVICE. 1976. Mechanical Methods of Chaparral Management. Agricultural Handbook No. 487.
- UNITED STATES DEPARTMENT OF AGRICULTURE, FOREST SERVICE. 1977. (unpublished paper) The Economics of Release and Pre-commercial Thinning in Ponderosa Pine, Douglas Fir, and Fir-spruce in Region V.
- UNITED STATES DEPARTMENT OF AGRICULTURE, FOREST SERVICE. 1978. Attitudes and Activities of Private Forest Land Owners in Western Montana.
- UNITED STATES DEPARTMENT OF AGRICULTURE, FOREST SERVICE. 1988. Final Environmental Impact Statement: Vegetation Management for Reforestation, Volume II.
- UNITED STATES DEPARTMENT OF INTERIOR. 1976. Final Environmental Statement for Timber Management. USDI, Bureau of Land Management. 598 pp.
- UNITED STATES DEPARTMENT OF THE INTERIOR. 1976. National Register of Historic Places. Washington, D.C. 961 pp.
- UNITED STATES WEATHER BUREAU. (various) Precipitation Records.
- UNIVERSITY OF CALIFORNIA. 1977. Pesticide Application and Safety Training. University of California, Division of Agricultural Sciences, Publication 4070. 98 pp.
- WALL, BRIAN R. 1978. Timber Resources of the Sacramento Area. California, 1972. USFS, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon. PNW-73. 61 pp.
- YAMIMOTO, PERRY. 1978. Erosion Control Handbook. State of California, Department of Conservation. 197 pp.
- ZIVNUSKA, JOHN H.; COX, PAUL; PALI, ADON; and PESONEN, DAVID. 1965. The Commercial Forest Resources and Forest Products Industries of California. California Agricultural Experiment Station, Extension Service. 122 pp.

APPENDIX "A"

TITLE 14

DEPARTMENT OF FORESTRY

§ 1545

(Register 83, No. 17—4-23-83)

(p. 94.10.27)

The applicant may request that the Director personally reconsider the decision to reject the application if the request is made within 10 days of the return of the application. The request shall identify the applicant and the proposed project and briefly state the applicant's reasons for requesting that the Director personally reconsider the decision. The Director shall consider the application and all correspondence from interested parties while reviewing the decision.

NOTE: Authority cited: Section 4799.02, Public Resources Code. Reference: Section 4799.02, Public Resources Code.

1541. Final Decision by the Director.

If the Director finds that the decision to reject the application conforms to these procedures and the Act, the Director shall uphold the decision to reject the application. If the Director finds that the decision to reject the application does not conform to these procedures and the Act, the Director may approve the application.

NOTE: Authority cited: Section 4799.02, Public Resources Code. Reference: Section 4799.02, Public Resources Code.

1542. Recovery of Funds.

(a) Pursuant to these procedures and the Act, a participant in a cost sharing agreement shall refund any cost sharing payments in the event of any of the following:

(1) The filing of an application to rezone the parcel(s) to which the project applied to a zone permitting a land use(s) incompatible with forest resource management, as set forth in PRC 4797.5;

(2) A violation of a contract pursuant to PRC 4797;

(3) A finding by the Director that the participant has not complied with the terms of a cost sharing agreement and a subsequent order by the Director that the participant refund any cost sharing payments advanced.

NOTE: Authority cited: Section 4799.02, Public Resources Code. Reference: Section 4797.5, Public Resources Code.

HISTORY:

1. Amendment filed 4-15-83; effective thirtieth day thereafter (Register 83, No. 16).
2. Editorial correction of effective date of 4-15-83 order filed 4-22-83 (Register 83, No. 17).

Article 8. Resource Protection Guidelines

1545. Wildlife Protection.

(a) Riparian vegetation found along stream and lakes, and within marshes, wet meadows, and other wet areas shall be retained and protected except when managed as part of a fish and wildlife habitat improvement practice and necessary mitigation measures to minimize damage from these practices have been imposed.

(b) All snags within the stream and lake protection zone and all live trees and snags with visible evidence of use as nesting and roosting sites by rare, endangered, or threatened bird species shall be left undisturbed. Participants are encouraged to leave all snags undisturbed.

(c) No practices may be performed on lands designated special treatment areas due to their importance as key habitat for rare and endangered animals or plants unless an environmental evaluation conducted according to 14 CAC 1532.2 indicates that a proposed practice(s) will improve such habitat.

(d) Participants are encouraged to retain some older acorn producing black oaks, create deer forage lanes in brushfields, and plant other vegetation to promote species diversity and improve wildlife habitat when such practices are not in conflict with program goals.

(e) If existing vegetation other than riparian is necessary to maintain stream temperatures, such vegetation shall not be removed.

(f) Domestic water supplies will receive the same review and consideration as that required for special treatment areas.

NOTE: Authority cited: Section 4799.02, Public Resources Code. Reference: Sections 4799 and 4799.01, Public Resources Code.

1545.1. Stream and Lake Protection.

(a) Throughout the course of the project, the applicant shall keep all streams and lakes below the stream and lake transition line free of slash, debris, and other material that will harm fish, wildlife, or other beneficial uses of water. Accidental deposits will be removed immediately.

(b) No tractors, trucks, cars, and other machinery shall be serviced adjacent to lakes or streams, or within wet meadows and other wet areas, or in other areas where such servicing will permit grease, oil, or fuel, or other toxic substances to enter lakes or streams or wet areas.

(c) Except when performing fish and wildlife habitat improvement practices or forest land conservation practices, heavy earth-moving equipment working on the project area shall be prohibited from working within 50 feet (15.24 m), slope distance, of the stream or lake transition line. Wider protection zones may be required following an environmental review of the project conducted according to 14 CAC 1532.2.

(d) The participant shall be responsible for complying with applicable sections of the Fish and Game Code and local ordinances.

NOTE: Authority cited: Section 4799.02, Public Resources Code. Reference: Sections 4799 and 4799.01, Public Resources Code.

1545.2. Wet Meadows, Marshes, and Other Wet Areas.

No activities shall be permitted in wet meadows, marshes, and other wet areas unless such activities are forest land conservation practices of fish and wildlife habitat improvement practices and necessary mitigation measures to minimize damage from these practices have been imposed.

NOTE: Authority cited: Section 4799.02, Public Resources Code. Reference: Sections 4799 and 4799.01, Public Resources Code.

1545.3. Erosion Control.

(a) Brush scalped with a bulldozer off slopes shall be windrowed along the contour. Windrowed brush shall be disposed of by burning prior to planting or seeding.

(b) Heavy equipment shall not be operated on the project area when soils reach field capacity.

(c) Heavy equipment shall not be operated on known potential or active slide areas.

NOTE: Authority cited: Section 4799.02, Public Resources Code. Reference: Sections 4799 and 4799.01, Public Resources Code.

TITLE 14**DEPARTMENT OF FORESTRY**

§ 1545.9

(Register 84, No. 38—8-1-84)

(p. 94.10.29)

1545.4. Hazard Reduction.

(a) Slash that is created by the project shall be treated by chipping, piling and burning, burying, lopping or otherwise removing as recommended by the area Fire Control Officer.

(b) Any burning shall be in compliance with applicable forest, fire, and pollution regulations.

NOTE: Authority cited: Section 4799.02, Public Resources Code. Reference: Sections 4799 and 4799.01, Public Resources Code.

1545.5. Use of Chemicals.

Chemicals used for forest improvement work shall be applied in accordance with all federal, state, and local laws and regulations.

NOTE: Authority cited: Section 4799.02, Public Resources Code. Reference: Sections 4799 and 4799.01, Public Resources Code.

HISTORY:

1. Amendment filed 8-31-84; effective thirtieth day thereafter (Register 84, No. 35).

1545.6. Stocking Levels.

Unless the Director recommends otherwise, the minimum stocking level at completion of a planting project shall be:

(a) 400 trees per acre (988 trees per ha) (10.44 foot (3.18 m) spacing) on Site III and better lands.

(b) 200 trees per acre (494 trees per ha) (14.76 foot (4.50 m) spacing) on Site IV and V lands.

NOTE: Authority cited: Section 4799.02, Public Resources Code. Reference: Sections 4799 and 4794, Public Resources Code.

1545.7. Species Selection.

Commercial tree species shall be used for reforestation projects consisting of site preparation and planting practices except that up to 10% of the area may be planted with other species in the interest of maintaining species diversity and wildlife habitat. Non-commercial species may be used in projects consisting of forest land conservation measures and fish and wildlife habitat improvement practices. In any case, the tree species used for any project financed by a cost sharing agreement pursuant to this Chapter shall be silviculturally adaptable to the specific site named in the agreement and the use of said species shall be subject to the approval of the Director.

NOTE: Authority cited: Section 4799.02, Public Resources Code. Reference: Sections 4799 and 4799.01, Public Resources Code.

1545.8. Special Treatment Areas.

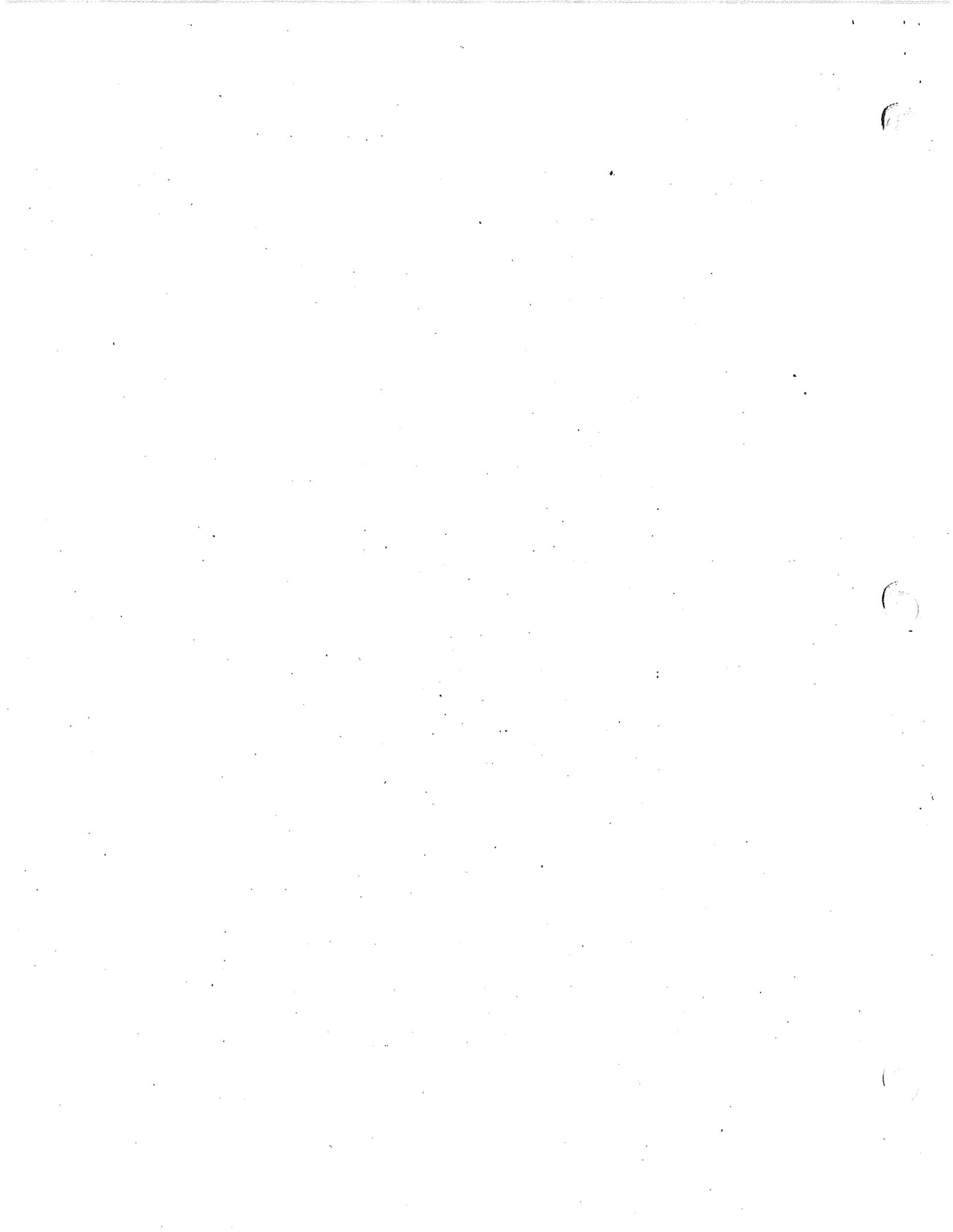
No practice may be performed in special treatment areas except in such cases where the area has been substantially damaged or where the proposed practice will improve the resource values which have prompted the appropriate public agency to designate the area a special treatment area. In any case, an environmental review shall be conducted in the manner set forth in 14 CAC 1532.2 for all projects within special treatment areas.

NOTE: Authority cited: Section 4799.02, Public Resources Code. Reference: Sections 4799 and 4799.01, Public Resources Code.

1545.9. Insect Control.

Pre-commercial thinning in Ponderosa Pine and Jeffrey Pine shall be limited to between May 15 and November 1 unless adequate measures are taken to prevent the infestation of the residual stand with IPS and/or dendroctonus beetles.

NOTE: Authority cited: Section 4799.02, Public Resources Code. Reference: Section 4799.01, Public Resources Code.



APPENDIX "B"

Check the appropriate effect and mitigation measures to be applied. Enter N/A where effect not applicable.

EFFECT

MITIGATION

Water Quality

- | | |
|--|---|
| <p><u>1.</u> Soil deposition in streams caused by accelerated erosion due to use of heavy equipment to remove vegetation</p> <p><u>2.</u> Landslides and slope failure due to heavy equipment operation on currently & potentially unstable lands</p> <p><u>3.</u> Increased water temperatures due to removal of streamside shading</p> <p><u>4.</u> Increased turbidity and sediment load in streams from clearing stream channels</p> <p><u>5.</u> Deposition of slash or debris in streams.</p> <p><u>6.</u> Accidental off-target deposition of herbicides due to spills and aerial drift</p> <p><u>7.</u> Effect on domestic water supplies from sediment deposits.</p> <p><u>8.</u> Unusual circumstances or project site conditions (e.g. soil type, slope, size of project, soil moisture) which could result in surface erosion effects not adequately mitigated by Resource Protection Guidelines.</p> <p><u>9.</u> Siltation of stream gravels important for spawning by accelerating erosion after vegetation removal</p> <p><u>10.</u> Impact to rare, endangered, or sensitive species habitat or wildlife as part of vegetation manipulation</p> <p><u>11.</u> Contamination of game meat with herbicides.</p> | <p>1. a. Brush scalped off slopes will be windrowed along the contour and burned, leaving effective berms of residual soil to impede surface water flow (14 CCR 1545.3a).
b. No heavy equipment on excessively wet soils (14 CCR 1545.3b).
c. No heavy equipment within 50' of stream and lake transition line, therefore leaving buffer strip (14 CCR Section 1545.1c).</p> <p>2. No heavy equipment on current or potentially active slide areas (14 CCR 1545.3c).</p> <p>3. a. Leave riparian vegetation (14 CCR 1545a).
b. Leave other vegetation as necessary to maintain stream temperature (14 CCR 1545e).</p> <p>4. Compliance with Fish and Game Code (14 CCR 1545.1d).</p> <p>5. All streams below stream and lake transition line will be kept free of slash and debris. Accidental deposits will be cleared up (14 CCR 1545.1).</p> <p>6. Compliance with Federal EPA, Cal. Food and Ag. Code, County ordinances as enforced by County Ag. Commissioners (14 CCR 1545.1).</p> <p>7. Establishment of Special Treatment Areas to protect domestic water supplies (14 CCR Section 1545.f).</p> <p>8. Effects beyond the scope of the Program EIR will need additional review. (Please consult CDF Forester.)</p> <p>9. See Mitigation for Significant Effect</p> <p>10. The Department of Fish and Game's California Natural Diversity Data Base and the California Native Plant Society registers will be consulted for evidence of such occurrences in the project area. If likely, a (PEIR) field survey will be performed by a biologist. If such species are present, a Special Treatment Area will be designated and no forest improvement practice will be performed thereon unless they clearly benefit the protected species (14 CCR Section 1545.8).</p> <p>11. Compliance with Federal EPA, Cal. Food and Agriculture Code, and County ordinances as enforced by County Agriculture commissioners (14 CCR 1545.5).</p> |
|--|---|

ENVIRONMENTAL CHECKLIST

Forest Insects and Disease

- ___ 12. Possible infestation of residual stands of three-needle pines with Ips and Dendroctonus beetles if slash from wet season precommercial thinning operations not adequately disposed
- ___ 13. Infestation of pine stands with root rot pathogens after precommercial thinning
- ___ 14. Particulates in air from burning brush
- ___ 15. Contamination of air from aerial drifts of herbicides

- 12. No precommercial thinning of three-needle pines between November 1 and May 15 unless risk of beetle infestation is reduced by chipping, burning, lopping, or otherwise treating thinning slash (14 CCR 1545.9.).
- 13. Allow application of borax on thinned stumps to qualify for cost share payments.
- 14. Compliance with Air Resources Board regulations and local ordinances (14 CCR 1545.4).
- 15. Compliance with Federal EPA, Cal. Food and Agriculture Code, and County ordinances as enforced by County Agriculture Commissioners (14 CCR 1545.5).

Archeological, Historic, and Cultural Resources

- ___ 16. Disturbance of archeological, historic, and cultural resources when brush is removed to plant trees or habitat is removed

- 16. An archeological records search and project review will be made by the appropriate Information Center for the California Archeological Inventory. They will determine if known archeological or historical sites occur within or near the project area. In addition, if recommended by the Information Center, the project area will be thoroughly surveyed by a professional archeologist to determine if any undiscovered (unrecorded) resources are present which may be damaged by the project. Areas where such resources are identified will be designated Special Treatment Areas and no forest improvement practices will be performed thereon except where practices clearly benefit the protected resource as recommended by the professional archeologist (14 CCR Section 1545.8). A copy of the project map and a brief description of the project will be sent to the Native American Heritage Commission. Representatives of the NAHC will review the project for Native American concerns (PRC 21080.4, 14 CCR 1545.8, EPIC v. JOHNSON).

- ___ 17. Slash build-up after precommercial thinning increases fire hazard

- 17. Current state and local law and regulations as enforced by Area Fire Control Officer require slash disposal in high risk areas (14 CCR 1545.4).

- ___ 18. Risk of fire escaping

- 18. Compliance with all state and local laws and regulations (14 CCR 1545.4).

Other

- ___ 19. Project may result in significant environmental effects other than those listed in items 1 through 18 above.

- 19. Effects beyond the scope of the Program EIR will need additional review. (Please consult CDF Forester.)

- ___ 20. Unusual circumstances or site conditions indicate that the project may result in unusually severe effects (other than those described in item 8 relating to water quality) which would not be adequately mitigated by the Resource Protection Guidelines.

- 20. Effects beyond the scope of the Program EIR will need additional review. (Please consult CDF Forester.)

Signature of CDF Forester

Date

Signature of RPF or person preparing checklist

Date

INSTRUCTIONS FOR PREPARING THE
ENVIRONMENTAL CHECKLIST

A program environmental impact report (PEIR) has already been prepared for the California Forest Improvement Program (CFIP) by the California Department of Forestry and Fire Protection (CDF). The PEIR identifies mitigation measures to minimize adverse environmental impacts that could be caused by CFIP projects. These mitigation measures have been incorporated into the State CFIP regulations as "Resource Protection Guidelines" [Art. 8, Title 14 California Code of Regulations, Section 1545 (14 CCR 1545)]. Accordingly, the Environmental Checklist asks questions about the project and the site, and the questions are listed with corresponding sections of the Resource Protection Guidelines (RPG). Appropriate mitigation measures from the RPG shall be incorporated into the CFIP Project Description.

Instructions Relating to Specific Items in the Checklist

Water Quality

- Item 2. - Delineate any landslide areas, potential and actual, on map(s) to be included in your management plan (14 CCR, Section 1545.3).
- Item 7. - Show any domestic water supply sources on the management plan/project description map and delineate a protection area around such water supply sources necessary to protect water quality. In the Project Description, please discuss how project activities in the vicinity of the protection area will be carried out to prevent water quality degradation (14 CCR, Section 1545(f)).
- Item 8. - Please discuss in the Project Description any unusual circumstances or project site conditions (e.g. soil type, slope, size of project, soil moisture) that would indicate the Resource Protection Guidelines (RPG) would not adequately mitigate surface erosion effects. Impacts beyond the scope of the Program EIR will need additional review. (Please consult CDF Forester.)

Wildlife, Plants

- Item 10.- (a) Please ask the CDF Forester to consult the Department of Fish and Game and the California Native Plant Society registers to see if the project area encompasses the habitat of any

rare or endangered animal species. Delineate any sensitive areas, including wet meadow sites or significant migration routes on the Management Plan map. In the Project Description, please discuss how CFIP activities influencing important habitat areas will be carried out to minimize disturbance (14 CCR, 1545.8). If occurrence in the project area is likely, a field survey will be performed by a biologist. If such species are present, a Special Treatment Area will be designated and no forest improvement practices will be performed unless they clearly benefit the protected species.

- (b) Inspect the project for snags with visual evidence of use for nesting and roosting sites for rare or endangered species. Such snags must be retained unless they are safety hazard. (14 CCR 1545(b)). Snags that are safety hazards must be felled.

Forest Insects and Disease

- Item 12.- If there will be any pre-commercial thinning on three-needle pines between November 1 and May 15, please discuss in the Project Description how slash will be treated to prevent infestation of Ips and Dendroctonus beetles (14 CCR 1545.9).

Archeological, Historic, and Cultural Resources

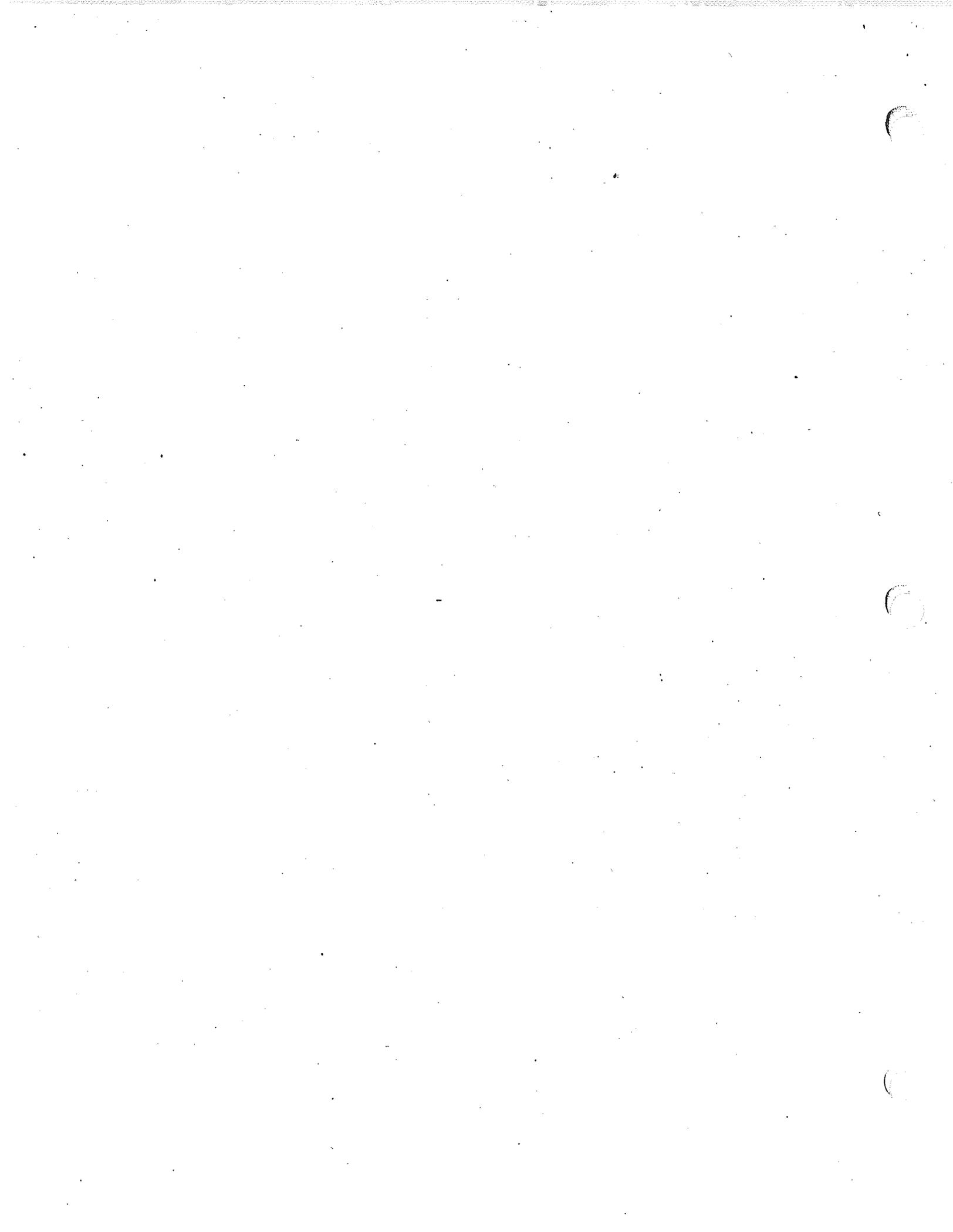
- Item 16.- Please ask the CDF Forester to check the archeological records for evidence of significant archeological, historical, or cultural resources in the project area. Delineate known sites on the Management Plan/Project Description map, and discuss in the Project Description how the sites will be protected during CFIP operations. A known site shall be labelled "Special Treatment Area" on the map.

Other

- Items 19 and 20 - Please discuss in the Project Description any significant environmental effects other than those listed in the checklist. Please also discuss in the Project Description (in addition to surface erosion effects discussed in Item 8) any unusual circumstances or site conditions that would indicate that the Resource Protection Guidelines

would not adequately mitigate possible effects listed in the checklist. Effects beyond the scope of the Program EIR will need additional review. (Please consult CDF Forester.)

Please complete and sign the attached environmental checklist. For your convenience, applicable sections of the CFIP regulations (Resource Protection Guidelines) are shown on the checklist as mitigation measures.



INSTRUCTIONS FOR PREPARING
THE
CFIP MANAGEMENT PLAN

BACKGROUND

The enabling legislation for the California Forest Improvement Program (CFIP) requires that a forest and land Management Plan be submitted for review with the CFIP application. This plan should describe, in general...

- a. the conditions and capabilities of the forest land property, including original forest type if determinable;
- b. the landowner's long-range management objectives, including provisions for eventual harvest of sawtimber; and
- c. needed forest resource improvement work consistent with protecting, enhancing, and maintaining forest productivity.

SCOPE

A CFIP Management Plan should be written for all forest land within the same ownership surrounding or contiguous to the parcel proposed for the CFIP project. The suggested format for providing the above-required information on small (50 or less) acre parcels is available as a separate CFIP handout. (Ask for Form RM-17). The Management Plan can vary according to the objectives of the landowner, and should be a flexible instrument--to be amended by the landowner as needs and economic conditions change.

INSTRUCTIONS

A forest and land management plan shall first outline the landowner's objectives. Second, the plan shall provide sufficient historical and resource baseline data* to formulate alternatives for forest improvement. Third, the plan shall compare alternatives and provide a recommended course of action to optimize forest productivity, consistent with the landowner's stated objectives. All of the above shall be presented in laymen's terms that the landowner can comprehend.

Depending on the interest and financial capabilities of the landowner, various alternatives will be proposed involving analysis of factors such as economics, product markets, impacts to the property and surrounding ownerships, etc.

- * Each plan will be unique. Large acreage ownerships are expected to require more comprehensive information than small ownerships. As a minimum, resource baseline information should include (1) existing land uses, (2) timber stand types and potential for improvement, (3) soil type (with a soil-veg survey map, if available) showing forestry potential and unstable areas, if any, and (4) a recent USGS quadrangle map illustrating on-the-ground conditions for the ownership. (Minimum acceptable plat map scale: 4 inches = 1 mile.)

DISCUSSION TOPIC

The following list is provided as a foundation in preparing the Management Plan. Add new categories, if necessary. The text should be typed. The Management Plan must be certified by a Registered Professional Forester.

- A. Landowner's Name, Address, County, and Phone Number. Legal description of site.
- B. Registered Professional Forester Name, Address, and Phone Number.

Categories

- 1. Land Use History
- 2. Management Objectives
- 3. Transportation System
- 4. Description of soils and site potential
- 5. Growing Stock--species and age class distribution (general)
- 6. Growth/Potential yields
- 7. Regeneration Needs
- 8. Socio-cultural considerations: markets, limitations
- 9. Current Silvicultural system(s)--rotation, cutting, cycle, etc.
- 10. Land Conservation Practice Needs
- 11. Fish and Wildlife Improvement Needs
- 12. Fire Protection Needs
- 13. Insect and Disease Problems
- 14. Proposed alternatives; cost/benefit analysis of investments
- 15. Management Recommendations: reforestation, pre-commercial thinning, release, follow-up, hazard reduction, fish and wildlife improvement, land conservation
- 16. Property Security/Improvements
- 17. Community/Agency cooperation mechanisms

A CFIP Project Description is a detailed prescription for forest improvement work to meet some of the goals outlined in a landowner's overall land management plan. The Project Description is necessary component of the CFIP Agreement. It must be concise, to the point, and binding. Upon acceptance, this description is attached to the CFIP Agreement as "Exhibit A", which is referenced in paragraph one of the subject agreement.

The CFIP applicant will propose work only to the extent it can be completed in twelve to eighteen months. Applicants with large acreages are encouraged to enter into sequential contracts as work is completed.

Due to contractual requirements, the following components are considered necessary for all project descriptions for CFIP.

1. Name and address of landowner. Name of Project Description author.
2. Legal description of site(s) including section, township, range, baseline and meridian, and county.
3. Specific description to be carried out under CFIP. Each of the principal headings denoted below should have a separate statement addressing specific methods to be utilized and mitigation measures to be employed in accordance with CFIP Regulations and the Environmental Checklist. Address CFIP Practices as follows:

A. Site Preparation:

- I. Method, target, procedures and standards. Also include clearance distances, degree of vegetation treatment/removal, equipment, erosion control, hazard reduction, locations, restrictions, and timing.
- II. Additional treatments such as disking/ripping along contours, broadcast burning, burning of piles/windrows.
- III. Mitigation measures.

B. Planting:

- I. Approximate spacing, method of planting, number of trees per acre, planting standards, seed zone(s), species, and timing.
- II. Mitigation measures.

C. Follow-up

- I. Type, purpose, method, standards, and timing.
- II Mitigation measures.

D. Clean and Release:

- I. Objective, method, standards, and target. Also include disease prevention needs, equipment, number of trees prior/post treatment, pesticide prescription, slash treatment, spacing, timing and treatment diameters.
- II. Mitigation measures.

INSTRUCTIONS FOR PREPARING THE
CFIP PROJECT DESCRIPTION

- E. Pre-commercial Thinning:
 - I. Objective, method, and standards. Include diameter limit, disease prevention needs, spacing standards or basal area, thinning prescription, and timing.
 - II. Slash treatment (lopping/pile and burn), include fuel loading and treatment objectives, standards, and timing.
 - III. Additional treatment(s) recommended.
 - IV. Mitigation measures.
- F. Land Conservation - Habitat Improvement Project:
 - I. What improvements are intended and how they will be physically accomplished.
 - II. Each element of work must be broken down with an estimated dollar rate or dollar/unit rate affixed. A total estimated project cost must be calculated from this (this is done because there are no cap rates for these practices).
- G. Hazard Reduction:
 - I. Objective and method.
 - II. Comprehensive justification including a fuel loading and risk analysis, and/or insect and disease prevention, and timing.
 - III. Mitigation measures.
- H. Supervision by a Registered Professional Forester (RPF):
 - I. Specific responsibilities that the RPF will administer (by practice) in order to insure a quality end product. Complete and include the CFIP RPF Checklist RM-7.
- 4. Map - each practice must be keyed to a map which is considered part of the project description. Map must reference range, township, and section #s (or other identifying method, such as assessor parcel number, if the area has not been surveyed). Colored maps will not copy.
 - A. Planimetric map scale will be at least 4 inches = 1 mile.
 - B. Attach a copy of largest scale USGS map available with project area outlined.
- 5. Necessary Field Work.
 - A. Layout project in the field with flagging or marked by readily identifiable existing physical feature, such as roads.
 - B. Determine the acreage of each practice (gross and net).

CFIP Project Number _____

1. Enter the name(s) of all the landowners as they appear on the deed (use attachment if necessary).

a. _____
Name Mailing Address: P.O. Box, Street

Phone Day/Evening City, State, Zip

b. _____
Name Mailing Address: P.O. Box, Street

Phone Day/Evening City, State, Zip

2. Responsible person to be contacted (if different from above).

Name Mailing Address: P.O. Box, Street

Phone Day/Evening City, State, Zip

3. (a) Does the landowner own 5,000 acres or less of forestland in California? Yes _____ No _____

(b) 20 acres or more of forestland? Yes _____ No _____

(c) Is the total area proposed for each practice 5 acres or more (other than preparing a Management Plan)? Yes _____ No _____ N/A _____ (Wildlife/Conservation)

(d) Number of acres under the Management Plan _____ Total Ownership Size _____

(e) Project area timber site productivity is? I _____ II _____ III _____ IV _____ V _____
System? _____ (REF. CCR, Title 14, Article 4, Sections 1060).

(f) Has the project area been damaged by natural causes within the last 3 years? Yes _____ No _____

4. How is the project area zoned? Circle one of the following and answer pertinent questions.
TPZ, Agriculture Preserve, or Other.

(a) TPZ. Is a petition for rezoning from TPZ to other uses underway or contemplated for the period of time during which the grant is administered, 10 years? Yes. _____ No _____
If yes, explain _____

(b) Other. List all land uses permitted under this zoning. Indicate existing land uses on Management Plan map. List specific use(s): _____

(c) Will the landowner agree not to put CFIP land to any use incompatible with forest resource management for 10 years? Yes _____ No _____

5. Has any of the land proposed for CFIP funds been harvested subject to the 1973 Z'Berg-Nejedly Forest Practice Act? Yes _____ No _____ If yes, list THP Number _____

6. Is there a previously prepared Forest or Land Management Plan for the area proposed for a CFIP project? Yes _____ No _____ Should the plan be revised? Yes _____ No _____
If Yes, list the CFIP Project Number _____

7. The project will be carried out by persons living in the county or in counties adjacent to the county where the project will take place? Yes _____ No _____

Complete the attached Application Project Summary. I do not have a conflict of interest with the State as described in Division 2, Chapter 2, Article 8, Sections 10410 and 10411 of the Public Contract Code.

I certify that the above and attached is true and correct to the best of my knowledge.

Executed on _____ at _____

Applicant's Signature

Requires CDF foresters evaluation.

(a) The project is located in an area of high unemployment? Yes _____ No _____

(b) The project offers relatively more employment opportunities? Yes _____ No _____

NAME(S): _____

SUMMARY OF PRACTICES TO BE PERFORMED

PRACTICE	ACREAGE*	COST/ACRE**	TOTAL EST. PROJECT COST
Management Plan/Addendum		\$	\$
Site Prep			
Trees and Planting			
Follow-up			
Release, chemical			
Release, non-chemical			
Pre-commercial thinning			
RPF Supervision			
Habitat Improvement			
Land Conservation			
Other			
Other			
TOTAL			\$

Box a

* Enter net acres work for partial practices (minimum of 5 acres of an individual practice except for land conservation and habitat improvement)

** Enter 100% contract cost/acre (not to exceed maximum allowable rate)

1. COST-SHARE RATE: _____ %

2. MAXIMUM REIMBURSEMENT:

_____ % X \$ _____ = \$ _____
 rate from #1 amount Box a maximum cost:round off to whole dollars

Location of the proposed project listed above. Provide maps (scale 15 min./7.5 min. USGS topographic are best) indicating areas to be treated. Use additional sheets if necessary.

For recording purposes at your local county recorder's office;

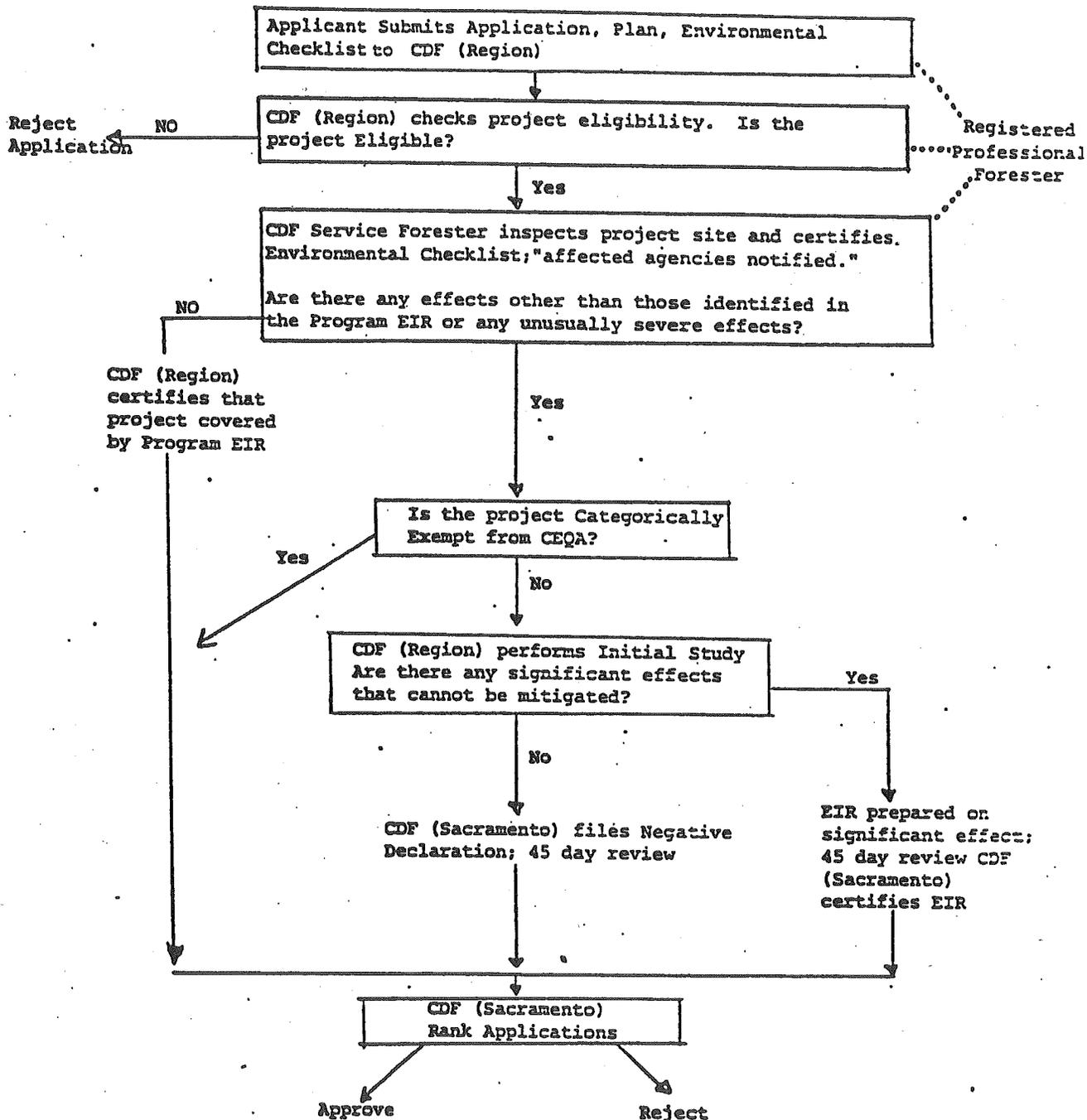
Sub. Sec.	Section	Township	Range	County	Assessor's Parcel #	Yes/No TPZ
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

For non TPZ zoned lands described above a part of that real property more fully described in that certain deed from N/A to _____ dated _____ and recorded with the recorder of _____ County at Book _____, Page _____

APPENDIX "E"

Exhibit D

PROJECT APPROVAL FLOW CHART





APPENDIX "F"

LIST OF PERSONS CONSULTED FOR ORIGINAL EIR:

John W. Chaffin
Deputy Regional Forester
U.S. Forest Service

Don Cosens
Soper-Wheeler Company

Dean A. Cromwell, Executive Officer
Board of Forestry

Martin R. Glick, Director
Economic Development Department

Robert W. Gustafson
Cooperative Forestry and Fire
U.S. Forest Service

William T. Hartman, Manager
Land Division
East Bay Municipal Utility District

John A. Helms, Associate Professor
Department of Forestry and Conservation
University of California

Francis C. H. Lum
State Conservationist
USDA, Soil Conservation Service

Ed Litrell
Environmental Services Branch
Department of Fish and Game

Howard Mays, State Executive Director
USDA, Agricultural Stabilization and
Conservation Service

Dr. Knox Mellon
State Historic Preservation Officer
Office of Historic Preservation
Department of Parks and Recreation

LIST OF PERSONS CONSULTED FOR ORIGINAL EIR: (continued)

Frederick A. Meyer, Supervisor
Natural Heritage Section
Department of Parks and Recreation

Robert Motroni
Forest and Rangeland Resources Assessment Program
California Department of Forestry and Fire Protection

Peter C. Passof, Forest Advisor
University of California Cooperative
Extension

Eldon E. Rinehart, General Manager
California Reclamation Board

Victoria L. Roberts, Resource Coordinator
California Native American Heritage Commission
Governor's Office

Ronald B. Robie, Director
California Department of Water Resources

H. K. Trobitz, Member
State Board of Forestry

Larry F. Walker, Executive Director
State Water Resources Control Board

Dr. Clyde Warhaftig, Member
State Board of Forestry

LIST OF PERSONS CONSULTED FOR CURRENT SUPPLEMENT:

Gaylon Lee
State Water Resources Control Board

Robert Mapes
California Department of Fish and Game

Robert Motroni
Forest and Rangeland Resources Assessment Program
California Department of Forestry and Fire Protection

Laurie Zander
California Regional Water Quality Control Board,
Lahontan Region

APPENDIX G

ESTIMATION OF TYPICAL COSTS PER ACRE OF VEGETATION MANAGEMENT AND OTHER REFORESTATION TREATMENTS 1/

In 1982, 1983, and 1986, the National Forests in Region 5 were surveyed to determine recent costs for performing site preparation and release treatments (results are on file at the Regional Office). Direct costs of contracts or equivalent work by Forest Service personnel, contract administration (including law enforcement), NEPA compliance, water monitoring, and appeals costs were itemized in the 1983 and 1986 surveys but not in the 1982 survey. The 1982 survey results were used in the Draft EIS. Results from the more recent surveys are presented in this appendix to the Final EIS.

The range of the cost values for each kind of treatment and the typical values are shown in Table C-1. Cost variability was the result of differences among the following factors: competition between contractors, distances that contractors must travel to the work sites, terrain and competing plant species, experience and salary levels of the workers, and project size. 2/

Based on recent contracts in Region 5, typical costs were estimated to be \$250 per acre for planting, \$190 per acre for precommercial thinning by hand felling, and \$160 per acre for precommercial thinning by feller-buncher.

1/ USDA, Forest Service 1988. Final EIS: Vegetation Management for Restoration

2/ Project size is one of the most important causes of cost variation. See Mills (1983)

**Table C-1—Cost ranges and typical costs of site preparation,
release, and precommercial thinning treatments
(dollars per acre)**

Treatment	Range	Typical
Tractor piling, pushing, or brush raking (153 contracts, typical contract size = 170 acres)		
Direct contract cost	50-390	148
Contract administration	3-50	20
NEPA compliance	0-170	<u>2</u>
Total		170
Terracing (2 contracts, typical contract size = 90 acres)		
Direct contract cost	145-172	160
Contract administration	5-30	30
NEPA compliance	0-10	<u>5</u>
Total		195
Discing (8 contracts, typical contract size = 170 acres)		
Direct contract cost	30-90	70
Contract administration	5-25	15
NEPA compliance	0-2	<u>0</u>
Total		85
Machine mastication, mowing (12 contracts, typical contract size = 200 acres)		
Direct contract cost	70-240	180
Contract administration	2-40	15
NEPA compliance	0-12	<u>0</u>
Total		195
Burning piles (total cost)	50-70	60
Broadcast burning (total cost)	200-400	300
Handcutting, clearing, or piling (158 contracts, typical contract size = 150 acres)		
Direct contract cost	20-450	200
Contract administration	3-120	30
NEPA compliance	0-5	<u>0</u>
Total		230

**Table C-1 (continued)—Cost ranges and typical costs
of site preparation, release, and precommercial thinning treatments
(dollars per acre)**

Treatment	Range	Typical
Hand grubbing (83 contracts, typical contract size = 135 acres)		
Direct contract cost	25-545	225
Contract administration	2-100	30
NEPA compliance	0-10	<u>0</u>
Total		255
Hand felling and daubing, cutting and squirting^a (4 contracts and supplemental estimates from silviculturists, typical contract size = 60 acres)		
Direct contract cost	165-385	240
Contract administration	8-90	15
NEPA compliance	5-55	10
Water monitoring	0-45	<u>5</u>
Total		270
Hand cutting and daubing brush (estimated total cost)	250-400	330
Light barriers (paper collars, opaque plastic covers, mulches, etc.)	83-340	200
Grazing/Browsing (total cost)	0 ^b -90	10
Hand piling on steep slopes (total cost)	300-685	400
Aerially applied herbicides^a (46 contracts, 6 EA appeals, 2 contract appeals, typical contract size = 650 acres)		
Direct contract cost	13-115	50
Contract administration	2-60	10
NEPA compliance	40-10	5
Water monitoring	0-30	5
Appeals cost	0-20	<u>5</u>
Total		75

**Table C-1 (continued)—Cost ranges and typical costs
of site preparation, release, and precommercial thinning treatments
(dollars per acre)**

Treatment	Range	Typical
Ground-machine-applied herbicides^a		
(11 contracts, typical contract size = 240 acres)		
Direct contract cost	40-70	60
Contract administration	2-10	5
NEPA compliance	2-5	3
Water monitoring, appeals	0-5	<u>2</u>
Total		70
Hand-applied herbicides^a		
(89 contracts, 13 EA appeals, typical contract size = 220 acres)		
Direct contract cost	55-270	110
Contract administration	1-70	15
NEPA compliance	1-65	10
Water monitoring	0-50	3
Appeals cost	0-5	<u>2</u>
Total		140

^a1983 cost survey data adjusted to 1986 dollars.

^bBenefit of about 30 to 40 cents per acre.

Source: 1986 cost survey except where noted.

APPENDIX H

CONDITIONS OF PESTICIDE APPLICATION

Pesticide applicators shall be responsible for all federal, state, and local regulations pertaining to pesticides and pesticide use (3 CCR 6408). Pesticide labels shall be read in their entirety before use and all directions shall be followed unless otherwise indicated by a permit from the Agricultural Commissioner. Pesticide registration and labels are subject to change; applicators shall be responsible for current registration status information and label instructions.

Selection and application of pesticides

- In accordance with Board of Forestry policy, use the least toxic pesticides available to achieve cost-effective control by consulting with the Agricultural Commissioner or pest control advisor, or by consulting chemical manufacturer information
- Landowner will inform CDF of the pesticide to be used and the rate of application at least 6 weeks prior to treatment
- Where allowed by label or permit, use water as a carrier to minimize drift
- Use low-volatility formulations where available and adequate to the job to reduce drift
- Use least toxic pesticides and lowest application rates possible for effective control
- Application equipment should be checked frequently to insure proper function and dosage
- Never combine pesticides unless indicated on pesticide labels or until you have consulted CDFA or a pest control advisor

Aerial Applications

- Aerial applications of liquid forms of 2,4-D, 2,4-DB, 2,4-DP, MCPA, dicamba, picloram, and other designated pesticides (3 CCR 6460) shall, unless otherwise specified under permit, comply with CDFA regulations which include but are not limited to the following:
 - pesticide shall not be discharged more than 10 feet above target
 - wind speed shall not exceed 10 mph
 - aircraft boom pressure shall not exceed 40 lbs per square inch
 - aircraft speeds shall not exceed 60 mph unless equipped with jet nozzles with orifices 1/16 inch or greater in diameter.

Storage and Disposal

- Pesticides and unrinsed containers shall not be stored or left unattended so as to cause a hazard (3 CCR 6670)

- Storage sites must be posted as specified (3 CCR 6674)
- All pesticide containers shall carry pesticide labels as specified (3 CCR 6676)
- Pesticides shall be transported in the appropriate manner as specified by law (3 CCR 6682)
- Pesticide containers shall be triple rinsed or rinsed as described by law (3 CCR 6684); rinse water shall be put into tank mix
- Pesticide containers shall be 1) disposed of in an approved solid waste disposal site, 2) reconditioned as described by law, or 3) returned to the pesticide registrant upon approval (3 CCR 3143)

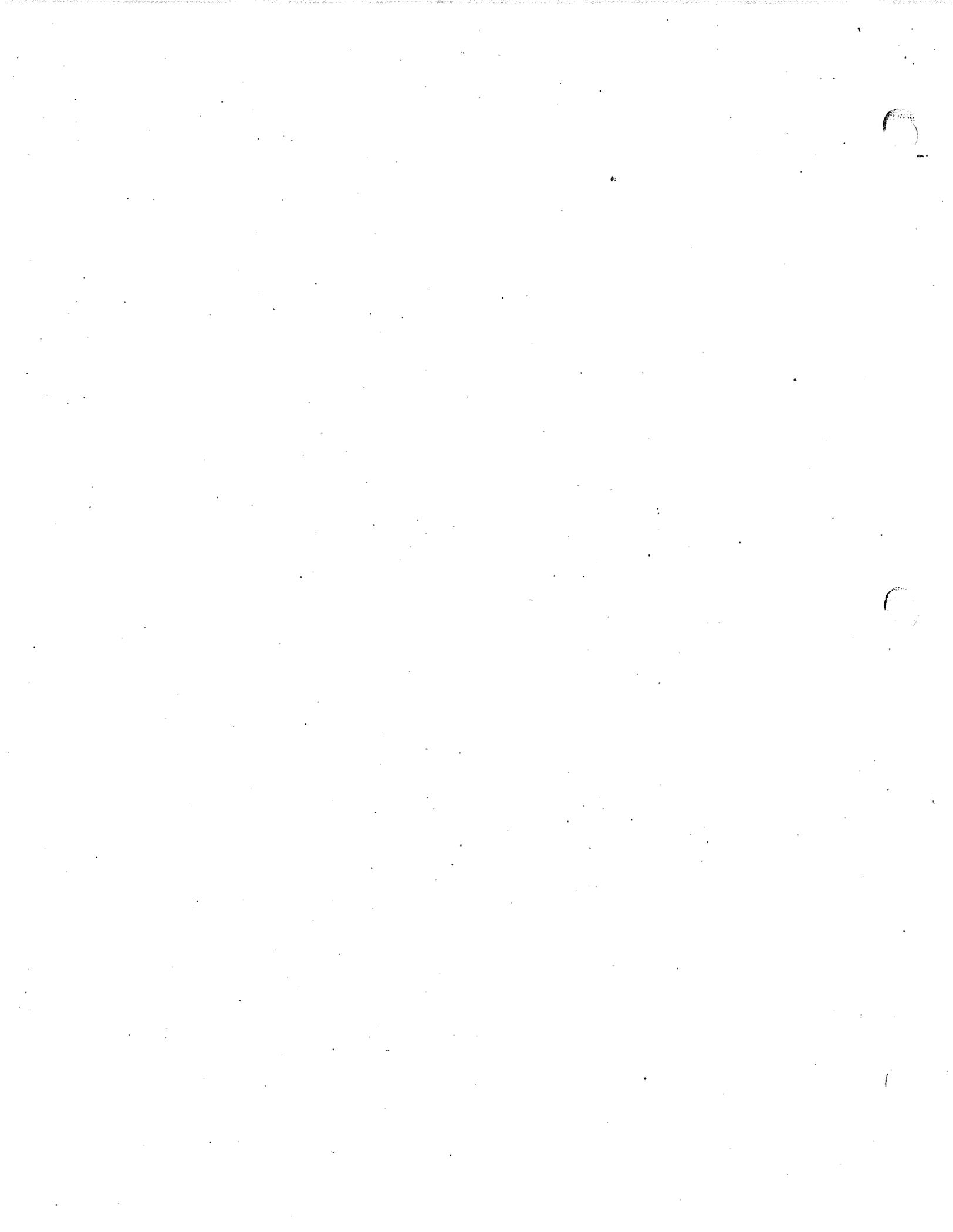
In Case of Spills

- Reread label carefully for specific instructions
- Confine spill with soil or other materials to prevent runoff and contamination of additional area
- Use soil, sawdust or other absorbent material to soak up spill
- Move all contaminated material into leakproof container and dispose of material as you would excess pesticides (as required by law)
- Put appropriate substances on spill to stop chemical action as indicated by label instructions or manufacturer
- Report major spills to the Agricultural Commissioner
- Report spills on state highways to the State Highway Patrol or others as required by law; inform the sheriff or police of spills on county or city roads; inform any others as required by law
- If water is contaminated, contact state health officials, the regional water quality control board, and the Department of Fish and Game immediately

Worker Safety

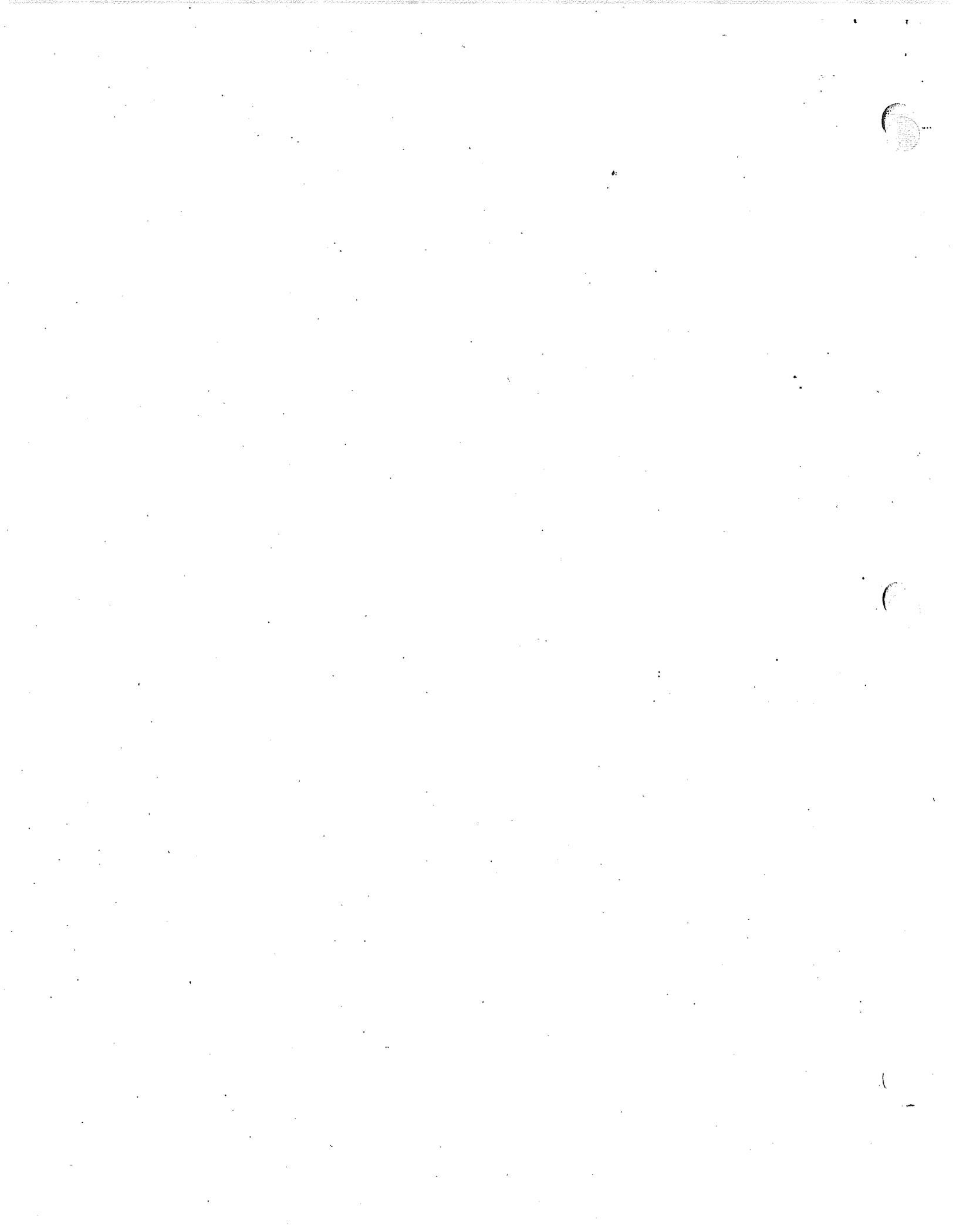
- Applicators will strictly comply with all federal, state and local laws, regulations and ordinances regarding worker safety and to specific label instructions regarding the application procedures, use of protective clothing and equipment; handling and safety precautions; emergency or medical treatments, facilities or provisions; cleanup requirements; reentry schedules; pesticide storage; and any other information pertinent to human health and safety (3 CCR 6700-6784)
- Employers shall provide training to applicators in language understandable to all employees on the hazards, safety requirements, medical treatments, and other pertinent information for each pesticide to be handled (3 CCR 6724)
- Employers shall provide clean clothing each day for each employee handling pesticides in Categories one or two (3 CCR 6738);

- Employers shall provide all safety equipment, eye protection, protective clothing, and respiratory equipment for specific pesticide related activities as described by law (3 CCR 6738) and by individual pesticide labels
- Employees shall not enter treated areas until the pesticide spray has dried or the pesticide dust has settled; longer reentry prohibitions will be complied with if indicated by pesticide labeling (3 CCR 6770)
- Workers should never eat, drink or smoke while handling pesticides and should always wash before engaging in these activities during work breaks
- Pour liquids, powders or dusts slowly to avoid spill or drift
- Unless otherwise specified by law or by pesticide label, the minimum protective clothing recommended for applicators is long-sleeved shirts and long pants when handling pesticides (UC 1977)



APPENDIX I

AGENCY AND PUBLIC COMMENTS





United States
Department of
Agriculture

Soil
Conservation
Service

2121-C 2nd Street, Suite 102
CA 95616-5475
(916) 449-2856

October 10, 1989

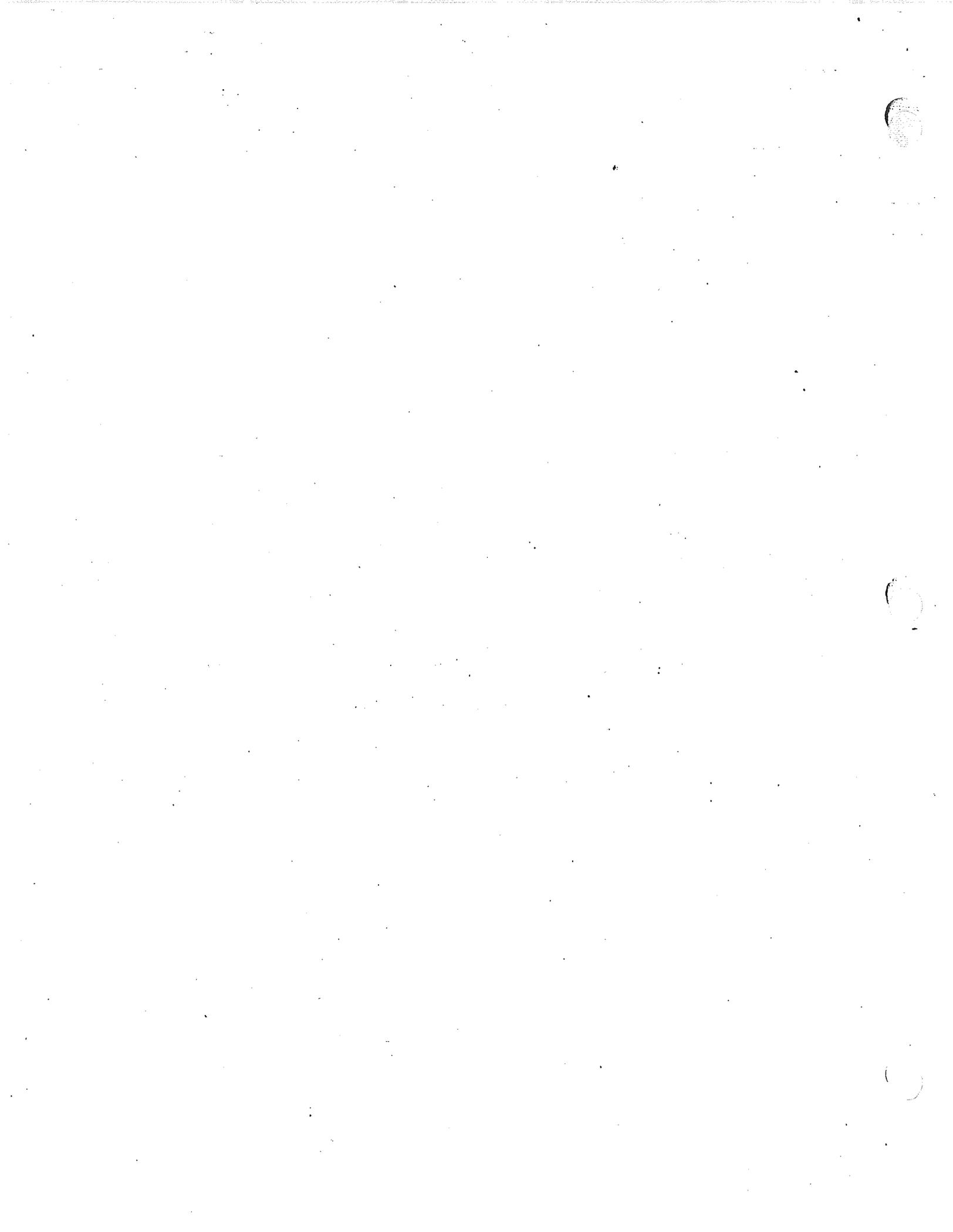
Mr. Jay D. Wickizer
Department of Forestry and Fire Protection (A-45)
P.O. Box 944246
Sacramento, CA 94244-2460

Dear Mr. Wickizer:

Thank you for the opportunity to review the final environmental impact report to the California Forest Improvement Program (CFIP). Please consider the following comments while preparing the final document:

- a.) Page 43. (3) Terrestrial Wildlife. Reference should be made to the California Wildlife Habitat Relationships System, California Department of Fish and Game.
- b.) Page 106. Wet Meadow Fencing. Under what conditions would the wet meadows be fenced? Rather than a specific design, we recommend a maximum overall height, such as 42 inches, and a minimum height above ground be given. This will allow flexibility in the design of different types of fences such as 3 or 4-wire barbed and/or smooth wire, woven wire, 3 or 4 wire suspension fence or electrical fence.
- c.) Appendix "F", List of Persons Consulted. Remove the name Francis C. H. Lum and replace with Pearlle S. Reed.

PEARLIE S. REED
State Conservationist



OFFICE OF PLANNING AND RESEARCH

TENTH STREET
SACRAMENTO, CA 95814

October 9, 1989

Doug Wickizer
CA Department of Forestry
1416 Ninth Street
Sacramento, CA 95814Subject: California Forest Improvement Program EIR Supplement
SCH# 89082117

Dear Mr. Wickizer:

The State Clearinghouse has submitted the above named draft Environmental Impact Report (EIR) to selected state agencies for review. The review period is now closed and the comments from the responding agency(ies) is(are) enclosed. On the enclosed Notice of Completion form you will note that the Clearinghouse has checked the agencies that have commented. Please review the Notice of Completion to ensure that your comment package is complete. If the comment package is not in order, please notify the State Clearinghouse immediately. Remember to refer to the project's eight-digit State Clearinghouse number so that we may respond promptly.

Please note that Section 21104 of the California Public Resources Code requires that:

"a responsible agency or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency."

Commenting agencies are also required by this section to support their comments with specific documentation.

These comments are forwarded for your use in preparing your final EIR. Should you need more information or clarification, we recommend that you contact the commenting agency(ies).

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact John Keene at 916/445-0613 if you have any questions regarding the environmental review process.

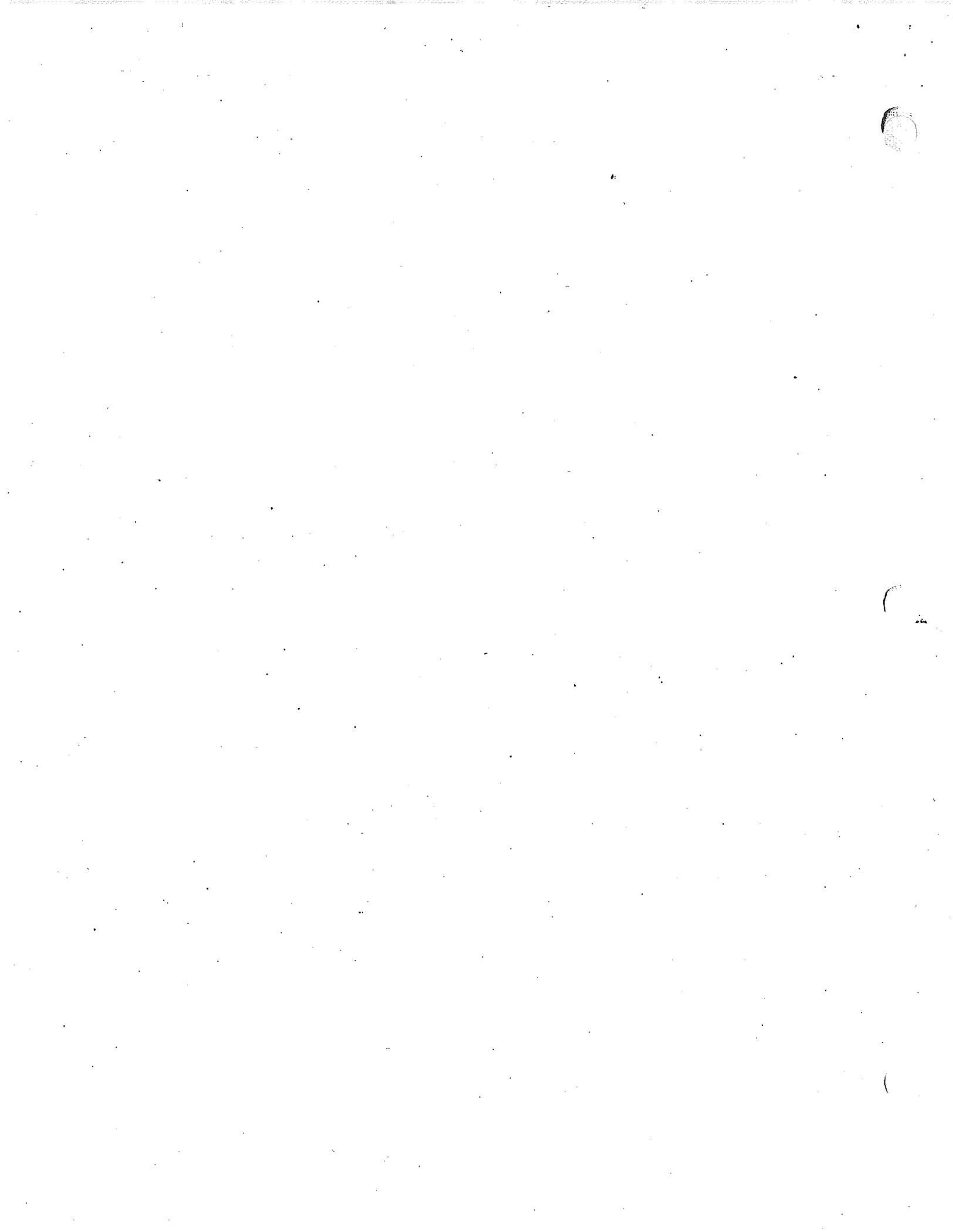
Sincerely,

A handwritten signature in black ink, appearing to read "David C. Nunenkamp".

David C. Nunenkamp
Chief
Office of Permit Assistance

Enclosures

cc: Resources Agency



NOTICE OF COMPLETION AND ENVIRONMENTAL DOCUMENT TRANSMITTAL FORM

SCH # 89082117

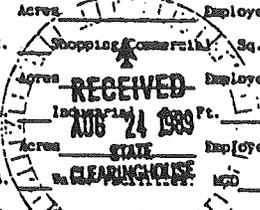
1. Project Title: California Forest Improvement Program EIR Supplement
2. Lead Agency: California Department of Forestry and Fire Protection
3. Contact Person: Doug Wickizer
a. Street Address: 1416 Ninth Street
3b. City: Sacramento
1. County: Sacramento 3d. Zip: 95814 3e. Phone: (916) 322-0128

PROJECT LOCATION 4. County: 4a. City/Community:
4b. Assessor's Parcel No. 4c. Section 4d. Twp. 4e. Range

5a. Cross Streets: 5b. For Rural, Nearest Community:

6. Within 2 miles: a. State Hwy # b. Airports c. Railways d. Waterways

7. DOCUMENT TYPE: CEQA, NCP, Early Cons, Neg Dec, Draft EIR, Supplement/Subsequent EIR, NEPA, NOI, POSEI, Joint Document, Final Document, Other
8. LOCAL ACTION TYPE: General Plan Update, Rev Element, General Plan Amendment, Master Plan, Amendment, Specific Plan, Community Plan, Redevelopment, Reroute, Land Division, Use Permit, Waste Mgmt Plan, Canal Ag Preserve, Other
9. DEVELOPMENT TYPE: Residential, Office, Shopping/Commercial, Industrial, State Clearinghouse, Transportation, Power, Waste Treatment, OCS Related, Other



10. TOTAL ACRES: 11. TOTAL JOBS CREATED:
12. PROJECT ISSUES DISCUSSED IN DOCUMENT: 1. Aesthetic/Visual, 2. Agricultural Land, 3. Air Quality, 4. Archeological/Historical, 5. Coastal Zone, 6. Economic, 7. Fire Hazard, 8. Flooding/Drainage, 9. Geologic/Seismic, 10. Jobs/Housing Balance, 11. Minerals, 12. Noise, 13. Public Services, 14. Schools, 15. Septic Systems, 16. Sewer Capacity, 17. Social, 18. Soil Erosion, 19. Solid Waste, 20. Toxic/Hazardous, 21. Traffic/Circulation, 22. Vegetation, 23. Water Quality, 24. Water Supply, 25. Wetland/Riparian, 26. Wildlife, 27. Growth Inducing, 28. Incompatible Landuse, 29. Cumulative Effects, 30. Other
13. FUNDING (approx) Federal \$ State \$ Total \$
14. PRESENT LAND USE AND ZONING:

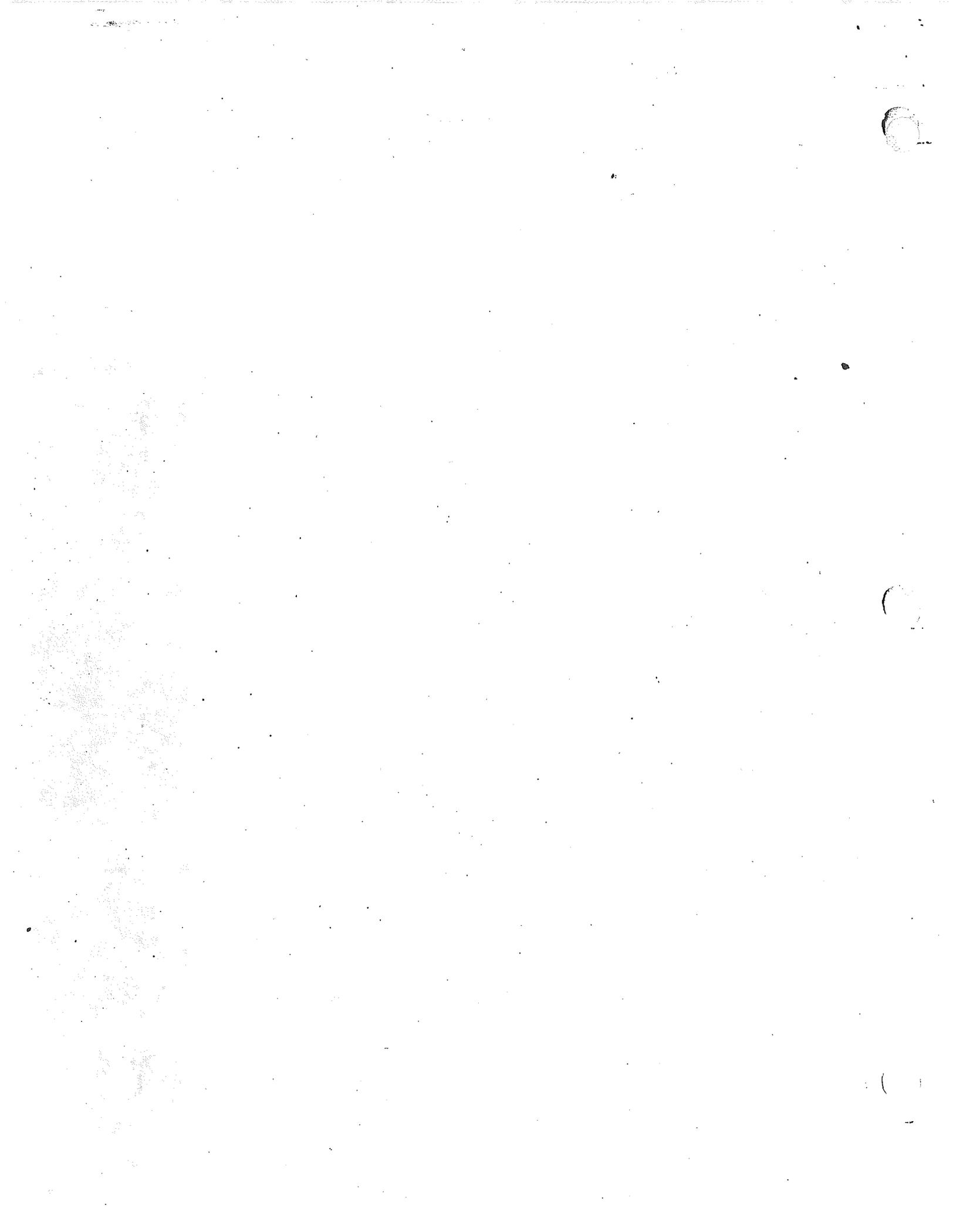
15. PROJECT DESCRIPTION: California Forest Improvement Program (CFIP) is a state funded program which cost shares projects designed to improve the forest resource system including reforestation, fish and wildlife enhancement, and land conservation projects. This supplement to the original EIR 1) makes clean and release practices eligible, 2) clarifies mitigation for archeological resources and threatened and endangered species, 3) expands upon discussions of effects and mitigations, and 4) includes non-substantive editorial revisions.

CLEARINGHOUSE CONTACT: JOHN KEENE 916-445-0613
STATE REVIEW BEGAN: 8-24-89
DEPT REV TO AGENCY: 10-2
AGENCY REV TO SCH: 10-6
SCH COMPLIANCE: 10-9
PLEASE RETURN NOC WITH ALL COMMENTS
Resources
AQD/APCD: All (File Date: 8/26)
FAX TELEPHONE: 916-323-3018

W/C N/C
Resources
Conservation
Fish & Game
Recreation
DWR
Parks & Rec/OHP
NAHC
Coastal Comm
State Lands
ARB
Water Res Cnt Bd
Wtr Qual (ITH)
Wtr Qual (3RD)

W/C N/C
X RWQCB
Trans Planning
Health
Food & Ag
Schools
Coastal Consrv
Coastal Consrv
Tahoe Rgl Plan
OPR

1, 2, 3, 4
5 Sacto, 5 Reddy
6 SLT, 8, 9



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
LAHONTAN REGIONLAKE TAHOE BOULEVARD
P. O. BOX 9428
SOUTH LAKE TAHOE, CALIFORNIA 95731-2428

(916) 544-3481

October 6, 1989

Mr. Jay D. Wickizer
Department of Forestry and
Fire Protection (A-45)
P.O. Box 944246
Sacramento CA 94244-2460

COMMENTS CONCERNING ENVIRONMENTAL IMPACT REPORT TO THE CALIFORNIA
FOREST IMPROVEMENT PROGRAM (CFIP)

Dear Mr. Wickizer:

Thank you for providing us the opportunity to comment on the final Environmental Impact Report for the California Forest Improvement Program (CFIP). We support the concept of the program as the long-term results will be to improve forest resources and water quality. We offer the following comments.

Erosion and Potential Sediment Discharge to Lakes and Streams

The North and South Lahontan Water Quality Control Plans (Basin Plans) prohibit the discharge of sediment, which is considered a waste, to lakes and streams in many of the hydrologic units in the Lahontan Region. The most common cause of sediment discharge to waterbodies is erosion through land disturbance from roads, vegetation removal, and wildfires. Fire can have a large impact on increasing erosion and is not generally a short-term problem. The Milford Fire near Honey Lake, CA is a good example. We support any efforts to rehabilitate areas impacted by wildfires.

While there is discussion of mitigation measures designed to reduce soil erosion, there should be an avenue for pre-project inspections. This inspection should allow the CDF inspector and Regional Water Quality Control Board (Regional Board) staff to provide input on the ground to reduce potential adverse impacts from erosion.

Pesticide Use

Any chemical application, including herbicide use, within the Lahontan Region should be done with awareness of the Regional Board's general surface water standard. This standard prohibits concentrations of pesticides or herbicides in waters of the region greater than the lowest detection procedures available (Attachment 1).

Mr. Jay D. Wickizer

-2-

We appreciate and support the program's intent to include Regional Board staff on review teams for projects which propose to use pesticides and in developing water quality monitoring when warranted. We would further require that if an accidental spill should occur the Regional Board be notified immediately.

Cumulative Impacts

It is not clear whether when evaluating potential cumulative impacts, "past projects" includes only CFIP projects or any past project which may contribute to cumulative impacts. When evaluating potential cumulative impacts, any past project or projects in the foreseeable future which may contribute to cumulative impacts must be included in the analysis.

Regional Board Review

Projects which disturb soil and vegetation have the potential to impact waterbodies. As with timber harvest plans, we believe review of projects under the CFIP is essential in assuring that water quality is protected. Therefore, as is done with timber harvest plans, we believe it is necessary that each proposed project, especially ones which involve class I and II streams, be review by the Regional Board for potential water quality impacts.

Overall we support the California Forest Improvement Program and appreciate your cooperation in the protection of water quality. If you have any questions, please telephone Dr. Ranjit S. Gill or Fred Blatt at the above number.

Sincerely,

HAROLD J. SINGER
EXECUTIVE OFFICER

cc: John Keene, State Clearinghouse
Region 1 and 5

sh

Temperature

Temperature objectives for COLD interstate waters are as specified in the "Water Quality Control Plan for Control of Temperature in The Coastal and Interstate Waters and Enclosed Bays and Estuaries of California" including any revisions thereto. A copy of this plan is included verbatim in the "Special Appendix, Plans and Policies".

In addition, the following temperature objectives apply to surface waters:

The natural receiving water temperature of intrastate waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not create a nuisance or adversely affect beneficial uses.

At no time or place shall the temperature of any WARM water be increased by more than 5°F above natural receiving water temperature. Temperature of COLD water shall not be raised above natural levels.

Toxicity

All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life. Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, bioassays of appropriate duration or other appropriate methods as specified by the Regional Board.

The survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality factors, shall not be less than that for the same water body in areas unaffected by the waste discharge, or when necessary, for other control water that is consistent with the

requirements for "experimental water" as described in Standard Methods for the Examination of Water and Wastewater, latest edition. As a minimum, compliance with this objective as stated in the previous sentence shall be evaluated with a 96-hour bioassay.

In addition, effluent limits based upon acute bioassays of effluents will be prescribed where appropriate, additional numerical receiving water objectives for specific toxicants will be established as sufficient data become available, and source control of toxic substances will be encouraged.

The discharge of wastes shall not cause concentrations of un-ionized ammonia (NH₃) to exceed 0.025 mg/l (as N) in receiving waters.

The summation of concentrations of total identifiable chlorinated hydrocarbons, organophosphates, carbamates, and all other pesticide and herbicide groups, in all waters of the basin, shall not exceed the lowest detectable levels, using the most recent detection procedures available. There shall be no increase in pesticide concentrations found in bottom sediments or aquatic life.

Waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of pesticides in excess of the limiting concentrations set forth in California Administrative Code, Title 17, Chapter 5, Subchapter 1, Group 1, Article 4, Section 7019, Table 4.

Chemical Constituents

Water designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the limits specified in California Administrative Code Title 17, Chapter 5, Subchapter



October 12, 1989

Mr. Jay Wickizer
California Department of Forestry
P.O. Box 944246
Sacramento, Ca 94244

Dear Mr. Wickizer:

I would like to comment on your August 24 request for comments on the Supplement to the final EIR to the California Forest Improvement Program.

My comments are specifically aimed at the manner in which the Supplement deals with the use of pesticides. Pesticides are a critically important tool in the establishment of successful plantations, and their use needs to be accurately addressed in any report claiming to assess environmental impacts.

To begin, under Section IV, D,4 of the report (page 89) it is stated that the use of pesticides "will result in some air pollution due to drift". While this statement is technically accurate it should be qualified by some sort of descriptive terminology. This statement when taken out of the context of the report sounds ominous given the hysteria surrounding pesticides today. I would suggest modifying this statement to simply state that pesticides "may result in a minimal level of air pollution due to the possibility of drift".

Continuing on that page of the report under IV, D,5 the report goes on to state that "vegetation and fauna killed by pesticides will be irretrievably lost". Aside from the outright mortality of pocket gophers due to an under_ground baiting program I cannot conceive any situation in which any fauna should be killed by the application of forest pesticides. If this section is speaking of the application of insecticides it should address them as a separate issue and state that some insects will die. This section as written is inflammatory and, again, if taken out of context sounds ominous.

Page 110 under V,C,8 (paragraph 3 of that page) stated that field "workers shall not enter treated areas before pesticide sprays have dried....". This is an inaccurate statement since most of pesticide applications being made will be done using back-pack sprays which necessitate that workers be on the ground while vegetation is still wet. This statement should be deleted from the report.

Finally, I believe the report should state somewhere that vegetation manipulation^{to} conifer establishment is in general conducive to many wildlife species (deer, etc) and that in most cases mitigation measures will not be necessary to insure that regrowth of brush species should be a cause for concern. It has been well documented through numerous studies and many years of hands-on experience that it is virtually impossible to eliminate 100% of browse plants from a plantation area no matter what the level of manipulation. Converting a dense, old growth brush field to conifers is beneficial for deer no matter how many brush seedlings are found during the first year of conifer establishment. Long, frustrating years of experience tells us they will be back, regardless of whether we 100% spray at least once or not.

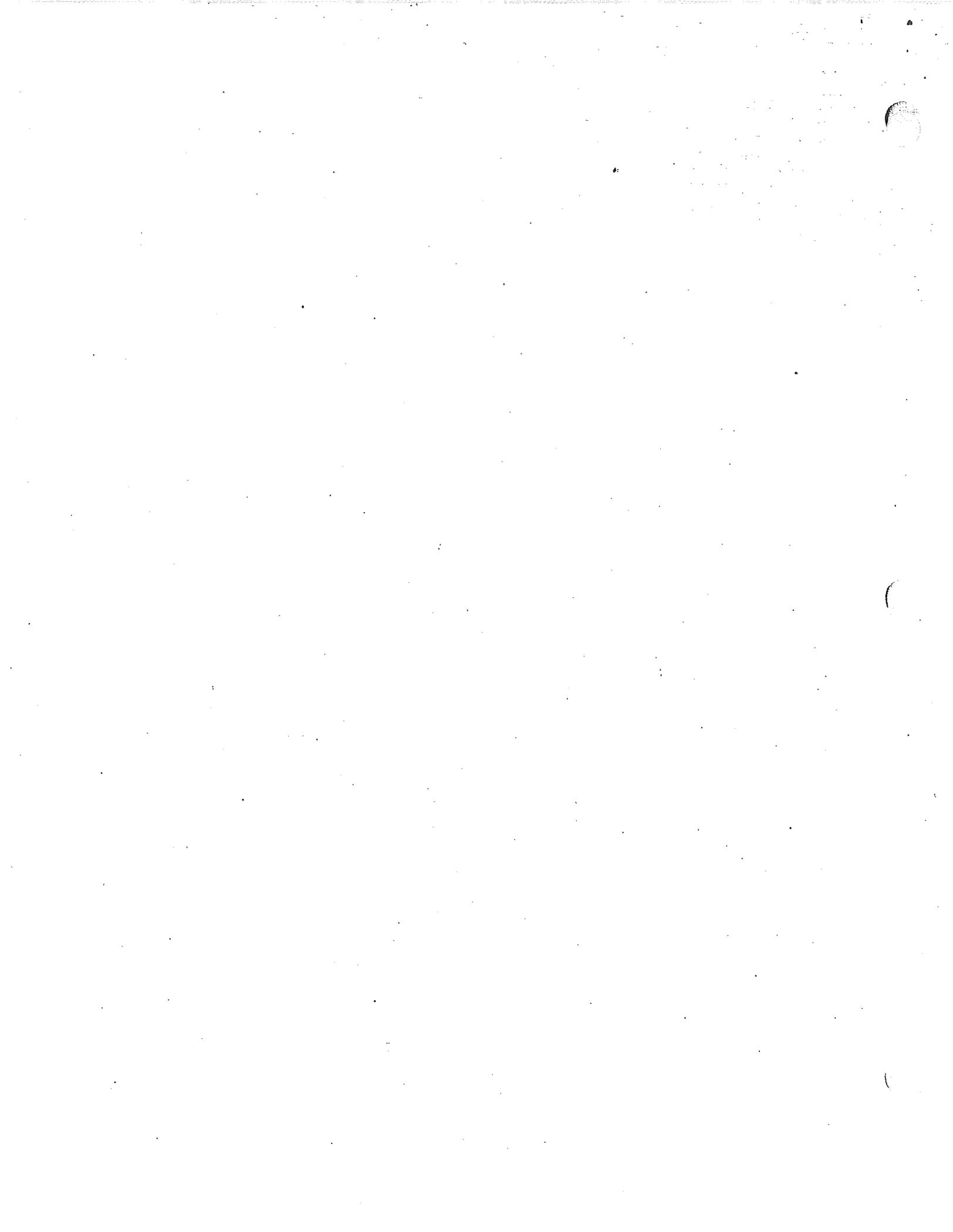
This by the way has become a particularly sensitive issue in the Southern District of late where over zealous Department of Fish and Game biologists ^{have} demanded restricted spray areas on numerous CF, IP reforestation projects. These requirements leave severely impacted the success of most of these projects and have made many foresters in this area wonder why the State seems eager to fund projects that ^{leave} built-in, mandatory self-destruct mechanisms. Some effort needs to be made to educate both CDF and DFG personnel on the necessity of good, large scale vegetation control in conifer establishment.

Mr. Jay Wickizer
Page Three

Thank you for the opportunity to comment on the
supplement.

Sincerely,


Christopher J. Conrad
Registered Professional
Forester No. 1796



**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
LOS ANGELES REGION**

101 Centre Plaza Drive
Monterey Park, California 91754-2156
(213) 266-7500



September 28, 1989

File: 700.200

Doug Wickizer
California Department of Forestry
and Fire Protection
1416 Ninth Street
Sacramento, CA 95814

**SUPPLEMENT TO FINAL EIR, CALIFORNIA FOREST IMPROVEMENT PROGRAM.
SCH #89082117: CALIF. DEPT. OF FORESTRY AND FIRE PROTECTION**

We have reviewed the subject document regarding the proposed project, and have the following comments:

Based on the information provided, we recommend the following:

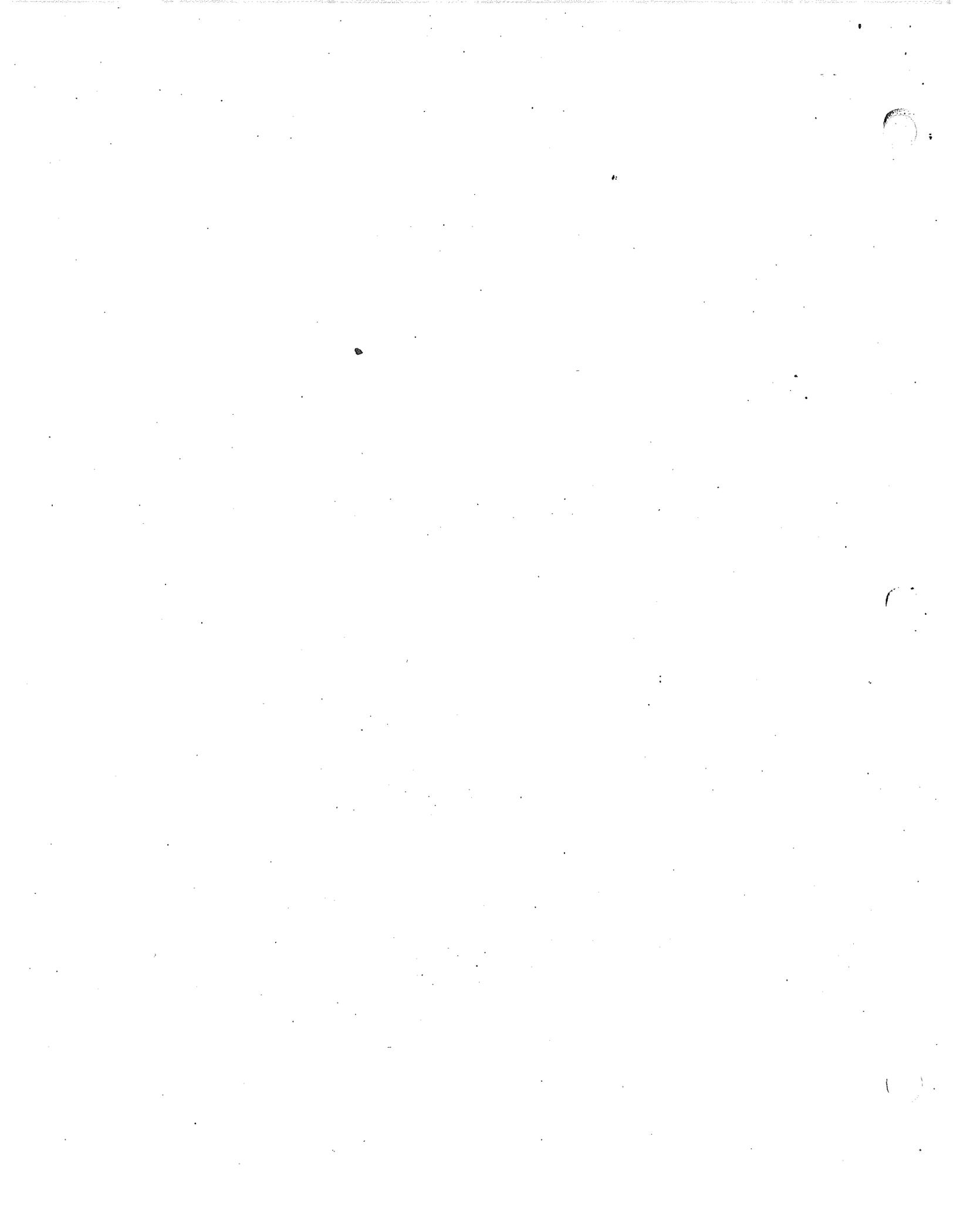
- We have no further comments at this time.
- The proposed project should address the attached comments.

Thank you for this opportunity to review your document. If you have any questions, please contact Eugene C. Ramstedt at (213) 266-7553.

A handwritten signature in cursive script that reads "John L. Lewis".

JOHN L. LEWIS, Unit Chief
Technical Support Unit

cc: Garrett Ashley, State Clearinghouse



APPENDIX J

RESPONSES TO WRITTEN COMMENTS ON THE CALIFORNIA FOREST
IMPROVEMENT PROGRAM ENVIRONMENTAL IMPACT REPORT

USDA, Soil Conservation Service

1. A reference to Wildlife Habitat Relationships System has been incorporated into the the document (Section II, E., 3).
2. The reasons for fencing are "to protect key wet areas and other key wildlife areas from livestock" (14 CCR 1527, b.6). Needs will vary according to site conditions, local wildlife populations, and landowner objectives, and projects will be approved upon consultation with the Department of Fish and Game. However, we have added language that identifies some potential objectives of fencing (see Section V, C., 6). We agree that fence design should be flexible, and have added language to clarify this (section V, C., 6).
3. The list of persons consulted has been changed to distinguish between contacts for the current EIR and the original EIR (Appendix F). Commenting individuals will be identified by including copies of comments with the final document.

* * * * *

Lahontan Regional Water Quality Control Board

Re: Erosion and potential sediment discharge to lakes and streams.

The regional water quality control board is one of several agencies explicitly identified in CDF's program procedures manual which are notified of all CFIP projects. Language has been added to this document explaining the review process (Section V, A.). CDF will cooperate fully with regional water quality control boards. Water quality control board staff may accompany CDF inspectors on pre-project inspections upon request and with the agreement of the landowner.

Re: Pesticide use

The document states that the pesticide applicator is responsible for knowing all state, federal, and local laws pertaining to pesticide use (see Sections V, B., 2 and V, C. 8, and the Appendix). This would include standards adopted as part of regional basin plans which have been approved by the State Water Quality Control Board.

Lahontan Regional Water Quality Control Board, cont'd

Appendix H, which will be attached to all projects with funded pesticide use, includes language directing the applicant to inform the regional water quality board in case of spills.

Re: Cumulative impacts

The chapter on cumulative impacts includes a section entitled "CFIP projects and other projects" (IV, C., 3) which discusses cumulative effects of CFIP projects "combined with effects of other projects in the area". This language identifies the need to consider non-CFIP activities.

Re: Regional board review

CFIP requires that all streams be identified. A description of the project area, map, and management plan are sent to commenting agencies which include, as specified in the CFIP Procedures Manual, regional water quality control boards. A sentence to this effect has been added to the document (Section V, A.).

* * * * *

Christopher Conrad, Registered Professional Forester

Re: Benefits of vegetation manipulation on wildlife

The document identifies potential benefits to wildlife. It begins by saying that program effects "depend on the condition and vegetation of the site before treatment", and on "the age of brush with respect to its forage quality" and "on the density with respect to access and escape cover" (Section IV, A., 6). It then says that during thinning "low growing vegetation...is usually enhanced which is mostly desirable for wildlife" (Section IV, B., 2) and that "the increase in herbaceous forage that often accompanies brush clearing and conifer stand thinning, as well as new brush growth that follows brush control increases available forage for many wildlife species" (Section V, B., 5).

Re: Worker entry in pesticide treated areas

Workers may include other persons in addition to pesticide applicators. The statement regarding worker entry into areas treated with pesticides has been changed to clarify worker safety concerns (Section V, C., 8).

Christopher J. Conrad, RPF cont'd

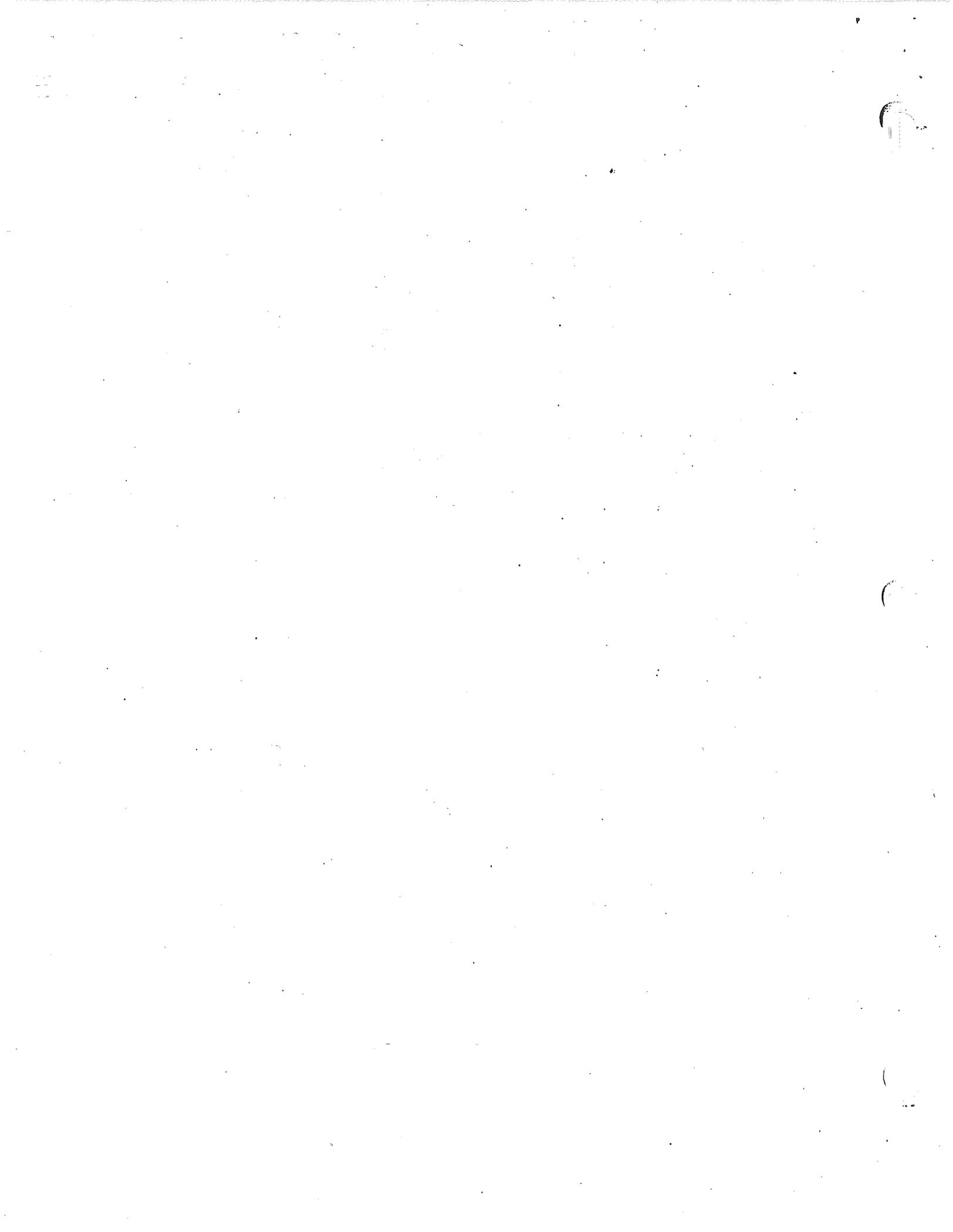
Re: Pesticides and air pollution

We are in agreement that some drift will occur under any spraying operation. However, we agree with you that under proper application, these will not cause significant impacts to air quality. Therefore a sentence at the beginning of the section on "Adverse effects which cannot be mitigated" (Section IV, D.) has been added which clarifies that these effects will not reach significance or will be mitigated to less than significant levels.

Re: Animal losses from pesticides

We agree that animal losses from herbicide applications will not occur except from gross misapplication or accidents. However, sections on pesticides are directed to all pesticides, including herbicides, rodenticides and insecticides. Therefore there will be losses of insects or mammals, although they will not constitute significant effects. A sentence at the beginning of the section on "Adverse effects which cannot be mitigated" (Section IV, D.) has been added which clarifies that these effects will not reach significance or will be mitigated to less than significant levels.

* * * * *



NOTICE OF DETERMINATION

TO: Office of Planning and Research
1400 Tenth Street, Room 121
Sacramento, CA 95814

FROM: Department of Forestry
and Fire Protection

SUBJECT: Filing of Notice of Determination in compliance with
Section 21108 or 21152 of the Public Resources Code.

California Forest Improvement Program

Project Title

79050318

Jay D. Wickizer

(916) 322-0128

State Clearinghouse Number Contact Person Area Code/Number/Extension

Project Description: The California Forest Improvement Program is a statewide, state funded program which cost shares projects designed to improve forest resource systems, including reforestation and timberstand improvement projects, fish and wildlife enhancement projects, and land conservation projects. Non-industrial forest landowners with 20 to 5,000 acres are eligible.

Potential adverse effects include changes in vegetation, impacts to wildlife habitat, soil erosion, water quality degradation, air quality impacts, loss of threatened and endangered species, and disturbance of archeological sites.

Regulations include Resource Protection Guidelines which provide standard mitigations for protecting wildlife, lakes and streams, meadows and wet areas; for preventing soil erosion; for use of pesticides; and for protecting other resources. Additional mitigations have been incorporated into the document to address concerns about wildlife impacts from thinning and clean and release practices; water quality impacts from pesticide use; impacts to archeological resources; and damage to rare, threatened, and endangered plant and animal species

An environmental checklist which includes will be used to identify potential effects and mitigations, and this will become part of the project contract. Additional mitigations for project impacts concerns expressed by commenting agencies will be incorporated into the project description and management plan. All environmental effects will be mitigated.

This is to advise that the Department of Forestry and Fire Protection
(Lead Agency or Responsible Agency)
has approved the above described project on February 1, 1990 and has made the following determinations regarding the above described project:

1. The project will not have a significant effect on the environment.
2. An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.

FILED AND POSTED BY

JUN 12 1990

GOVERNOR'S OFFICE OF

3. Mitigation measures were made a condition of the approval of the project.
4. A statement of Overriding Considerations was not adopted for this project.

This is to certify that the final EIR with comments and responses and record of project approval is available to the General Public at:

California Department of Forestry and Fire Protection, 1416 Ninth Street, P. O. Box 944246, Sacramento, CA 94244-2460.

Date Received for Filing and Posting at OPR June 12, 1990.

Signature (Public Agency)

Deputy Director for
Resource Management
Title

