

FINAL

ENVIRONMENTAL IMPACT REPORT

FOR

PROPOSED ADMINISTRATIVE REGULATIONS FOR THE

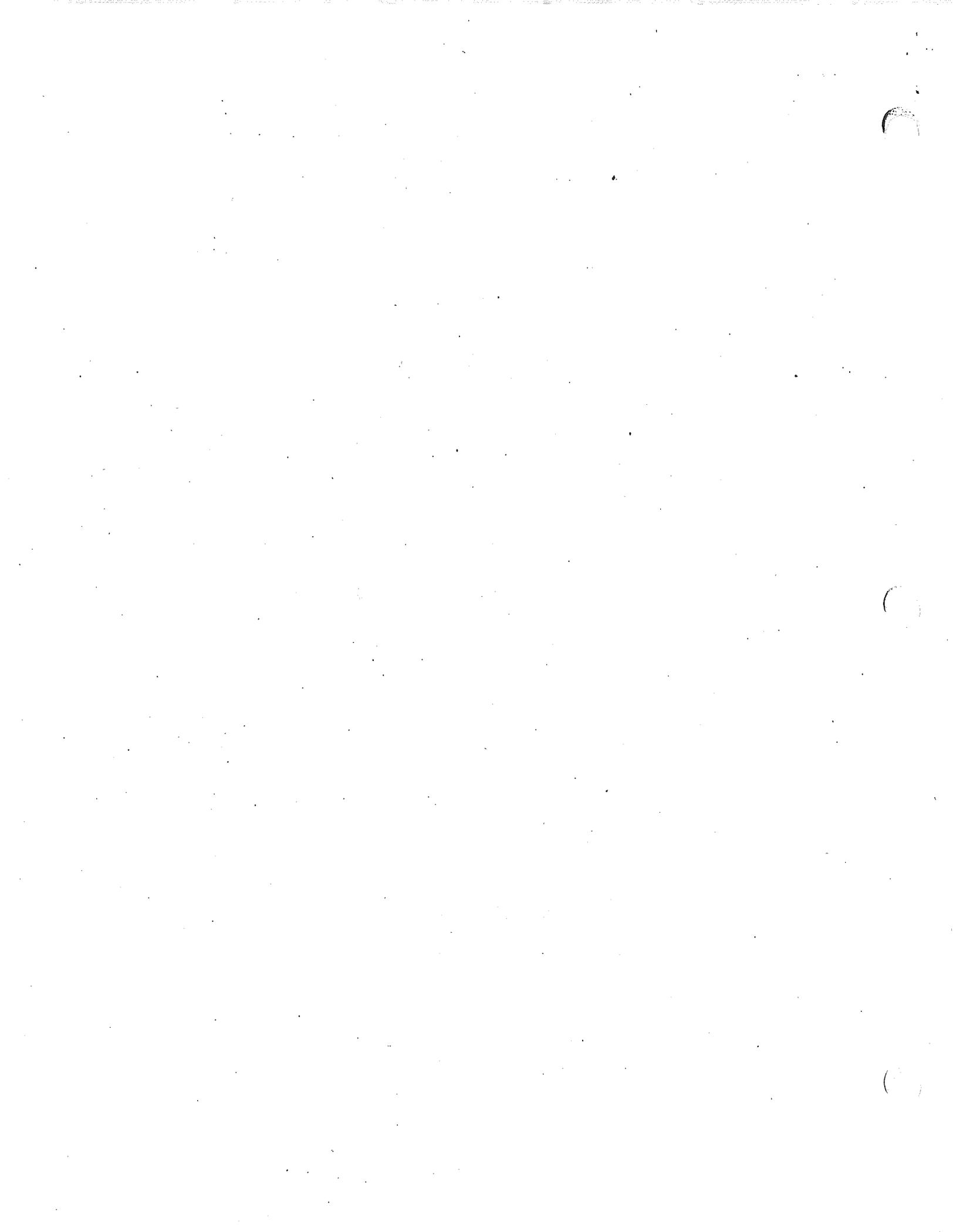
CALIFORNIA FOREST IMPROVEMENT PROGRAM

TO BE ADOPTED BY THE DIRECTOR OF FORESTRY

AND

APPROVED BY THE BOARD OF FORESTRY

JUNE, 1979



FINAL EIR

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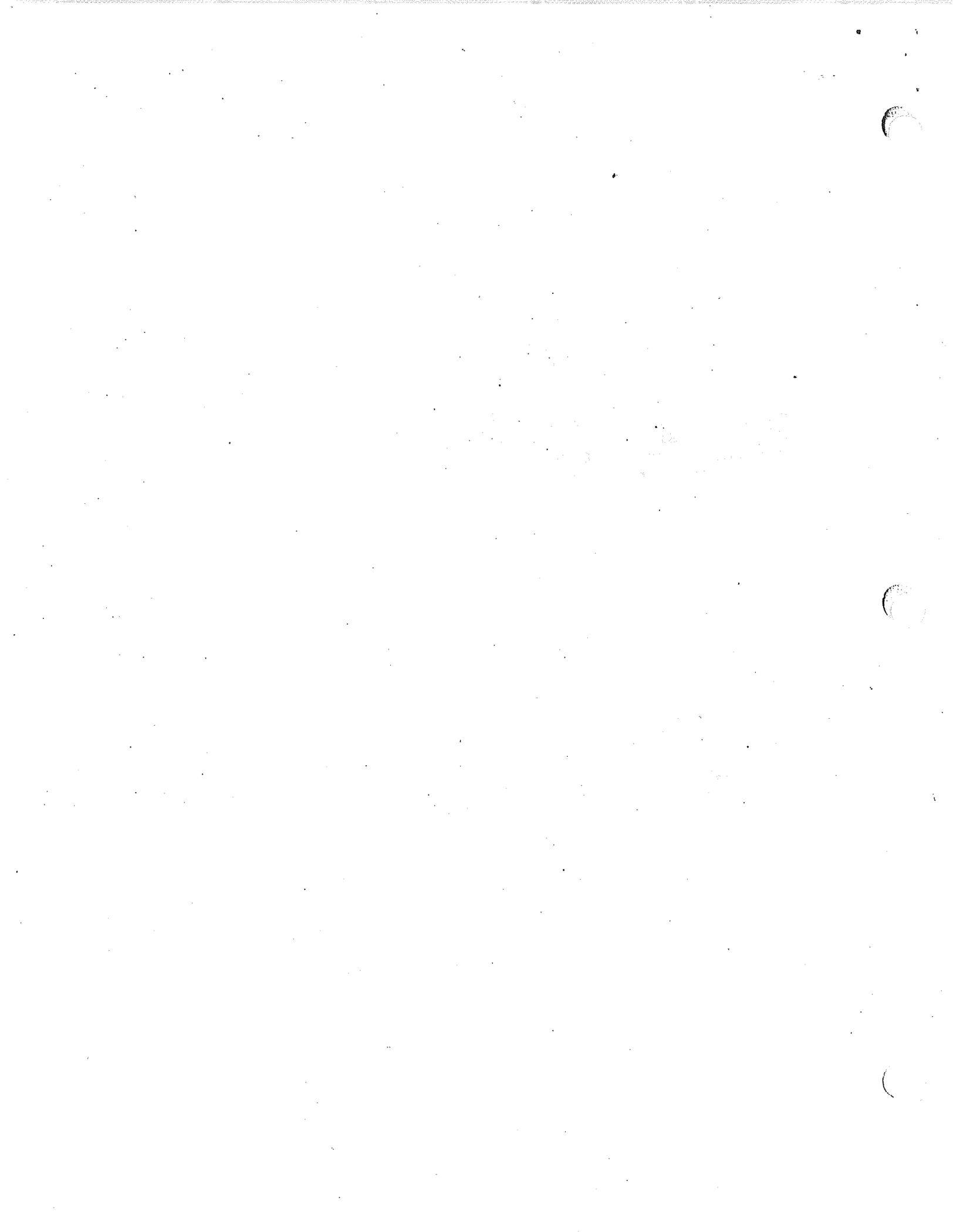
Comments and replies received on Draft EIR

California Forest Protective Association . . . . .	a
California Regional Water Quality Control Board North Coast Region . . . . .	b
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Pages 11, 40, 50, 51, 52, 87, and Sections 1526.1, 1545(b), 1545.1(a)  
(of Appendix A) were revised.

Typographical errors were corrected throughout.



# CALIFORNIA FOREST PROTECTIVE ASSOCIATION



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May 11, 1979

MAY 15 1979

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Mr. Audley C. Davidson  
Department of Forestry  
State of California, Resources Agency  
1416 Ninth Street  
Sacramento, California 95814

Dear Audley:

I have reviewed your Draft Environmental Impact Report for the proposed Administrative Regulations for the California Forest Improvement Program. Naturally, I think that it is loaded with legalistic and bureaucratic considerations that don't help to grow trees, but I suppose that is part of the game so I will not comment further on that.

p. 30. Last line in text should say (see Table 6) and in Table 6 the reference for Productive forest should read (see Table 7) and for Unproductive forest (see Table 8).

pp. 32 and 76. Acreage of private commercial forest. You quote Bolsinger as saying there are 40 million acres of forest, and then in Tables 6 and 7 you delineate the productive forest as 17.9 million acres. In the footnote you define "commercial forest land," but you do not point out the difference. Bolsinger clarifies that while the "productive" category includes lands capable of growing 20 cubic feet per acre per year, it also includes productive areas that are withdrawn from timber utilization, such as parks and Wilderness areas. Most of this is in federal ownerships. He distributes the commercial forest land as follows:

	M acres
National Forest	8,168
BLM	239
BIA*	114
Other federal	40
State	79
County and Municipal	27
Farmer	1,646
Industrial and other private	5,986
<b>TOTAL</b>	<b>16,299</b>

\*Legally, BIA lands are privately owned

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**"KEEP CALIFORNIA GREEN" BE CAREFUL WITH FIRES**

Mr. Audley C. Davidson  
Department of Forestry  
May 11, 1979  
Page Two

Thus, there are only 7.6 million acres of privately owned commercial forest. (There are only 5.69 million acres in Timberland Preserve Zone.)

Let me further break down this acreage of commercial forest lands in private ownership, to present my concept of acreage in holdings of less than 5,000 acres. Some of the acreages listed as Tree Farms may be out of date. My analysis of TPZ acreages is not complete; the major deficiencies are for Mendocino and Siskiyou Counties.

The information that I have shows the known acreage in holdings of more than 5,000 acres to be 4,518,082. The detail on the separate enclosed sheet includes some information that was provided to us with the expectation that it would not be disclosed. I have sent it along to complete the picture for you. Would you please destroy the listing?

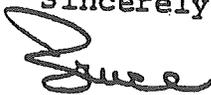
Thus, of the 7.6 million acres of private commercial forest, I have information that says at least 4.5 million acres are in holdings larger than 5,000 acres. Thus, there is at the most 3.1 million acres in holdings of less than 5,000 acres. Further, I believe that most of the larger holdings are in TPZ; if that is the case, there can only be 1.2 million TPZ acres in tracts of less than 5,000 acres.

pp. 53 and 76. We think that it is inappropriate to write off the use of 2-4-5-T so blithely. We believe that there should be a provision that 2-4-5-T be allowed when it is approved for use by EPA. I'm as cynical as you about this happening, but I believe that we should think positively and not condemn the prisoner until he is proved guilty.

p. 76 D. second paragraph. In the second sentence: perhaps you have more information that I do, but I wouldn't make the flat-footed statement that "large owners own more high site lands." It is true, they own more lands, and probably they own more of the high site lands, but I'd hesitate about making an across-the-board statement.

In my copy of the draft (#79050118-A) I have marked typographical and spelling errors, too. If you'd like my copy, I will drop it by your office.

Sincerely yours,

  
Bruce J. Bayless, Director  
Economics and Taxation

BJB:eo  
Enclosure

DEPARTMENT OF FORESTRY  
NINTH STREET  
SACRAMENTO, CALIFORNIA 95814



June 12, 1979  
L2

Mr. Bruce J. Bayless  
California Forest Protective Association  
1127 11th Street, Suite 534  
Sacramento, CA 95814

Dear Mr. Bayless:

Thank you for your comments on the Proposed Administrative Regulations for the California Forest Improvement Program (Draft EIR). Our comments are keyed to your letter as follows:

- (1) No comment necessary.
- (2) Corrections made in Final EIR.
- (3) Thank you for the land ownership data. Your data is incorporated by reference.
- (4) The use of 2,4,5-T was not "written off." The regulations provide for a re-evaluation of the use of 2,4,5-T in 1982.
- (5) This was a simplified statement based on the data of Table 7. You are correct, a "probably" or two should have been inserted.

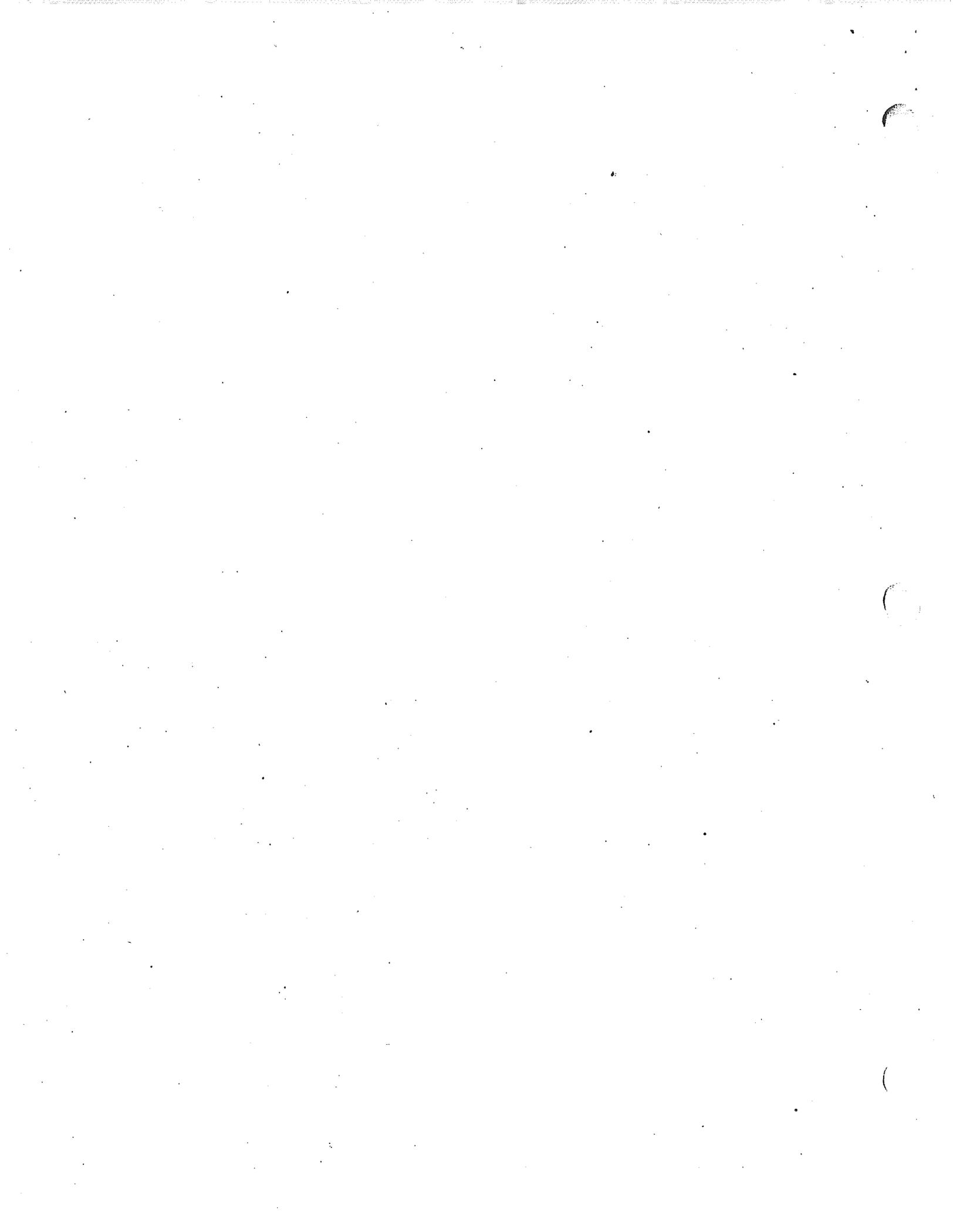
Sincerely,

Geoffrey H. Snow, Chief  
Legislation, Planning and  
Legal Affairs

By

*Paul Cox*  
Paul Cox  
Program Development and  
Environmental Officer

sd



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—  
NORTH COAST REGION

1000 CODDINGTON CENTER  
SANTA ROSA, CALIFORNIA 95401  
Phone: 707—545-2620



May 8, 1979

Mr. Audley Davidson  
Department of Forestry  
1416 - 9th Street, #1521  
Sacramento, California 95814

Dear Mr. Davidson:

Evaluation of the Draft E.I.R. and Regulations on  
the Forest Improvement Program

An evaluation of the drafts indicates that there are a few items needing clarification. The following evaluation considers the regulations and the E.I.R. separately.

A. Review of Draft Regulations on Forest Improvement Programs

Page 10 - definition of a stream: Much of the land involved in this program is cut-over and many of the streams have been radically altered from poor logging practices of the past. Because of this, watercourses are not always in their "natural" state but have been altered (re-channeled, buried or otherwise changed). The current definition should be amended to read: 'stream' means a perennial or intermittent watercourse...'

Page 13 - definition of wet meadows, marshes and other wet areas: Again, much of the areas involved in this project will be cut-over. In such situations, wet areas or marshes exist and should be either protected for the habitat which they support or have activities restricted on them due to their unstable nature and susceptibility to sediment generation. Therefore, if cut-over areas are to be excepted under this definition, another definition or mitigation is essential to cover these areas.

Page 22, Section 1532.1. The Director should provide public review similar to the requirement for timber harvest plan review which requires the Director to transmit a copy to the appropriate regional water quality control board and others.

Page 23, Section 1532.2. There should be some inducement for inter-agency review, including inter-agency field review if necessary. Geologic review by the Division of Mines and Geology staff may be necessary in some circumstances.

Page 31, Section 1545(a). This should be amended to read "...except when managed as part of a fish and wildlife habitat improvement practice and necessary mitigation measures to minimize damage from improvement practices have been imposed".

Page 31, Section 1545(b). This should be amended to read "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 except when this practice conflicts with safety needs. Participants are encouraged to leave all snags undisturbed provided that this does not conflict with safety needs. Conflicts with program goals should be resolved with inter-agency consultation to ensure that water quality impacts and wildlife habitat losses are mitigated as much as possible.

Page 32, Section 1545(e). This should be amended to read "If existing vegetation other than riparian is necessary to maintain stream temperature, prevent light-induced changes in stream biology, prevent sediment discharge or other water quality impacts, such vegetation shall not be removed".

Page 32, Section 1545.1(a). The last line in this section should be amended to read "Accidental deposits will be removed as soon as is possible".

Page 33, Section 1545.2. This should be amended to read "...such activities are forest land conservation practices or fish and wildlife habitat improvement practices and necessary mitigation measures to minimize damage from these practices have been imposed".

Page 33, Section 1545.3(a). This should be amended to read "Brush scalped with a bulldozer off slopes may be windrowed along the contour and disposed of by burning if residual material on the contour does not produce concentrated water flows".

Page 34, Section 1545.5. This section should be amended to read "Chemicals used for site preparation and follow-up work shall be applied in accordance with all federal, state, and local laws and regulations. No individual pesticide or combination of pesticides shall be discharged to waters that adversely affect beneficial uses".

B. Review of the E.I.R. (Pages Reference the April, 1979 Draft)

Page 7, Item (3): Use of burning as a "necessary" tool is overstated here and elsewhere. Use of dessicants is often unnecessary. Dioxin containing herbicides could release these contaminants to the air if burned, as well as being themselves converted to polychlorinated dibenzo dioxins upon burning.

Page 8, Item (6): Rodenticides and other pesticides may cause water quality problems but this is not indicated here or elsewhere.

Page 9, Item (D) (1): No mention is made of sediment removal behind log jams, which could be necessary to reduce water quality impacts.

Page 10, Item (E): Mention is made of fords to replace poor live stream culvert or bridge crossings but no indication is given here or elsewhere when fords are preferred to culverts or bridges nor is mention made of water quality impacts associated with their use.

Page 11, Paragraph 2: When is it necessary for an RPF to have an engineering plan? 14

Page 36: FIP practices have impacts on the fishery which could also be tabulated. In particular, the introduction into water of rodenticides, herbicides, and other pesticides can impair the fishery. Temperature, light, and other changes can impair the habitat. Also, under what conditions would woodpecker habitat be favored? 15

Page 42, Item (A) (1): It is indicated that parcels are small, yet nowhere is the size limitation (20 acres to 5,000 acres is a considerable range). Some 20 acre plans can induce severe water quality impacts. In line with this, it is possible that a large number of small landowners in a region may become involved in this program and capitalize on the opportunities because of the economics of scale. If so, will there be any provision for administrative control of such cumulative effects? 16

Page 44, Item (2): This section seems to be given cursory treatment. Herbicide and other pesticide impacts are very real and need some attention. Impacts from fire are not as "short-term" as implied. Increased erosion caused by destruction of the vegetative cover and associated runoff increases can result in stream aggradation and long-term effects. Erman et. al., 1977 (in "Evaluation of Streamside Buffer Strips for Protecting Aquatic Organisms" by U.C.) indicated effects on invertebrate community patterns 10 years after logging. Studies on Oregon soils in the cascades show that non-wetability of the soil continues for several years resulting in decreased infiltration and increased surface runoff and erosion (Cramer, O.P. 1974. Environmental Effects of Forest Residues Management in the Pacific Northwest, PNW-24). Further, the process of mineralization of soil surface is accelerated for several years after burning. Changes in pH from burning in draws can also degrade water quality. 17

Removal of streamside vegetation causes effects other than solely raising water temperature. Light induced effects decrease the dissolved oxygen content of the water. Photo-stimulated algal growths can cause taste and odor problems as well as further lowering the dissolved oxygen content. Mats of algae aid retention of fine soil sediments in stream gravels and retard washing of gravels by normal flows.

Page 48, Item (9): The other adverse effects (scouring, fouling of water supplies, etc) should be discussed in greater detail.

Page 48, Item (10): Clearing streamside brush to improve access for recreation can result in channel damage, deposition of rubbish, and contamination by livestock wastes to the detriment of downstream water uses.

Page 49, Item IC (A): The regulations do not require, nor does the E.I.R. include, a mechanism for inter-agency review. 15

Page 50, Paragraph 3: Unusually severe effects or circumstances (as in check list) should be explained. That is, some idea of normally severe effects need to be presented. Slopes above 30%, Hely soils, Larabee soils, Yorkville soils, Atwell soils, Masterson soils, and other situations encountered in the North Coast are extreme conditions which, although perhaps common in particular locations, are unusually severe for the region and should require extensive evaluation.

Some effects are not unusually severe and are contained in this program E.I.R. If so, it appears they will not be addressed in a site specific way and therefore site specific mitigation of the effects would not be developed. It is essential that mitigation be developed which is appropriate for each site.

Page 52-53: Pesticides use can result in severe water quality impacts. Silvicultural usages are being addressed in the 208 process and it is hoped that Forest Improvement Program guidelines will be in accordance with the 208 developments. These projects appear to be oriented to high use of pesticides. Therefore, more is needed to mitigate the potential effects than the current rules and regulations (particularly since the adequacy of the DF&A program as a functional equivalent of an E.I.R. process is currently being challenged). 20

Page 53-54 (5): Who will perform the analysis of risk for determining equipment operations on slide areas? Our experience with timber harvesting plans indicates that a significant number of plans are submitted which fail to note areas of ancient landslides, especially areas which are covered with dense brush. It is reasonable to assume that similar circumstances would develop in plans developed for your program. It is essential that a geologist determine the risk of operating equipment in these areas. 21

Page 56, Paragraph 2. Erman, et. al., indicated strips less than 30 meters are probably inadequate for protecting stream biota. Considering the expected level of disturbance for these projects, a 30 meter standard buffer strip width is more consistent with the objectives stated on Page 1. 22

Page 56, Paragraph 3: Hand clearing should not be rejected out-of-hand. This method may have special applications in areas where the local work force is underemployed, where an interface with the CETA program is possible, and/or where severe erosion could be expected from mechanical site preparation. This method may be environmentally effective or acceptable, for example, in stream protection zones.

May 8, 1979

- 5 -

Page 55-58: Water quality should be addressed.

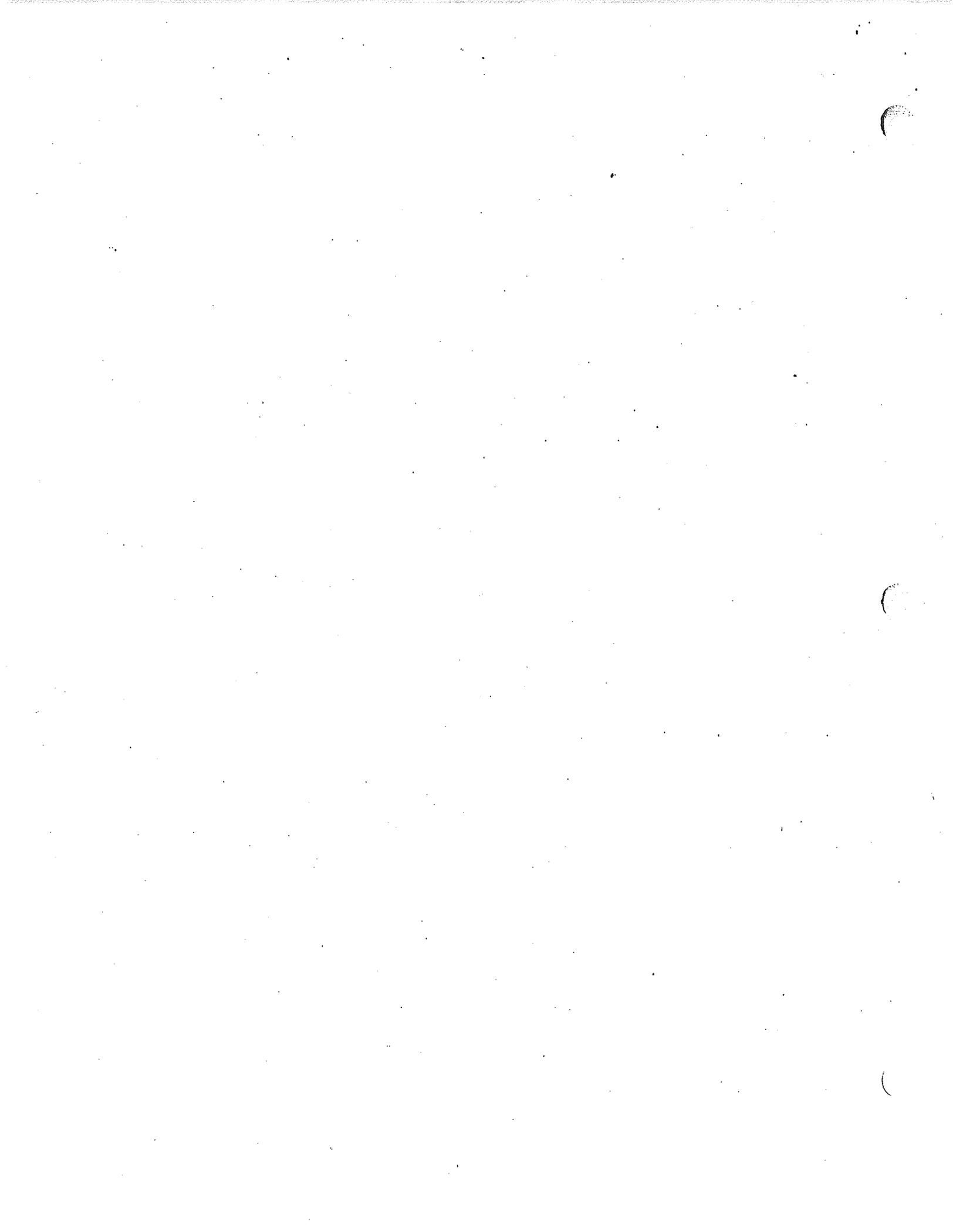
Page 70 (G): Will the engineering requirement for a specific culvert diameter encourage use of undersized culverts? Would a given storm flow/recurrence interval criteria for engineering be more desirable?

Page 60, Paragraph 1: It is inconsistent to rely upon brush development as an effective erosion control measure when numerous techniques are planned to specifically arrest and retard brush development. What is the basis for the statement that runoff and erosion will be reduced to "insignificant levels" by the second wet season?

In general, the necessity for burning as part of this program appears to be over-emphasized. Also, it is unclear what activities will be permitted within the stream protection zones.

Sincerely,

Craig R. Johnson  
Senior WRC Engineer



# Memorandum

To : Mr. Craig R. Johnson  
Senior WRC Engineer  
California Regional Water Quality Control Board  
North Coast Region

Date : June 12, 1979  
L2

From : Department of Forestry

Subject: 0900 ENVIRONMENTAL PROTECTION  
Proposed Administrative Regulations for the  
California Forest Improvement Program (Draft EIR)  
SCH #79050318A

Thank you for your comments on the Proposed Administrative Regulations for the California Forest Improvement Program (Draft EIR). Our comments are keyed to your letter as follows:

- (1) The definition of stream (1526.1) has been changed to reflect your concerns and those of the Department of Fish and Game. "Natural" was used to eliminate man-made ditches, flumes, etc., and not to exclude previously disturbed water courses.
- (2) Any conflict in these definitions will be minimal, and will be revealed and mitigated in the environmental analysis and plans. In addition 1545(a) provides protection.
- (3) Review is provided in those cases where necessary or appropriate (1532.1).
- (4) RPS's, the landowner applicant, and CDF review should recognize when additional expertise is necessary. It will be required where appropriate.
- (5) Regulations have been amended to reflect this change.
- (6) Exclusion of equipment will mitigate water impacts. Any removal of riparian vegetation will be mitigated by replanting.
- (7) Section 1545.1 amended to read "immediately."
- (8) Regulations have been amended to reflect this change.
- (9) Contour windrowing was designed to mitigate water quality from land clearing. In any cases where such mitigation would not occur, or damage to the soil would occur, windrowing will not be allowed.

- (10) This is in Section 1545.3.
- (11) The use of certain management tools such as prescribed burning or dessication will be proposed by the applicant or the RPF and reviewed by CDF. Herbicides containing dioxins are prohibited.
- (12) Agree. The intent was to show that all pesticides can cause problems if not handled properly.
- (13) Site specific analysis of each project will identify problems with releasing sediment built up behind log jams, or in construction of fords. Regulations provide for the Water Quality Board and Department of Fish and Game involvement in site specific analysis.
- (14) When the site specific analysis so indicates, or where required by county ordinance.
- (15) Agree. By the planting of trees that in time will be habitat.
- (16) The chance of a large number of contiguous owners participating in this program is remote except in the case of a large substantially damaged area where reforestation and other eligible work improves the situation by restoring the area to it's original condition.
- (17) We agree these effects can occur. Incorporated by reference in the Final EIR.
- (18) Sections 1532.1 and 1532.2 explicitly provide for project-by-project review by state agencies having jurisdiction over any possible environmental effects of proposed projects. CFIP anticipates that the Water Quality Control Board, like other concerned agencies, will be involved in this process. Page 50, line 1, has been amended to reflect this.
- (19) We agree that some soils in certain parts of the state on steep slopes pose problems. The environmental checklist, applied to all projects and completed by a RPF and certified by CDF with other state agencies such as the Water Quality Control Board in the review process, has been designed to identify and provide mitigation for these problems.
- (20) We do not believe pesticide use will be excessive. The regulations will be amended to incorporate future 208 and Department of Food and Agriculture requirements.

June 12, 1979

(21) See comment (4).

(22) Stream buffer strips up to 30 meters may be required in some cases. The environmental analysis and project review should provide protection in these cases.

(23) We agree that hand clearing can be an effective site preparation technique. Hand clearing is required within stream and lake protection zones. We have coordinated with EDD and CETA with regard to employment problems.

(24) "Erosion" was meant to imply water quality. The principal effect on water quality is from sediment.

(25) Fish and Game Code 1600 requirements should prevent this from occurring.

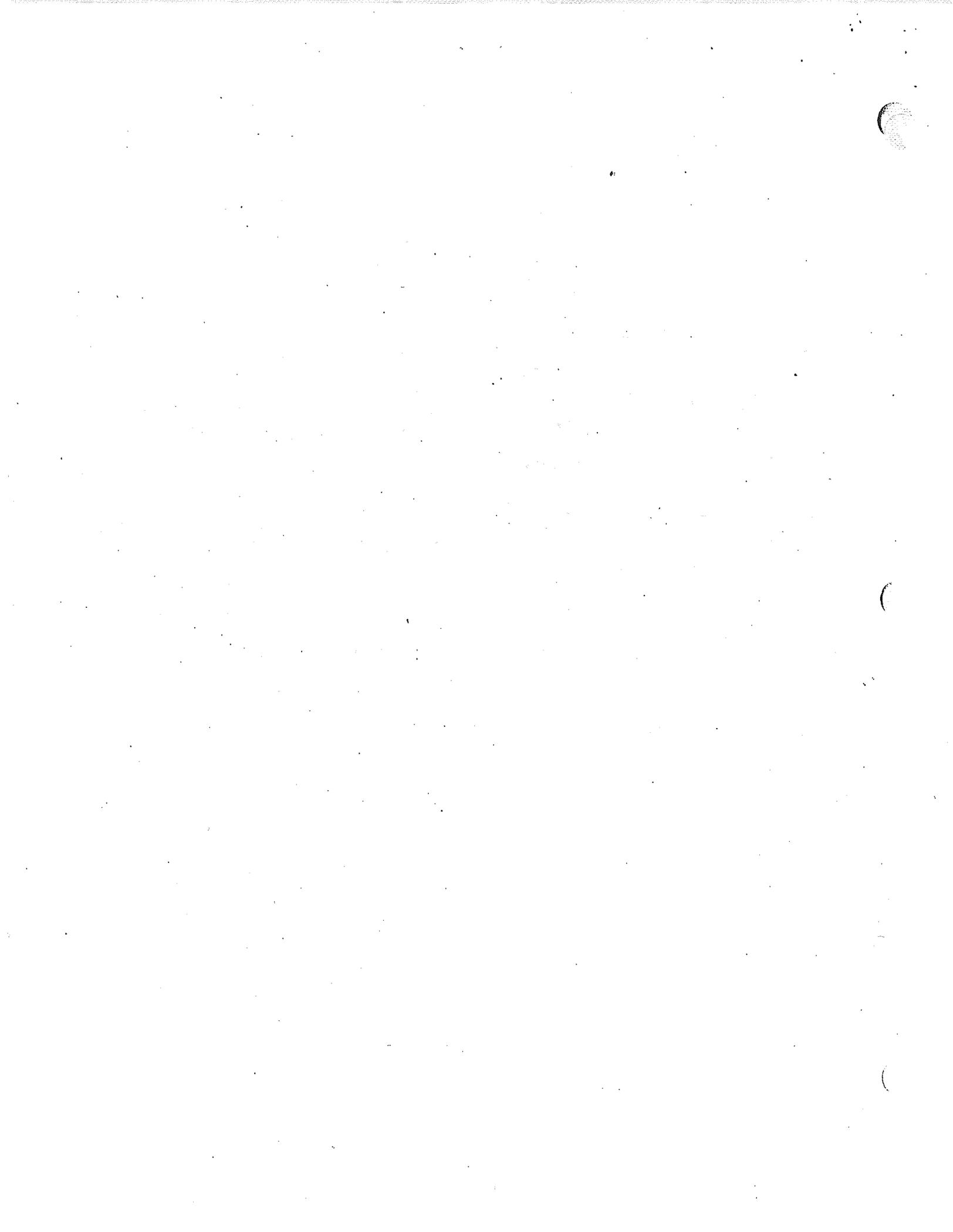
(26) The statement was for general statewide conditions. If not true for certain projects along the north coast or elsewhere, the environmental analysis should identify and mitigate any unusually severe effects.

(27) See response to comment (11). The stream and lake protection zone is to prohibit use of heavy equipment. Vegetation can be manually altered provided that riparian vegetation and water quality are maintained.

Geoffrey H. Snow, Chief  
Legislation, Planning and  
Legal Affairs

by *Paul Cox*  
Paul Cox  
Program Development and  
Environmental Officer

sd



To : L. Frank Goodson  
Project Coordinator  
Resources Agency

Date: May 29, 1979

From : Department of Conservation  
Division of Mines and Geology  
1416 - 9th Street, Sacramento 95814

Subject: SCH 79050318A, Review of Draft Environmental Impact Report for Proposed Administrative Regulations for the California Forest Improvement Program, April, 1979.

The following commentary was provided by Division geologist, Michael E. Huffman:

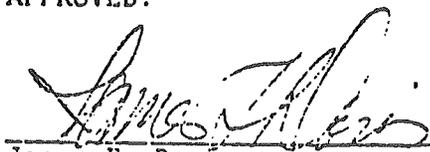
1. The Environmental Impact Report is inadequate in assessing the potential for geologic instability, landsliding and erosion. It is implied that most tractor clearing will be limited to slopes of less than 30% (p. 7, para 2, p. 55, para. 5). However, the 30% estimate is likely to be exceeded often in the north coastal region because most forested slopes exceed 30% and there are no slope limitations on the operation of tractors specified in the Administrative Regulations (Section 1545.3 Erosion Control).
2. The EIR states (p.53) that no heavy equipment will be allowed on potential or active ("ancient or current" p. 60) slide areas until after analysis and mitigation. Such areas should require an experienced geologist to identify, analyze, and prescribe adequate mitigation. Available geologic and stability maps are usually inadequate for comprehensive analysis and judgement needed to recommend proper mitigation.

Similar geographic expertise is needed on recommended measures such as riprap or cribbing at slides (p. 10 last para., p. 11, para 2, p. 45, 2nd sentence).

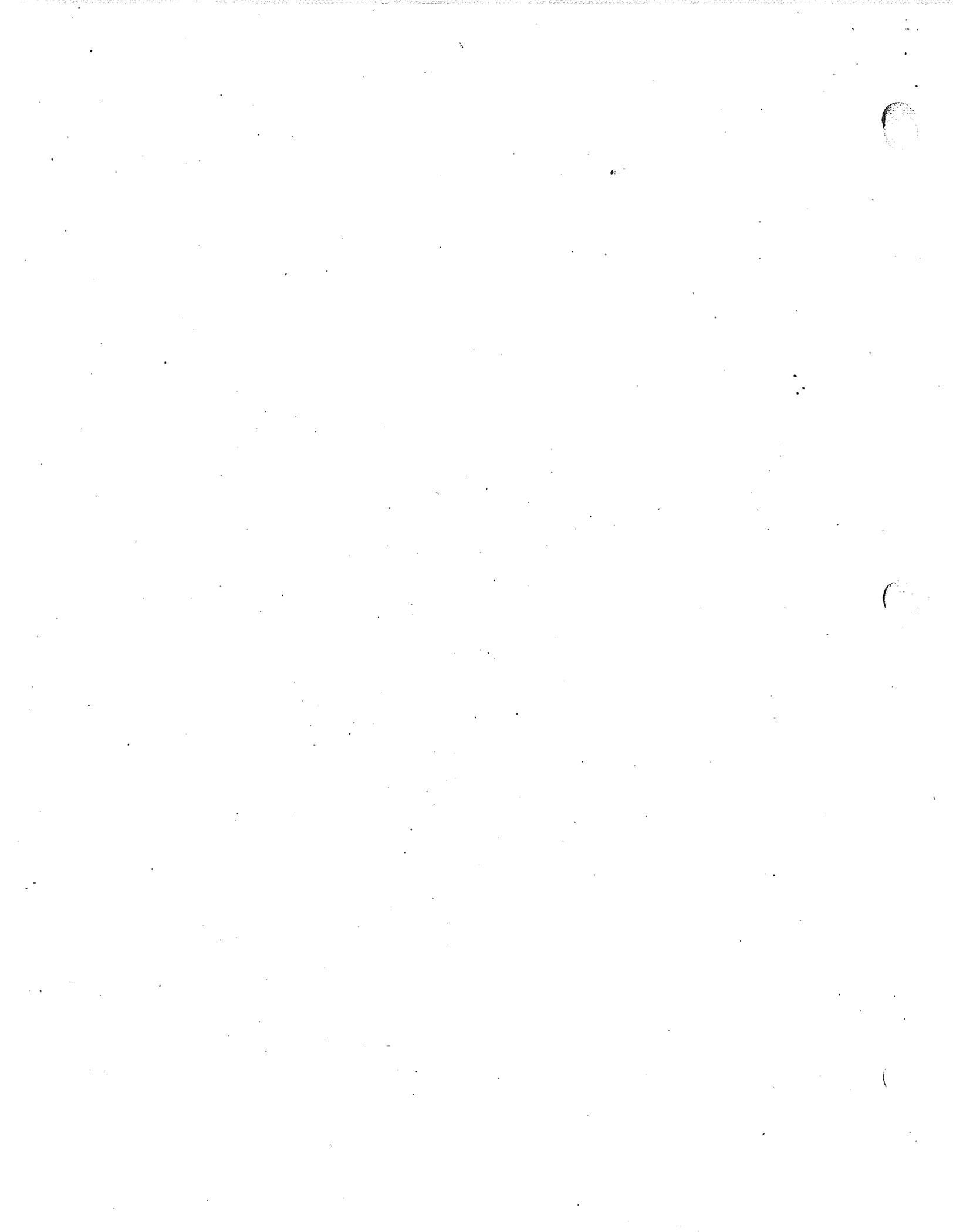


Perry Y. Amimoto  
Advisory Services Officer

APPROVED:



James F. Davis  
State Geologist



# Memorandum

To : Mr. Perry Y. Amimoto  
Advisory Services Officer  
Division of Mines and Geology

Date : June 13, 1979  
L2

Attn: Michael E. Huffman

From : Department of Forestry

Subject: 0900 ENVIRONMENTAL PROTECTION  
Proposed Administrative Regulations for the  
California Forest Improvement Program (Draft EIR)  
SCH #79050318A

Thank you for your comments on the Proposed Administrative Regulations for the California Forest Improvement Program (Draft EIR). Our comments are keyed to your letter as follows:

(1) A slope limitation is provided on page 55 of the Draft EIR. Paragraph 6, line 9 of (1) Erosion reads: "The bulldozer clearing method will not be used in situations where effective contour windrowing of cleared material cannot be accomplished."

The site specific environmental analysis should reveal any areas that have unusually severe problems which will require a supplemental EIR on that particular impact.

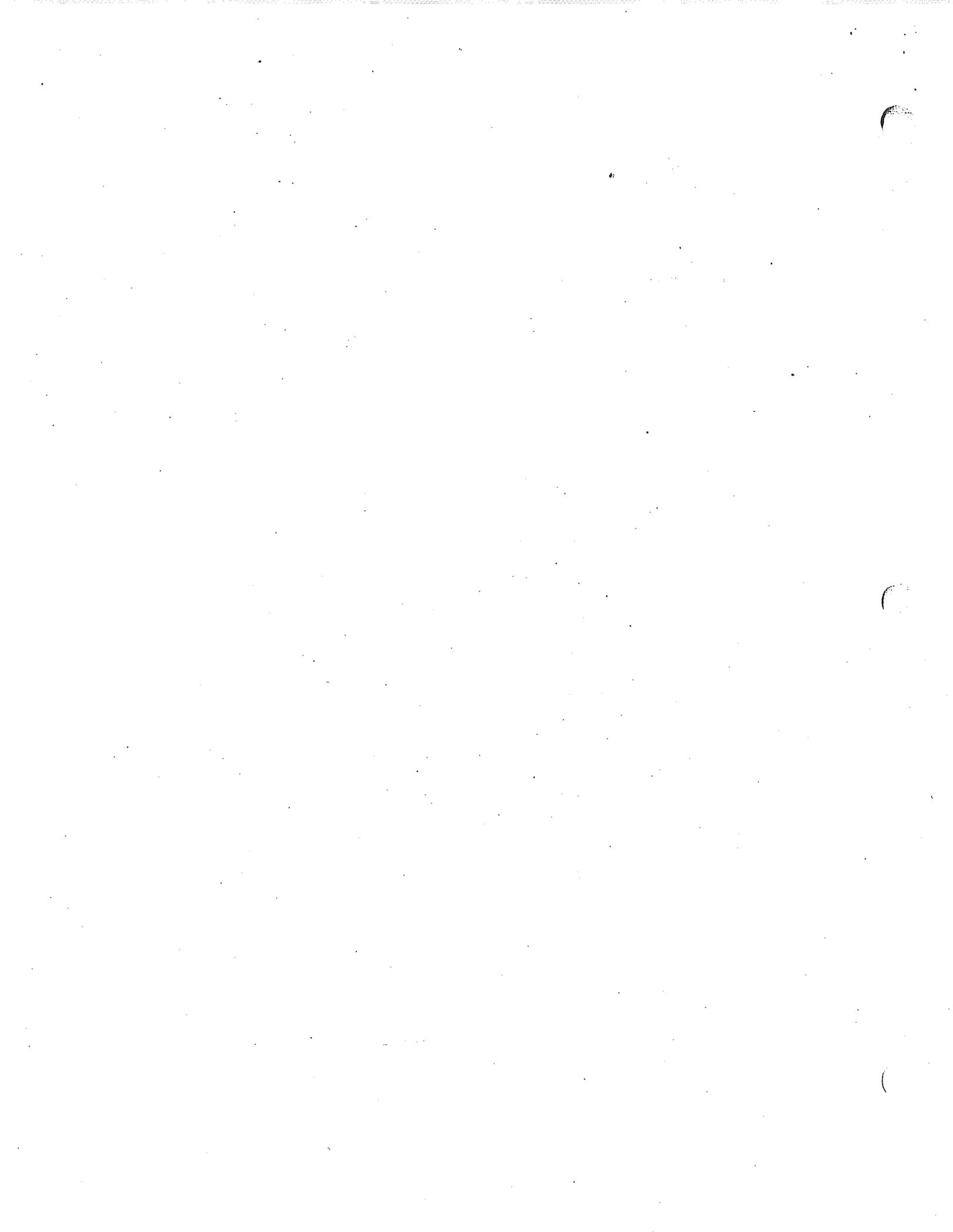
(2) Section 1545.3(c) on page 33 of the Proposed Administrative Regulations reads: "Heavy equipment shall not be operated on known potential or active slide areas."

We will use engineering and geologic expertise where appropriate (see response to Soil Conservation Service).

Geoffrey H. Snow, Chief  
Legislation, Planning and  
Legal Affairs

By *Paul Cox*  
Paul Cox  
Program Development and  
Environmental Officer

sd



# Memorandum

1. L. Frank Goodson, Project Coordinator  
Resources Agency

Date: June 5, 1979

2. California Department of Forestry  
1416 Ninth Street  
Sacramento, CA 95814

From : Department of Fish and Game

Subject: SCH 79050318 - Draft EIR - Proposed Administrative Regulations for the Forest Improvement Program

Subject draft EIR and proposed administrative regulations have been reviewed.

We have previously met with the Department of Forestry staff to discuss the proposed administrative regulations and the effects of the Forest Improvement Program on fish and wildlife resources. As a result of these discussions several amendments to the March 25, 1979 draft regulations circulated for review by the State Clearinghouse have been prepared. The amendments deal with the definition of the term "stream", with protection of snags and live trees used as nesting and roosting sites by protected bird species, and with several additional subjects. A copy of the amendments is attached to these comments. Without these amendments, the Forest Improvement Program could result in adverse effects on fish and wildlife resources. Adoption of the amendments, however, would remove the most significant drawbacks of the Program to fish and wildlife. We, therefore, recommend that these amendments be adopted as part of the administrative regulations for the Forest Improvement Program.

In addition to the above comments, which have previously been discussed with Department of Forestry, we offer the following additional comments:

Section 1527.1 Project Eligibility Subsection (e).

We believe a ten year limitation on land use incompatible with forest resource management is too short. In view of the public funds to be invested, we believe the limitation should extend at least through the time it takes for the reforestation efforts to be rewarded by eventual harvest of planted commercial species.

Subsection (e)(1).

The minimum eligibility (20 acres) is too large. We believe there may be many smaller parcels that are in serious need of reforestation and would be productive for the program. We recognize the eligibility clause does not apply to fish and wildlife habitat improvement practices.

L. Frank Goodson  
California Department of Forestry

-2-

June 5, 1979

As a general comment, we recommend that the regulations provide a clear statement that the subsidized reforestation practices will be limited to restoring forests to what was originally supported by the land in a specific area. In other words, an area known historically to support a mixed hardwood-conifer forest should be subject to practices designed to restore this mixture. Monoculture attempts should be avoided unless there is clear evidence that the area historically supported single species or single species-types of trees.

This concludes our comments at this time.

  
Director

Enclosure

**Memorandum**

To : Mr. E. C. Fullerton, Director  
Department of Fish and Game

Date : June 13, 1979  
L2

From : Department of Forestry

Subject: 0900 ENVIRONMENTAL PROTECTION  
Proposed Administrative Regulations for the  
California Forest Improvement Program (Draft EIR)  
SCH #79050318A

Thank you for your comments on the Proposed Administrative Regulations for the California Forest Improvement Program (Draft EIR). Our comments are keyed to your letter as follows :

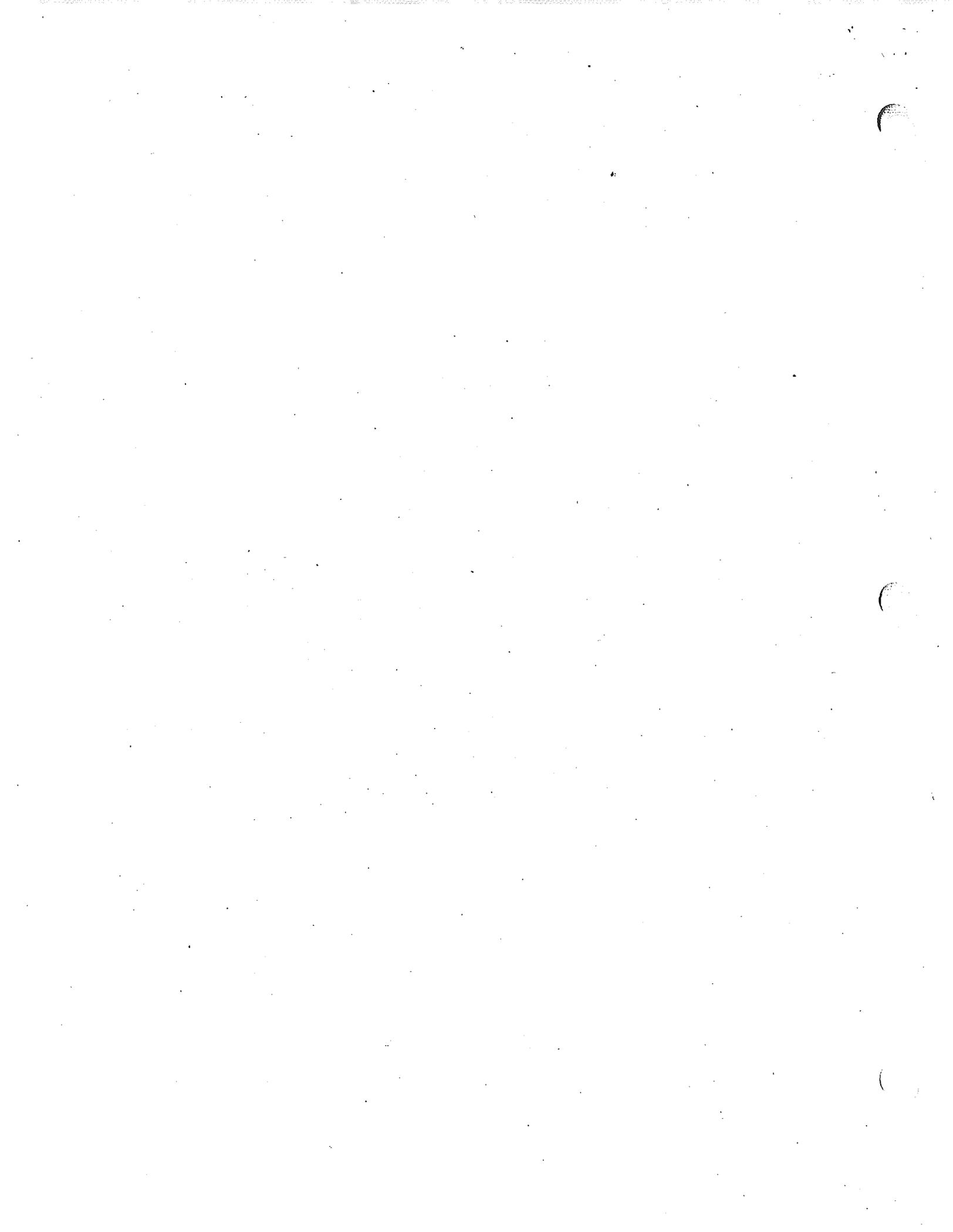
- (1) As you indicate, the regulations have been amended in Sections 1526.1, 1545(b), and 1545.1(b). We will comply with the Resource Secretary's "Policy for the Preservation of Wetlands in Perpetuity," but we cannot incorporate the statement by reference in the regulations; this incorporation is prohibited by Title I, California Administrative Code, Chapter 25, subparagraph (b).
- (2) The 10-year limit is required by statute. Longer term conditions would discourage landowner participation.
- (3) The 20 acre minimum was set for lands not zoned Timber Preserve Zone, because existing federal programs are able to provide for the needs of smaller parcels. The 20 acre minimum does not apply to lands zoned Timber Preserve Zone, nor does it apply to fish and wildlife habitat improvement projects.
- (4) CFIP has been tailored to restore timber productivity and overall environmental quality to the most productive conifer sites. These lands have historically had coniferous timber as the climax species. Some tendency toward "monoculture" may occur because of the difficulty of planting certain species of trees. This is likely to be mitigated by natural growth following treatment.

Geoffrey H. Snow, Chief  
Legislation, Planning and  
Legal Affairs

By

*Paul Cox*  
Paul Cox  
Program Development and  
Environmental Officer

sd



Amendments to  
Forest Improvement Program Regulations  
(March 25, 1979 Draft)

1. Amend 14 CAC 1526.1 to read:

"Stream" means a natural perennial or intermittent water course as designated by a solid line or dash and three dots symbol on the largest scale United States Geological Survey Map most recently published or as corrected on the management plan map to reflect conditions as they actually exist on the ground. A ~~"perennial stream"~~ is one containing flowing surface water during most of the year except for infrequent or extended periods of drought. An ~~"intermittent"~~ stream is one in which surface water flows only part of the year because it receives water from seasonal sources, such as springs and bank storage as well as precipitation. Both ~~perennial and intermittent~~ streams also have all of the following characteristics below the stream transition line:

- (a) ~~A well-defined channel with a distinguishable bed and bank.~~
- (b) ~~Evidence of scour and/or deposit of rock, sand, gravel or silt.~~
- (c) ~~Either evidence of aquatic vegetation and aquatic insects or absence of permanent non-aquatic vegetation.~~

~~Ephemeral streams which flow only briefly in direct response to precipitation shall not be considered as "streams" as defined above.~~

(Reference: Section 4799, Public Resources Code.)

2. Amend 14 CAC 1545.1 (b) to read:

(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 ~~except when this practice conflicts with safety~~

~~needs-and-program-goals.~~ Participants are encouraged to leave all snags undisturbed ~~provided-that-this-does-not-conflict-with-safety~~ and-program-goals.

3. Amend 14 CAC 1545.1 (a) to read:

(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 as-soon-as-it-is-practical.*

4. Amend 14 CAC 1545.2 to read:

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 or fish and wildlife habitat improvement practices.

Note: Authority cited: Section 4799.02 Public Resources Code.

Reference: Sections 4799, 4799.07 Public Resources Code and "Policy for the Preservation of Wetlands in Perpetuity," Secretary for Resources, September 19, 1977.

# Memorandum

Date : MAY 24 1979

To : (1) Mr. L. Frank Goodson  
Projects Coordinator  
Resources Agency

(2) Department of Forestry  
1416 9th Street, 15th Floor  
Sacramento, CA 95814

From : Department of Parks and Recreation

Subject: DEIR - SCH #79050<sup>5</sup>18: Proposed Administrative  
Regulations for the Forest Improvement Program

The Office of Historic Preservation has reviewed the Draft EIR referenced above.

The Department of Forestry is to be commended for the detailed and comprehensive procedures to be adopted for the identification of cultural resources. However, we cannot agree that the mitigation procedure outlined on Page 52 is adequate. "The review of registers and an RPF's inspection..." may not suffice to identify cultural resources subject to potential impacts, and should be coordinated with the Regional Officer of the California Archaeological Site Survey. Because Registered Professional Foresters are not trained to recognize all types of archaeological values, consultation with a Regional Officer is imperative. This does not imply that an on-site inspection will be necessary in all cases; frequently, a literature search of existing site records may suffice.

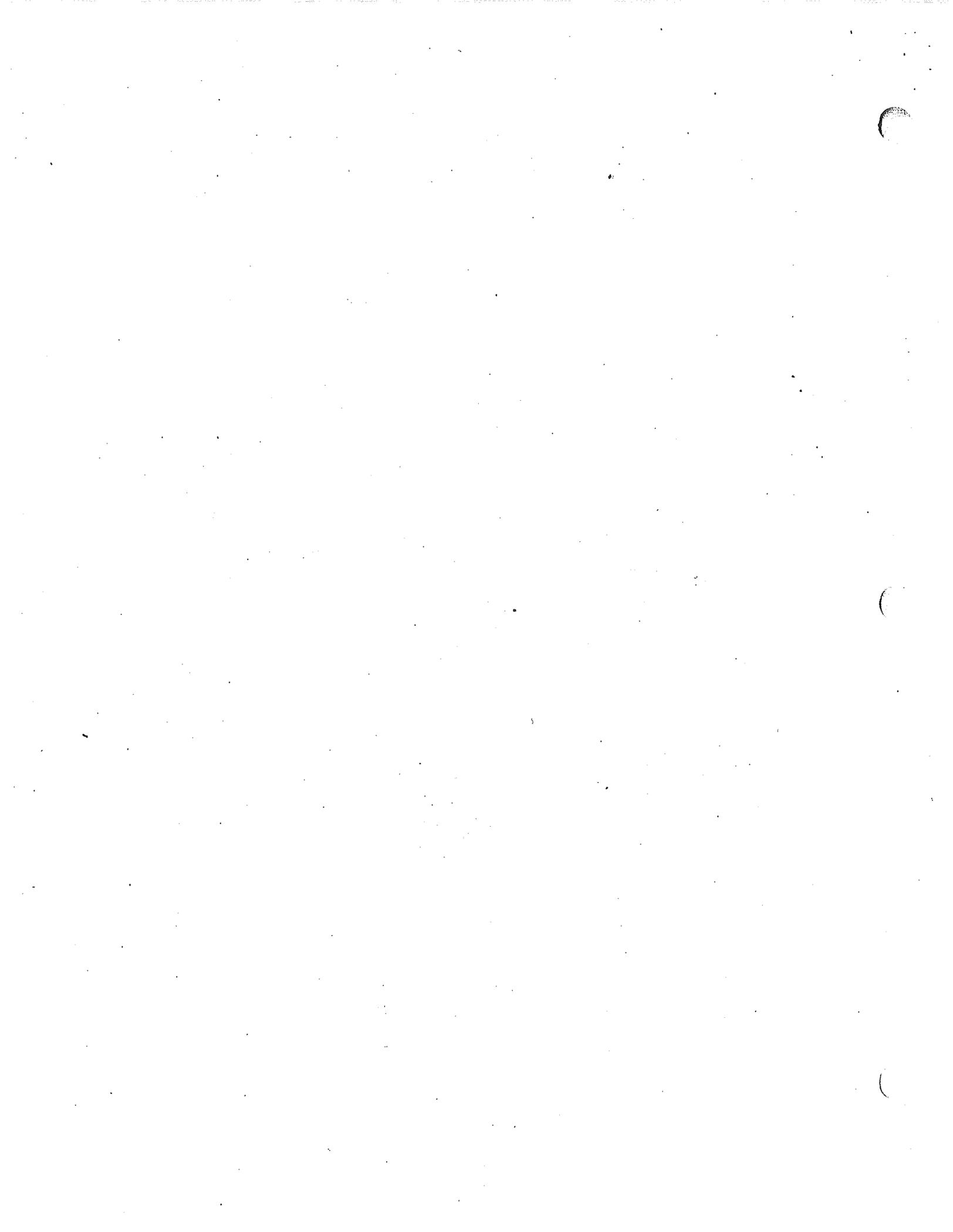
Alternately, or subsequent to the identification procedure, the Regional Officer should review the results of the RPF's findings. In either case, contact with a qualified archaeologist at either the pre-harvest inspection stage or at another time prior to the issuance of a harvest permit should help to ensure the identification and protection of cultural resources.

If you have any questions, please contact Nicholas Del Cioppo, Office of Historic Preservation, by calling (ATSS) 492-8703.

  
Dr. Knox Mellon  
State Historic Preservation Officer  
Office of Historic Preservation

James P. Tryner, Chief  
Resource Preservation and  
Interpretation Division

I-5923C



# Memorandum

10 : Dr. Knox Mellon  
State Historic Preservation Officer  
Office of Historic Preservation

Date : June 13, 1979  
L2

From : Department of Forestry

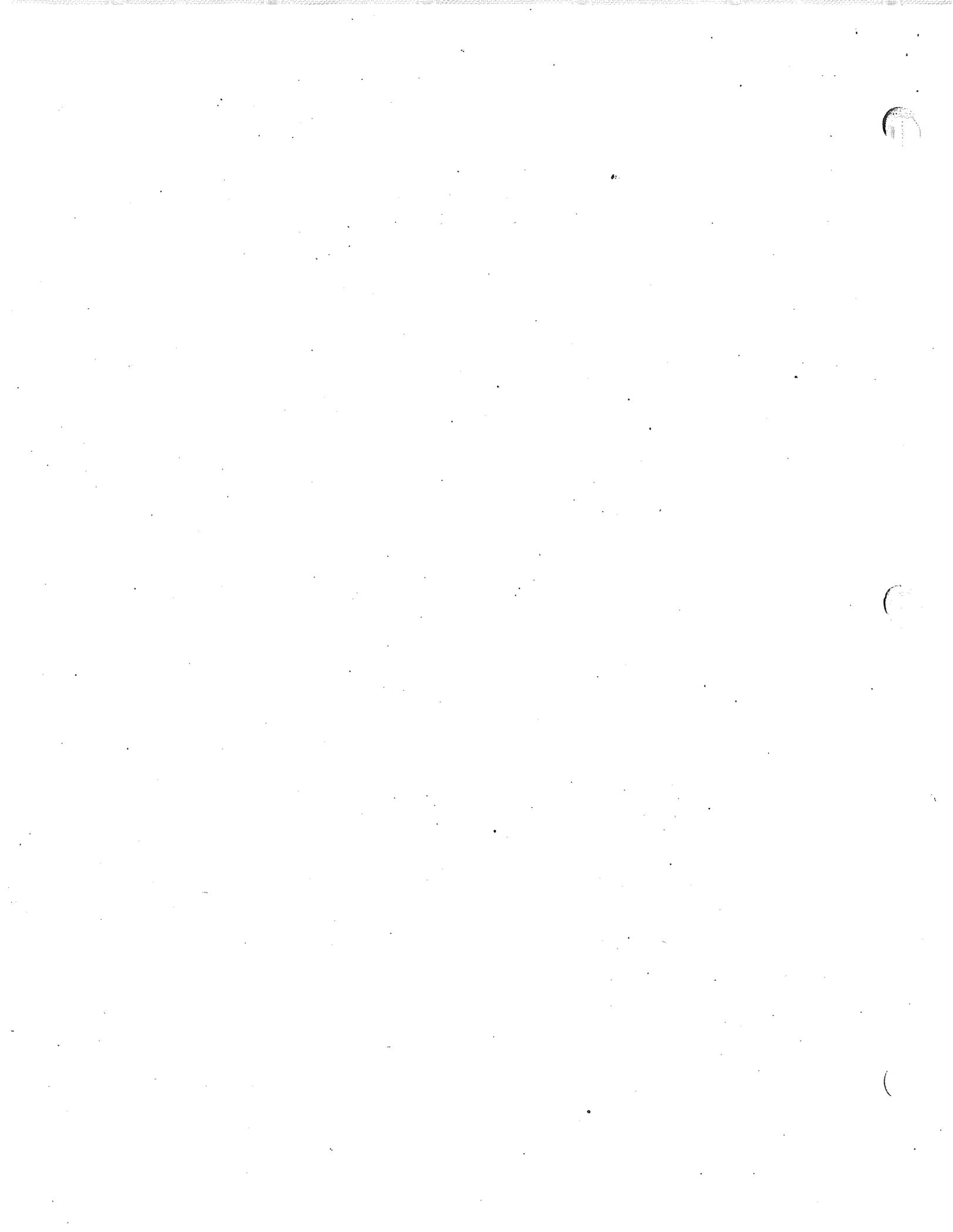
Subject: 0900 ENVIRONMENTAL PROTECTION  
Proposed Administrative Regulations for the  
California Forest Improvement Program (Draft EIR)  
SCH #79050318A

Thank you for your comments on the subject Draft EIR. The Final EIR was changed to require consultation with the Regional Officer of the California Archaeological Site Survey on pages 51 and 52.

Geoffrey H. Snow, Chief  
Legislation, Planning and  
Legal Affairs

By *Paul Cox*  
Paul Cox  
Program Development and  
Environmental Officer

sd  
cc: Projects Coordinator  
Resources Agency



JUN 1979

# Redwood Community Development Council, Inc.

## REFORESTATION TRAINING PROJECT

5 Third Street

Suite 5 Eureka, California 95501

(707) 445-8428

May 31, 1979

Andrew Chapman  
Resources Agency  
Department of Forestry  
14116 9th Street  
Sacramento, California. 95814

Dear Andy;

I have reviewed the current draft of the Forest Improvement Program. Enclosed are my comments and our Research Analyst's first reaction to the requirements.

### 1527 Eligibility and Ineligibility Practices

I find it interesting that whereby a major percentage of regeneration problems are associated with the competition of non-commercial plant species, the department will not be addressing these problems.

Although pre-commercial thinning is an accepted practice for stand improvement, conifer release from other vegetation has been excluded. I sense that the Department wishes to free itself of the herbicide controversy. Perhaps a conflict over herbicides vs. other release alternatives early on in the implementation of FIP would be detrimental to the long term effectiveness of this legislation. I can understand the caution that you must feel. I am disappointed, however, that the FIP program will not approve some kind of brush or hardwood release.

Although the "proper time" for release is relative to site specific conditions, there is general agreement on the proper time for conifer release. It appears that between 5 to 10 years after restocking (assuming the area was planted within 2 years after logging) and before the competing vegetation has become too dominant, that some method of release should be most successful. Areas that benefit from this technique would most likely have been harvested prior to the Zeberg-Nejedley Forest Practice Act. As a result, postponement of treatment now will only further complicate forest improvement efforts beyond 1982.

Could you please give me a clear interpretation of the following:

7:b ....by removal...

Do these two words assume that release involves removal of the competing vegetation? Or does it also include inhibiting its growth; i.e., manual cutting of stems.

Since 7:b is unclear, how should I interpret 7:c-5? Please define "release".

#### 7:c Fire

There is genuine concern that the exclusion of fire prevention could result in the future loss of an investment in Forest Improvement. The cost of a fire break could be prohibitive. Yet in regions where fire is a real problem, fire prevention is one of the first considerations of a land management plan.

#### 7:c-4 Road Construction

You may find that the conservation measure proposed will often involve some aspect of road maintenance or construction. Although your section on erosion does not mention it, road failures and associated problems are a major factor in slope instability and accelerated erosion. Where previous road construction is a contributing factor to regeneration and conservation problems, some kind of flexibility should be considered for the implementation of proposed cost-share agreements.

#### 1527.1 Project Eligibility

Do I interpret the following correctly?

1527.1:e Where a contract agreement is proposed (not an agreement with existing TPZ) the area of land owned by the applicant within and contiguous to the project is 20 acres or more.

1527.1:e-2 But if the proposed project involves timber related practices described in paragraphs 2, 3, 4, or 7; regardless of whether it is in TPZ or on contract agreement, the area proposed is 5 acres or more.

#### 1530 Cost Sharing Schedules

##### a:2 Prevailing Cost.

I have been involved in contract work long enough to be wary of prevailing cost restrictions. I am not opposed to an attempt by the State to develop a standard for fair cost sharing arrangements, but I am cautious of prevailing costs because they have a tendency to put a ceiling on such things as bid prices for work. Bid prices are often more influenced by site specific conditions than the service performed itself; i.e., treeplanting. The cost of employing a worker, purchase of seedlings, operation of equipment, etc., often remains constant. However, the cost of planting in rocky soil is more than in good soil and the time it takes to perform a quality job is often longer than one that places more emphasis on productivity. In other words, you often get what you pay for.

Andrew Chapman  
May 31, 1979  
Page 3

Please be cautious of setting standards which are not receptive to site specific conditions. Reforestation efforts are easily sabotaged in interplantings, heavy slash, and piece work payment situations.

#### Priority Rating Table.

Although there has been concern over the priority rating system, I find it adequate. My greatest concern is on the project cost because as I have said before, quality is more important than quantity when a long term investment is being made. A five finger agreement is often more important than the difference of a few dollars. The incentive to cut costs to qualify for the cost sharing program could easily make the difference between a successful reforestation investment and a poor one.

I would suggest deleting the project cost factor within the Priority Rating System. Otherwise, set a benchmark at which point constant costs will not be compromised.

#### 1545.3 Erosion Control

Erosion control measures and reference material which the department recognizes as techniques that would qualify for cost sharing arrangements should somehow be expressed.

Example reference material.

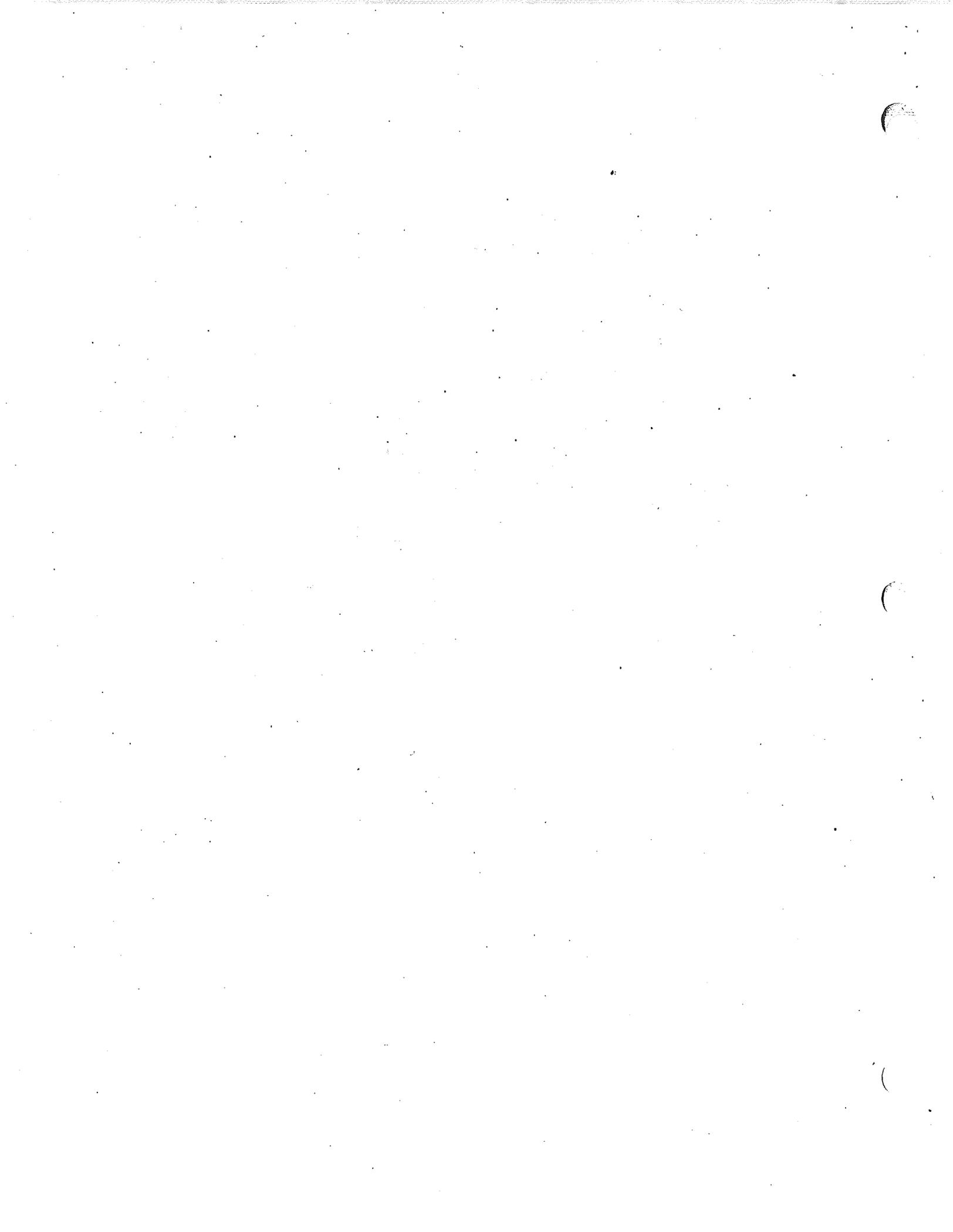
Erosion Control on Mountain Roads - Krable, 1930's  
Erosion and Sediment Control Handbook - Dept. of Conservation, 1978

I hope that these comments have been useful to you. Our intention is to provide an honest reaction to the Forest Improvement Program. If you have any comments or questions please don't hesitate to contact us.

Sincerely,

Robert B. Rohde  
Director

enclosure:



# Redwood Community Development Council, Inc

17 Third Street      REFORESTATION TRAINING PROJECT  
Suite 5      Eureka, California 95501      (707) 445-842

May 14, 1979

TO: State Board of Forestry  
Review of Draft Administrative Regulations and Environmental  
Impact Report for California Forest Improvement Program.

GENERAL COMMENTS: Draft Administrative Regulations.

The information presented seemed on the whole logical and understandable. My only concern is it was hard to understand what organization would be administering the program on the county level. Would it be the Department of Forestry, U.C. Agriculture Extension Service, or some other non-profit organization.

Why I stress this point is that local administration is a necessary element in advising, reviewing and overseeing any cost-share project

SPECIFIC COMMENTS: Draft Administrative Regulations.

My comments are concerned with the cost-share priority rating system.

## Priority 1

The points for rating Class I timber sites are too high because these sites tend to regenerate naturally, on a rate faster than Class II or Class III sites. Class I sites are generally owned by companies or individuals with holdings larger than 50,000 acres, although there are exceptions.

I feel Class II sites should be equal in rating to Class I sites. Class II sites have a larger geographic distribution and in many cases have greater regeneration problems. Class II sites have produced or are producing the bulk of forest products here on the Northcoast.

## Priority 9-11

Large counties that have conifer producing lands, at least at the present, have high unemployment rates, i.e. Del Norte, Mendocino, Humboldt, and Trinity counties. Additional points should be awarded to these priorities.

It only seems logical to award additional priority points to areas with high unemployment and small business problems who on the whole contribute the largest conifer acreages and production towards the State's forest product economy.

GENERAL COMMENTS: Environmental Impact Report.

The program excludes small ownership of less than 20 acres. Could this be reduced to 10 acres? In my experience dealing with small landowners, (as I am one myself) I cannot afford to do repair and restocking on my forest due to costs. On the Northcoast, there are numerous landowners who own 10 acres of forest land and have no financial means to improve their forest production. Are there any solutions?

Page 8:1 Establishing Tree Cover.

The use of Eucalyptus as a tree cover I feel is inappropriate for this program. My reasons are as follows: Due to it's nature, Eucalyptus can greatly modify the natural ecosystem where it grows inhibiting the return of native conifer types.

Eucalyptus at this time has a very low economic return, if at all. Strong consideration must be given in restocking poor sites with the best native conifer or shrub suited for the land.

Page 9 Brush Habitat Improvement.

Can fire hazard reduction, or fuel breaks be included to protect timbered areas adjacent to brush habitat improvement sites?

Page 42:4 Environmental Effects (Hydrology).

Any disturbance of soil will have an effect on water quality. Small watersheds can receive a greater impact than that off a larger watershed. Total watershed condition is a factor of accumulation of water and sediment from smaller tributaries. Any soil disturbing activity should be monitored.

Page 48:4 Re-vegetating Streams.

Bamboo should be excluded from use in re-vegetating streams because the plant has a strong tendency once established, to dominate and inhibit natural species that can re-occur, thus altering the natural setting. The spread rates of bamboo are also extremely fast and hard to control.

Page 53 Pesticides.

Is this section assuming herbicides will be sprayed exclusively by aerial means? Can it be done by hand and on the ground?

I could not find any such statement. Assuming that aerial spraying will be done on acreages over 50, due to costs. Are there any acreage limitations for spraying either by hand or by aerial means?

State Board of Forestry  
June 1, 1979  
Page 3

Page 53 Pesitcides.

Is this section assuming herbicides will be sprayed exclusively by aerial means? Can it be done by hand and on the ground?

I could not find any such statement. Assuming that aerial spraying will be done on acreages over 50, due to costs. Are there any acreage limitations for spraying either by hand or by aerial means?

Page 56:3 Erosion.

Has all hand-site preparation clearing been ruled out? Hand clearing is quite effective on steep locations of a small size.

Page 75:4 Clean and Release Practice.

It states that this practice will not be done at this time due to the herbicide controversy. If I am correct, it states on Page 53, that the herbicide 24-D can be used, so why can't it be used on a Clean and Release Project? I need clarification on this matter.

On the Northcoast, conifer release is one of our major silviculture problems. I would like to know why it is not addressed?

FINAL COMMENT:

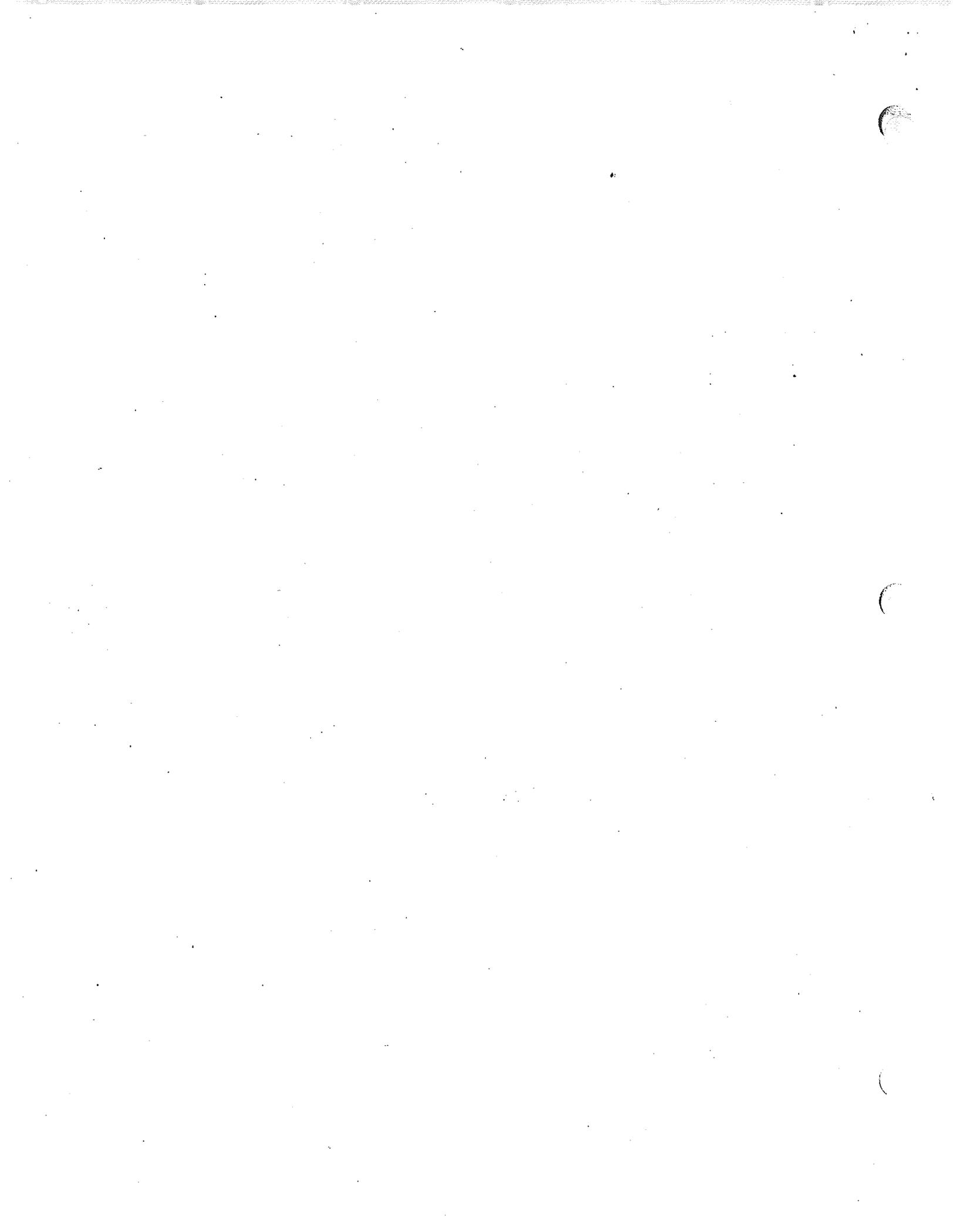
I am in strong support for this state program. I hope my comments may be of some use. I will make myself available to anyone in your organization who would like to comment on my questions.

Thank you for your time and interest.

Sincerely,

*John Schwabe*

John Schwabe  
Reforestation Analyst.



## DEPARTMENT OF FORESTRY

NINTH STREET

SACRAMENTO, CALIFORNIA 95814

(916) 322-4898



June 13, 1979

L2

Mr. Robert B. Rohde, Director  
Redwood Community Development Council, Inc.  
517 Third Street, Suite 5  
Eureka, CA 95501

Dear Mr. Rohde:

Thank you for your comments on the Proposed Administrative Regulations for the California Forest Improvement Program (Draft EIR). Our comments are keyed to your letter as follows:

- (1) As stated in the regulations, the release of young, commercial stands from competing vegetation will not be offered for cost sharing at this time, due primarily to the controversy surrounding the application of herbicides and the current suspension of the use of 2,4,5-T.
- (2) "Release" is "to free trees from competition by cutting or otherwise removing or killing nearby vegetation and branches. Usually applied to young stands" (SAF, 1958). Since the advent of the use of chemicals, it also means inhibiting the growth of competition without killing or removal of the vegetation.
- (3) Fuel breaks are not offered as a practice because their design and strategic location is hard to adapt to small properties. Hazard reduction around buildings, etc., is required by State law now.
- (4) As much flexibility as possible has been allowed through the land conservation practices.
- (5) Projects involving timber related practices proposed for non-TPZ lands must be five acres or greater on a parcel 20 acres or greater.
- (6) The costs of projects will vary from site to site. We believe that maximum prevailing costs are necessary to assure that only cost-effective projects are approved.

June 13, 1979

- (7) Hopefully, the priority to lower cost projects will not encourage inferior projects.
- (8) See Bibliography (and Addendum) where Department of Conservation, 1978, and Department of Forestry, 1968 can be consulted.
- (9) The Department of Forestry will be administering the program.
- (10) In cases where high site lands have not regenerated naturally, rehabilitation projects deserve high priority because of their cost effectiveness.
- (11) We believe that most of the projects will take place in high unemployment areas regardless of the priority points.
- (12) Other programs are available for smaller properties (see Department of Fish and Game responses).
- (13) Eucalyptus planting is not mandatory; however, RPF's and landowners are allowed to prescribe, subject to CDF approval, eucalyptus reforestation projects that are appropriate to a given site.
- (14) See comment (3).
- (15) The program EIR, the regulations, and the supplementary environmental evaluation of each project are designed to mitigate impacts on watersheds.
- (16) Use of bamboo will not be encouraged. It may be appropriate for certain sites.
- (17) Herbicide application methods approved by the agencies with legal jurisdiction over herbicide use will be allowed. Any acreage limitations will be followed.
- (18) Hand site clearing will be allowed where effective. Hand clearing is required within the stream and lake protection zones.
- (19) See comment (1).

Sincerely,

Geoffrey H. Snow, Chief  
Legislation, Planning and  
Legal Affairs

By   
Paul Cox  
Program Development and  
Environmental Officer

sd



United States  
Department of  
Agriculture

Soil  
Conservation  
Service

2828 Chiles Road  
Davis, CA 95616

MAY 17 1979

May 15, 1979

Audley C. Davidson, Forester III  
California Department of Forestry  
1416 Ninth Street  
Sacramento, California 95814

Dear Mr. Davidson:

Responding to your request for our review of the Draft Environmental Impact Report for the Proposed Administrative Regulations for the California Forest Improvement Program (CFIP), we are submitting the following comments.

1. Page 11 - Second paragraph. We question the need for a Registered Professional Forester to prepare a plan for revegetation, rip-rap, or similar type of engineering expertise. May we suggest that the paragraph be changed to read:

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

2. Page 40 - Third paragraph, third sentence. We feel this sentence needs to be revised to read as follows:

"Maps of the State Soil-Vegetation Survey, the university and the soil survey reports of the Soil Conservation Service are available for most forest areas."

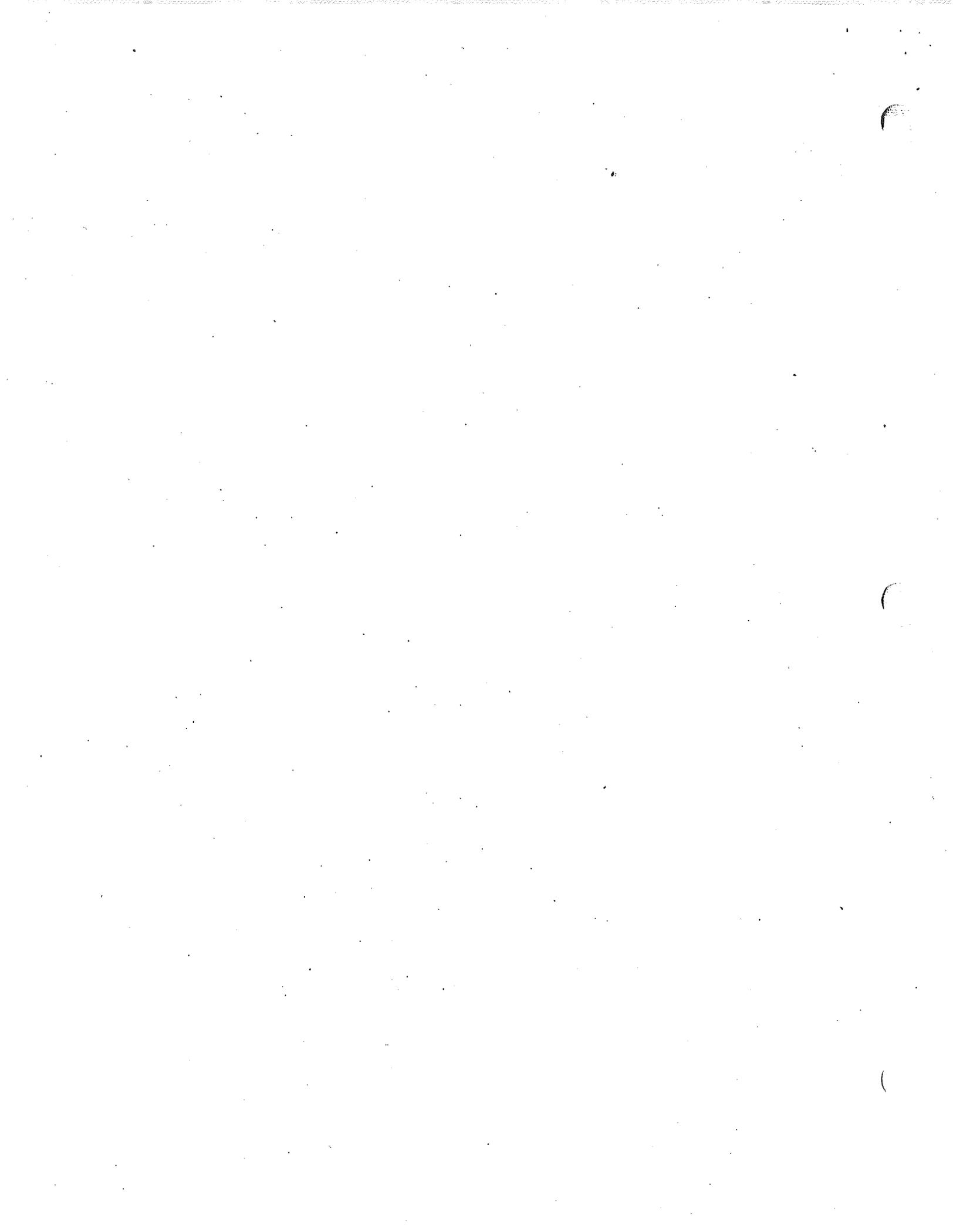
The generalized soil maps are suitable only for broad planning purposes.

Thank you for the opportunity to review and comment on this Environmental Impact Report.

Sincerely,

FRANCIS C. H. LUM  
State Conservationist





## DEPARTMENT OF FORESTRY

NINTH STREET  
SACRAMENTO, CALIFORNIA 95814  
(916) 322-4898



June 12, 1979  
L2

Mr. Francis C. H. Lum  
State Conservationist  
Soil Conservation Service  
U. S. Department of Agriculture  
2828 Chiles Road  
Davis, CA 95616

Dear Mr. Lum:

Thank you for your comments on the Draft EIR for the Proposed Administrative Regulations for the California Forest Improvement Program (State Clearinghouse No. 79050318A).

We agree with your comments, and have amended pages 11 and 40.

Sincerely,

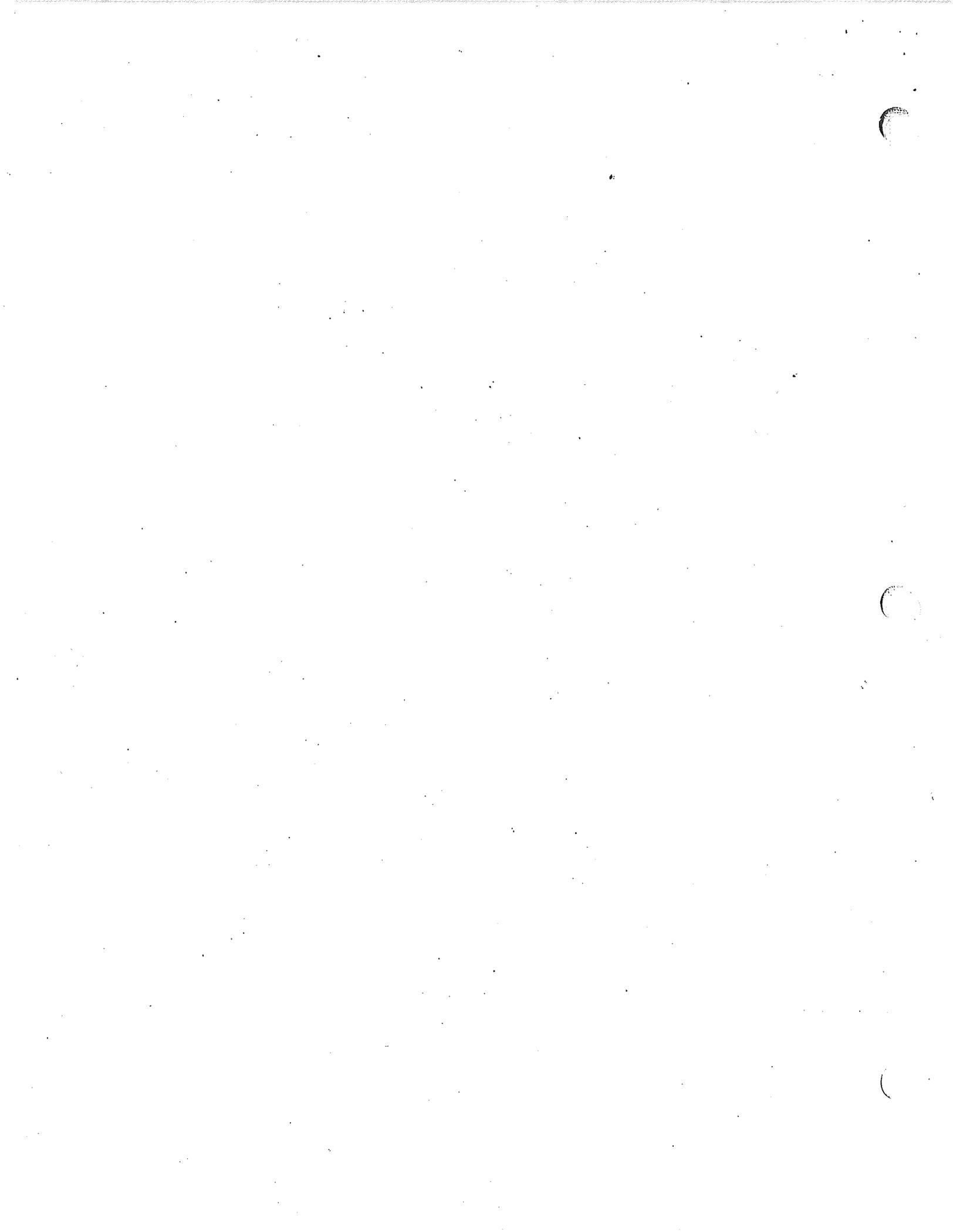
Geoffrey H. Snow, Chief  
Legislation, Planning and  
Legal Affairs

By

A handwritten signature in cursive script that reads "Paul Cox".

Paul Cox  
Program Development and  
Environmental Officer

sd



FINAL  
~~DRAFT~~  
 Environmental Impact Report  
 California Forest Improvement Program

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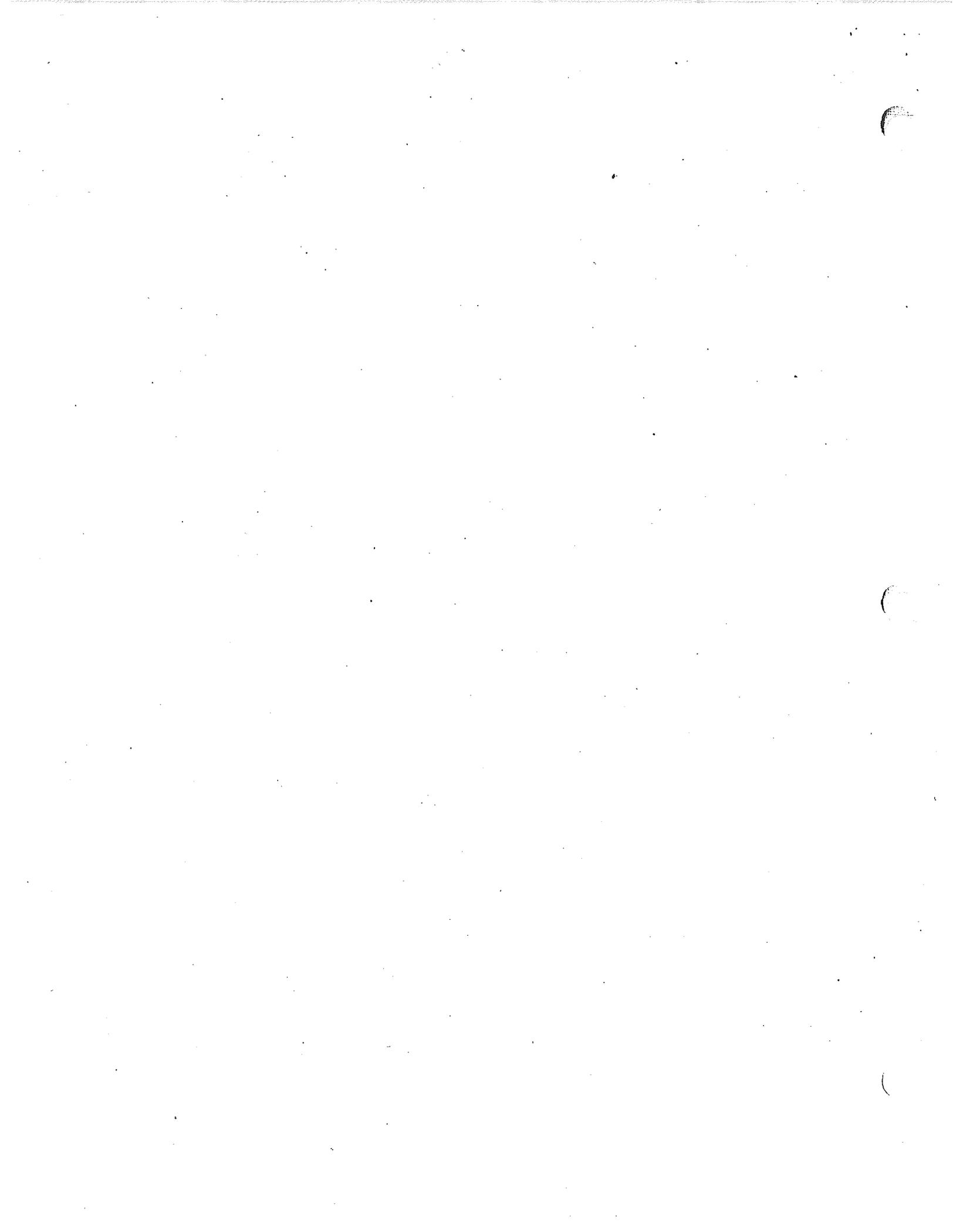
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## I. PROJECT DESCRIPTION

### (A) General

The California Forest Improvement Act of 1978 (CFIP) (Section 4790 et seq., Public Resources Code) authorizes the Director of Forestry to (1) undertake a program of public and private investment in forest resource management, (2) improve California's urban forest resources, and (3) encourage the use of wood for energy. The project covered by this program EIR is the implementing regulations for Chapter 2 of the Act, thus excluding the urban forestry (Chapter 3) and wood energy (Chapter 4) portions of the Act. The regulations cover the cost-share agreement authority of Chapter 2 of the Act; regulations implementing the loan authority of Chapter 2 will be issued subsequently.

The Act authorizes the Director to enter into cost-share agreements and make grants and loans for reforestation, timber stand improvement, land conservation, and wildlife habitat work on privately owned forest lands in the State. Eligible practices and projects are described in Sections 1527 and 1527.1 of the proposed regulations.

The Act prohibits (State) General Fund financing of any part of the program, except for existing technical assistance services, program planning, and obtaining funds. Limited federal funding is now available for selected forest improvement projects in some areas of the State, however, it is not known whether these funds will continue nor at what level.

The level of program activity depends mostly on the availability of funds and the degree of voluntary participation of forest landowners with properties less than 5,000 acres in size. 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 CAC 1514(h)). Program design options, this is, different "practices," are treated as "Alternatives" (pg. 70).

#### (1) Criteria Affecting Participation

##### (a) Physical availability and funding.

Table 1 shows the best projections 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 by each practice. Over a 21-year time span 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.

Table 2. The maximum estimated dollars available are shown in

shown in Table 3. The probable maximum number of acres treated per year is

Table 1. Area Available<sup>1/</sup> for Treatment by Practice

Region	Pre-commercial Thinning (M acres)	Reforestation <sup>2/</sup> (M acres)
North Coast <sup>3/</sup>	27 <sup>4/</sup>	329 <sup>5/</sup>
Other	<u>187</u>	<u>381</u>
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 (Millions of Dollars)

1979-80	1980-81	1981-82	1982 to End of Program
\$8	\$10.5	\$14	\$14

Table 3. Acres Treated Annually by Practice

Fiscal Year	Thousands of Acres	
	Thinning	Reforestation
1979-80	8	20
1980-81	12	45
1980-82 to End of Program	19	63

Recent data is available (Bolsinger, 1979) of acreages available by landowner classes. This data is included under II. (D) Vegetation and Forest.

(b) Landowner Eligibility

The project is tailored to meet the needs of 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, only ownerships greater than 20 acres are eligible for timber related practices.

(c) 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 ACP and FIP programs probably 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 75 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 draft regulations have a base cost share rate of 80 percent for all practices (with a 90 percent cost share authorized if one of four conditions are met). (See Section 1530 of the regulations.)

#### 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 in Sacramento..

MAP 2  
CALIFORNIA

NATURAL VEGETATION

-  Coniferous Forest
-  Oak Woodland
-  Coniferous Woodland
-  California Prairie
-  Chaparral
-  Sagebrush
-  Desert Shrub
-  Marsh-grass
-  Redwood



STATE OF CALIFORNIA  
THE RESOURCES AGENCY  
DEPARTMENT OF CONSERVATION  
DIVISION OF FORESTRY

Base map compiled by  
L. T. Burcham  
1933

The setting of maximum dollar per acre costs can also affect participation, especially if the maximum rates are set lower than actual costs. (This has the effect of reducing the actual cost share below 80 or 90 percent.) Per acre costs will be adjusted annually.

Because these factors are also speculative, they are not included as "alternatives." However, they are intended to be within the scope of this EIR. If comments or testimony arise with respect to the cost share percentage or maximum allowable rates, they may be changed. The effect of such changes will be addressed in the Final EIR. The rates will also be subject to yearly review. 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.

(d) Loans

See Alternative 3.

(B) Reforestation

(1) Brush conversion and hardwood conversion.

Reforestation is a complex process with many interdependent steps that take several years to accomplish. Quality failure or adverse natural conditions at any step can result in total failure of the project. The chain of events usually consists of seed collection, seed treatment, sowing (in the field for "seeding," in a nursery for "planting"), growing nursery stock (for from one to four years), lifting, packing, storing stock, transportation and storage to or at the site, site preparation, planting, rodent, bird and browsing animal control and follow-up treatment or replanting or seeding in case of total or partial failures.

The grant program will cost share site preparation, planting and follow-up treatment as part of the reforestation practice.

(2) 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 reforested.

Another method of site preparation can be done by hand treatment or grubbing. This method is used for small scattered areas for "underplanting" 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 is often recommended. "Also," 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. Tractor clearing is usually limited to slopes less than 70 percent. Most clearing occurs on slopes of less than 30 percent.

(3) Use or disposal of cleared material.

Brush and hardwood cleared material can rarely be 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. If large trees such as oaks are a part of the vegetation they must be felled. Herbicides such as 2, 4,-D and dicamba are used to desiccate brush prior to burning. Where brush has been windrowed only the windrows are burned. However, it is sometimes best to crush the brush and broadcast burn the area.

(4) Follow-up site preparation.

On certain areas where rapid sprouting of brush crowns or seedling development of brush (from seeds made viable from broadcast burning) are a problem, follow-up treatment with herbicides is often prescribed. Depending on the particular brush species which are a problem, various formulations of 2,4,-D or dicamba are used. Atrazine and simazine are used to control grasses.

(5) Establishing tree cover.

As soon as possible after site preparation, the area is planted or seeded. 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. Douglas-fir is the species most often seeded.

If survival of seedlings from seed is thought to be a problem, planting stock from forest tree nurseries is used. 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,

coast and sierra redwood. White fir and red fir are also available. Eucalyptus 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 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 (Cal. Dept. of Forestry, 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 seedings or planting, an area may be reseeded or replanted either in whole or in part in ensuing years.

#### (6) Follow-up treatment.

In some cases regrowth of vegetation originally cleared may be rapid enough to interfere with the seeded or planted trees. In this case hand clearing, herbicide treatment, or tractor 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 brush regrowth by deer or cattle browsing is possible, but sometimes the most troublesome brush species will not be eaten by cattle or deer.

Follow-up treatment is sometimes necessary because of insect attack 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 repellants, or protection of individual trees.

#### (C) Pre-Commercial Thinning

Pre-commercial thinning is the reduction of the number of stems in an overcrowded 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.

Stands to be treated have usually originated from "natural reproduction," but some "plantations" may be thinned.

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

(D) Wildlife Habitat Practices

(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 miniyarders, 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).

The 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 and the use of winter burning for the practice under relatively safe fire conditions. An example of the latter is strip burning of chamise (standing or crushed) in the winter. This practice would ordinarily be accomplished on forest land that is nontimber land or low site (V) timber lands, and natural brush fields. Planting grass, herbs, and browse suitable for wildlife will be cost-shared.

The areas developed are good for deer range. On north slopes (summer range) it is desirable to have 70 percent brush and conifer cover and 30 percent grass and forbs. On south slopes for summer range the opposite, i.e., 30 percent brush and conifer, and 70 percent open grass and forbs is desirable.

(3) 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 include: willow (Salix), alder (Alnus), cottonwood and populus (Populus), sycamore (Platanus), walnut (Juglans), oak (Quercus), blackberry and wildrose, Atriplex, and similar 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.

(4) Wet meadow fencing practice.

Fencing to protect wet meadows, other wet areas and key wildlife habitat from domestic stock. Fencing is usually done by hand methods or with light machinery such as pickups, post drivers, and light winches.

(E) Land Conservation Practices

Several practices will be cost shared for erosion control.

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Most of the practices are directed toward control of erosion from rural roads on private land:

- Installation and repair of failed or undersize culverts.
- Installations of fords to replace poor live stream crossing culverts or bridges.
- Outsloping and berm removal on low standards 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 of slides, slumps or nonroad related erosion control a RPF 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 include CMP, rock, concrete, and wood. 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 THP's (Timber Harvest Plans).

## 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-carver terraces, and sandy beaches.

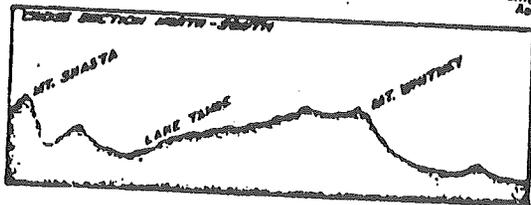
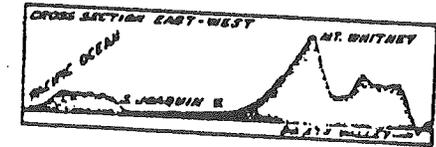
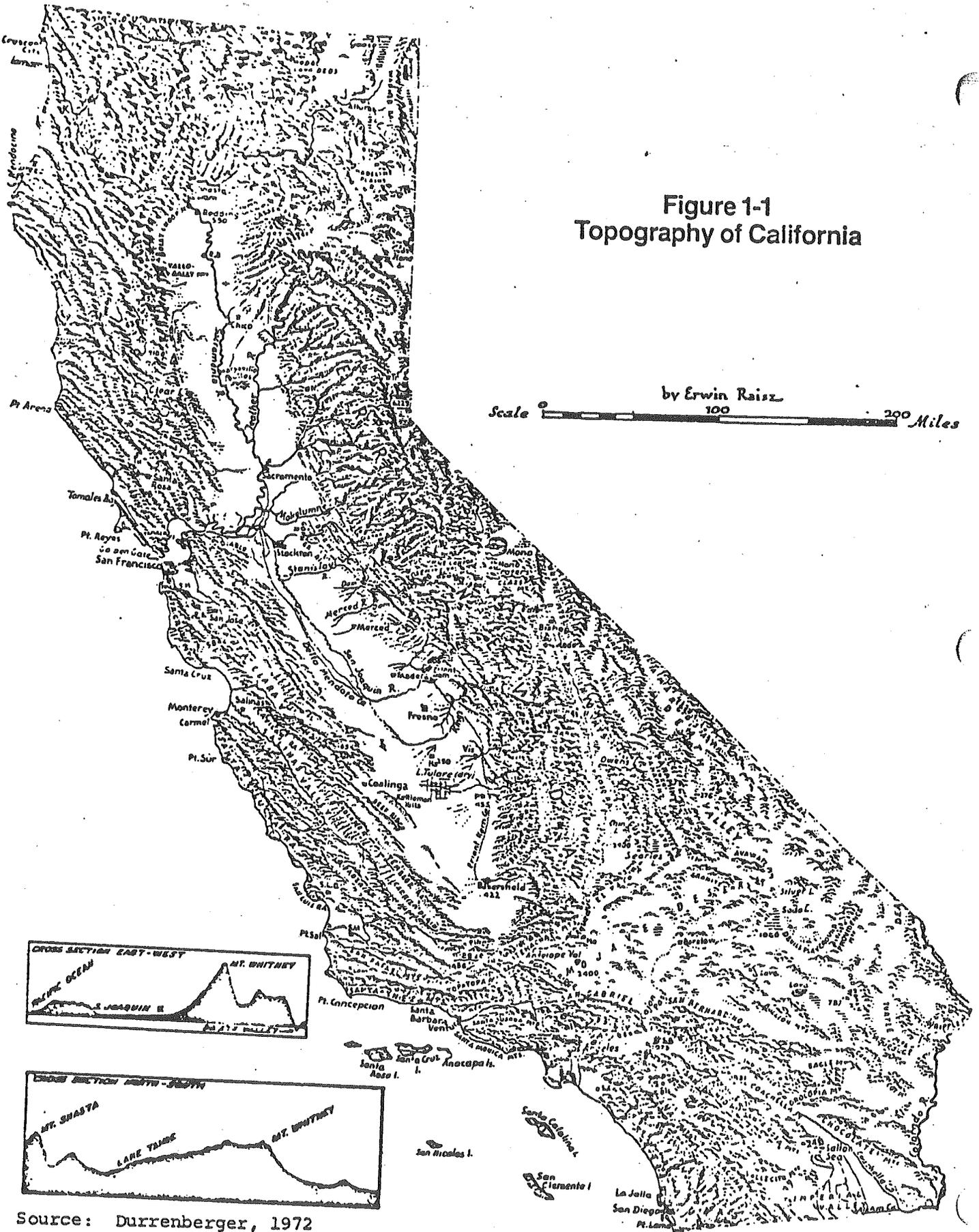
To a large extent, environmental factors within California determine the location of forests, agriculture, pastures, recreational, and oftentimes, industrial and urban areas. In addition, climate, topography, the presence of rivers or reservoirs, and soil patterns contribute to the determination of the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

Figure 1-1  
Topography of California

by Erwin Raisz

Scale 0 100 200 Miles



Source: Durrenberger, 1972

spacial and temporal boundaries of a given environment at any point in time. The dimensions of California's environment are immense.

(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 basis 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.

(B) Climate

Because of the strong influence of the Pacific Ocean, Coast Ranges, and Sierra/Nevada-Cascade axis, climatic variations in California run in a more or less north-to-south direction. 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.

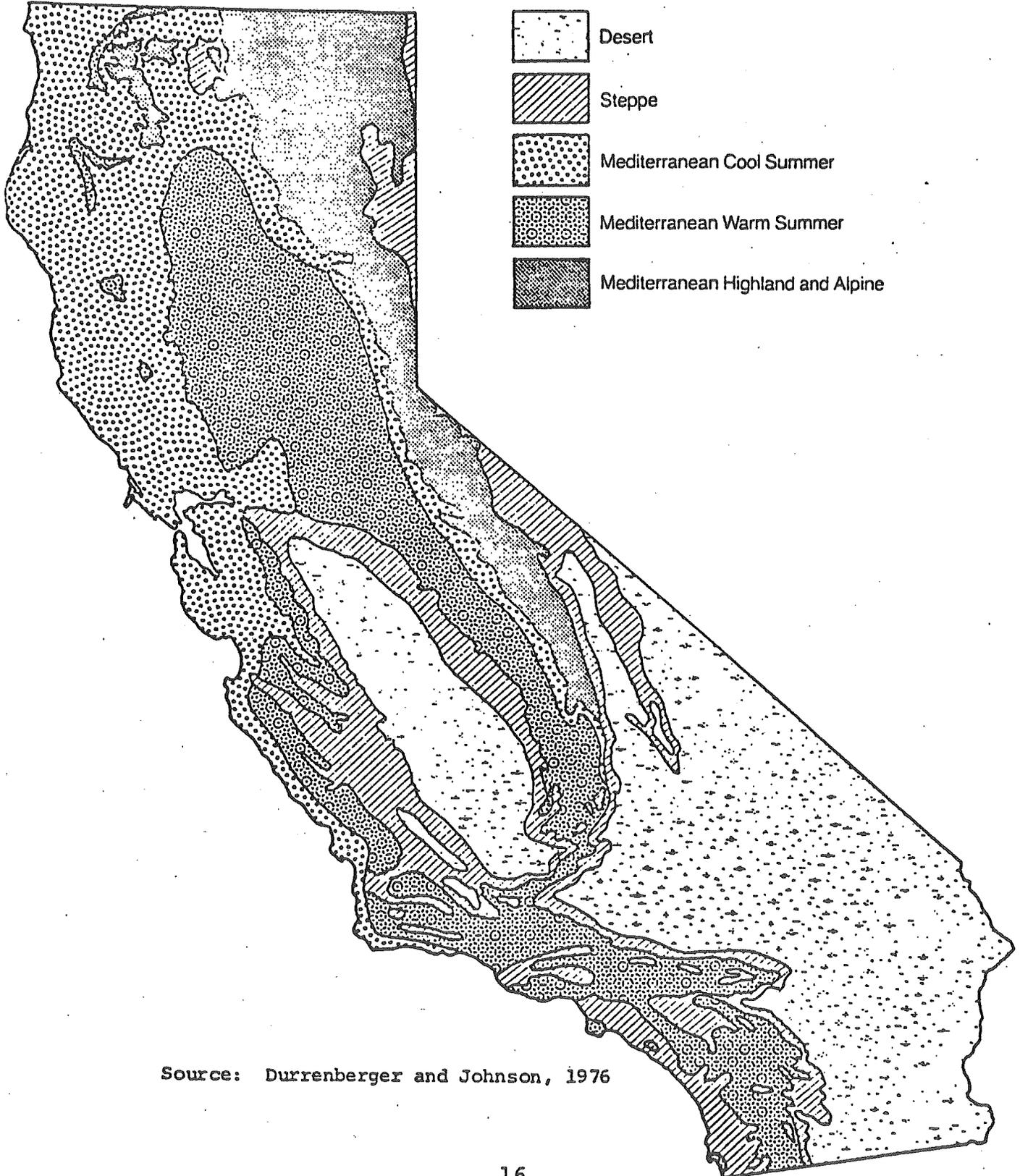
For example, the immediate coast and westerly slopes of the State's mountains receive more rain than the eastern and southern slopes. These eastern slopes fall in typical "rain shadows" (see Figure 1-4). Precipitation also decreases in California from north to south because the Pacific westerlies lose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

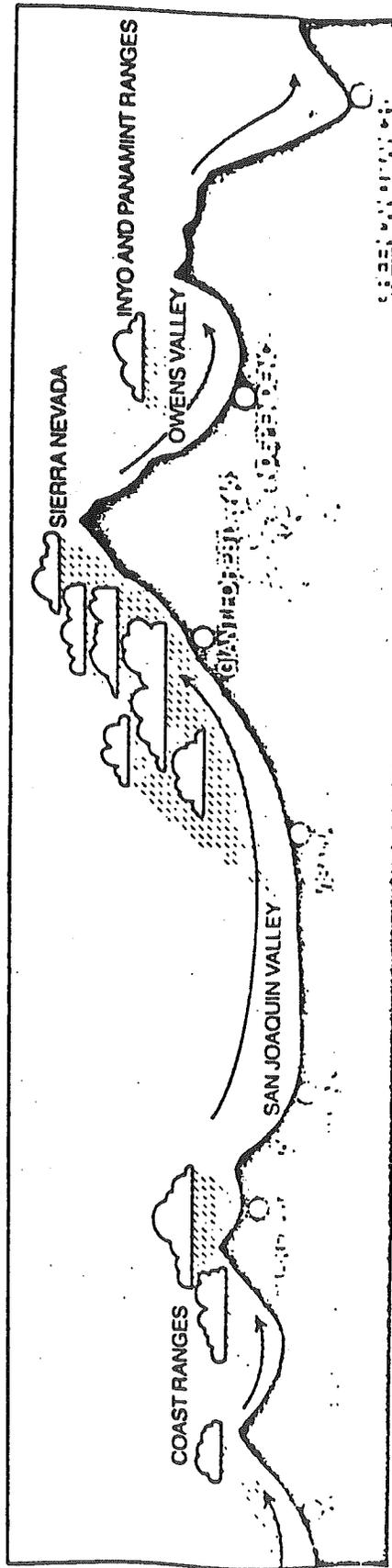
Snow is the major form of precipitation in high, forested mountainous areas, and is the chief source of water for California's vast agricultural production and urban settlements. The snow season is from October to May, the same time as rain falls on the lowlands of the State.

Figure 1-3  
Climate



Source: Durrenberger and Johnson, 1976

**Figure 1-4**  
**Rain Shadows**  
(West-East Cross Section)



Source: Durrenberger and Johnson, 1976

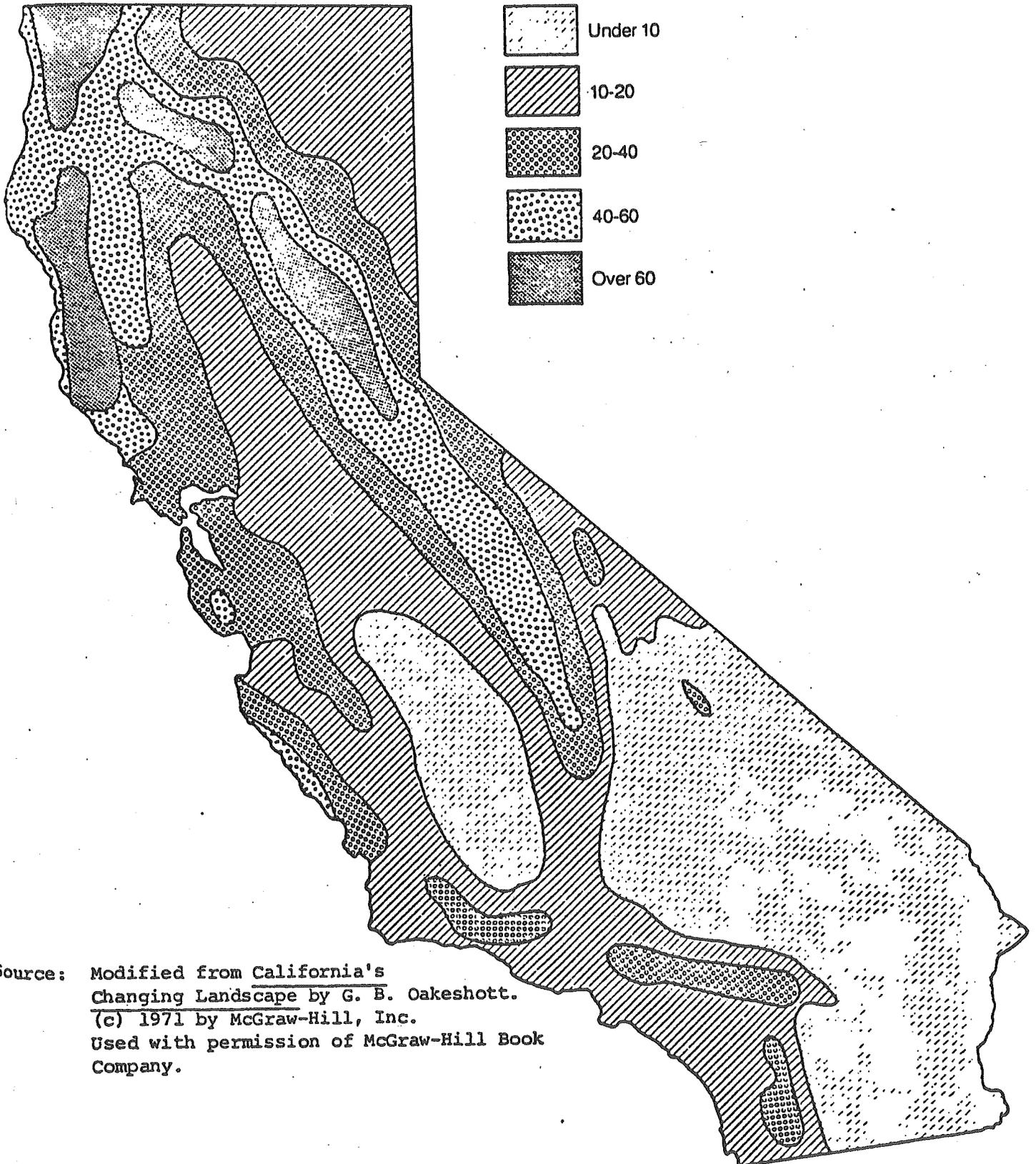
Table 4

Average Annual and Monthly Rainfall

	ELEV.	ANNU.	J	F	M	A	M	J	J	A	S	O	N	D
Ituras	4365	12.97	1.73	1.44	1.40	1.09	1.27	1.03	.26	.21	.42	1.10	1.34	1.60
Aberfeld	489	6.38	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	.38	.16	.26	.42	.90
Big Bear	6800	37.19	5.50	7.29	7.08	3.02	.30	.10	.67	.44	.65	1.71	2.87	7.36
Bishop	4108	5.76	1.42	.80	.73	.29	.30	.09	.10	.11	.17	.27	.40	.89
Blithe	268	4.33	.49	.51	.48	.15	.02	.03	.24	.61	.38	.27	.28	.69
Bridgeport	6420	10.47	1.57	1.78	1.08	.64	.42	.45	.51	.32	.24	.64	.98	1.85
Durbank	699	13.88	2.35	3.06	2.25	1.21	.27	.07	T	.02	.29	.52	.98	2.66
Chico	230	26.60	4.75	4.58	3.55	3.10	1.15	.42	.01	.07	.20	1.58	2.48	5.75
Coalinga	676	6.62	1.06	1.31	1.34	.58	.21	.04	.01	.01	.07	.28	.49	1.54
Crescent City	45	65.36	10.71	9.30	7.81	4.15	2.97	1.78	1.53	.31	1.24	8.09	7.13	10.36
Davis	51	16.58	3.17	3.13	2.37	1.22	.57	.15	T	T	.05	.87	1.41	3.62
Escalante	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	.62	.12	.16	.88	2.74	5.09	6.48
Fort Bragg	80	37.85	6.88	5.88	5.16	2.60	1.64	.64	.08	.01	.31	2.89	4.38	7.62
Fresno	294	9.31	1.57	1.66	1.63	.98	.28	.11	.01	T	.05	.66	.75	1.63
Greenland Ranch	-168	1.90	.14	.29	.21	.17	.07	.01	.11	.19	.12	.10	.18	.33
Indio	11	3.01	.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	.28	.61	2.39
Long Beach	34	13.80	2.31	3.40	2.03	.80	.09	.08	T	.05	.23	.45	1.21	3.17
Los Angeles	312	14.54	2.38	3.37	2.36	1.17	.28	.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
Marbleville	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	.18	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	709	14.36	3.04	2.62	2.21	1.04	.30	.10	.06	.01	.01	.42	1.09	3.46
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	1.08	.45	.02	.05	.33	1.49	2.27	4.23
Redding	577	39.80	7.14	5.81	5.13	3.10	1.75	1.18	.11	.08	.26	2.44	3.75	7.88
Riverside	820	11.96	1.79	2.58	2.00	.91	1.18	.04	.01	.20	.11	.60	.87	2.67
Sacramento	25	18.09	3.62	2.98	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	.28	.03	.02	.08	.18	.55	.83	2.72
San Diego	19	8.80	1.90	1.94	1.52	.70	.29	.05	.04	.09	.10	.44	.89	1.94
San Fernando	950	16.63	3.84	4.09	3.07	1.27	.18	.10	.01	.05	.24	.54	1.34	4.10
San Francisco	92	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	2.58	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	.03	.04	.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	3.60	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	.03	.13	.72	1.06	3.05
Santa Marta	238	14.49	3.02	2.49	2.55	.99	.21	.20	.04	.03	.14	.75	.90	2.95
Santa Monica	0	12.87	2.21	2.64	2.49	.74	.08	.01	.01	.01	.21	.31	1.08	3.10
Santa Rosa	167	39.40	5.74	5.08	4.21	2.14	1.00	.35	.02	.01	.09	1.55	3.15	6.06
Scotts	139	48.71	8.53	7.12	6.56	2.93	1.88	.77	.05	.05	.38	3.88	6.80	9.73
Stockton	11	16.62	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	4.67	1.96	1.20	.64	.28	.10	.34	2.10	3.96	5.71
Victorville	2750	6.38	1.13	1.10	1.11	.48	.08	.60	.03	.18	.16	.34	.53	1.24
Yosemite N. Park	3985	37.62	6.41	6.90	5.33	3.17	1.37	.50	.24	.07	.38	2.00	3.61	7.41

Source: U.S. Weather Bureau (in Durrenberger, 1972)

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.

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 winter. 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. Figure 1-4 illustrates snow patterns.

#### (4) Temperature

Temperatures vary widely within the State and its forested regions. Temperature data is in Figure 1-5.

#### (5) Winds

Wind patterns are shown in Figure 1-6. 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.

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.

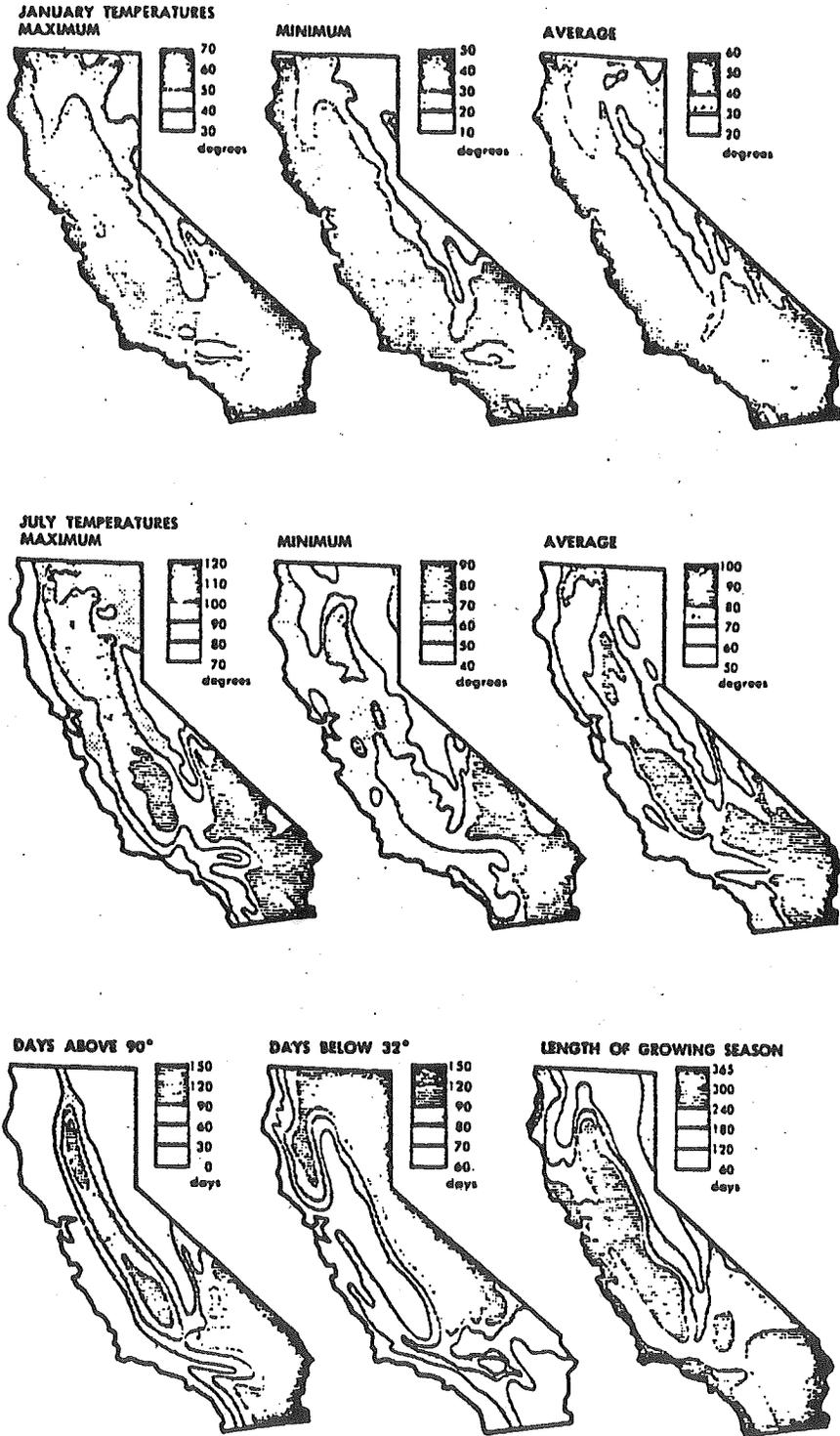
Mountain-valley breezes form in a similar way. Solar heating of the land during the day creates rising warm air, which tends to move upslope following the terrain. At night, the air flow is reversed as radiation cools the land and chills the air above it. This cooled air drops down into the lowlands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

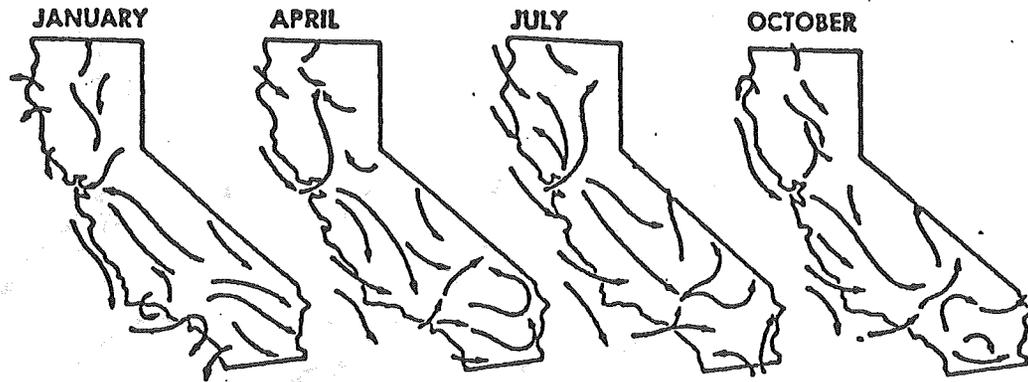
Atmospheric conditions that create temperature inversions and permit stagnant air masses to remain the long periods of time

FIGURE 1-6  
Temperature

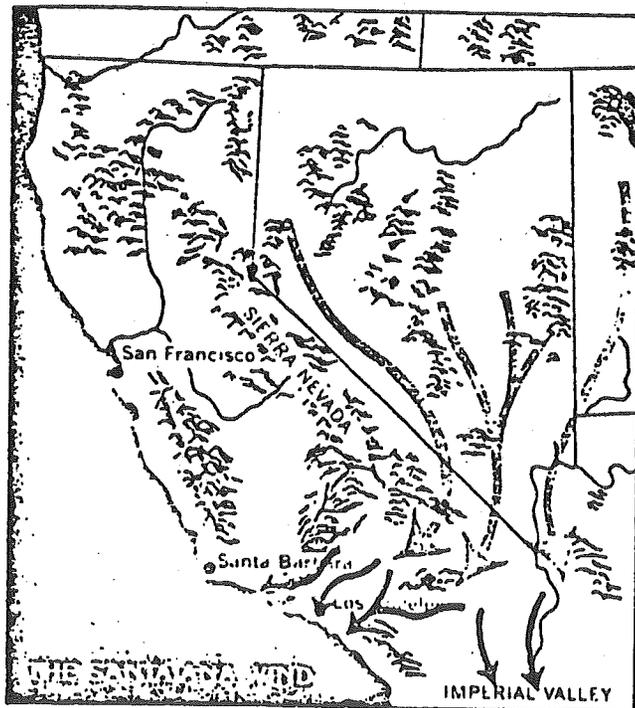


Source: U.S. Weather Bureau (in Durrenberger, 1972)

FIGURE 1-7  
Wind Patterns



Source: Durrenberger and Johnson, 1976



Source: Anderson, 1975

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 nighttime 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 runoff, springs, groundwater, and storage reservoirs all depend on watersheds where rain or snow fall. About 85 percent of developed water supplied 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 runoff is 71 million acre feet. Figure 1-7 shows the watershed origin of the runoff. About 82 percent of California's water yield comes from forested areas, some of which are prospectively affected by this project.

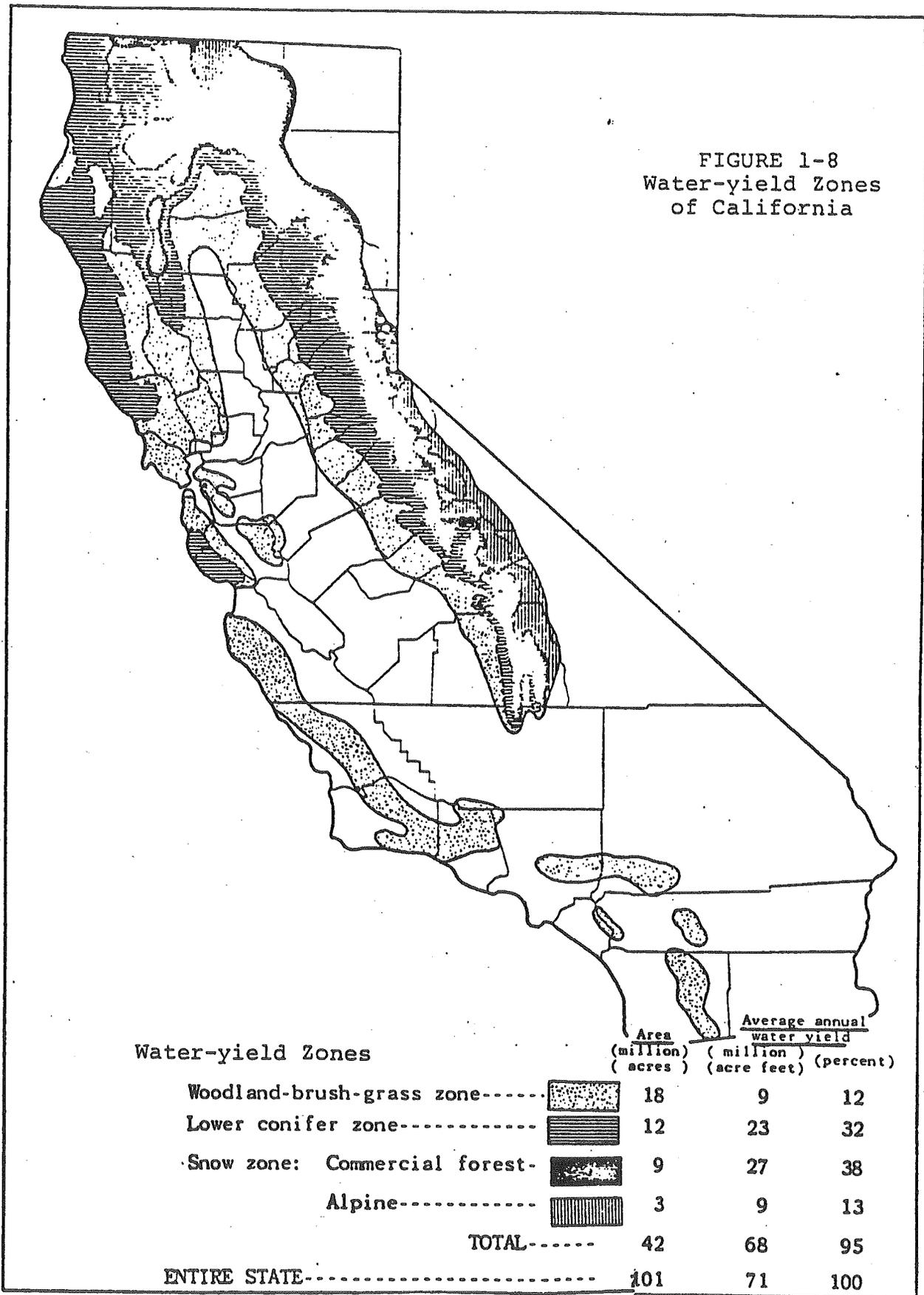
These same watersheds provide replenishment of underground water basins with a storage capacity of 1.3 billion acre feet (DWR, 1975).

#### (D) Vegetation (Plant Communities) and Forest

##### (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 micro climate, that is the climate

FIGURE 1-8  
Water-yield Zones  
of California



Source: Modified from Anderson, 1963

near the ground, by reducing solar radiation, reducing temperature extremes, increasing relative humidity by transpiration, add humus to the soil, acting as windbreaks, and modifying 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.

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. This project is such an activity, however, it is designed to ameliorate past damage and enhance future productivity.

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 Griffen 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 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.

Griffen, et al, (1972), contains detailed maps that can be approximately matched to the "forest land" of Assembly Bill 3304. 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>	(tan-oak)
<u>Pinus</u>	(pine)
<u>Quercus</u>	(oak)
<u>Sequoia</u>	(redwood)

Table 5.

Comparison of plant communities,<sup>1</sup> vegetation zones,<sup>2</sup> vegetation types,<sup>3</sup> and forest cover types<sup>4</sup>

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)

<sup>1</sup>Munz (1959).

<sup>2</sup>Franklin and Dyrness (1969).

<sup>3</sup>"Potential natural vegetation types"--see Kuchler (1964).

<sup>4</sup>Society 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. The community is "California" - four of its common trees are endemic. Many of its shrubs and herbs are also endemic. Blue oak and digger pine characterize the 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. 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 California, Southern Oak Woodland, blue oak is replaced by Engelmann oak, and coast live oak is important. 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 occurs 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 safebrush 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 sequoias occur in the Mixed Conifer Forest.

To the east relatively pure pine stands reappear. In the north-east 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 bigcone 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 tan-oak, 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. Tan-oak 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, podsolized 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 40 million acres are forest (see Table 6).

Table 6. Area by Major Vegetation Type, California, 1975<sup>1/</sup>

Land Use or Vegetation Type	Thousand Acres	Percent
Productive forest (see Table 7)	17,944	17.9
Unproductive forest (see Table 8)	22,216	22.2
Coastal sagebrush	2,300	2.3
Inland sagebrush	3,800	3.8
Desert	23,900	23.9
Grassland	12,000	12.0
Riparian, marsh, tidelands	700	.7
Barren	11,000	11.0
Urban, industrial, roads, and other	4,390	4.4
Totals	100,050	100.0

<sup>1/</sup> Bolsinger, 1979

Table 7, Productive Forest Site Class and Ownership

Forest Survey CFL Site Class (based on cu. ft. growth)	Site Class <sup>1/</sup> (14 CAC 1060) (based on height of trees)		"Project" Area (Other Misc. Private and Farmer All Public and Private Owners)	
	Rwd	DF	Pine, Fir	-----thousand acres-----
165	I, II, III	I	I, II	501
120-164	III	II, III	III	721
85-119	IV, V	III, IV	IV	792
50-84	V	IV, V	V	1,033
20-49	V	V	V	<u>504</u>
			Subtotal CFL	3,551
Productive Reserved and Deferred <sup>2/</sup>				-
Site Unknown				<u>45</u>
			Total Productive Forest	3,596
				<u>17,944</u>

Source: Bolsinger 1979

<sup>1/</sup> Acreages are based on forest survey site class. As shown, acres are approximate for site classes of Assembly Bill 3304.

<sup>2/</sup> Not including RARE II

This project is confined to private "forest land"<sup>1/</sup> and certain practices, i.e., reforestation, thinning, and clean and release (alternative) are further confined to "commercial forest land" (CFL).<sup>2/</sup> In addition the reforestation, thinning and clean and release (alternative) are directed to or biased toward high site lands. The project is also directed only to small private owners. The acreage of CFL in this ownership by site class is shown in Table 7.

The ownership of the broader "forest land"<sup>3/</sup> class which 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, of the approximately 18 million acres of private forest land, probably about 40 percent 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.

Table 8. Area of "Unproductive" Forest, California, 1975<sup>1/</sup>

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 <sup>2/</sup>	7,586
Pinyon-juniper	2,696
Oak woodland	5,779
Total	22,216

<sup>1/</sup> Bolsinger, 1979

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

<sup>1/</sup> Land 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.

<sup>2/</sup> Land capable of producing 20 cubic feet per acre per year of industrial wood and not withdrawn from timber utilization ("industrial wood" excludes fuelwood).

<sup>3/</sup> See footnote 1, page 31.

(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 1850's, 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" (Assembly Bill 3304 definition). 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). There are no known rare and endangered fish in California directly related to forest conditions.

### (3) Terrestrial Wildlife

Terrestrial wildlife can usually be associated with a "habitat" or plant community (see page 23). However, because of the mobility of wildlife, various habitats may be cyclically used for various purposes.

The lower, drier 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, humming birds, swallows, quail, and partridge, 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 small mammals.

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

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

Practices of this project may actually be directed at certain wildlife species, either to increase (+) or decrease (-) their populations as shown below.

Wildlife Directly or Indirectly  
Affected by FIP Practices

<u>Name</u>	<u>(+/-)</u>	<u>Reason Affected</u>
Mice (Peromyscus sp) and gophers	(-)	Poisoned to protect tree seed.
Porcupine (Erethizan dorsatum)	(-)	Killed to protect trees.
Squirrels (Scuirius, Eutamias)	(-)	Killed to protect seed; robbed of seed for use in project.
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 (Oreortyx sp.)	(+)	Favored by brush treatment, fish and wildlife practices, game improvement.
Pheasant	(+)	Favored by brush treatment, fish and wildlife practices, game improvement.
Pigeon (Columba sp)	(+)	Favored by brush treatment, fish and wildlife practices, game improvement.
Turkey (Meleagris sp)	(+)	Favored by brush treatment, fish and wildlife practices, game improvement.
Passerines	(+)	Habitat favored (+) or destroyed (-).
Woodpeckers	(+)	Habitat favored (+) or destroyed (-).
Passerines, Jays, Crows	(-)	Poisoned by treated seed.
Rattlesnakes	(-)	Killed by woods workers.

The mountain forests (see page 23) 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 squirrel 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 livers 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. Species affected by reforestation and thinning are shown below:

Wildlife Affected by FIP Practices  
(Especially Reforestation, Thinning)

<u>Species</u> (+/-)	<u>Reason</u>
Mice ( <u>various</u> ) (-) and gophers	Poisoned to protect seed, usually disfavored by conifer forest except for one or two species.
Woodrat ( <u>Neotoma</u> sp.) (+)	Poisoned to protect seed and trees. May be favored by forest in long run. Disfavored by hardwood control.
Porcupine (-)	Killed to protect trees.
Squirrels, chipmunks (+)	Initially poisoned to protect seed, usually favored in long run by conifers, somewhat disfavored by hardwood control.
Deer (+)	Favored by wildlife practices, usually initially favored by clearing for reforestation. Long-term disfavored by conifer forest.
Pigeon (-)	Disfavored by brush control.
Woodpeckers, creepers, muthatch, chickadee, grosbeak, brouse, owl, goshawk, siskin, etc. (+)	Disfavored by brush control. Habitat is conifer forest.

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.

(4) Rare, Endangered, and Threatened Species

The California Native Plant Society (CNPS) has listed and mapped the vascular plants of California which they consider to be rare or endangered species. Because the list is so extensive

(740 species of highest priority, 556 species of lower priority, and 134 species of formerly considered rare plants described now as not rare, but of limited distribution) the list is not included here.

This effort is ongoing and looseleaf handbooks of all rare and endangered plants have been prepared. The Fish and Game Commission has listed 11 plants as endangered and 18 plants as rare in 14 CAC 670-2 under the authority of Fish and Game Code 1904-7. These are shown below:

Rare:

- (1) Marin bent-grass (Agrostis blasdalei var. marinensis)
- (2) Large-flowered fiddleneck (Amsinckia grandiflora Kleebl. ex Gray)
- (3) Vine Hill manzanita (Arctostaphylos densiflora)
- (4) Dwarf golden star (Bloomeria humilis)
- (5) Maritime ceanothus (Ceanothus maritimus)
- (6) Mason's ceanothus (Ceanothus masonii)
- (7) Camatta Canyon soap plant (Chlorogalum purpureum var. reductum)
- (8) Santa Monica Mountains live-forever (Dudleya cymosa ssp. marcescens)
- (9) Santa Susana tarweed (Hemizonia minthornii)
- (10) Lake County dwarf flax (Hesperolinum didymocarpon)
- (11) Baker meadow-foam (Limnanthes bakeri)
- (12) Milo Baker lupine (Lupinus milo-bakeri)
- (13) Eureka Dunes evening primrose (Oenothera avita ssp. eurekensis)
- (14) Point Reyes blennosperma (Blennospermum nanum var. robustum)
- (15) Pismo clarkia (Clarkia speciosa ssp. immaculata)
- (16) Sonoma narrow-leaved bird's beak (Cordylanthus tenuis ssp. capillaris)
- (17) Birds-on-nest (Cordylanthus nidularis)
- (18) July gold (Dedeckera eurekensis)

Endangered:

- (1) Presidio manzanita (Arctostaphylos hookeri ssp. ravenii)
- (2) Chinese Camp brodiaea (Brodiaea pallida)
- (3) Tiburon mariposa (Calochortus tiburonensis)
- (4) Pitkin Marsh Indian paint brush (Castilleja uliginosa)
- (5) Presidio clarkia (Clarkia franciscana)
- (6) San Bernardino bird's beak (Cordylanthus eremicus ssp. bernardinus)
- (7) Contra Costa wallflower (Erysimum capitatum var. angustatum)
- (8) Boggs Lake hydge-hyssop (Gratiola heterosepala)
- (9) Pitkin Marsh lily (Lilium pitkinense)
- (10) Antioch Dunes evening primrose (Oenothera deltoides var. howelli)
- (11) Vine Hill clarkia (Clarkia imbricata)

In addition the U.S. Fish and Wildlife Service has classified four plants on San Clemente Island as endangered.

Of these plants the manzanitas are the only ones threatened by forestry practices. The others might inadvertently be damaged by the wildlife practices or land conservation practices.

Fish and wildlife species designated as rare, endangered, and threatened are currently protected by two mechanisms: the California Endangered Species Act of 1970, administered by the Department of Fish and Game (Cal. Dept. of Game, 1976), and the Federal Endangered Species Act of 1973, administered by the U.S. Fish and Wildlife Service. Under the provisions of the California Endangered Species Act, the taking, selling, or possessing of species identified by the California Department of Fish and Game as rare or endangered, is prohibited. In addition, the Department of Fish and Game conducts ecological studies to determine the habitat requirements and management of each species. California law specifies the conditions when a species is considered endangered and other conditions for classification as rare.

A species is declared rare if any of the following conditions exist:

(a) Species is confined to a relatively small and specialized habitat and is incapable of adapting to different environmental conditions.

(b) Although found in other parts of the world, it is nowhere abundant.

(c) It is so limited that any appreciable reduction in range, numbers, or habitat would cause it to become endangered.

(d) If current management and protection programs were diminished in any degree, it would become endangered.

The only species likely to be affected by this project are shown below:

<u>Species</u>	<u>Reason Affected</u>
Yellow-billed cuckoo	Riparian forest habitat
Bald Eagle	Forest and tree nests
Kit Fox	Possible woodland user
Wolverine	High mountain forests
Garter snakes	Inhabit forest edge
Salamanders	Use forest zones

Wildlife and land conservation practices can be instituted to improve conditions for these species.

(F) 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, the university and the soil survey reports of the Soil Conservation Service are available for most forest areas. These maps show soil "series" or "association." These classifications relate to parent material, 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.

(G) Archaeology/Cultural/Historical

As with its natural features, California's archaeological, 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").

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 archaeological resources do exist on forest and commercial forest land, or closely associated therewith. Riparian forests often contain significant archaeological 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 have become 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 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 Archaeological Site Survey: current archaeological site information may be obtained from the Regional Officer of the California Archaeological Site Survey.

The Regional Officer maintains records on (a) the location of archaeological sites in any given area, 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. Based upon this knowledge, the Regional Officer can make suggestions for mitigation or avoidance of potentially adverse effects.

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: archaeological or other sites which have religious and medicinal value to Native Americans; burial sites; cemeteries; or other features, including vegetation, to which an ethnic community may attach particular significance.

### III. ENVIRONMENTAL EFFECTS

#### (A) Reforestation and Brush Habitat Improvement Practices

##### (1) 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 small in relation to the surrounding areas, any impact, 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 runoff and overland flow once the soil has become thoroughly saturated.

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 and grass of hardwood trees 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.

Various types of 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 longterm vegetative cover results in a change in the longterm water demand on the watershed.

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) Response to a particular treatment is variable and most unpredictable.
- (e) 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 runoff due to removal of the brushfield litter. This will result in a short-term increase in water yield.
- (f) 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.

(h) For areas that have been substantially damaged by wildfire the effects of reforestation, or wildlife improvement, effects are the same as above, except that the fire-caused effects are often more severe, although not caused by the practice.

## (2) Water Quality

Water quality in 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, soils, 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, temperature changes, pesticide residues, 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. This impact is discussed 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.

## (3) Soil

Surface soil movement is the most obvious impact of reforestation and habitat improvement. The process of clearing the site of unwanted vegetation and 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 indirectly 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 or 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. Buring 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 is 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.

#### (4) 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. Clean and release does not quality for cost-sharing at this time (14 CAC 1527), which will eliminate much of the need for aerial application of herbicides. Herbicides may be aurally 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.

#### (5) Wildlife, Including Rare and Endangered Species.

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.

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

In clearing, burning, or operation of equipment in these practices, there is always 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.

Some specifics on wildlife relationships are also shown under "Environmental Setting."

#### (6) Archaeology, Cultural, Historical

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, archaeological campsites and possibly historic roads or trails.

Burning could destroy buildings or other cultural structures.

Vegetation materials or sites with ethnic significance could be distrubed.

#### (7) Brush Habitat Improvement (Additional Effects)

The environmental effects of this practice are similar to site preparation for reforestation as shown. 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, because steep ground is sometimes cleared. Clearing fires may escape control with severe damage.

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.

#### (8) 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 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. Surface soil is not usually disturbed.

The principal adverse environmental effect is the creation of large amounts of "slash" which is a fire hazard. Rare and endangered plants are not likely to be encountered in stands for which thinning is practicable.

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. If root disease problems are suspected, borax can be painted or spread on pine stumps to prevent thinned stumps from becoming infected.

#### (9) 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.

#### (10) Revegetation Along Stream Channels

The reestablishment of riparian vegetation is usually beneficial to aquatic life, including fisheries. The reestablishment of riparian vegetation along major streams, rivers, and wet areas would provide essential wildlife habitat (Dept. of Fish & 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.

The planting of phreatophyte type vegetation might cause water loss.

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.

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.

#### (11) 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 a 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 water quality degradation, erosion, tearing down of stream banks, and creation of animal wallows.

#### (12) Land Conservation Practices

The practice is 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.

### IV. MITIGATION MEASURES AND CEQA COMPLIANCE

#### (A) General

This Program EIR, the Resource Protection Guidelines (14 CAC 1545 et seq., Appendix A), and an environmental evaluation of each proposed project consisting of an Environmental Checklist (Exhibit A) supported by the Management Plan (Exhibit B) and Application (Exhibit C) 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, 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 Service Forester

will inspect the project area to assure that the responses to the checklist and the supporting material included in the plan accurately reflect conditions on the ground (see also 1532.1 and 1532.2). The checklist (Exhibit A) and the management plan will determine if CEQA documentation is required in addition to that provided by this Program EIR. The flow chart (Exhibit D) 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 CAC 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 Exhibits A, B, C for a review of the environmental checklist, management plan instructions, and application form.)

#### (1) Rare and Endangered Species

##### Plants

Location lists developed from the Native Plant Society looseleaf records are available at all Regional Offices of the Department. From these publications, locations of rare and endangered plants will be prepared and proposed projects will be checked against these lists. Any project proposed for an area listed as rare or endangered plant habitat will be inspected to see if the plant exists on the project site (See Environmental Checklist question No. 5). No treatments shall be permitted within areas critical to the survival of rare or endangered plants unless the proposed treatment will improve the habitat of such plant (14 CAC 1545).

## Animals

Because rare and endangered animals are mobile, their location cannot be pinpointed as easily as plants. Mitigation will consist of not disrupting habitat of the animals listed on page 29 above (14 CAC 1545). RPF's preparing management plans will check areas proposed for projects against At the Crossroads, the register for rare and endangered animals prepared by the Department of Fish and Game (see Environmental Checklist question No. 4). Areas identified in At the Crossroads as key habitat for rare and endangered animals, will be treated in a manner similar to that described above for rare and endangered plants (14 CAC 1545).

It would be possible to have all sites reviewed by the California Native Plant Society and/or the Department of Fish and Game personnel. This mitigation was rejected due to cost. It was felt that protection can be provided by reference to the Registers, At the Crossroads, and inspection by the RPF and CDF personnel.

### (2) 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 the limit noise to certain hours of the day or days of the week (14 CAC 1532.1).

### (3) Archaeological/Historic/Cultural Resources

To complete the Environmental Checklist (question No. 7) and management plan required for each project, the RPF will contact the Regional Officer of the California Archaeological Site Survey, inspect the area for archaeological, cultural, and historic resources, and will check proposed projects against the National Register of Historic Places, California Historic Landmarks, and the California Inventory of Historic Resources. If the Regional Officer's report, a visual inspection, or any of the registers listed indicate that archaeological, cultural, or historic resources may be located on areas proposed for practices which could harm such resources, special treatment areas necessary for the protection of such resources shall be designated. Notification of project locations for specific areas also will be provided local ethnic groups and historical societies at their request. Areas necessary for the protection of archaeological, cultural, historic resources will not be harmed (14 CAC 1545.8). \*

~~It would be possible to require inspection of all practice sites by a Department of Parks and Recreation archeologist. This mitigation was rejected due to cost. The review of registers and a RPF's inspection should be adequate to identify significant archeological, cultural, and historic resources.~~

#### (4) Pesticides

Existing federal, State, and local regulations and permitting programs will be used to mitigate the environmental effects of pesticide applications (14 CAC 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 non-restricted. 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,"<sup>1/</sup> unless the local commissioner has determined that pesticide can be used without "undue hazard" under local conditions. (Two commissioners require permits for nonrestricted pesticides.) "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.

The California Attorney General in 1976 rendered an opinion (SO 75/16) that the issuance of restricted materials permits was subject to the provisions of CEQA. The Legislature, in urgency legislation (Chap. 308, Stats. 1978): (a) required the application of CEQA to each major pesticide program (registration, evaluation, classification, licensing, monitoring, and the adoption of use regulations); (b) required that the CDFA first attempt to bring

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<sup>1/</sup> "Agricultural use" includes forestry uses.

these programs into compliance with CEQA by a "functional equivalent" process (P.R.C., Sec. 21080.5) rather than by the normal EIR process; (c) stated that the issuance of individual EIR's and negative declarations on pesticide use permits would be an unreasonable burden; and (d) enacted a moratorium on the application of CEQA on CDFA pesticide programs until January 1, 1981, or until functional equivalent certification is obtained.

Pesticides which will be allowed upon recommendation of a RPF and/or registered pest control advisor are shown in Table 9. All these 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 CAC 1545.5). Table 9 describes the use of each compound, its application, and the effects of non-use.

There has been considerable public controversy over the use of herbicides in forest management and agriculture. The latest comprehensive environmental documents on this subject are California Department of Food and Agriculture, 1978, and U.S. Forest Service, 1978. These documents evaluate the environmental effects of herbicide applications for forest improvement purposes and the effectiveness of existing regulatory programs in mitigating those possible effects.

This project will not allow the use of 2,4,5-T in any practice. This chemical is presently under the Rebuttable Presumption of Registration (RPAR) process of the federal Environmental Protection Agency (EPA). EPA was expected to finish the RPAR process for 2,4,5-T in the late spring of 1979. However, on March 1, 1979, EPA issued an "emergency" ban on the use of 2,4,5-T and Silvex.

The cleaning and release or "weeding" practices (see Alternatives), has not been proposed because 2,4,5-T as an aerial spray is often used for this practice. The decision to not offer this practice in the FIP program will be reviewed in three years by which time the RPAR process should be concluded and a final decision on 2,4,5-T by EPA should be available.

Other registered and nonregistered chemicals listed in Table 9 will be applied in conformance with existing local, State, and federal regulations and permitting programs. Aerial drift of sprays will be controlled by these permitting processes.

#### (5) Slides and Mass Movement of Soil

No heavy equipment will be allowed on potential or active slide areas (14 CAC 1545.3c) 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

Table 9. Effects of Herbicides Use and Non-use

Herbicide	COPA Status	Type	Usual/Use/Application	Alternatives; Effects of non-use.
Amino triazole	NR	Herbicide (nonselective) wettable powder	Ground foliage spray, seldom used except on poison oak. Persistent.	Profuse and continual sprouting and growth of poison oak.
Amate X (ammonium sulfate)	NR	Herbicide (nonselective) wettable powder	Ground foliage spray; fill and stumps. (Corrosive and seldom used.)	Profuse resprouting of brush species.
Atrazine	NR	Herbicide (selective to perennial weeds.)	Ground (some air) foliage spray or preemergence spray; persistent.	Invasion of site by perennial weeds and subsequent increase in rodent population.
Dicamba	R	Herbicide (selective to broad leaved plants), liquid.	Air or ground foliage spray. Used in synergistic combination 2,4d as a desiccant. Non-persistent.	Less effective burn.
Picloram	R	Herbicide (nonselective) liquid.	Cut surface (stump) treatment. Persistent.	Profuse resprouting of brush species.
Simazine	NR	Herbicide (selective to annual weeds), wettable powder.	Ground foliage spray or preemergence spray, persistent.	Invasion of planting site by annual weeds and subsequent increase in rodent population
2, 4D	R	Herbicide (selective to broad leaves in proper season), liquid.	Air or ground foliage spray, killing stumps; nonpersistent. Variability of 2,4-d compound in-activation in soil occurs because of differences in temperature, moisture, organic matter and soil micro-organisms. Studies indicate that virtually all detectable residue disappears within 30 days after normal (2-4#/acre) applications to vegetation on forest soils.	Profuse resprouting of brush species.
Chlorophacinone	R	Rodenticide, anticoagulant.	On baits and seed.	Destruction of seed and/or seedlings by rodents.
Strychnine	R	Mammal poison (rodenticide)	On baits for gophers, on bait or salt blocks for porcupines.	Severe damage or destruction of young trees by porcupines.
BGR	R	Big game repellent, liquid.	Foliage spray to protect plants.	Browsing damage to small trees.
Biram	R	Rabbit and deer repellent, liquid.	Foliage spray to protect plants.	Damage or destruction of young seedlings by girdling or browsing.

NR--Not Restricted  
R--Restricted

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.

(B) Reforestation and Wildlife Habitat Improvement

(1) 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.

Most of the reforestation projects will be on the better quality higher site timberlands which for the most part have a low potential for erodibility. Higher site forest soils generally are characterized by deep profiles, 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.

Land clearing for site preparation will be done during the dry season (14 CAC 1545.3b), 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 CAC 1545.3a). 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.

On steep slopes, mechanical clearing with bulldozers is not possible. Crushing and burning techniques have less impact on the soil than mechanical clearing because the soil horizons are not mixed or moved. Therefore, the possibilities of erosion from steep slopes are significantly reduced. The greatest displacement of soil by erosion occurs within the first wet season following the clearing operation. The combined mitigating effects provided by reforestation, litter accumulations, resprouting of brush, and the development of brush seedlings and various types of herbaceous vegetation can be expected to reduce run-off and erosion to insignificant levels by the second wet season.

The retention of a buffer strip of vegetation along streams where no mechanical clearing will be done (14 CAC 1545.1c) provides a natural filter that will help to prevent any eroded soil deposits from reaching the stream. A strip wider than the 50-foot from the stream transition line could be required. Wider strips may in some cases be required following environmental review of the site, but were not considered necessary for mitigation on all sites and, if adopted, wider strips would remove large areas of highly productive timberland from production.

It would be possible to only allow hand clearing as a mitigation measure for site preparation. This alternative mitigation was rejected because mechanical clearing is more cost-effective in many situations.

Clearing of spots, or long strips, in brush has been tried previously as a method of establishing trees. Less erosion and more retention of brush species would occur if this method were required. However, spot or strip clearing was rejected as a mitigation measure because tree establishment has been poor in California with this method. The brush reinvades too rapidly and harbors rodents so that trees do not become reestablished. The followup treatments that would be required are very expensive themselves and could result in environmental damage.

RPF's will identify those areas critical for domestic water supplies when responding to Environmental Checklist Question No. 3, 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 CAC 1545f). Any alternative mitigation would be less protective.

## (2) Energy

Some cleared vegetation can be harvested or manufactured into fuel. The program will encourage applicants to use cleared vegetation as wood fuel because the value of merchantable

by-products are not deducted from the State's cost share payments. Therefore, some of the cleared material will be converted into fuel as an economic and energy conserving measure.

### (3) 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 CAC 1545.4). Brush disposal by chipping, burying, hauling away, or other methods could have been required, but this option was rejected because of cost. The air pollution (wood smoke) problem is not severe in mountainous forest land areas.

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.

### (4) Wildlife

Mitigation for wildlife ordinarily occurs in reforestation because the clearings are usually irregular in size or shape, which creates patches and "edge effect" which is desirable wildlife habitat. Snags with visible evidence as nesting or roosting sites for rare, endangered, or threatened bird species will be retained (14 CAC 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 CAC 1545a, 1545e). It would be possible to prohibit all activities near streams, but this would remove high site timberlands from production unnecessarily.

Slash and debris will be kept out of streams. Accidental deposits will be cleaned up (14 CAC 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 practice will mitigate the adverse effects of fires.

(5) Brush Habitat Improvement: Additional

In addition to the same mitigation provided for site preparation in the reforestation practice the following mitigation measures are proposed for the brush habitat improvement practice.

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

Heavy equipment will not be used in the stream transition zone along "blue-line streams" (14 CAC 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 deerseason. As noted previously, no 2,4,5-T will be used. 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 CAC 1545.4).

(C) Precommercial Thinning

No heavy equipment may be used for thinning within 50-feet of the stream and lake transition line (14 CAC 1545.1c).

Slash created by thinning operations will be treated as required by area Fire Control Officers in high risk areas (14 CAC 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 CAC 1545.9) (see Environmental Checklist Question No. 6). Any burning will be in compliance with State and local laws and regulations (14 CAC 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 thru May 1st, could be imposed. This is not necessary if chipping, lopping, or slash burning is accomplished.

(D) Stream Clearance

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

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 CAC 1545.4).

For any operation in live streams appropriate Department of Fish and Game permits (F. & G. C., Sec. 1600 et seq.) will be required (14 CAC 1545.1).

Other stream clearance practices have not been proposed because of their potential for environmental damage (see Stream Clearance Alternative, page 73).

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

(E) Revegetation Along Stream Channels

Because no machinery is allowed within 50-feet of streams, there is little opportunity for erosion or stream bank deterioration. Planting should reduce erosion.

Applicants will be encouraged to consider phreatophyte problems and the effects of this practice on fishing and recreational access.

(F) Wet Meadow Fencing

Use of the fence design shown below will be encouraged.

Fencing for wet area protection will consist of 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.

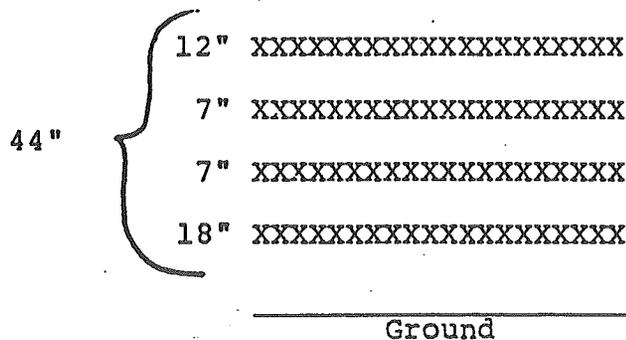


Exhibit A

Environmental Checklist

Water Quality

1. Is there any evidence of ancient or current landslides on the project area? \_\_\_\_\_

If the answer is yes, then 14 CAC 1545.3 (c) must be satisfied.

2. Are there any unusual circumstances or site conditions (e.g., soil type, slope, size of project, soil moisture) that would indicate that the Resource Protection Guidelines (14 CAC 1545 through 1545.9) will not adequately mitigate surface erosion effects? \_\_\_\_\_

If the answer is yes, then complete an Initial Study.

3. Are there any domestic water supplies located on the project area? \_\_\_\_\_

If the answer is yes, then 14 CAC 1545 (f) must be satisfied.

Rare or Endangered Animals

- 4 (a). Does the project area include any of the habitat of any of the rare or endangered animals listed by the Department of Fish and Game in At the Crossroads? \_\_\_\_\_

If the answer is yes, then 14 CAC 1545 must be satisfied.

- (b). Are there any snags with visible evidence of use as nesting or roosting sites for rare, endangered, or threatened birds? \_\_\_\_\_

If the answer is yes, then 14 CAC 1545 must be satisfied.

Rare or Endangered Plants

- 5 (a). Does a review of the California Native Plant Society Registers indicate that any rare or endangered plants may exist on the project area? \_\_\_\_\_

- (b). If the answer to (a) is yes, has a field inspection located such plants on the area? \_\_\_\_\_

If the answer to (b) is yes, 14 CAC 1545 must be satisfied.

Forest Insects and Disease

6. Is any pre-commercial thinning proposed for three-needle pines between November 1 and May 15? \_\_\_\_\_

If the answer is yes, then 14 CAC 1545.9 must be satisfied.

Archaeological, Historic, and Cultural Resources

7. Does one or more of the following indicate that any archaeological, historic, or cultural resources are located on the project area?

1. National Register of Historic Places \_\_\_\_\_
2. California Inventory of Historic Resources \_\_\_\_\_
3. Inspection of project area \_\_\_\_\_

If the answer is yes, then 14 CAC 1545.8 must be satisfied.

General

8. Will the project result in any significant environmental effects other than those listed in the table below? \_\_\_\_\_

If the answer is yes, then an Initial Study must be prepared.

9. Except for surface erosion effects (see question 2), are there any unusual circumstances or site conditions that would indicate that the Resource Protection Guidelines will not adequately mitigate any of the effects listed in the table below that may occur? \_\_\_\_\_

If the answer is yes, then an Initial Study must be prepared.

## Possible Effects and Mitigation Measures

### Effect

### Mitigation

#### Water Quality

1. Soil Deposition in streams caused by accelerated erosion due to using heavy equipment to remove vegetation. (DEIR pp. 59, 71.)

1. Brush scalped off slopes will be windrowed along the contour and burned leaving effective berms of residual soil to impede surface water flow. (14 CAC 1545.3a)

2. No heavy equipment on excessively wet soils. (14 CAC 1545.3b)

3. No heavy equipment within 50' of stream and lake transition line therefore leaving buffer strip. (14 CAC 1545.1c)

2. Landslides and slope failure due to heavy equipment operation on currently & potentially unstable lands. (DEIR pp. 59, 71)

No heavy equipment on current or potentially active slide areas. (14 CAC 1545.3c)

3. Increased water temperatures due to removal of streamside shading. (DEIR pp. 59, 44)

1. Leave riparian vegetation. (14 CAC 1545a)

2. Leave other vegetation as necessary to maintain stream temperature. (14 CAC 1545e)

4. Increased turbidity and sediment load in streams from clearing stream channels. (DEIR p. 59)

Compliance with Fish and Game Code. (14 CAC 1545.1)

5. Deposit of slash, debris in streams.

All streams below stream and lake transition line will be kept free of slash and debris. Accidental deposits will be cleaned up. (14 CAC 1545.1)

6. Accidental off-target deposition of herbicides due to spills and aerial drift. (DEIR p. 69)

Compliance with Federal EPA, Cal. Food and Ag. Code, County ordinances as enforced by County Ag. Commissioners. (EPA has suspended use of 2,4,5-T) (14 CAC 1545.1)

7. Effect on domestic water supplies from sediment deposits.

Establishment of Special Treatment Areas to protect domestic water supplies. (14 CAC 1545.f)

#### Wildlife, Plants

8. Damage to rare and endangered plants as part of vegetation removal. (DEIR p. 61)

California Native Plant Society registers will be reviewed and if necessary, project will be inspected for rare and endangered plants. If such plants are present Special Treatment Areas will be designated and no practices may be performed thereon unless proposed practices improve rare or endangered species habitat. (14 CAC 1545)

9. Damage to rare and endangered animal habitat as part of vegetation removal. (DEIR p. 61)

Same process as for rare and endangered plants except that applicant will consult At the Crossroads, the Department of Fish and Game's (DFG) inventory of rare and endangered animals and their habitat. (14 CAC 1545)

Effect

Mitigation

10. Siltation of stream gravels important for spawning by accelerated erosion due to vegetation removal. (DEIR p. 59) See Mitigation for Significant Effect #1.
11. Contamination of game meat with herbicides. Compliance with Federal EPA, Cal. Food and Ag. Code, and County ordinances as enforced by County Ag. commissioners. (EPA has suspended use of 2,4,5-T) (14 CAC 1545.4)

Forest Insects and Disease

12. Possible infestation of residual stands of three-needle pines with IPS and dendroctonus beetles if slash from wet season pre-commercial thinning operations not adequately disposed (DEIR p. 75) No pre-commercial thinning of three-needle pines November 1 and May 15 unless risk of beetle infestation is reduced by chipping, burning, logging or otherwise treating thinning slash. (14 CAC 1545.9)
13. Infestation of pine stands with root rot pathogens after pre-commercial thinning. (DEIR p. 75) Allow application of borax on thinned stumps to qualify for cost share payments.

Air Quality

14. Particulates in air from burning brush. (DEIR p. 60) Compliance with Air Resources Board regulations and local ordinances. (14 CAC 1545.4)
15. Contamination of air from aerial drifts of herbicides. (DEIR p. 69) Compliance with Federal EPA, Cal. Food and Ag. Code, and County ordinances as enforced by County Ag. Commissioners (EPA has suspended use of 2,4,5-T) (14 CAC 1545.4)

Archaeological Historic, and Cultural Resources

16. Disturbance of archaeological, historic and cultural resources when removing brush to plant trees or remove habitat. (DEIR pp. 53-55, 58) Archaeological and historic registers checked to see if such resources are on project area. Areas where such resources are found will be designated Special Treatment Areas and no practices will be performed thereon unless such practices improve protected resources. (14 CAC 1545.8)

Fire Hazard

17. Slash build-up after pre-commercial thinning increases fire hazard. (DEIR p. 63) Current state and local law and regulations as enforced by Area Fire Control Officer require slash disposal in high risk areas. (14 CAC 1545.4)
18. Risk of fire escaping. (DEIR p. 62) Compliance with all State and local laws and regulations. (14 CAC 1545.4)

## EXHIBIT B

### Forest Resource Improvement Management Plan Format and Instruction Sheet

#### Notice to Registered Professional Foresters:

The following list of topics is provided as a laundry list in preparing the narrative part of the management plan. Use only the subjects that are appropriate for your particular project or add new subject titles if necessary. Use your own paper and the text should be typed.

Any significant detailed information that can be best illustrated in map form should be attached. Examples are timber types, project delineation, unstable land areas, locations of any rare or endangered plants or animals, etc. Minimum acceptable map scale: 4 inches=1 mile. (1 inch=1320 feet)

Copies of the latest U.S.G.S. quadrangle map and soil vegetation survey map, both corrected to reflect actual ground conditions, should be attached.

If your responses to the environmental checklist indicate that the project may have some significant environmental effects, please discuss those effects in detail.

Landowner's Name:

Address:

County:

Registered Professional Forester Name:

Address:

Phone:

1. History
2. Management Objectives
3. Transportation System
4. Description of Soils and Site
5. Growing Stock-Species and age class distribution
6. Estimated growth per acre per year
7. Regeneration Needs- include species, planting rate and method
8. Cultural Needs
9. Silvicultural System
10. Land Conservation Practice Needs
11. Fish and Wildlife Improvement Needs
12. Fire Protection
13. Insects and Disease
14. Project Proposals-site preparation, planting, thinning, etc.

EXHIBIT C

Application for

Forest Resource Improvement Application

1. Who is the landowner submitting this application?, (Use additional sheets if necessary to list all owners.)

\_\_\_\_\_  
(Name) (Address) (Phone)

2. Who is the responsible person to be contacted, if different from the person above?

\_\_\_\_\_  
(Name) (Address) (Phone)

3. How is the project area owned?

\_\_\_\_\_ Fee Simple  
\_\_\_\_\_ Other. Please explain  
\_\_\_\_\_  
\_\_\_\_\_

4. Show the location of the proposed project by legal subdivision description or other description that will enable the Department to locate the project on the ground.

<u>Sub. Sec.</u>	<u>Section</u>	<u>Township</u>	<u>Range</u>	<u>County</u>	<u>Assessors #</u>	<u>Acreage</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

5. Do you own 5,000 acres or less of forest land in California? \_\_\_\_\_ Yes  
\_\_\_\_\_ No; less than 500 acres? \_\_\_\_\_ Yes \_\_\_\_\_ No.

6. How is the area proposed for the project zoned? \_\_\_\_\_ TPZ \_\_\_\_\_  
\_\_\_\_\_ Other. Please list uses permitted and indicate areas of different zoning on maps submitted with the management plan. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. Please answer for the non-TPZ lands proposed for timber-related practices described in paragraphs 2,3,4, and 7 of 14 CAC 1527(a):

(a) Does the landowner own 20 acres or more of forest land within and contiguous to the project?        Yes        No

(b) Is the total area proposed for all practices other than preparing a management plan 5 acres or more?        Yes        No

8. Will you agree not to develop any non-TPZ land subject to a project for uses incompatible with forest resource management?        Yes        No

9. (a) Has any of the land proposed for the project been harvested subject to the Z'berg-Nejedley Forest Practice Act?

       Yes        No

(b) If the answer to (a) is yes, is the work proposed for the project required by the Forest Practice Act?

       Yes        No If yes, which practices? \_\_\_\_\_

\_\_\_\_\_

(c) If the answer to (b) is yes, has a Report of Satisfactory Stocking been filed for areas harvested subject to the Forest Practice Act \_\_\_\_\_

       Yes        No. If yes, give approximate date and, if possible, number of Report. \_\_\_\_\_

(d) If the answer to (c) is yes, has the area been damaged by fire, insects, disease or other natural causes after the Report of Satisfactory Stocking was filed?        Yes        No. If yes, please briefly explain and identify in the management plan.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

10. Project Description and budget: Please complete the following table:

Area	Practice	Acreage	cost per acre	Total Cost per Practice

Total Acreage \_\_\_\_\_ Total Cost \_\_\_\_\_

Department Cost Share Rate?<sup>2</sup> (circle one) 80% or 90%

Total Department Cost Share Payments \_\_\_\_\_

Total Landowner Cost Share Payments \_\_\_\_\_

Notes:

1. Identify different areas proposed for practices on plan map.
2. See Question 12

11. How will the landowner finance his/her share of the project:

(a) Direct cash payments \$ \_\_\_\_\_.

(b) Materials (please itemize by price and quantity of each material provided) \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

(c) Services (please itemize by price and quantity of each service provided) \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

12. The Department may increase the cost sharing rate from 80% to 90% of the total cost of the project if the landowner satisfies any one of the following four conditions:

\_\_\_\_\_ The applicant owns less than 500 acres of land.

\_\_\_\_\_ 10% or more of the cost of the project will be devoted to forest land conservation measures and/or fish and wildlife habitat improvements.

\_\_\_\_\_ The project will be carried out primarily by persons living in the county or in adjacent counties to where the project will take place.

\_\_\_\_\_ The applicant agrees to increase recreational opportunities for the public. Please explain: \_\_\_\_\_

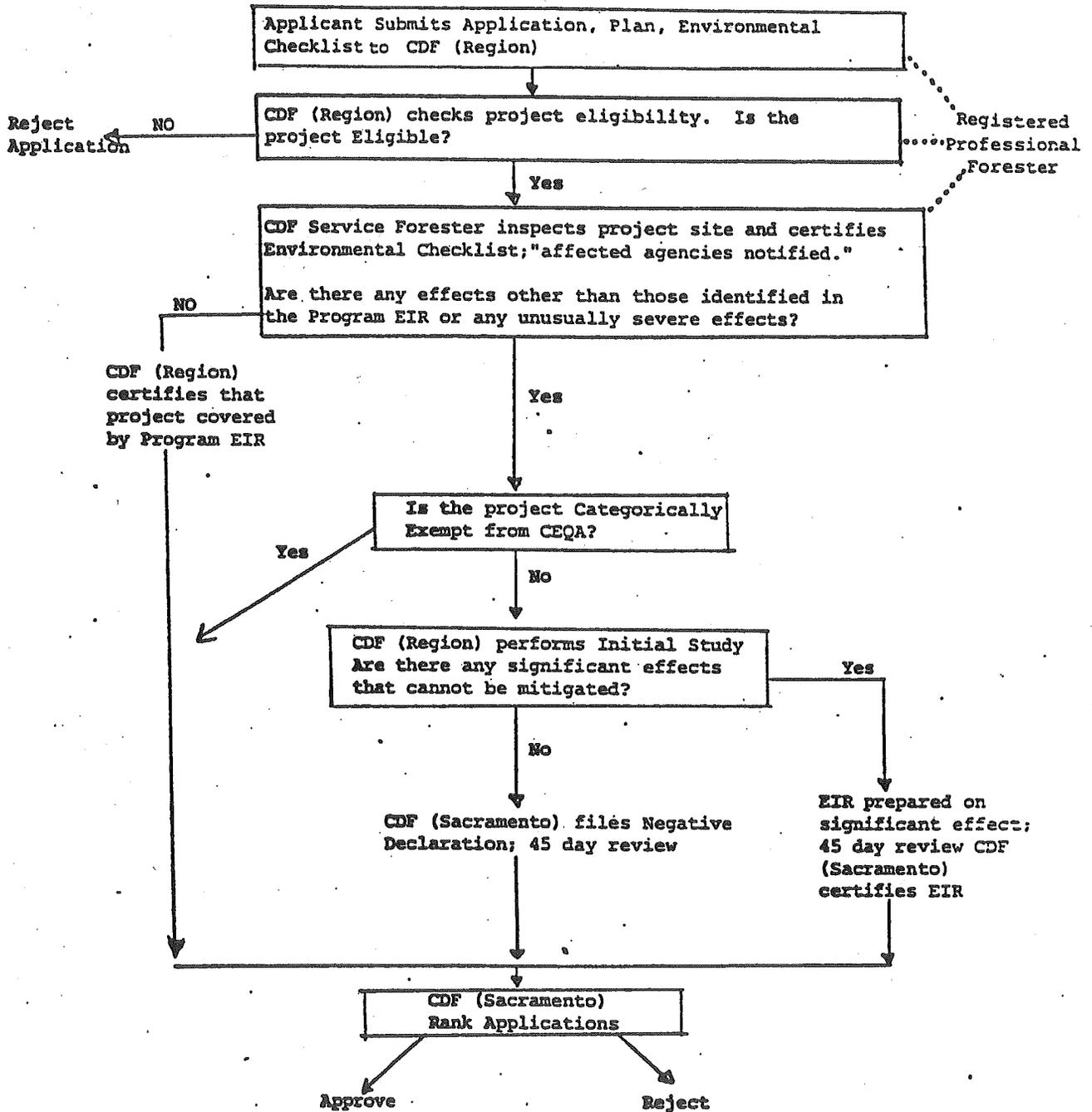
\_\_\_\_\_

13. Please give the name of the contractor who will carry out the project. State owner if appropriate. (The landowner can either furnish this information upon application or upon the Service Forester's request) \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Exhibit D

PROJECT APPROVAL FLOW CHART



(G) Land Conservation Practices

Any stream crossings, "blue-line stream" culverts, stream bank work, or stream crossings will be done under Department of Fish and Game Code, Section 1600, et seq. (14 CAC 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 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 guideline documents.

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.

V. ALTERNATIVE PRACTICES

(A) No Project Alternative

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 (see Table 10).

The federal government cost-shares these projects on private land through the existing Agricultural Conservation Program (ACP) and Forestry Incentive Program (FIP). Acreages treated in 1977 by these federal programs are shown in Table 10. Federal agencies also finance these practices on federal land; see Table 10 for area treated.

Many private timber growers also carry out the practices on private lands. Table 10 indicates that 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.

The area of land treated by forest land conservation measures and fish and wildlife improvement practices is not available, but it is clear that these practices are presently undertaken though probably to a limited extent.

Table 10.  
*Silvicultural accomplishments in California, July 1, 1975 - September 30, 1976, by ownership*<sup>1/</sup>

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 <sup>1/</sup>	NA	NA	NA	28,903
Site preparation for natural regeneration for release	3,046 36,430	1,205 212	2,141 12,739	160 1,572	6,552 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

<sup>1/</sup> Bolsinger, 1979

NA = Not available.

Table 11. Forest Improvement Accomplishment - 1977<sup>1/</sup>

Tree Planting on Private Land		<u>Acres</u>
Cutover Land <sup>2/</sup>		39,495
Other Industry		18,350
C.F.M. <sup>3/</sup>		<u>9,978</u>
Total		<u>67,823</u>
Direct Seeding on Private Land		
Forest Industry		690
Nonindustrial		900
C.F.M. <sup>3/</sup>		<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. <sup>3/</sup>		<u>5,480</u>
Total		<u>30,480</u>

- <sup>1/</sup> Best available CDF data - 12/13/78.  
<sup>2/</sup> Planting required by the Forest Practice Act, all owners.  
<sup>3/</sup> Cooperative Forest Management (CFM) program includes practices funded under federal ACP and FIP programs.

Without the project the acreage treated would probably continue to rise as it has in the recent past. It appears the project would increase the rates of practice accomplished over the no project alternative by between 30 percent and 100 percent on small ownerships depending on practice, response, and funding.

(B) Wildlife Habitat Improvement Alternatives

(1) Guzzlers: Alternative

Building wildlife watering facilities and devices such as guzzlers and spring development was considered as a practice.

It was decided not to offer this practice because it is more appropriate for grasslands, deserts, or similar nonforested areas not authorized for treatment by Assembly Bill 3304.

Mitigation of environmental effects and problems with livestock watering and other nonforest uses was also considered to be a problem.

(2) Stream Clearance: Alternative

It would be possible to have more environmentally hazardous practices such as:

(a) Removal of natural rock barriers.

(b) Removal of silt deposits, spawning gravel cleaning, and the addition of spawning gravel.

For environmental protection these activities should not be funded unless the application was jointly sponsored by the private applicant, DFG and RWQCB. In streams, the bed of which is claimed by the State Lands Commission, the SLC should fund a portion of the project.

This alternative was rejected due to possible adverse environmental effects and the complexity of working out multi-departmental procedures at this time.

(3) Water Diversion for Wet Meadows: Alternative

Water diversion to grow grass for wildlife in forest meadows is a wildlife improvement practice. This practice was not proposed for the following reasons.

(a) Adverse environmental effects of possible failure of diversion structures resulting in erosion and water loss.

(b) Problem of securing and checking on water rights. Possibility of the State becoming a party to water rights conflicts through practice funding. The possibility of diverting water needed for fish or other instream uses.

(c) Possibility of practice facilitating domestic livestock grazing which is outside the purpose of the Forest Improvement Act.

(d) Engineering and licensing problems of designing diversion structures, and the difficulty of managing tail water flows.

(C) Timber Management Alternatives

(1) Hardwood Conversion

Hardwood conversion is the changing or manipulation of a stand of forest trees, composed principally of hardwood species, to a stand of forest trees composed principally of coniferous trees. The removal of stands or portions of stands of hardwood trees to accommodate other resource values such as the improvement of wildlife habitat is included. Bolsinger (1979) and others, have pointed out that hardwood conversion and clean and release are pressing timber management needs in California.

Hardwood conversion may be accomplished by:

(a) Killing hardwood trees with herbicide by foliar applications (aerial or ground spray) or by basal spray or injection. Basal spray is soaking the bark and/or stumps with herbicide; injection is with specialized herbicide injection tools and usually includes "frilling" with axes, with herbicide poured in the "frills."

(b) Mechanical methods, that is, cutting or felling hardwoods with chainsaws and/or hand tools, or the use of heavy equipment such as crushers, bulldozers, hydro-axe, or other mobile equipment.

(c) Herbicide and mechanical methods are often used in combination.

## (2) Clean and Release Practice

Clean and release is the elimination of unwanted competing woody vegetation, such as hardwoods or brush, from an immature stand of commercial conifer trees. In a stand of coniferous trees, this operation can be accomplished by foliar application (aerial or ground spray) of selective herbicides, by basal spray or injection of herbicides; or by mechanical means. In a stand of conifers where hardwoods are also desired for management foliar sprays cannot be used. The other methods can be used to kill unwanted conifers or hardwoods.

Mechanical methods include felling or girdling of weed trees with chainsaws or hand tools, crushing, felling, or bulldozers, provided that the operation can be accomplished with minimal damage to the desirable trees that are left standing to grow.

In clean and release, suppressed or killed trees are not felled or removed from the stand.

The principal environmental effect of hardwood conversion and clean and release is changes in the species of trees kept for management on a particular site. Usually, hardwoods are the target species to be controlled. This has adverse effects on the species of wildlife that use hardwoods for food, nesting, or dens. Conversely, conifer using wildlife are favored. Some low vegetation may be favored so that deer and some other wildlife may be favored.

Hydrologic and water quality effects are minimal providing herbicides or poisons are not spilled or sprayed into water.

Standing dead trees usually provide useful wildlife habitat.

The slash and snags created by this practice are a fire hazard.

Surface soil disturbance is minimal, unless the hardwoods are harvested (which would be subject to Forest Practice Rules for CEQA compliance).

Archaeological resources are not likely to be affected as there is usually little soil disturbance.

Rare and endangered plants might be affected by aerial sprays.

It was decided not to offer hardwood conversion and clean and release at the present time due to the controversy over aerial sprays of herbicides and the use of the herbicide 2,4,5-T. This

herbicide and aerial spraying are presently under review by EPA and the California Department of Food and Agriculture. On March 1, 1979, the EPA declared an emergency ban on the use of 2,4,5-T. The decision to not offer clean and release as a practice will be reviewed in 1982.

Because clean and release is not offered, about 165,000 acres of commercial forest land will not be treated.

(D) 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 classes of private owners. 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. Land owner 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 land owners (See Table 1), but considerable amounts of the seeding and planting accomplished may be required by the Forest Practice Act. This latter planting and seeding would not be eligible.

If clean and release (Alternative (C) (2)) is not offered as a practice, reforestation might be more likely on large landowners than it would be for small owners. Large land owners might accomplish planting through the project and do cleaning and release with their own funds.

When loan regulations are proposed, they will be subject to CEQA.

VI. ADVERSE IMPACTS WHICH CANNOT BE MITIGATED

(A) There will be a 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.

(B) 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.

(C). 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 somewhat mitigated by less potential for wildfires under uncontrolled conditions.

(D) Using pesticides, including herbicides, will result in some air pollution due to drift. Two, 4-D and other pesticides will be present on the vegetation and soil for a short period of time. The 2,4-D will be decomposed by various processes in a short time.

(E) Vegetation and fauna killed by pesticides will be irretrievably lost.

(F) 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.

(G) 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.

(H) 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.

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

(J) There is a short-term commitment of manpower 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.

## VII. 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 projects 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 will be made up by reduced future wildfire energy consumption and the tree growth available if wood fuel becomes more popular in the future.

#### VIII. 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 on the provision of fire protection, health and safety regulations, and public use in general.

#### IX. 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 wildlife enhancement and land conservation practices.

Due to improvement of access in other practices; certain regulations concerning provision 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.

#### X. 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.

(C) In burned areas now relatively barren or with standing dead forests, there will be a long-term positive aesthetic change.

(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.

#### XI. 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.

LIST OF PERSONS CONSULTED:

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  
United State Forest Service

William T. Hartman, Manager  
Land Division  
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State Conservationist  
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Ed Litrell  
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USDA Agricultural Stabilization and  
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California Reclamation Board

Victoria L. Roberts, Resource Coordinator  
California Native American Heritage Commission  
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Ronald B. Robie, Director  
California Department of Water Resources

H. K. Trobitz, Member  
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Larry F. Walker, Executive Director  
State Water Resources Control Board

Dr. Clyde Warhaftig, Member  
State Board of Forestry

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