

The Watershed TMP: a Proposal to Manage the Redwood Ecosystem Under Convergent Environmental, Economic and Social Goals

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Abstract

Under present California Forest Practice Rules, mandated by the Legislature and codified by the State Board of Forestry, Non-industrial Timber Management Plans (NTMPs) give small landowners the flexibility to operate under a specific set of rules 'forever,' allowing short notice (3 days or less) for pre-approved harvest operations. This permit is presently restricted to forestland ownerships less than 2,500 acres, requires uneven-aged management (selection harvest), and allows forest managers to both react to market conditions and have certainty of regulation. There is no comparable tool for larger ownerships. Using this concept for larger ownerships, with an explicitly directed primary outcome of wildlife, watershed benefits or carbon sequestration, and timber as a subsidiary output, would improve environmental quality, reduce landowner costs and reduce regulatory time for forestry under the California permit process. A Legislative bill or Board of Forestry initiative could create a Watershed Timber Management Plan as a low-intensity, watershed-scale forest management permit. This tool would be particularly useful in California's coast redwood ecosystems, where selection harvest is a demonstrated way of managing for both ecosystem services and timber production.

Key words: silviculture, watershed, forest policy, forestry, California, redwood, NTMP, natural capital, ecosystem services

Background

Private timberlands in California fall under control of the State Legislature. The Z'Berg-Nejedly Forest Practice Act of 1973 and amendments give the State Board of Forestry (Board) the formation language for the California State Forest Practice Rules (FPRs). That legislation reflects the intent of the State Legislature to:

“create and maintain an effective and comprehensive system of regulation and use of all timberlands so as to assure that:

(a) Where feasible, the productivity of timberlands is restored, enhanced, and maintained.

(b) The goal of maximum sustained production of high-quality timber products is achieved while giving consideration to values relating to sequestration of carbon dioxide, recreation, watershed, wildlife, range and

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forage, fisheries, regional economic vitality, employment, and aesthetic enjoyment.²

The implementation of this intent is the responsibility of the Board through its rulemaking procedures, then accomplished through the agency of the California Department of Forestry and Fire Protection (CalFire). In practice this has created a set of ‘classes’ of permits for timber harvesting: timber harvest plans (THPs), modified timber harvest plans (MTHPs), non-industrial timber management plans (NTMPs), sustained yield plans (SYPs) (still requiring a THP), program timber environmental impact reports (PTEIRs), exemptions and emergency notices. Additional federal permitting requirements for large ownerships may also mandate or justify a Habitat Conservation Plan, to be implemented and referenced in subsequent THPs. While this plethora of approaches exist, choices for landowners narrow quickly.

THPs are flexible, may cover large areas, and are good for 3 years, with extensions granted by CalFire. All silvicultural (harvest) methods are allowable in THPs. MTHPs are for parcels 100 ac and less, and do not allow even-aged (clearcut and functional equivalents) methods, among other significant restrictions. MTHPs are time-limited in the same manner as THPs. SYPs are intended to be a supporting element for THPs over a broad area, but are used little because of the documentation required for the THP. PTEIRs are also for very large areas, establishing a local set of forestry rules through an EIR process, followed by subsequent Program THPs, smaller in scope than a full THP. PTEIRs are a very useful tool for local ‘regulations’, though they are acknowledged to be complicated, expensive, and require broad buy-in to begin.

NTMPs are allowed for landowners with less than 2,500 total ac, and require uneven-aged management (selection harvest). NTMPs are permanent. With 50 or more years of harvest and yield projections, NTMPs are intended to be continued into the future with the simple notification of a Notice of Timber Operations. Some elements of NTMPs must remain up-to-date, such as water quality and species considerations administered through other agencies.

It is important to note that these options trade size for silviculture (*table 1*). But this means that large landowners, such as ranchers, organizations and industry, cannot make the same trade. This is counterintuitive; the landowner, the public and the ecosystem all need the opportunity for and benefits of less intensive silviculture over large areas, particularly individual watersheds that may be of great natural capital value, such as for domestic water supply or listed fisheries. Without large, low intensity operations, forest managers tend to seek the most cost-effective solution of compressing harvests into a set of THPs, with concomitant high-yield cutting patterns. It is this approach that may define checkerboard clearcuts as the most cost-effective management approach (*fig. 1*). While this even-aged matrix may be as effective at protecting forest resources as an uneven-aged system, no option presently exists for landowners who specifically want to devote land to ecosystem services while still harvesting trees.

² Z’Berg-Nejedly Forest Practice Act, Division 4, Chapter 8, Public Resources Code, sec. 4513. Effective January 1, 2010.

Table 1—*Selected California Forest Practice Rule Harvest Permits.*

CalFire Permit	Maximum size (acres)	Silvicultural limitations	Time Period	Additional Permit required
MTHP	100	Uneven-aged	3 years*	No
NTMP	2,500	Uneven-aged	Permanent	No
THP	None	None	3 years*	No
SYP	None	n/a	Permanent	THP
PTEIR	None	Within PTEIR frame	Permanent	PTHP
Exemption: Dead, Diseased and Dying	None	10% cut, only damaged trees	1 year	No
Emergency Notice	None	Only damaged trees**	1 year	No

* May be extended in one-year amendments.

** With exceptions.

Discussion

There is a bias in the options available for California private forest management. Managing below 2,500 ac favors uneven-aged management, granting unchanging rules and short notice harvests. No permit alternative exists for larger lands to ‘trade’ management intensity for increased certainty of harvest and reduced cost in the future. In CalFire’s own assessment of the cost-effectiveness of NTMPs:

“The cost of preparing an NTMP is about 25 to 50 percent more than a typical THP, much of which comes from the required sustained yield analysis. However, this cost is recaptured over time because subsequent NTMP harvest entries can be conducted under a much simpler notice to CDF, which triggers the inspection and enforcement process.”(CalFire 2003).

The bias exists because the Legislature and the Board of Forestry identify two classes of landowners: Non-industrial private forest landowners (NIPFs) and industrial landowners. NIPFs do not own more than 2,500 ac of timberland in California and are “not primarily engaged in the manufacture of forest products” (see footnote 2). CalFire estimates that more than half a million additional acres would be available for NTMPs if the maximum were increased to 5,000 ac (CalFire 2003).

There is no ‘industrial’ alternative to NTMPs, trading uneven-aged silvicultural practices for long-term certainty in regulation. This seems counterintuitive; California’s sequestration of carbon dioxide, recreation, watershed protection and wildlife can all benefit from uneven-aged management. For example, carbon sequestration of an uneven-aged forest is effective because (1) Climate Registration Protocols require a baseline of timber to be in place before ‘additional’ timber can be valued (Climate Action Reserve 2010), and (2) large trees, in general, put on more volume of wood per acre per year than small trees (Lindquist and Palley, 1963). Some industrial owners operate successfully using only uneven-aged systems, such as Big Creek and Mendocino Redwoods (MRC), operating within the THP system and (in MRC’s case) developing an HCP, as well.

The PTEIR may be a choice for large landscapes, but Calwater watersheds and other intermediate size areas, from 2,500 ac to 15,000 ac, are too small for such an investment. In addition, the PTEIR harvests, designed for multiple ownerships, are managed via individual Program THPs with their own costs.

Prudent management

In California and the redwood region, cut blocks in even-aged management are regulated by the FPRs, with a maximum size from 20 to more than 30 ac. Adjacent areas must be restocked for 5 years prior to even-aged treatment, with logical boundaries in between cut blocks. *Figure 1* shows the Gualala River watershed, managed with even-aged silviculture.



Figure 1—Even-aged redwood silviculture in the Gualala River watershed.³
(photo: Fred Euphrat).

Seen from a statewide perspective, permanent forestry plans with a lighter impact would be useful for managing important landscape elements, such as streams and watersheds, wildlife habitats and corridors, and urban interface areas. Consider that the average Calwater 2.2a planning watersheds units recognized by CalFire are 7,537 ac (Smith 2008); that habitat for many species is reduced by fragmentation (Andren 1994); that biological corridors require continuity (Noss and Cooperrider 1994); and that parcel development reflects a loss of cost-effectiveness of forest management. The corridor issue is addressed, to an extent, by the FPRs - stream corridors provide riparian passage. Other biodiversity hotspots, such as ridgetop and saddle corridors, edge to forest ratio, and the encroachment of urban and agricultural areas remain unaddressed. Larger, permanent uneven-aged plans may mitigate many of the

³ www.krisweb.com. 1999. Gualala watershed, hypothesis no. 3. "Figure 9. Clear cuts in unstable, inner gorge locations of upper Little North Fork Gualala River in 1999. Arrows designate landslides."

biodiversity problems of industrial timber management while making it more cost-effective.

Indeed, the State Legislature finds forest management, in combination with uneven-aged methods, “prudent,” in its enactment of NTMP legislation. The intent in section 4593 of the Public Resources Code is:

(b) The Legislature further finds and declares that minimal environmental harm is caused by prudent management of nonindustrial timberlands because low volume production and dispersion around the state of these small tracts reduces damage to aesthetics, air quality, watersheds, and wildlife.⁴

Recognizing that the Legislature's finding of 'prudent' forestry also embraces low-volume harvest and dispersed production, the inclusion of uneven-aged management allows demonstrated protection of aesthetics and habitat (Thornburg et al. 2000), particularly with the inclusion of old individual 'heritage' trees and group selection.

It is a timely moment in California to transition to uneven-aged management. For example, a two-aged stand is shown in *fig. 2*. This is the kind of forest where single-tree selection can both harvest the larger trees and promote the growth of smaller ones. The larger trees put on more high quality volume; the smaller trees fill canopy gaps and increase growth in response to additional light and space. Uneven-aged stands may be harvested every 10 to 15 years and produce an even flow of timber while maintaining a continuous forest, depending on the site and other tree growth characteristics (Arvola 1978).

The watershed approach to forest management

This discussion has been oriented towards the use of uneven-aged silviculture as a method to increase the quality and quantity of forest benefits. This is reflective of the considered opinion of the Legislature, which supports uneven-aged management with the reward of the permanent NTMP. But this belies the fact that there are many approaches to uneven-aged management, and there is no direct causal link recognized between specific forest management and particular outcomes in the FPRs. Selection harvesting is considered better for NTMPs, but without benefits stated explicitly.

It stands to reason that, if goals were explicit, with cause-and-effect relationships that could be measured, inventoried and modeled, the State would get greater benefits from forest management. Goals of carbon sequestration, watershed or wildlife management could be implemented with certainty, and the State would be able to quantify those benefits. This does not mean moving away from timber; it means using silviculture to achieve other benefits, rather than expecting trickle-down benefits from a purely silvicultural approach.

A Watershed TMP would allow forestry for specific attributes determined by what is important in a locality. Examples are: watershed management above sensitive waterways, habitat management for particular species, or aesthetic and fire

⁴ Division 4, Chapter 8, Public Resources Code, sec. 4593 (b).



Figure 2—Two-aged redwood stand in Jackson State Demonstration Forest (photo: Fred Euphrat).

management adjacent to residential zones. All of these require varied forest management. The Calwater Planning Watershed system is a reasonable first step of organizing and delineation. Multiple watersheds can be used to create larger elements but, under a Watershed TMP, would still be modeled, evaluated and permitted by watershed to address local issues.

Expanding the NTMP approach to more timberlands would create both increased certainty and social benefit. In the words of CalFire,

“This change would benefit both landowners and the state by providing an opportunity for these additional timberlands to be placed into a sustained yield and uneven-aged management regime.” (CalFire 2003).

It must be stated that industrial timberlands already meet criteria for sustained yield under the FPRs. Expanding an NTMP approach may not, in itself, make the lands more ‘sustained,’ as cutting patterns would shift, though timber output would not necessarily change. But it would clearly expand the opportunity for uneven-aged management to benefit California.

It must also be stated that, on a watershed level, it is not the intention of this paper to propose that selection cutting has less impact, over time, than even-aged methods. Good road practices, revegetation and harvest methods appropriate to stand dynamics are critical to any harvest. Rather, uneven-aged methods, with their concomitant combination of closed canopy forests and their continuous accumulation of carbon is preferred by the public, via the legislature, to be an action of less potential negative consequence, thus requiring less scrutiny, as in the NTMP legislation discussed above.

In the redwood region, the utility for Watershed TMPs may be greater than the rest of the state. Redwoods coppice and are relatively shade tolerant. The highly productive redwood forests produce effective (though not biological maximum) growth in uneven-aged conditions. Forests have been effectively managed through uneven-aged silviculture for decades, and are a sustainable source of wood and jobs.

Model rules

A Watershed TMP would require its own legislation and its own section in the FPRs. Elements that section would include are:

- A maximum size of one planning watershed.
- Disconnected sub-areas within one planning watershed OK.
- Ability to reasonably adjust Calwater lines for property and resource management.
- One landowner.
- No assessment of total landowner forestland holdings.
- No differentiation between industrial and non-industrial ownership.
- Only uneven-aged management.
- Primary resource NOT timber.
- Explicit goals for outcomes of primary and subsidiary resources.
- Inventory and Modeling of primary resource.
- Inventory and Modeling of timber.
- Re-inventory schedules.
- Accommodation for other agencies' review as necessary through time.
- Plan setting in context with adjacent parcels, permits and Watershed TMPs.
- Permit for harvest by Notice of Timber Operations.

The political landscape

In California there is a constituency for every side of an issue. Conversations regarding a Watershed TMP approach have yielded a variety of responses. One forest manager said, 'Of course, we already do that, we just don't get any credit for it.' The Watershed TMP may be welcomed by industries that are already using selection forestry to their current advantage. This is also a good tool for industry lands seeking compliance with Federal Habitat Conservation Plans. In most cases, this would reduce cost for the submitter and the agency, and may well bring significant acreage into uneven-aged management for specific ecosystem services.

An environmental advocate said 'No way will we accept permanent logging plans.' But advocates are not all of one mind. Others see this as an opportunity to focus on particular watersheds, species or aesthetics to the benefit of the community and its job base. It allows public trust advocates to look at a manager's big picture, rather than having to address watershed via THPs in a piecemeal fashion. Permanent plans with continuous monitoring allow for flexibility and focus on locally important resources. The Watershed TMP could spread the benefits of 'prudent' management throughout the redwood region and the state.

A Watershed TMP scenario

An industrial manager chooses to prepare a Watershed TMP, with combined goals of water quality, habitat, carbon sequestration and timber harvest. The plan will cover about 7,500 ac. That area will modify the Calwater watershed, to better encompass a watershed on the property. That watershed is adjacent to two other Watershed TMPs, so conjunctive planning will occur.

Emphasizing water quality and carbon accumulation, smaller watercourses will be cut less than allowed by the rules. Overall stocking will be maintained at 20 percent above FPR floors. While clearings will be limited to the regulatory maximum of 2.5 ac, their locations will avoid habitat elements, preserving saddles and creating continuity with adjacent watersheds. Cutting frequency will be increased relative to even-aged silviculture, necessitating an active road system, which will allow constant monitoring.

Following a higher up-front cost for the Watershed TMP, significantly less capital will be required for later permit compliance. Jobs will be less cyclic, because of the certainty of this and other plans, adding regional economic vitality. As now, the entire area will continue with owl surveys, murrelet surveys and wildlife inventory, and stay apprised of changes in State and Federal species listings. Carbon sequestration will continue to progress on site, due to standing trees on site and quickly increasing volume.

Conclusion

The Legislature has created a two-tier system of forest landowners in California, creating divergent opportunities and outcomes. Landowners with less than 2,500 ac are given the opportunity to manage forests with uneven-aged methods and a permanent plan in the NTMP process. The legislature considers uneven-aged methods part of a 'prudent' approach. Larger landowners, specifically forest industries, must manage with short-term permits and face changing CalFire rules. While landowners with greater than 2,500 ac may choose to use uneven-aged methods, there is no incentive to manage forestlands for resources other than for timber productivity.

A Watershed TMP would provide a reason for industry and other forest landowners with greater than 2,500 ac to produce specific benefits from uneven-aged management. The incentive is a permanent permit at a watershed scale of one Calwater planning watershed, which would require only a Notice of Timber Operations to proceed, in addition to statutory requirements from other agencies. The Watershed TMP would be oriented towards one or more of many benefits received from forests as well as timber, with inventory and monitoring to match.

The goal of Watershed TMPs is to allow large landholdings to use uneven-aged management across as broad a range of California forests as possible. It allows landowners to evaluate the range of positive outcomes from silviculture. It promotes multi-watershed planning of wildlife habitat. It helps create long-term certainty in jobs and local economies, and sequesters forest carbon more effectively than other means.

At this writing, the California Legislature is considering SB 455, Watershed Timber Harvest Plans⁵. While similar in some ways to the proposal above, it differs in that it would not require uneven-aged management, plans would be larger than one planning watershed, and requires both a watershed and fish and wildlife assessment. The bill also affects conversions of forest to non-forest uses.

Watershed TMPs may be a tool most effective in the redwood region, because of the relative shade tolerance and resprouting ability of redwoods, the steep slopes and the sensitive species. The natural capital of our forests is great, the ecosystem services they provide are priceless. It is time for the law to encourage silviculture to become an active agent in watershed protection, carbon sequestration and habitat protection in California.

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⁵ Pavley, 2011. SB 455, California State Legislature. As introduced, not amended, as of 20 Oct 2011.