

Article ID: 1000-5692(1999)04-0430-09

# A brief review of timber management on private lands in California

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**Abstract:** Private individuals and companies own 45% of California's productive forestland. To harvest timber, these owners are required to have a licensed professional forester prepare detailed management plan that goes through extensive review by the state. Plans cost \$ 6 000 ~ \$ 12 000 and up, and may 6 or more months to prepare and go through review by the state. Foresters' decisions are constrained by laws, stand conditions, economics, and the landowner's objectives. The Forest Practice Rules have detailed standards for selecting silvicultural systems and meeting post-harvest stocking. Factors considered in project feasibility include costs of plan preparation, tree marking, logging, administration, trucking, taxes, planting, and presence of any protected species. On many properties under 16 hectares, these costs exceed the revenues that can be generated from the standing timber. Important issues for California's forest landowners include an increasingly tight regulatory climate, high inheritance taxes, and extreme fire danger resulting from fire suppression. As the public demands aesthetically pleasing forests as well as forest products, California is faced with importing much of its wood products supply. Within the framework of existing laws, foresters balance ecology, economy, and public opinion to provide for the diverse values of California's populations. Table 2 References 2

**Key words:** timberland management; private timberland; management plan; silviculture; California

**CLC number:** S721; F326.2

**Document code:** A

Received date: 1998-11-27

Biography: Claralynn Rose Nunamaker (1964—), Female, Illinois, USA, Registered professional forester # 2606, Master of science degrees, Private consulting forester, until 1998 involved primarily in field forestry, writing harvest plans. After 1998, involved primarily in forestry outreach/extension to forest landowners and teachers. Currently run the Northern California Society of American Foresters Office (under contract).

## 0 Introduction

Approximately 45% of California's productive timberland is privately owned in forest types that range from redwood forests along the north coast to mixed conifer forests in the Klamath and Sierras to high-elevation true fir forests. Dozens of industrial owners, or companies whose primary business is timber and lumber production, control 1.7 million hectares. Another 1.3 million hectares are owned by an estimated 30 000+ individuals, or non-industrial private forestland owners<sup>[1]</sup>. This paper outlines the process of timber harvesting on private forestlands in California.

## 1 California forest management plans

Any private commercial harvest in the state must be done under an approved forest management plan, a formal document that must comply with the California Forest Practice Rules. There are two basic types of plans for the private landowner: the Timber Harvest Plan (THP) and the Non-industrial Timberland Management Plan (NTMP). Either plan must be prepared by a state-licensed Registered Professional Forester (RPF) who is employed by the forestland owner either as an employee or as a contractor. The plan prepared by the RPF will ultimately be reviewed by inspectors of the California Department of Forestry and Fire Protection (CDF) and other agencies.

## 2 Constraints on and content of harvesting plans

Certain legal constraints apply to THPs and NTMPs. The RPF must conform to the intent and letter of the Forest Practice Rules. The silvicultural and yarding methods selected must comply with the Forest Practice Rules while ensuring adequate protection of non-timber forest resources, including fisheries, wildlife, and water quality. The harvest plan must not violate state or federal acts such as the federal Endangered Species Act, the California Endangered Species Act, or the California Environmental Quality Act.

Plans require the RPF to address public concerns. Notifications must be sent to nearby landowners whose property receives runoff from watercourses in the proposed plan area, to local Native American tribes, and to adjacent landowners. A public notice must be published in a local newspaper, and a Notice of Intent and map, which clearly describe and indicate the project boundaries, must be conspicuously posted on the public road nearest the plan area.

Extensive fieldwork is needed to prepare a plan. The forester assesses and marks timber, determines harvesting methods, flags tractor roads and crossings, classifies and flags water courses and other wet areas, identifies and flags unstable areas. Surveys are also done for archaeological resources and the spotted owl. Fieldwork might take as little as two days for a small, simple plan (excluding 3~6 nighttime owl calls) to 3~5 months for a very large, complicated plan.

### 2.1 Timber harvest plans (THPs)

A timber harvest plan is generally prepared for areas of 16~400 hectares. THPs are sometimes

prepared for smaller parcels, but usually parcels under 8 hectares do not have sufficient timber to justify the costs. THPs for holdings over 400 hectares are usually best split into smaller plans. Most THPs take 2~3 months to prepare and must go through the review process. They are then valid for a three years and may be extended twice for one year each time.

The THP is composed of six sections and can easily be 100 pages long. Sections I and II are a standardized form. Section I identifies the owners of the timber and the timberland, the RPF, and the logger. It also includes information on the property (size, location, legal description) and statements made by the RPF and landowner. Section II answers detailed questions about the plan, including: silviculture; tree marking guidelines; yarding methods; protection around springs and watercourses; how watercourses are flagged in the field; construction or reconstruction of any roads or skid trails; how to install and remove watercourse crossings; protection of wildlife or botanical species of concern, etc. Detailed maps are prepared for this section and show road and watercourse crossings, silvicultural and yarding methods, site class, erosion hazard ratings, unstable areas, springs, wet areas, structures, etc. Section II is also the operational guide for the logger.

Section III provides detailed information for certain questions in Section II. It typically includes a description of the timber type, site class, soils and erosion hazard ratings, explanations and justifications for any exceptions to the Forest Practice Rules, and a fuller discussion of wildlife than that provided in Section II.

Section IV is the Cumulative Impacts section. The forester addresses: sediment, water temperature, organic debris, chemical contamination, changes in peak flow, watercourse conditions (gravel embeddedness, aggradation, bank mass wasting, etc.), soil productivity (organic matter loss, surface soil loss, soil compaction, soil moisture, growing space loss), biological resources (pools and riffles, large woody debris, near-water vegetation, snags/den/nest trees, multistory canopy, road density, hardwood cover, late seral forest characteristics, late seral habitat continuity), recreational resources, visual resources, and vehicular traffic impacts.

Section V is titled "Additional Attachments". This section contains an erosion hazard worksheet, lists of adjacent and downstream landowners, copies of the public notices and letters sent to neighbors and responses received, as well as management alternatives to timber harvesting. Section VI contains "Confidential Addenda", which includes the report Archaeological Survey Report and information pertaining to the Spotted Owl.

## 2.2 Non-industrial Timber Management Plans (NTMPs)

A NTMP is a long-term, sustained yield plan prepared for forestland holdings of up to 1 012 hectares<sup>[2]</sup>. It is very similar to a THP except that there is no standardized form, and the forester must provide data, such as output from a growth modeling program, that shows that harvest will not exceed growth in any 10-year period over the next 100 years. NTMPs require more data collection and analysis, so the preparation time for NTMPs is longer, typically 3~6 months. Reviews generally take at least 6 weeks and frequently take longer. Because of restrictions on logging in the winter period (November 15 through May 1), plans begun in the late spring often cannot be begun until the next year.

Growth may be balanced with harvest using volume control or area control. For example, under a 100-year rotation, 10% of the area could be harvested in small groups under 1 hectare in size in a ten-year period. Alternately, if a property is growing an estimated  $20 \text{ m}^3$  per hectare per year, then that much could be harvested per year.

As with a THP, a NTMP is subject to the review process and public comment. Once the NTMP is approved, a landowner can file a Notice of Operations with CDF to conduct timber operations in accordance with the NTMP. The Notice is not subject to review, because the methods used in the Notice have already been approved in the NTMP.

### 3 The review process

The prepared plan is submitted to CDF. Once CDF is satisfied the plan is complete and in proper order, it is accepted for filing. CDF then has 10 days to conduct an office First Review and a field Pre-Harvest Inspection (PHI). The THP is reviewed by a panel of representatives from CDF, the California Department of Fish & Game, the Regional Water Quality Control Board, a state geologist, and a state archaeologist. Questions raised during the review are sent to the RPF, who answers the review questions in writing. If a PHI is necessary, agency representatives meet with the RPF on the plan area and discuss any questions the agency personnel have. Questions arising at the PHI or at a Second Review, conducted after the PHI, are also addressed by the RPF. Usually, a series of mitigations is proposed by agency personnel to address issues and concerns raised during the review process. Once the mitigations are signed by agency personnel and RPF, they become part of the plan.

In the 10-day “public comment period” during the review process, any member of the public may write CDF with any concern about the proposed plan. CDF provides an official written response to such comments. A few timber harvest plans are challenged in court, and sometimes from the court cases come significant changes in harvest plan preparation. The addition of the cumulative impacts section, for example, stemmed from court cases.

### 4 Cost and feasibility

Many factors determine the final cost of a THP or NTMP: plan size, steepness, accessibility, complexity of forest types, listed species, etc. For small holdings (under 40 hectares), a THP might cost \$ 6 000 ~ \$ 10 000. Large or complex THPs may cost as much as \$ 30 000. NTMPs require a more intensive cruise and more information, so they are more expensive. They generally run \$ 12 000 to \$ 50 000 or more for the initial plan, and \$ 1 000 ~ \$ 5 000 for each subsequent Notice of Operations. Note that these are amounts paid to the RPF and do not include other costs. To determine whether or not a plan is feasible, a forester often informally estimates the volume likely to be recovered and balances the projected revenue against projected costs. The forester considers costs such as plan writing (office and fieldwork), tree marking, administration, logging, trucking, taxes, planting, and fees to state agencies.

An additional consideration is that all threatened and endangered species on state or federal lists

must be adequately protected. Plan costs, for example, include surveying for the northern spotted owl, which may mean up to six visits to the plan area to hoot for owls and listen for a response. The coho salmon has recently been listed, and while the full impact of that listing is not yet clear, plan costs are expected to further increase in response to special measures that will have to be taken to protect that species. Numerous other species are protected, and if any of these are found, restrictions are placed on logging activities. These protective measures range from restricting the months in which harvesting may occur to establishing no-cut zones around the location of the species. The smaller the landholding, the greater the likelihood that finding a listed species (such as the spotted owl or coho salmon) on the property will restrict logging to the point that timber operations become economically unfeasible.

## 5 Loggers and mills

The role of the RPF is to prepare the plan so that logs may be harvested. The actual falling, skidding, yarding and often trucking of the logs is done by a logger, a California Licensed Timber Operator. The logger offers a bid to a landowner, indicating the logging cost per unit volume. Bids are lowest for tractor yarding, higher for cable yarding, and highest for helicopter yarding. The lowest bidder may not win the bid, as a landowner may prefer a more expensive logger whom he/she knows will do a good job. Mills also bid the price they will pay for the harvested timber. The landowner decides which logger to use and to which mill to send logs.

## 6 Silviculture

The silvicultural system is selected based on the type and condition of the forestlands as well as the landowner's management objectives, which may include timber production, reducing fire risk, or protecting non-timber values such as water, wildlife habitat, or aesthetics. The Forest Practice Rules allow two basic silvicultural methods: even-aged and uneven-aged. Each method is further divided into several specific silvicultural systems. The following tables (Table 1 and Table 2) have been adapted from the Forest Practice Rules (California Code of Regulations, Title 14: Natural Resources)<sup>[2]</sup>.

Under even-aged management, trees are managed as one age class. Types of management include seed tree, shelterwood, thinnings and clear cuts. Units generally cannot exceed 8 hectares, and often planting is required. Minimum rotation age is 50 years on site class I lands, 60 years on site class II and III lands, and 80 years on site class IV and V lands<sup>[2]</sup>. The choice of silvicultural method is strictly limited by the type and structure of the existing stand.

Uneven-aged management includes selection methods in which either individual trees or small groups of trees (under 1 hectare) are harvested. This type of silviculture is mandated for NTMPs.

An important part of the Forest Practice Rules is the establishment of a replacement stand. Under all silvicultural systems, adequate regeneration must be established by residual trees (trees not harvested), natural seedling, coppicing, or planting within five years of the completion of timber operations. If a landowner fails to establish adequate regeneration, the Department of Forestry may contract to have the land planted and bill the landowner for such work.

**Table 1 Relationship of standard silvicultural treatments to objectives and stand conditions**

Method		General characteristics of each method
Even-aged	CC Patch	Stand is of harvestable size and savable understory is absent. Units are usually <8 hectares in size; up to 16 hectares may be permitted if explained and justified. All trees in unit are cut. Unit is normally regenerated artificially (In a "fuzzy clearcut", not all trees are cut).
	Strip	Stand is of harvestable size and savable understory is absent. Most appropriate for evenaged stands of true fir. Strips are long and normally not over 1.5 times the average height of the stand in width, in contouring shapes. All trees are cut. Unit is normally naturally regenerated.
	SW Preparatory step	Overstory is well stocked and is of harvestable size; savable understory is absent. Regeneration not immediately scheduled. Stand needs to have wind firmness and seed producing ability improved before seed cut is made.
	Seed step	Savable understory is not present or is unsatisfactory. Sufficient suitable seed trees must be left after harvest to provide for new seedlings. All trees other than shelter trees are cut. Unit usually naturally regenerated.
	Removal step	Timber stands normally consist of an adequately stocked, savable understory with sheltering overstory. All overstory trees are cut. Some additional regeneration may follow the timber operation.
	ST Seed tree step	Overstory is harvestable, and savable understory is absent. Suitable seed trees are left after harvest. Aside from scattered seed trees, cutover areas may be similar to clear cut in appearance. Unit is naturally regenerated.
	Removal step	Timber stands consist of an adequately stocked, savable understory with an overstory of scattered seed trees.
Uneven-aged	Sel Single tree or group	Stands are uneven-aged or converted to uneven-aged. Some trees in all size classes are generally cut. No minimum harvestable age. Regeneration is usually obtained naturally. Shade tolerant trees are usually harvested individually. Shade intolerant trees are usually harvested in small group, up to 1 ha in size. Best suited to economic conditions which make possible frequent entry into stand for small volumes, and vegetation conditions that will tolerate repeated logging, and when natural regeneration is likely.
Intermediate	Commercial thinning	Prior to rotation age, allows for adjustment of stocking. The overstory consists of young growth trees. Understory may or may not be present.
Treatments	Sanitation-salvage	To be used in the cutting and removal of only those trees that are dead, dying or deteriorating because of damage from fire, wind, insects, disease, flood, or other injurious agents, and to prevent the spread of insects or diseases.

CC=Clearcut; SW=Shelterwood; ST=Seed tree; Sel=Selection

**Table 2 Maximum removal, minimum retention, re-stocking/regeneration requirements, and acreage limitations of various silvicultural methods in the Northern Forest District**

Regeneration method		Maximum removal	Minimum retention (DBH = diameter at 1.4 m)	Restocking/Regeneration	Acreage limitation
Even-aged	CC Patch	All	None	Must meet point count (a) in 5 years	8 hm <sup>2</sup> ; up to 16 hm <sup>2</sup> in special conditions (b)
	Strip	All	None		
	SW Preparatory step		SW Seed step retention plus Basal area retention: Site I; 23 m <sup>2</sup> ·hm <sup>-2</sup> Site II/III; 17 m <sup>2</sup> ·hm <sup>-2</sup> Site IV/V; 11 m <sup>2</sup> ·hm <sup>-2</sup>	Meet point count immediately upon completion	8 hm <sup>2</sup> ; up to 16 hm <sup>2</sup> in special conditions (b)

Table 2 continued

Regeneration method	Maximum removal	Minimum retention (DBH = diameter at 1.4 m)	Restocking/Regeneration	Acreage limitation	
Seed step	All except retention trees	16 seed trees > 46 cm DBH; each tree > 61 cm DBH counts as 2 seed trees	Must meet point count within 2 years, or seed trees are harvested and area is planted	8 hm <sup>2</sup> ; up to 16 hm <sup>2</sup> in special conditions (b)	
Removal step	All overstory use once in life of stand	Savable understory	Meet point count immediately upon completion	8 hm <sup>2</sup> ; up to 16 hm <sup>2</sup> in special conditions (b)	
ST Seed tree step	All except retention trees	8 seed trees > 46 cm DBH; each tree > 61 cm DBH counts as 2 seed trees	Must meet point count within 2 years, or seed trees are harvested and area is planted	8 hm <sup>2</sup> ; up to 16 hm <sup>2</sup> in special conditions (b)	
Removal step	37 predominant trees per hectare and/or 27 m <sup>2</sup> of basal area per hectare	Savable understory	Meet point count immediately upon completion	8 hm <sup>2</sup> ; up to 16 hm <sup>2</sup> in special conditions (b)	
Uneven-aged	Sel Single tree	All except retention trees	Basal area retention: Site I: 23 m <sup>2</sup> · hm <sup>-2</sup> ; Site II/III: 17 m <sup>2</sup> · hm <sup>-2</sup> ; Site IV/V: 11 m <sup>2</sup> · hm <sup>-2</sup>	Not applicable	None
	Group	Groups < 1 hm <sup>2</sup> may cover up to 20% of unit	In groups, none	80% of unit meets single tree selection standards	None retention
Intermediate treatments	Commercial thinning (Average preharvest DBH < 36 cm)	All except retention trees	Trees per hectare > 10 cm DBH; Site I/II/III: 247; Site IV/V: 185	Same as minimum retention	None
	Commercial thinning (Average preharvest DBH > 36 cm)	All except retention trees	Basal area retention: Site I: 23 m <sup>2</sup> · hm <sup>-2</sup> ; Site II/III: 17 m <sup>2</sup> · hm <sup>-2</sup> ; Site IV/V: 11 m <sup>2</sup> · hm <sup>-2</sup>	Same as minimum retention	None
	Sanitation-salvage	Dead, diseased & dying trees	—	Meet point count immediately upon completion	None

a. Tally of complex point system that is based on counts of seedlings and trees in nested, fixed-radius plots.

b. Evenaged regeneration units within an ownership must be separated by a logical logging unit that is at least 8 hm<sup>2</sup> or as large as the area being harvested. Such units shall be separated by at least 91 m in all directions.

c. On Site I mixed conifer land, basal area retention is increased to 29 m<sup>2</sup> · hm<sup>-2</sup>.

d. On Site II mixed conifer land, basal area retention is increased to 23 m<sup>2</sup> · hm<sup>-2</sup>.

## 7 Current issues

Several important issues currently face California's private landowners. One is the tight regulatory climate. Costs of compliance with forestry laws increase every year and are largely borne by private

landowners. These high costs encourage conversion of forestlands to uses such as vineyards or subdivision for homes. A related issue is that when a protected species moves onto a landowner's property, logging may be restricted or stopped. This is a strong disincentive to the landowner to create such habitat. Clearly, we need to find ways to reward landowners for management that improves habitat for protected species.

Second, years of suppression of historically frequent, low-intensity fires have significantly altered our forests. The consequent increase in stand density and fuel loading have made catastrophic, stand-replacing fires a serious threat statewide. The movement of people into the urban-rural interface complicates fire suppression by forcing choices between combating wildfires and saving homes. Fuelbreaks and prescribed burns can help reduce the risk of wildfire, yet concerns about the impact of smoke on public health limit the amount of prescribed burning that is permitted. It will be important for foresters to be able to actively manage forests through silviculture to reduce fuel loading.

Third, we need to develop strategies to better deal with the problem of inheritance taxes when forestlands are passed down from generation to generation. It is not at all uncommon for "land-rich, cash-poor" people who inherit property to be forced to cut timber and/or sell off pieces of the landholding just to pay the inheritance taxes.

Finally, forest management is a highly political, emotional and divisive issue throughout the state. The public is using the forests in unprecedented numbers for recreation and demands aesthetically pleasing forests as well as forest products. Foresters are struggling to balance economics, ecology and public opinion. Innovative potential solutions being explored, such as third-party certification that provides some reassurance that lumber is being produced in ecologically well managed forests. Another approach is using conservation easements, under which landowners may legally give up certain harvesting or development rights in return for tax benefits and reduced land valuation.

The only thing that is certain in the management of our state's forests is that there will be no easy answers.

## References:

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- 2 California Department of Forestry and Fire Protection. Resource Management, Forest Practice Program. *Z'berg nejedly forest practice act* [M]. Sacramento: Public Resources Code, 1999. 30~203.



# 简评加州私有土地的木材管理

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**摘要:** 在加州, 私人及私营公司拥有的生产性林地占 45%。为了收获木材, 这些林地的业主需要持有执照的专业林业工作者准备一份详细的经营计划, 该计划需经州政府广泛的审阅。这种经营计划往往耗资 6 000~12 000 美元或更多的资金。计划的准备及州政府的审阅耗时 6 个月或更长的时间。林业工作者所作的决策受到法律、林地条件、经济状况和林地业主的目的等限制。林业实践法规对造林体系的选择及采伐后要达到的更新量有详细的标准。项目可行性中要考虑的因子包括准备计划的成本费用、树木的标号、砍伐、管理、运输、税务、造林及任何受保护物种的存在。许多面积小于 16 hm<sup>2</sup> 的林地, 其成本费用会超过立木所产生的收益。对加州林地业主来说, 重要的是日趋严峻的受规章制度限制的大气候、高额的遗产税及极度的火灾隐患。由于大众对森林及林产品的美学要求, 加州正面临着大量进口木制品。在现有的法律框架内, 林业工作者要平衡生态学、经济学及加州居民的意见, 以便为他们提供各种价值的物品。表 2 参 2

**关键词:** 林地管理; 私有林地; 管理计划; 造林; 加利福尼亚州