Comment Form — **Mendocino Redwood Company Draft EIS/PTEIR for the Habitat Conservation Plan/ Natural Communities Conservation Plan/Timber Management Plan**

Comments, whether written or verbal, only need to be provided once. If you wish to provide written comments after the public meetings, please send your comments to one of these contacts:

Eric Shott
NMFS
777 Sonoma Ave., Room 325
Santa Rosa, CA 95404

John Hunter
USFWS
1655 Heindon Road
Arcata, CA 95521

13

FEB 20

Chris Browder
CAL FIRE, Resource Management
P.O. Box 944246
Sacramento, California 94244-2460

Brad Valentine
CDFG
135 Ridgway Ave.
Santa Rosa, CA 95402

Faxed comments may be sent to Eric Shott, NMFS at (707) 578-3435 or John Hunter, USFWS at (707) 822-8411.

Electronic comments may be sent via e-mail to either of the following addresses:

- mrc.hcpitp@noaa.gov In the subject line of the e-mail, please include "MRC HCP ITP."
- sacramentopubliccomment@fire.ca.gov In the subject line of the e-mail, please include "MRC PTEIR."

Comments must be received on or before February 21, 2013.

Your Name Ken Spacek Today's Date 2-14-13

Name of organization, government, group, or agency (if applicable) _____

Mailing Address 35405 Annapolis Rd.

City/State/Zip Annapolis Ca. 95412

Telephone or E-mail Address (optional): 707 886-1915 kspacek3@Gmail.com

Comments: Hi: I'm 65 years old and grew up on the Northern California Coast at Manchester; zip 95459. I have experianced old growth redwood forests and coho salmon. I have worked and played in these streams and forests from Elk creek in the North to Russian Gulch near the Russian River in the south. My family owned a sawmill at Mallo pass North of Manchester, it ran from 1954 to 1966 until most of the old growth redwood timber ran out and stumpage prices jumped closing most of the sawmills at that time, second growth redwood timber wasn't marketable. I have an extensive college education in the Sciences an A.S. degree in 1976 and over 170 units. It pains me to make a comment on MRC's TMP, HCP, because I know what has happened historically and presently in regards to the coast redwood forest condition, as do most locals. I hope my comments will be heard and the conditions in the coast redwood forest will improve.

Use the back of this form or attach additional pages if necessary.

MENDOCINO REDWOOD CO. PUBLIC COMMENT for TMP, HCP, NCCP.

Redwood forests are different than the majority of conifer forests in the state of California, which is covered by the forest practice rules. The difference is they were in late serial stage continuously though there existence as they are not fire prone or insect prone, which most conifer are. Redwood trees grow three to four times faster, are much larger and live ten times longer than the best conifer species when in their natural environment. Coast redwood forests control their own climate when in their natural state, which is the most perfect closed system on earth and produces the most biomass of any other land cover. These natural condition have been lost or greatly reduced.

Maintaining these forests at a stocking standard that is less than five percent of the natural redwood forest condition is ludicrous and immoral; it affects all species including humans. Climate change is evident along the coast redwood region with reduced fog influence and warmer conditions and directly the result of past and present forest practices. The state of California forest practice rule are exactly that, for the state, and do not change significantly to maintaine enough of a natural condition in the coastal redwood forest. All most all forest management professionals use these rules as a guide for timber harvest plans and cut the maximum allowable. The actual growth and potential of the redwood forest is not realized and the native species suffer, vegetation, aquatic, and terrestrial.

Mendocino Redwood's company timber management plan [TMP] reflects much of the same practices; real upslope conditions are not suffienctly addressed to maintain a healthy forest. Loss of canopy, biomass, ground water retention are limiting factors for salmon, owls, frog, salamanders and plants that are endangered and very much a part of the whole natural coast redwood forest environment. Many agencies and private management plans, including MRC'S [TMP, HCP, NCCP] have a narrow view of the species of interest and its extended natural habitat, just riparian habitat is not the solution to the coho salmon declining population problem, or other endangered species etc.. The coastal redwood forest watersheds

from the top of their ridges to their confluences need to be considered in every plan.

Mendocino Redwood's timber management plan is not in the best interest all those involved, including their own profits margins. Evidence shows that redwood trees grow best at age fifty plus, with near closed canopies which they are accustom too. Since they are very shade tolerant, they are very intolerant to adverse effect of canopy loss and extreme daily temperature differences throughout the seasons. Seed reproduction is lost with genetic diversity of the region and seedlings suffer as well from eroded natural habitat, minimal moisture and shading condition. The balance has been severely disrupted and invasive species are able to invade these available niches.

Mendocino Redwood's timber management plan is much too aggressive, the basil area for harvest triggers and stocking standards should be doubled, and at every twenty year harvest interval for the next eighty years. The average growth of redwood forest is fourteen percent, about a five year doubling factor, this will allow for increased harvesting in the near to long term future. The long term effects for endanger species as well as all species living in the coast redwood forest including the economics of those involved would be positive. This could be calculated very easily using the graphs, models, and processes used in the MRC'S timber management plan. Compare, it is a win situation for the coast redwood forests and all the species with-in.

sincerely a coastal redwood spokesman

Ken Spacek

Ken Spacek Comments 2-8-13

Appendix A

MRC Timber Management Plan and Attachments

Table of Contents

1 INTRODUCTION ..... - 3 -
1.1 Planning Approach ..... - 6 -
1.2 Assessment Area ..... - 7 -
1.3 Long-term Sustained Yield ..... - 10 -
1.3.1 Summary of inventory and growth and yield methods ..... - 11 -
1.3.2 Methodology to determine MSP ..... - 13 -
1.3.3 Stand vigor, site occupancy and regeneration considerations ..... - 18 -
1.4 Non-timber Value Considerations for MSP Determination ..... - 19 -
1.4.1 Regional economic vitality and employment considerations ..... - 21 -
1.4.2 Range and forage considerations ..... - 22 -
1.4.3 Special modeling constraints ..... - 23 -
1.4.4 Herbicide use ..... - 25 -
1.5 Silvicultural Considerations ..... - 27 -
1.5.1 Selection, Group Selection, or Alternative Group Selection ..... - 28 -
1.5.2 Transition and alternative transition ..... - 29 -
1.5.3 Rehabilitation ..... - 30 -
1.5.4 Restoration variable retention ..... - 31 -
1.5.5 Seed tree removal, alternative seed tree removal ..... - 33 -
1.5.6 Special selection ..... - 33 -
1.5.7 Site preparation ..... - 34 -
1.6 MSP Monitoring ..... - 34 -
2 IMPLEMENTATION VIA PROGRAM TIMBER HARVEST PLAN (PTHP) ..... - 36 -
3 MRC'S OPERATIONAL STANDARDS WITHIN THE TMP and EIS/PTEIR ..... - 38 -
3.1 Alternate Standards ..... - 39 -
3.2 Definitions ..... - 40 -
3.3 Ratings and Standards ..... - 40 -
3.4 Cumulative Effects Analysis ..... - 40 -
3.5 Silvicultural Methods ..... - 41 -
3.6 Harvesting Practices and Erosion Control ..... - 43 -
3.7 Site Preparation ..... - 43 -
3.8 Watercourse and Lake Protection ..... - 44 -
3.9 Hazard Reduction ..... - 45 -
3.10 Fire Protection ..... - 45 -
3.11 Wildlife Protection Practices ..... - 45 -
3.11.1 Take of northern spotted owl (NSO) and protective measures ..... - 46 -
3.11.2 Take of marbled murrelet (MAMU) and protective measures ..... - 46 -
3.11.3 Late-succession forest stands ..... - 47 -
3.12 Logging Roads and Landings ..... - 47 -
3.13 Archaeological and Historical Resources Protection ..... - 49 -
3.14 Rare Plants ..... - 49 -

3.15 Improving Effectiveness of Prescriptions and Addressing Site-Specific Impacts not Analyzed in the PTEIR ..... - 49 -

4 REFERENCES ..... - 51 -

Attachments

Attachment A—Landscape Planning
Attachment B—EIS/PTEIR Growth and Yield Modeling - Alternatives Modeling
Attachment C—Sample PTHP
Attachment D—Rule-By-Rule Description for Alternate Standards
Attachment E—PTHP Checklist

1 INTRODUCTION

Mendocino Redwood Company (MRC) was formed in 1998 and consists of approximately 229,000 acres of redwood and Douglas-fir forest. From the beginning, MRC's purpose has been to demonstrate that it is possible to manage productive forestlands with a high standard of environmental stewardship while operating a successful business. Our original stewardship goal has evolved into a goal of restoring under-stocked areas of our forestlands to a selectively managed redwood and Douglas-fir forest. Additional stewardship objectives include: (1) improving aquatic and upslope habitat; (2) providing protection for old-growth trees; (3) maintaining clean water in the streams and rivers on the forestlands; (4) and contributing to community well-being; and (5) producing a long-term, sustainable timber supply.

This is really questionable

In 2000, MRC was evaluated by and received certificates from two of the Forest Stewardship Council's (FSC's) accredited certifiers located in the U.S.: Scientific Certification Systems of Oakland, California, and the Richmond, Vermont-based SmartWood Program of the Rainforest Alliance. The FSC is an international, independent, non-profit organization that promotes responsible forestry. FSC Certification is awarded when an independent evaluation of a forest company's practices meets the highest standards for environmentally and socially responsible forestry. The FSC has the backing of the world's leading environmental groups, including the World Wildlife Fund, Natural Resources Defense Council, The Wilderness Society and Greenpeace. In 2005 and 2010, MRC was re-certified as a well-managed forest by Scientific Certification Systems and the SmartWood Program of the Rainforest Alliance (all certificates are evaluated annually with a comprehensive re-evaluation every 5 years).

?

HCP

Habitat conservation planning has been active on the lands of MRC since the previous landowner, Louisiana-Pacific (LP), started the process in the 1990s. While LP did not complete the Habitat Conservation Plan (HCP) planning process for the lands within this Timber Management Plan (TMP), MRC started its own HCP planning process in 1999. During 2002, MRC also opted to complete a Natural Communities Conservation Plan (NCCP) in conjunction with an HCP. California Department of Fish and Game (CDFG) is the agency responsible for the approval of the NCCP, and MRC opted to work with this same agency to get approval on a Long Term Streambed Alteration Agreement (called the Master Agreement for Timber Operations, or MATO), utilizing the NCCP and the Environmental Impact Report (EIR) as the analysis tools for the approval of the MATO. In 2005, MRC opted to utilize the California Forest Practice Rules (CFPRs; 14 CCR, also FPRs), Article 6.8, 1092, Program EIR to reach a long term programmatic agreement with the California Department of Forestry and Fire Protection (CAL FIRE) for its overall management goals, including the conservation measures within the HCP/NCCP and MATO. Finally, in 2007, MRC achieved a resolution from the North Coast Regional Water Quality Control Board, (Resolution No. R1-2007-0034) for a "Collaborative Effort to Develop Ownership-Wide Waste Discharge Requirements (OWDRs) for Timber Harvesting Activities Conducted by the Mendocino Redwood Company on Their Lands in Mendocino and Sonoma Counties." The Regional Water Board and MRC will develop Ownership-wide Waste Discharge Requirements that include by reference the water quality control measures contained in the HCP/NCCP. The intent is that the waste discharge requirements will: 1) incorporate the HCP/NCCP water quality measures; 2) protect the beneficial uses of waters on MRC's land that

could be affected by MRC's activities; and 3) comply with the Porter-Cologne Act, the Basin Plan, and the Clean Water Act. The analysis in the EIS/PTEIR may support issuance of the waste discharge permits.

This TMP is designed to address those issues related to the FPRs and the Forest Practice Act. CAL FIRE, as the lead agency responsible for implementation of the FPRs, will review and—if determined by the Director of CAL FIRE that the management of the timberlands achieves the resource protection goals within Public Resources Code (PRC) §§ 4513, 4551, 4561 and 4581—certify the Program Timberland Environmental Impact Report (PTEIR).

This TMP addresses the requirement of the FPRs for a forest landowner to achieve "Maximum Sustained Production of High Quality Timber Products" (MSP; 14 CCR § 913.11). The MSP rule requires that forest landowners owning ≥ 50,000 acres are required to submit an MSP document to CAL FIRE. This planning document must include methodologies and results of the timberland owner's planning effort to achieve MSP and Long-Term Sustained Yield (LTSY). Landowners can demonstrate MSP through:

- An Option A, that addresses management effects on timber resources while considering watersheds, fisheries, wildlife, recreation, employment, and more. An Option A must demonstrate a balance of growth and harvest over time within the assessment area. The non-timber resources are thoroughly analyzed in individual site plans, Timber Harvest Plans (THPs). The THPs are submitted to CAL FIRE individually, rather than in the overall Option A document (14 CCR § 913.11(a)).
- A Sustained Yield Plan (SYP), which addresses management effects on timber, watersheds, fisheries, and wildlife. Non-timber resources are provided a thorough analysis in an SYP. SYPs comply with the California Environmental Quality Act (CEQA) under the umbrella of the Forest Practices Rules and Act (14 CCR § 913.11[b]) and the functional equivalent process per PRC § 21080.5 and 14 CCR § 15251(a).
- A PTEIR that addresses impacts and provides mitigation for those impacts resulting from timber operations. The environmental analysis is addressed within the PTEIR document, and the TMP demonstrates MSP and LTSY.

In summary, MRC will utilize the TMP, HCP/NCCP, MATO and OWDRs to provide for the regulatory framework and all of the necessary management guidelines for MRC's "covered lands" land base, and the PTEIR will analyze and address the impacts resulting from the timber operations and related activities on the covered lands. The covered lands include roughly 213,000 acres out of the 229,000 acres that MRC owns. The other 16,000 acres will have a separate Option A document developed for them and are not included in the HCP/NCCP.

Previously, MRC has utilized "Option A" to demonstrate MSP for all of the ownership. MRC's initial Option A was submitted as an attachment to THP 1-99-505-MEN, and was approved in 2000. MRC updated the planning strategy and a subsequent Option A was submitted under THP 1-07-145, and this updated Option A was approved in 2008.

The 2008 Option A was updated to include a new landscape planning strategy. This provided: (1) increased operational efficiency, (2) reduced environmental impacts, and (3) increased habitat

complexity across these forestlands. The 2008 Option A incorporated key components of the developing HCP/NCCP, such as new wildlife tree strategies. Including key components within the Option A enabled MRC to "field test" these developing measures prior to HCP/NCCP implementation. The key updates in the 2008 Option A included:

- Establishment of harvest blocks: Harvest blocks were developed by grouping adjacent stands (an approximately 30-acre block of similar vegetation type) into an effective management block. Each harvest block was assigned a 5-year period, with a total of four 5-year periods making an entire harvest cycle of 20 years.
- Reduced road use: Harvest blocks were built around existing and planned road networks. The result is a reduction in miles of road used per harvest activity.
- Compatibility with each stand's unique characteristics: Silviculture was designed to provide flexibility in addressing the particular restoration or harvest need of each stand.
- Longer intervals between harvests: Harvest interval increased from 10 years in the previous Option A to 20 years in the updated Option A.
- Increased aquatic and terrestrial habitat for sensitive species: Increased harvest intervals and decreased road use provides for less disturbance and better habitat for terrestrial species. Increased protections for riparian corridors from the previous Option A should provide improved aquatic habitat.

While the harvest planning strategy used within the TMP is very similar to that implemented in the 2008 Option A, the PTEIR is being utilized to present a more holistic approach to the management of MRC's forestlands, using standards for habitat improvement and restoration efforts outlined in the HCP/NCCP, MATO, and this TMP. A combined Environmental Impact Statement (EIS) and PTEIR analyze the impacts associated with the operations proposed in all of these documents, which were developed over 10 years of negotiations with the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), CDFG, North Coast Regional Water Quality Control Board, and CAL FIRE. The joint EIS/PTEIR will address both state actions (issuance of Natural Communities Conversation Plan Act take authorization, approval of the MATO, and certification of PTEIR based on the TMP) and federal actions (issuance of Endangered Species Act incidental take permits). Certification of the PTEIR by the CAL FIRE will allow the North Coast Regional Water Quality Control Board to issue OWDRs for the covered lands of the HCP/NCCP.

Section 14 CCR § 1092.32 describes the requirement to maintain MSP under the provisions of the PTEIR after certification of the PTEIR. MSP will be shown using the following key metrics:

- Harvest levels.
- Growth of conifer inventory.
- Silvicultures applied.
- Assessment of non-timber values such as fish and wildlife, related to the long term sustainability of the forest.

1.1 Planning Approach

MRC's planning approach is primarily targeted towards maintaining and improving habitat conditions for terrestrial and aquatic species, being a successful business, and improving community well being. This approach is also compatible with the FPRs; the FSC's Pacific Coast Standards; and the goals, objectives, and conservation measures of our proposed HCP/NCCP.

The goals and objectives listed above are the key building blocks of our planning strategy. Initially, MRC needed to better define and understand patterns and trends in our forest management and forestlands, so we divided MRC's ownership into 15 compartments, or "Sustainability Units." The Sustainability Units are 22,000 acres or less, watershed-based, and were delineated so that each unit would comprise lands that share a common history, have similar environmental variables, and are affected by similar social concerns. This geographic stratification increases the resolution and the overall accuracy of the inventory estimates. Sustainability Units are the basis for assessing forest inventory, growth, and harvest.

Our approach to silviculture and harvest is based on the Sustainability Units. Each Sustainability Unit has been divided into four separate groupings of Harvest Blocks, dispersed in a proportional manner across planning watersheds. The grouping of Harvest Blocks represents a 5-year management period. Individual Harvest Blocks are managed on average, every 20 years. By extending average harvest intervals to 20 years, MRC has tried to reduce effects due to harvesting frequency. Our professional forestry staff developed the design of "Harvest Blocks" based on on-the-ground knowledge and aerial photo interpretation. These Harvest Blocks establish what is commonly referred to as "area control." A short harvest time frame of 20 years with recently low stocking rate will degrade the Redwood forest. Area control is an essential part of sustainable forest management. Without area control, a landowner could intensify harvest in only the best stocked areas of the land base, and still meet a sustained harvest. Using volume control *and* area control insures that harvests are not just concentrated on only the best stocked lands, but the harvests also are spread throughout the land base, reducing the intensity of harvest in any particular watershed. This also directs MRC's operations to include lands for harvest that were poorly managed in the past and could use some form of restoration, such as thinning, vegetation management, or reforestation. OK

The longer interval between harvests is accompanied with a silviculture strategy that is appropriate for regenerating the forest and managing vegetation competition, which is primarily tanoak. MRC will continue to incorporate restoration harvest methods, such as rehabilitation and variable retention, to hasten the development of conifer-dominated stands. the growth of Tan Oak is a Necessary step in Regeneration of the Redwood forest - succesion. the Redwood need to grow up through Tan oaks which produce nutrient rich canopy for Redwood Regeneration

Accountability is essential to this plan. MRC will monitor and report the acres harvested on the forestlands by 5-year periods to ensure that the company is meeting the standards established in this plan. MRC will continue to report the forest inventory and harvest volume on an annual basis.

1.2 Assessment Area

This TMP covers the majority of the forestlands owned by MRC. The covered forestlands are comprised of approximately 213,000 acres situated in the western portion of Mendocino County in the redwood forests of northwestern California. These areas are referred to as "covered lands." There are approximately 16,000 acres of MRC's lands that are excluded from the HCP/NCCP, TMP, and EIS/PTEIR, located in scattered parcels throughout Mendocino and northern Sonoma counties. These areas were excluded from the HCP/NCCP, TMP, and EIS/PTEIR for two main reasons: (1) they are outliers and will be difficult to manage under the HCP/NCCP, and (2) management of these areas will be more heavily influenced by neighbors, or outside influences, than those MRC properties connected to larger tracts of land. So how MRC manages it lands is questionable

Covered lands are situated south of the Humboldt County line, west of Highway 101, north of the Sonoma County line, and east of the Pacific Ocean. The forestlands are located in two distinct areas: the Rockport Tract, just south of the Humboldt County line and the major ownership block, starting at the north in the headwaters of the Noyo River, and proceeding south towards just south of the ridge between the Garcia and the Gualala River in southern Mendocino County, east of the Pacific Ocean, and west of Highway 101. Within the covered lands, MRC owns about 1,000 acres of the Gualala River watershed, in the northern areas near the divide with the Garcia River. Doty Creek

what about Annapolis

Covered lands are in the watersheds of the following significant rivers: South Fork Eel River, Noyo River, Big River, Albion River, Navarro River, Garcia River, Gualala River and the Russian River. Other significant, but smaller, watersheds include Elk Creek, Greenwood Creek, Alder Creek, Hollowtree Creek, Cottaneva Creek, and Juan Creek.

Most of the covered lands are young-growth stands of redwood and Douglas-fir, mixed conifers and hardwoods, or mixed hardwoods. MRC's vegetation types are described within the HCP/NCCP and within Attachment A of this TMP. In general, the habitat ranges from oak savannah in the eastern portion of the ownership, nearest to Ukiah, to older second-growth redwood and Douglas-fir forests near the coast. Due to the harvest history of the ownership, begun in the late 1800s, the average forest condition is second-growth conifer forest with a moderate to high degree of tanoak composition.

3rd or 4th growth maybe a better term

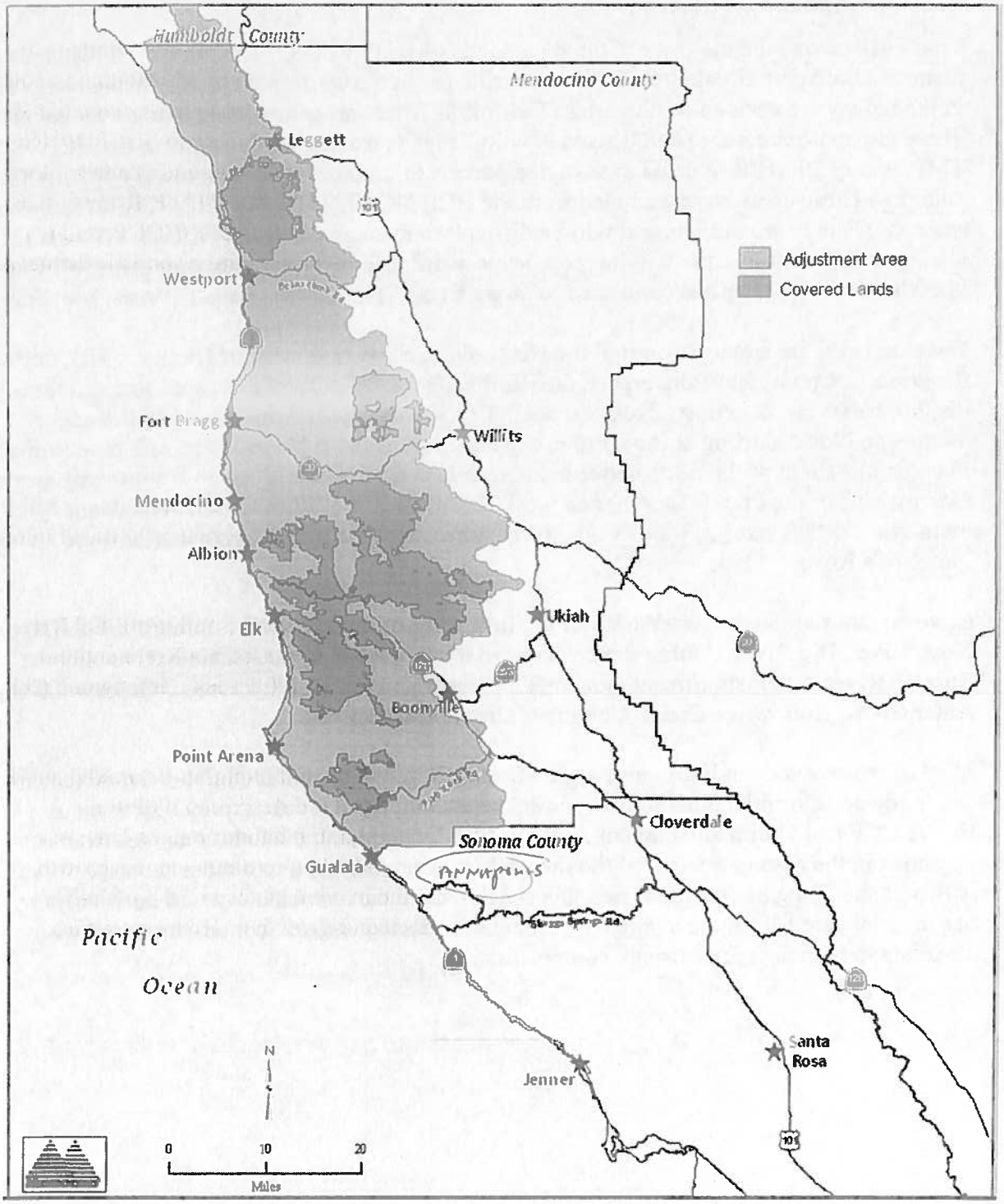


Figure 1. Mendocino Redwood Company Covered Lands and Adjustment Area. (The adjustment area encompasses the plan area as well as land adjacent to the plan area—primarily commercial timberland—from which MRC may add or delete covered lands.)

Table 1. Acres by Land Cover Types on Mendocino Redwood Company's Ownership.

Land Cover Types	Gross Acres*
Redwood/Douglas-fir	134,023
Mixed Conifers and Hardwoods	68,312
Mixed Hardwoods	4,005
Brush and Grassland	2,061
Douglas-fir	2,146
Oak Woodlands	1,084
Pygmy Forest	454
Redwood/Monterey Pine	449
Tanoak	209
Rocky Outcrops	63
Water, swamps	30
*Gross Acres include the roads that traverse the land cover types.	

Areas of landscape features are approximate. Many landscape features in whole or part are not surveyed. Errors may be present due to differences in sources of base layers of landscape features from county, state, federal, and MRC reporting.

The range in elevation on MRC covered lands is from sea level to 3,400 feet. Average daily temperatures range from a high of 66.5 degrees (Fahrenheit) during July to a low of 43.6 degrees (Fahrenheit) in December. Annual precipitation ranges from 50 to 80 inches. MRC's covered lands lie within the rugged Coast Range province that is underlain by marine sandstones of the Franciscan Formation.

Previous companies that have operated on the covered lands include: The Union Lumber Co., Albion Lumber Co., Mendocino Lumber Co., Rockport Redwood Co., L.E. White L.C., Holms Lumber Co., Southern Pacific Land Company, Masonite Corporation, and Louisiana-Pacific Corporation.

Early harvest efforts started at the mouths of watersheds and progressed upstream and up-slope to the ridgelines. Initial logging activities generally clearcut the old growth forests, then burned the slash while the logs were still on the ground before yarding them downhill to the river systems. Oxen were used to pull logs to mills or river systems. The rivers served as the transportation routes to the mills. Subsequent entries into the forests further inland were commonly accomplished with steam donkeys and railroads. During the 1940s, crawler tractors replaced steam donkeys with the yarding of logs and trucks replaced railroads with the delivery of logs to the mills. Clearcutting continued to be a common harvest method. This is NOT correct as old growth was being cut until the 1960s

? Tax laws in the 1940s and 1950s encouraged landowners to remove 70% of their conifer stocking resulting in harvests that removed the larger, healthier trees. Little effort followed harvesting to ensure that the areas harvested were stocked with conifers and able to grow amidst competition from hardwoods. The result of this 'high-grading' is that portions of the forest consist of unnaturally high densities of tanoak. High-intensity fires associated with burning slash

the 24" Rule for felling.

Nobody was burn slash in the 40s-60s many Residual tree Remained which were clear cut in the 80s & 90s

successional natural

and catastrophic wildfire (Comptche Fire in 1931, for example) also favored the establishment and rapid growth of tanoak. It has been hypothesized that the intensity associated with the Comptche Fire was due to high levels of lying dead wood associated with shake operations in the forest. This condition limits the ability of redwoods and Douglas-fir to achieve desired stocking levels. We have focused our effort on restoring these forests to conifer-dominated conditions. This work is ongoing through this plan's silvicultural strategies. In the condition the forest is in now the chance of a catastrophic fire is almost eminent (greatest) with the low height young trees and brush and continues ladder fuels.

1.3 Long-term Sustained Yield

LTSY is defined in the FPRs (14 CCR § 895.1) as "the average growth sustainable by the inventory predicted at the end of a 100-year planning horizon." This section outlines the approach to harvesting, related growth and overall inventory levels over this 100-year period to meet LTSY. LTSY must be demonstrated to meet the requirements of MSP under 14 CCR § 913.11. This requirement is necessary for the state of California's forestlands to maintain high quality timber products over a long horizon. 100 years? Redwoods grow 1000 years

Only growth associated with forested land (timber sites 1 through 5) were included for this LTSY analysis. A timber site is a value given to a plot of land based on its productive capability. A low number denotes very high productive capacity, while site 5 denotes very poor capacity, such as rocky areas. Of the approximately 213,000 acres of covered lands, 4,753 acres were excluded from this analysis due to their timber site.

Conifer LTSY was 739 board feet per acre, per year, or 150 million board feet per year over covered lands. The LTSY considers growth from all forested land, regardless of the harvest level applied to individual stands. Some of the important outcomes of our planning approach include:

- Conifer volumes continue to increase throughout the planning horizon. At the end of the planning period, a majority of areas where growth exceeds harvest occur in sensitive stands, such as watercourse buffers; while the majority of "non-sensitive" covered lands maintain a balance of growth and harvest.
- Allowable harvest levels are always less than the calculated LTSY.
- The maximum harvest percentage of growth is 82% in any 5-year planning period. The average harvest throughout the 100-year planning horizon is 67% of growth. This statistic indicates a continual improvement of the forestlands.
- Conifer inventory will be twice the level at 2045 than it was when MRC acquired the property—this was an initial goal of MRC set in 1998 when the company initially formed.
- MRC has developed a 20-year entry time period for harvest of covered lands. This limits harvest to 25% of the covered lands over each five-year period. For instance, in our first five-year period, we will be limited to a total of approximately 53,000 acres available for harvest (since our current acreage is approximately 213,000).

100% of MRCs lands will be harvested every 20 year

The LTSY was calculated with the use of computer models described in detail in the Landscape Planning discussion (Attachment A, below)

This is extreem logging even in comparison with past practices that actually had dense Timber compare to the present less than 10% conditions. When estimating forest Regeneration you have to take into account that great volumes existed in the natural forest and is now becoming depleted.

Table 2 displays the summary of conifer inventory, growth, and harvest projected for MRC's ownership. Note that for purposes of assessing conifer harvest, we have considered only 2008–2010 (effectively a 3-year planning period) for the first period volume harvest.

Table 2. Modeled Inventory, Growth, and Harvest by 5-year Period*

5-Year Period	Conifer Inventory	Conifer Growth	Conifer Harvest	Harvest as a Percent of Growth	Harvest as a Percent of Inventory (Annual)
1	2,603,697,022	469,740,842	198,819,322	42%	1.53%
2	2,874,618,539	489,650,759	289,770,722	59%	2.02%
3	3,074,498,578	516,167,003	313,342,929	61%	2.04%
4	3,277,322,651	545,449,023	321,913,932	59%	1.96%
5	3,500,857,740	575,195,081	310,040,679	54%	1.77%
6	3,766,012,145	608,799,705	314,879,820	52%	1.67%
7	4,059,932,031	637,291,535	367,758,052	58%	1.81%
8	4,329,465,512	664,231,990	435,054,796	65%	2.01%
9	4,558,642,706	672,358,452	451,006,470	67%	1.98%
10	4,779,994,688	676,458,758	452,862,540	67%	1.89%
11	5,003,590,904	681,921,960	458,900,235	67%	1.83%
12	5,226,612,627	686,396,514	477,032,959	69%	1.83%
13	5,435,976,180	691,617,855	535,182,936	77%	1.97%
14	5,592,411,100	701,256,859	534,423,481	76%	1.91%
15	5,759,244,479	712,053,235	532,418,750	75%	1.85%
16	5,938,878,961	721,841,922	545,549,067	76%	1.84%
17	6,115,171,813	726,057,866	592,135,444	82%	1.94%
18	6,249,094,238	732,055,155	597,048,774	82%	1.91%
19	6,384,100,617	739,179,845	589,994,391	80%	1.85%
20	6,533,286,075	749,285,738	603,569,033	81%	1.85%

* All inventory data are in net board feet (Scribner short log), unless otherwise specified.

1.3.1 Summary of inventory and growth and yield methods

The following section summarizes MRC's inventory analysis and growth and yield modeling. A more detailed explanation is included in Attachment A. MRC's inventory data and projections of growth and harvest are important components in the calculation of LTSY. MRC's timber inventory data is derived from two levels of forest stratification. First, the covered lands are divided into "Sustainability Units" as described under Section1.1, Planning Approach.

Second, individual stands within the Sustainability Units are assigned a vegetation label (or stratum), based on species composition, tree size, and stand density. Sample plots are installed in the vegetation strata to obtain estimates of forest conditions. Plots are allocated to each stratum in order to meet statistical confidence targets by Sustainability Unit (+/- 10% with 90% confidence interval for net conifer volume). MRC's current inventory estimates are based on over 19,000 temporary sample plots.

The simulation model used to estimate growth in the forest is CRYPTOS (Cooperative Redwood Yield Project Timber Output Simulator). CRYPTOS 'grows' each tree in a tree list based on the tree species, crown canopy, and competition, as well as the site conditions in each stand. CRYPTOS also estimates forest mortality. Growth estimates of the forest include assumptions on regeneration of new trees after harvest. Harvest is simulated in the model which allows the application of numerous silvicultural applications to be "tested" against the unique set of vegetation, site class, and sensitivity levels in each stand. These "tests" are useful in overall predictions on growth and yield over time, however field application of silvicultural methods during PTHP preparation will, by necessity, make changes on silvicultural methods from modeled predictions due to site-specific circumstances. CRYPTOS was designed for average management harvest practices, a computer program model. it

The use of a simulation model has enabled MRC to compare multiple scenarios with different management strategies to identify the best scenario to meet our objectives. The simulation model provides a prediction of periodic inventory, harvest, growth, and habitat levels over time. A more detailed description of the growth model is included in Attachment A.

Conifer growth in a forest is influenced by site conditions, stocking levels, management of competition, and age of the trees in the forest. The high growth rate (as a percentage of the existing inventory) in the early periods in our forest is related to the young age of the trees in the forest. The growth rate (as a percentage of existing inventories) slows as the average tree size increases while the average growth per acre increases throughout the life of this plan (Table 3).

The growth rate slows as the average tree size increases is a false statement

Table 3. Conifer Growth over 100-Year Planning Horizon.

5-Year Period	Conifer Inventory	Conifer Growth	Conifer Growth per Acre per Year (Board Feet)	Conifer Growth as a Percent of Inventory (Average Annual)
1	2,603,697,022	469,740,842	463	3.6%
2	2,874,618,539	489,650,759	483	3.4%
3	3,074,498,578	516,167,003	509	3.4%
4	3,277,322,651	545,449,023	538	3.3%
5	3,500,857,740	575,195,081	567	3.3%
6	3,766,012,145	608,799,705	600	3.2%
7	4,059,932,031	637,291,535	628	3.1%
8	4,329,465,512	664,231,990	655	3.1%
9	4,558,642,706	672,358,452	663	2.9%
10	4,779,994,688	676,458,758	667	2.8%
11	5,003,590,904	681,921,960	672	2.7%
12	5,226,612,627	686,396,514	677	2.6%
13	5,435,976,180	691,617,855	682	2.5%
14	5,592,411,100	701,256,859	691	2.5%
15	5,759,244,479	712,053,235	702	2.5%
16	5,938,878,961	721,841,922	712	2.4%
17	6,115,171,813	726,057,866	716	2.4%
18	6,249,094,238	732,055,155	722	2.3%

Redwood forest Inventory (average annual) 14.5% 14 % 13.5% 13.2

questionable if this decrease really occurs in addition

where did Table 3 come from? who calculated this information?

Is this a CRYPTOS model.

19	6,384,100,617	739,179,845	729	2.3%
20	6,533,286,075	749,285,738	739	2.3%

* All inventory data are in net board feet (Scribner short log), unless otherwise specified.

1.3.2 Methodology to determine MSP

The methodology to determine MSP is to calculate growth for the next 100 years with constraints that reflect operating policies to protect non-timber resources and sustainable timber management (while LTSY is determined on a 100-year horizon, and is shown as such on the preceding pages, the HCP/NCCP and EIS/PTEIR is proposing an 80-year length for state and federal permitting time-frames.) We use a set of computer models that are collectively referred to as a landscape planning model to accomplish this. MRC's landscape planning methodology is based on developing virtual forest stands that are geographically based and have a unique identifier that connects spatial information in MRC's Geographic Information Systems (GIS) to tabular data in Microsoft Access databases. Each stand contains information (vegetation, sensitivity, site class, harvest timing) that assists in inventory estimates and guides the activity in the growth and yield simulations. Stands include the following information:

- Vegetation Type – Each stand is placed into strata based on tree species, size, and density. This is used to determine inventory sampling frequency and to assign tree lists to stands for inventory reporting and for growth and yield modeling.
- Site Class – Site class is used to assign site indices to trees based on their species. This sets the growth trajectory for each tree in the tree list.
- Sensitivity Codes – Sensitivity codes direct the stand toward appropriate silviculture techniques according to MRC policies and any laws related to management. More information is provided in the section below entitled "Limits on MSP by Consideration of Other Forest Resources."
- Timing Choices – Harvest timing is hard coded in MRC's growth and yield modeling. This controls the number of acres harvested in a given 5-year period and establishes logical harvest blocks that minimize road use. When the computer program maintains a harvest timing that is on a 5 year period it time to harvest.

Both growth and harvesting simulations occur within a Visual Basic program that "reads" data from Microsoft Access databases. Our landscape planning model is an iterative process, with the goal of identifying the blend of silviculture methods and return frequency that achieve our management objectives while utilizing MRC management policies. Some of the important management objectives and policies considered in MRC's landscape modeling include:

- A non-declining inventory at the ownership level. Growth always exceeds harvest in each of the 5-year planning periods. – only if you conciden the riparian growth.
- Reliance on uneven-age management techniques. Long-term silviculture management will rely on single-tree and group selection. ok if high stocking rates are maintaine
- Restoration of forested stands with high levels of tanoak competition. Many stands will require early restorative activities to achieve adequate stocking levels for selection management. These restorative harvests will include variable retention, rehabilitation, transition, and seed tree removal. These have very low stocking rates with reduced canopy.

A computer based program for harvesting Timber is only as good as the information that was entered into it. Was the information collected from other forest types and how reliable were the persons entering the information.

- Development and maintenance of desired habitat conditions. The approach to growth and harvest included the development and maintenance of desired structural conditions in the forest. desired structure conditions needs to be defined as it could be different from entity to the next
- Appropriate management of sensitive areas (described in detail in the HCP/NCCP). Sensitive areas include Aquatic Management Zones (AMZs), rock outcrops, special habitat areas, etc. WLPZ

The following tables and charts display data related to the calculation of MSP on MRC forestlands. All data displayed is the result of the growth and yield simulation using MRC's landscape planning model. simulated from what? forest model?

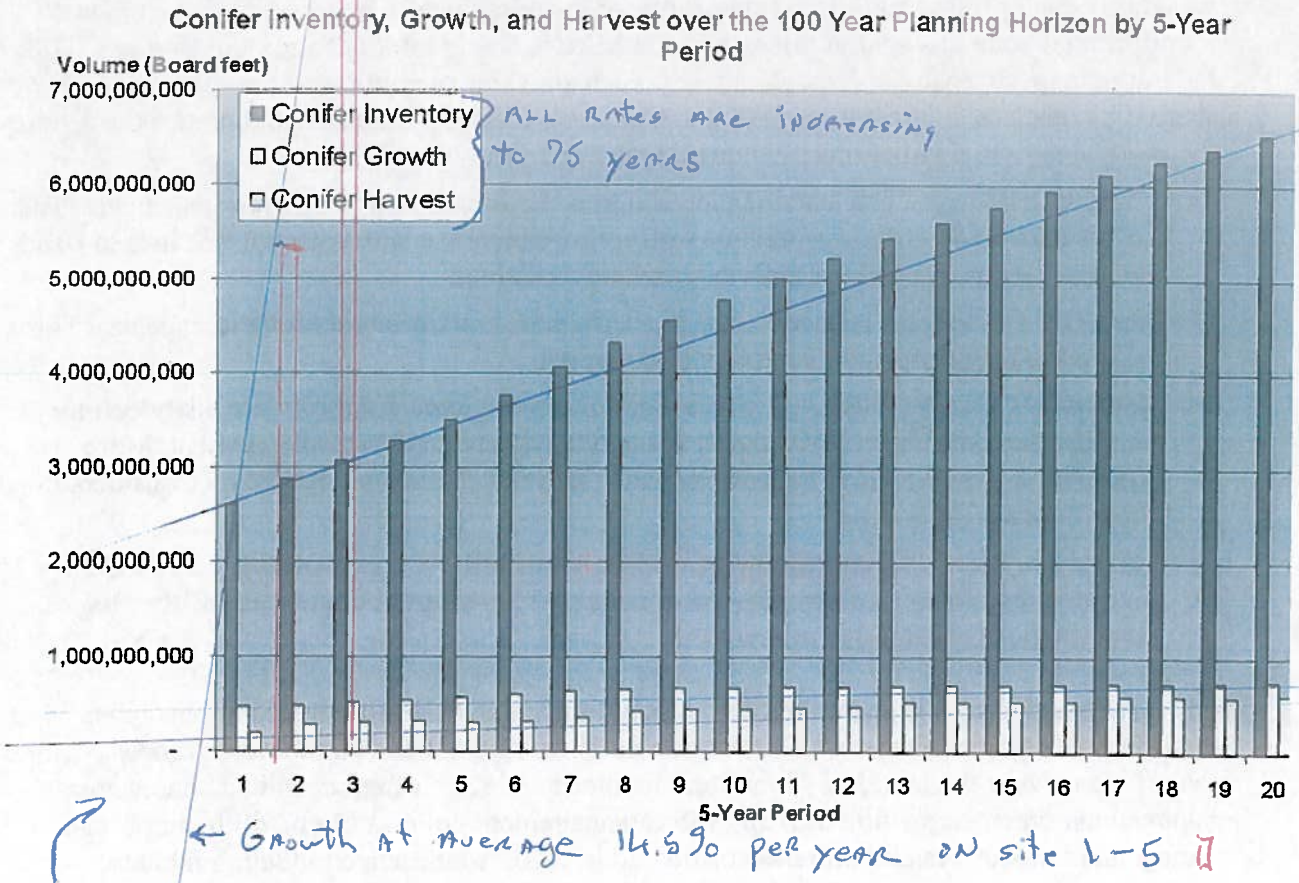


Chart 1: Modeled Conifer Inventory, Growth, and Harvest by 5-Year Period
This chart displays the trend of increasing inventory levels and the relationship between growth and harvest over the 100-year planning period.

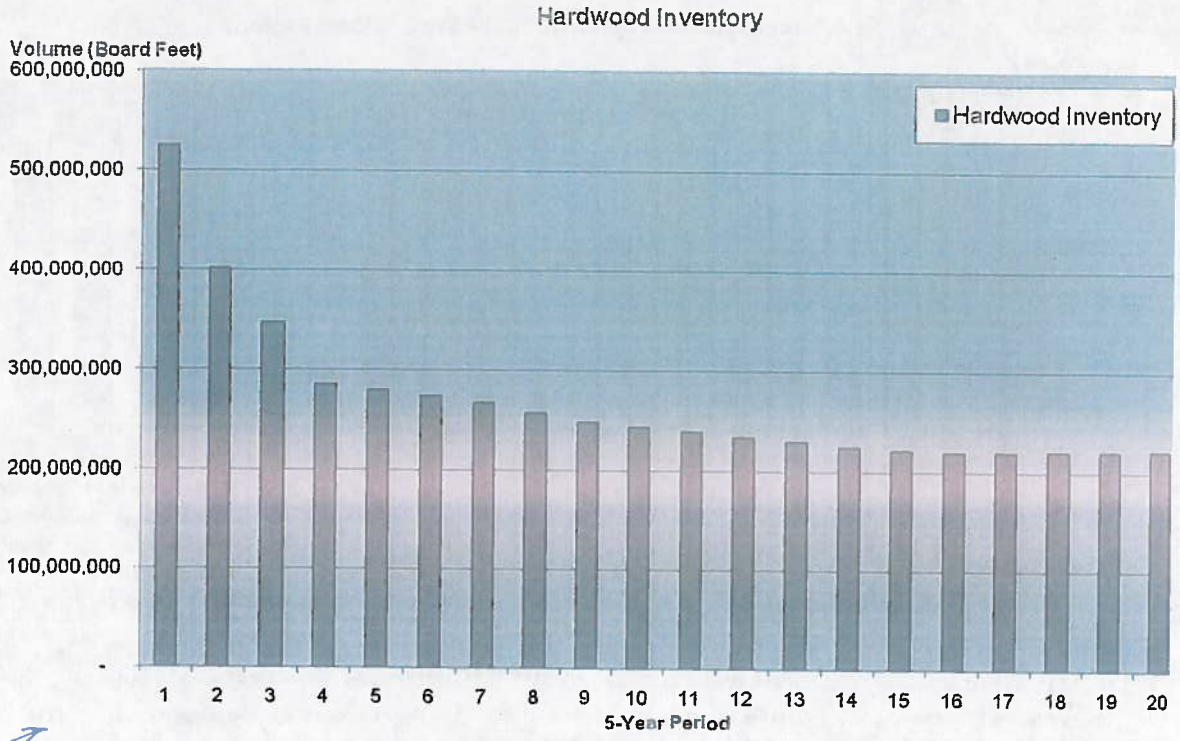


Chart 2: Modeled Hardwood Inventory, Growth and Harvest by 5-Year Period
It is the intent of MRC management to restore the forest to conifer-dominated conditions. Hardwoods remain an important component of the forest in subsequent periods.

Hardwood is a natural succession stage and as conifer increase hardwood would decrease naturally. When MRC decreases the amount of hardwoods by what ever means it desn't necessarily mean the conifers will take over, you could be allowing a different species to grow, such as manzanita of some invasive species (Pampas Grass). Decreasing hardwood in a selective manner (thinning) retaining canopy may keep this problem from occuring.

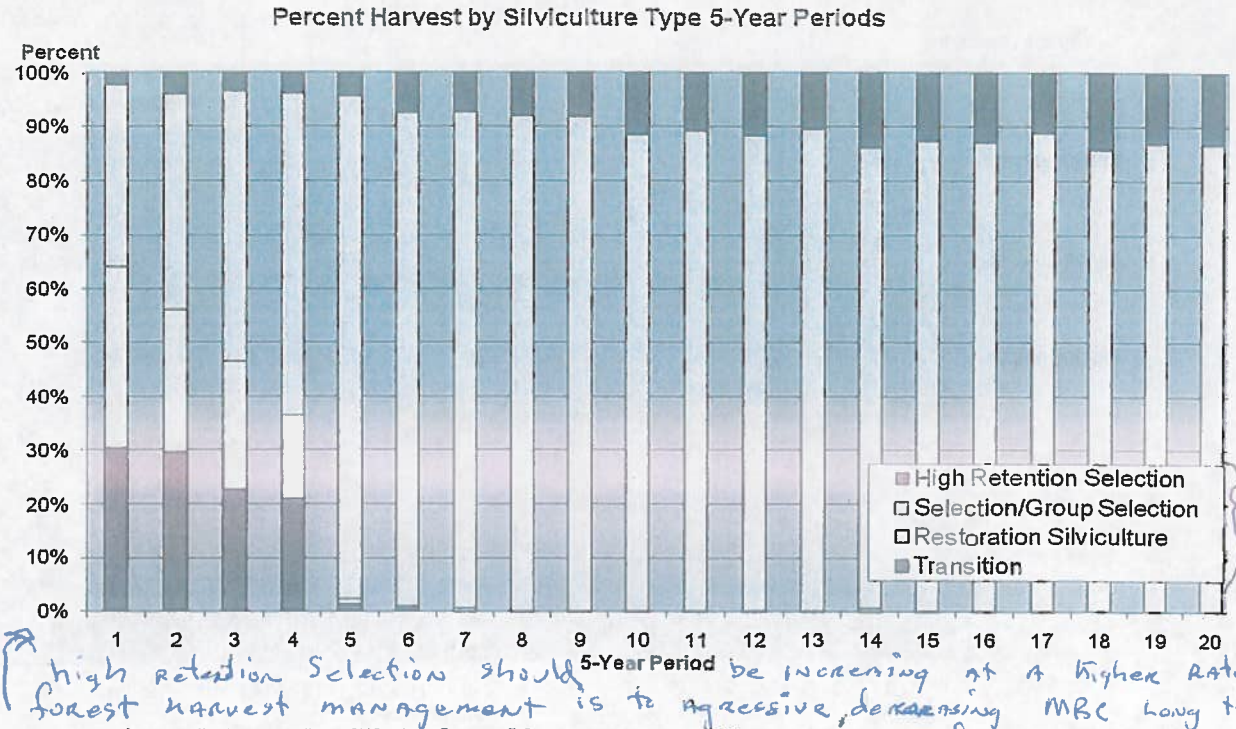


Chart 3: Projected Acres by Silvicultural Method by 5-Year Period

The overall percentages of silviculture methods incorporated by 5-year period are shown above. Restoration silviculture includes rehabilitation, seed-tree removal, and variable retention.

Table 4. Acres Harvested by Silviculture Type. this is confusing

5-Year Period	Selection/Group Selection	High Retention Selection	Transition	Restoration Silviculture	
1	10,251	+ 676	+ 9,158	+ 10,253	= 30,338
2	15,302	1,496	11,277	10,077	= 38,152
3	18,388	1,301	8,327	8,735	= 36,751
4	20,270	1,272	7,146	5,202	= 33,890 139,131
5	36,903	1,720	452	413	= ~~39,488~~ ~~139,131~~
6	38,010	3,062	148	200	
7	38,554	3,035	-	225	
8	39,041	3,369	-	71	
9	41,892	3,714	-	104	
10	39,751	5,127	-	55	
11	40,386	4,851	-	25	

20 years

20 years

MRC acres 213,00 (confusing)

these two columns should be showing seperation with the high retention going up in a redwood forest.

5-Year Period	Selection/Group Selection	High Retention Selection	Transition	Restoration Silviculture
12	40,561	5,328	-	61
13	43,884	5,126	-	170
14	40,598	6,575	-	224
15	41,007	5,986	-	55
16	40,936	6,018	-	65
17	44,298	5,553	-	18
18	40,930	6,838	-	-
19	41,089	6,202	-	-
20	41,131	6,296	-	-

* Restoration silviculture is performed on stands that have less than desirable conifer stocking and are usually impacted by hardwood competition

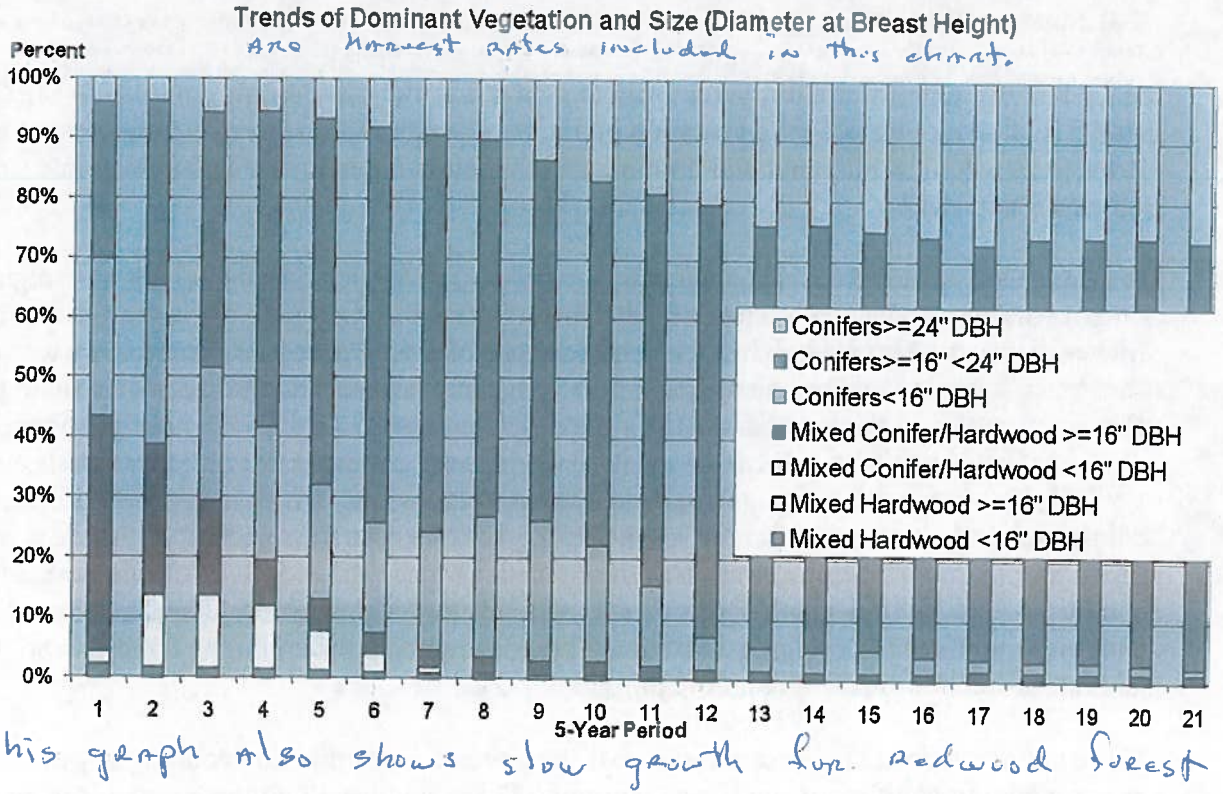


Chart 4: Trends of Dominant Vegetation and Size by 5-Year Period

The chart above displays the trends of species and size class over the planning period.

Maximum Sustained production MSP should read as maximum rate of harvest to maintain the redwood forest at a constant low productivity in it's depressed condition.

MSP = Maximum Sustained Production

1.3.3 Stand vigor, site occupancy and regeneration considerations

Ensuring adequate site occupancy, maintaining good stand vigor, and making provisions for adequate regeneration are all provisions for ensuring MSP. These are related to the conditions found in the forest after a harvest operation is complete. MRC's retention and restocking guidelines are designed to create future healthy stands for continued timber production and improved wildlife habitat.

Regeneration activities on MRC lands include site preparation and tree planting. Timber stand improvement (TSI) work is completed to maintain optimal site occupancy, and includes vegetative management and pre-commercial thinning. TSI vegetation management is designed to improve conditions for the growth of conifer seedlings on a site that has been harvested where openings exist in the forest canopy. TSI thinning is designed to maintain and enhance an already well-stocked stand, mainly through density control. The details of modeling regeneration activities are discussed with each silviculture method in the Landscape Planning Attachment. TSI thinning work has been sporadic and unpredictable on MRC's landscape, and is not modeled, however this method has been applied at a significantly higher rate from 2008 through 2012 than previously during MRC's ownership. evenage forest management is wholey concerned with seedling growth, unevenage forest management is for growing the forest at all age levels. Redwood trees are shade tollerant and the seedling sprouts will grow

All silviculture regimes are designed to ensure good stand vigor. Furthermore, it is MRC policy that the selection of trees for harvest on partial cuts prioritizes diseased and suppressed trees prior to removing co-dominant and dominant trees, unless the tree provides favorable structural elements for wildlife. ← to what level, all?

Hardwoods are modeled for management, or control, within each of the silviculture regimes. The targeted hardwood basal area retention level is 15 square feet, per acre, of trees greater than 6 inches diameter at breast height (dbh), in each stand following harvest, where there was at least that much hardwood component to begin with. This is to ensure that hardwoods remain part of the complex structural conditions MRC is seeking to promote in the forest stands. Approximately 40% of MRC's lands have hardwood levels above desired conditions. The hardwoods are typically the dominant overstory species in these stands—stands which exhibit characteristics of being conifer dominated in the past. It is MRC's goal to restore the majority of these stands to a species mix that more closely resembles the conditions that existed prior to commercial logging activities. Adjacent old-growth forests, such as Hendy and Montgomery Woods, present forest conditions unaffected by logging activities. These forests help the company to envision what the natural forest conditions were on the property. OK very good

There are hardwood stands scattered across the covered lands that do not show any evidence of ever containing conifers in significant amounts. These stands will not be converted to conifer production. The majority of these particular areas is typically dominated by true oaks or mixed hardwood types, and they are most likely to be present in some of the eastern extremes of the property, or in very small locations spread throughout the ownership, such as within rock outcrops. There are also scattered stands of hardwoods that historically were conifer dominated that will be left as hardwood dominated. These isolated stands are being left to insure that the current conditions of the majority of MRC lands are not entirely removed from the landscape. ok

While MRC recognizes the need to restore the majority of its lands to the historical condition of conifer domination, it also recognizes the current conditions as a unique community that should be preserved, just to a much less degree than currently. OK.

1.4 Non-timber Value Considerations for MSP Determination

Non-timber forest values considered in the calculation of MSP include the conservation and improvement of terrestrial wildlife habitat, improvements to habitat adjacent to watercourses, and increased attention to community concerns such as viewshed, recreational opportunities, and economic vitality. Specific conservation strategies for terrestrial and aquatic species are described in detail within the HCP/NCCP. The above considerations impact the determination of MSP through the application of silviculture applications that are appropriate for the level of sensitivity in each stand. The goal of the silviculture applications is to ensure that the selected plan will achieve the targeted forest conditions and meet harvest constraints.

Modeling silviculture regimes includes establishing harvest triggers (MRC uses basal areas of hardwoods and conifers as triggers) and establishing retention standards (using both hardwood and conifer basal area). Fine tuning triggers and retention logic affect the size, density, and growth rates in the forest, which allows the development and maintenance of desired forest structural characteristics. Trigger and retention levels are used to represent the desired management in the field to develop vertical diversity, improve the recruitment of large woody debris, increase canopy closure close to watercourses, and rehabilitate poorly-stocked conifer stands. Detailed descriptions, trigger conditions, regeneration assumptions, retention, and re-entry specifications for MRC silviculture prescriptions are found in Attachment A. Table 5 below displays the acres constrained for non-timber values. basal area is not a true growth predictor in a Redwood forest, True growth is in height of trees.

Table 5. Acres Constrained in Modeling Activities for Non-Timber Forest Values.

Forest Management Type	Descriptions	Total Gross Acres
Old Growth Management (Type I)	Description: Forest stands containing old-growth trees that have never been entered for timber harvest. These stands contain a wide variety of tree species, size classes and ages as well as very large redwoods and Douglas-fir. These stands serve as a natural model of a redwood ecosystem, providing a baseline to compare to the rest of the property. These areas are not harvested in the growth model.	104
Old Growth Management (Type II)	Description: Forest stands that have been previously harvested yet contain a significant level of old-growth trees. These areas are harvested using High Retention Selection in the growth model.	564
Class I and Large Class II Watercourse Buffers (Including Floodplains)	Description: Management buffers along fish-bearing watercourses and watercourses used for domestic water supply (Class I), watercourses that support non-fish aquatic life beneath a watershed area that exceeds 100 acres in size (Large Class II), and certain floodplains. Modeling assumed a conservative buffer width for modeling of 150 feet (horizontal distance from the centerline of the watercourse). The actual buffer widths that will be implemented in the field will vary based on slope. These areas are harvested using High Retention Selection in the growth model.	21,103
Small Class II Watercourses Buffers	Description: Small Class II watercourses that support aquatic life that are non-fish-bearing and have watershed area ≤100 acres in size. Modeling assumed a	5,852

Forest Management Type	Descriptions	Total Gross Acres
?	conservative buffer width for modeling of 75 feet (horizontal distance from the centerline of the watercourse). The actual buffer widths that will be implemented in the field will vary based on slope. These areas are harvested using Selection silviculture in the growth model.	?
Pygmy Forest	Description: Pygmy forests are rare and unique ecosystems that exist close to the Pacific Ocean shore. There are many rare plants which are found only in these vegetation communities, including dwarfed pines (Bolander pine). These areas are not harvested in the growth model.	162
Bishop Pine	Description: Bishop pine forests are rare and unique ecosystems that exist close to the Pacific Ocean shore. There are many rare plants which are found only in these vegetation communities. These areas are similar to Pygmy forest but lack Pygmy Cyprus and Bolander's pine. These areas are not harvested in the growth model.	319
Rock Outcrop	Description: Natural rock outcrops are a unique feature in the forested landscape. Some of these features may be suitable habitat for peregrine falcons. These areas are not harvested in the growth model.	63
Conservation Easement	Description: MRC has two separate conservation easements on the property where certain harvesting and development rights have been legally restricted. These areas are not harvested in the growth model.	462
Viewshed	Description: Viewsheds are important scenic areas in areas adjacent to State Parks, non-industrial neighbors, state highways, county roads, and the Skunk Train. These areas are harvested with Selection silviculture in the growth model.	3,656
Oak Woodlands	Description: Forested areas consisting largely of true oaks and madrone. These areas are not harvested in the growth model.	1,084
Lower Alder Creek Marbled Murrelet Management Area (Core Areas)	Description: Un-entered and second growth stands in Lower Alder Creek that support marbled murrelet nesting activities. These areas are not harvested in the growth model.	140
Lower Alder Creek Marbled Murrelet Management Area (Buffer Areas)	Description: Largely second-growth stands that surround marbled murrelet core nesting areas. These areas are harvested using a Medium Retention Selection silviculture in the growth model.	1178
Coastal Zone Special Treatment Areas	Description: Stands that have been identified from Coastal Commission maps. These areas are harvested using Medium Retention Selection in the growth model.	657
Northern Spotted Owl (NSO) (Core Area)	Description: Stands that have been identified as NSO core activity centers or nesting sites. These areas are not harvested in the growth model.	6874
Northern Spotted Owl (Buffer Area)	Description: Stands that have been identified as buffers surrounding NSO nesting sites. These areas are harvested using Selection silviculture in the growth model.	953
Point Arena Mountain Beaver	Description: Stands that have been identified as Point Arena Mountain Beaver habitat. These areas are not harvested in the growth model.	52
Carbon Sequestration	Description: Stands that are experimentally managed to maximize carbon sequestration. These areas are harvested using High Retention Selection in the growth model.	341

Are these lands included in growth models across MRCs TMP?

Habitat Total 34,564 acres
213,000 − 34,564 = 178,436 acres
commercial

1.4.1 Regional economic vitality and employment considerations

MRC currently employs approximately 45 full-time and 10 part-time and seasonal workers. The seasonal work force tends to fluctuate depending on annual harvest levels, whereas the full-time employment remains relatively static, with some exceptions, such as the 2008 "Great Recession." This employed group represents a set of individuals with wide variety of scientific backgrounds and expertise. MRC's sister companies in the Ukiah area, with their associated mills, treating, and distribution businesses employ an additional 350 full-time and 20 to 30 part-time and seasonal workers. This number is more the bottom level of employment, as throughout the period of the EIS/PTEIR and HCP/NCCP, as harvest levels increase, an increase in employment is expected along the way. This is expected to be more pronounced in the milling and distribution side as harvest volumes increase. While the HCP/NCCP will precipitate hiring science staff for monitoring, the expected harvest acreage will remain fairly even, while the volume per acre increases. with better long Term management practices the forest growth could be increased dramatically, profits would be realize by MRC and th whole community

In addition to the direct employment of MRC, MRC purchases products and engages in contracts with over 150 suppliers, most of which are located in Mendocino County. The value of MRC's contracts with these suppliers is over $15 million per year, and these contracts involve over 300 additional contractor employees. The majority of these contracts are involved in the logging and hauling operations. MRC partners closely with these contractors to ensure that forest management objectives are carried out in all aspects of operations on the ground. Partnering activities include joint training programs and greater involvement of contractors with timber harvest planning and layout.

As MRC improves the forest inventories and wildlife habitat on its land base, these successes will contribute to the stability and diversity of employment in our communities. Many employment opportunities are directly related to the forest products industry and the addition of value-added products. OK

The economic effects of MRC's harvest production activities on local economies can be analyzed by looking at direct and indirect employment and payrolls, local sales taxes, property taxes, and timber yield taxes. Multipliers are determined per million board feet of timber harvest to arrive at projected economic contributions. OK

Direct employment and payroll covers employees of MRC and their wages or salaries. It also covers employees of logging, trucking, and other contractors employed by MRC in the course of normal operations. Data collected from MRC manufacturing operations indicate that the direct employment per million board feet is 12.15 jobs. The jobs considered in this multiplier include foresters, biologists, watershed specialists, logging contractors, managers, and mill workers. Excluded from the calculation are contractors engaged in road construction and vegetation management. Also excluded are consultants, inspectors, and vendors associated with timber harvest. It also did not include all employees associated with the Calpella Distribution Center and the Ukiah wood treatment plant, which amount to 7.32 jobs per million board feet log scale. These jobs were considered in the regional employment multiplier considered below.

McKillop (1995) estimated a timber industry employment multiplier of 2 and an income multiplier of 1.6 per million board feet of timber harvested. McKillop and Spriggs (1993) estimated that $257 per year is collected in local sales tax for each job created directly and indirectly by timber harvesting in California, Oregon, and Washington. This amounts to $6,246 in sales tax revenue per million board feet harvested. The average yield tax per million board feet of conifer harvest in Mendocino County is estimated to be $13,630. Property taxes do not fluctuate with timber harvest. MRC pays property taxes for its timberlands, its related sawmills and other facilities. The analysis below only includes the property taxes paid as the result of a viable timber harvesting operation, such as those associated with the facilities. It does not include those taxes associated with the land since those taxes would be paid in the absence of a timber harvesting program. The following tables show the effect of timber harvest on the local economy per million board feet of conifers harvested. Redwood, Fir, forest etc of MRC is very important To the community and needs to be protected. Recent and past timber manage practices h been reducin community benifets

Table 6. Multipliers used to estimate jobs, payrolls, and taxes resulting from MRC's forest management operations.

Multipliers per Million Board Feet of Timber Harvested					
Timber Jobs	Regional Jobs	Timber Payrolls	Regional Payrolls	Yield Tax	Sales Tax
12.2	24.3	$274,300	$438,600	$13,630	$6,246

Table 7. Estimated jobs, payrolls, and taxes per decade resulting from MRC's forest management operations.

Decade	Volume Harvested	Timber Jobs	Regional Jobs	Timber Payrolls ($)	Regional Payrolls ($)	Yield Tax ($)	Sales Tax ($)
1	488,590,044	5,966	11,883	134,132,700	214,475,400	6,665,070	3,054,294
2	635,256,862	7,747	15,431	174,180,500	278,511,000	8,655,050	3,966,210
3	624,920,500	7,625	15,188	171,437,500	274,125,000	8,518,750	3,903,750
4	802,812,847	9,797	19,513	220,262,900	352,195,800	10,944,890	5,015,538
5	903,869,009	11,029	21,967	247,967,200	396,494,400	12,321,520	5,646,384
6	935,933,194	11,419	22,745	256,744,800	410,529,600	12,757,680	5,846,256
7	1,069,606,417	13,054	26,001	293,501,000	469,302,000	14,584,100	6,683,220
8	1,077,967,816	13,152	26,195	295,695,400	472,810,800	14,693,140	6,733,188
9	1,189,184,218	14,506	28,893	326,142,700	521,495,400	16,206,070	7,426,494
10	1,193,563,425	14,567	29,014	327,514,200	523,688,400	16,274,220	7,457,724

These number would increase if actual redwood growth is used.

1.4.2 Range and forage considerations

The structure and composition of the vegetation on MRC's ownership is diverse. The dominant vegetation type is forest (primarily composed of redwood, Douglas-fir, and tanoak). Forest structure and composition is dynamic, due to harvesting activities and forest succession. A portion of the forested landscape will consist of forage species as the result of harvest. The actual acreage of forage may decrease as the result of using of uneven-aged silviculture. Grasslands currently represent approximately 4% of MRC's ownership. Some of these lands were forested

prior to conversion attempts earlier in the century. Native American fire management also had a role in the current grassland distribution. Some of these grasslands are gradually returning to forest cover as a result of fire exclusion and reforestation. There are no specific model constraints or policies to manage range and forage, however MRC is currently engaged with a local Native American tribe to reduce encroaching Douglas-fir on an area that was maintained as oak savannah through Native American burning practices prior to European intervention. This is located on about 5 acres in the lands near Ukiah. This is not necessarily true as deer population have been declining since the old growth was cut, I belie that deer foraged on mosses and lichens etc in the natural forest environment — experience —

1.4.3 Special modeling constraints

Although the silviculture prescriptions, described above under 1.4, will be utilized throughout the TMP, for modeling and MSP projections, some adaptations were necessary to most accurately state growth and yield over time. These are modeled as limitations on the amount of harvest that can occur in any entry.

The first example of a special modeling constraint modeled in the MSP model run are AMZ buffers for Class I, Large Class II, and Small Class II streams. MRC's GIS and Inventory staff placed the appropriate buffer around each stream (dependent on class) and developed individual polygons for each buffer (a forest stand). When a harvest is possible in one of these polygons, the model reviews the tree data within each stand to determine if it meets the criteria for harvest. If the basal area of conifers within the stand meets the pre-harvest triggers described in Chapter 8 of the HCP/NCCP—the stand can be harvested in the model, and retention of trees within the stand will meet required post-harvest conditions within Chapter 8. However, the AMZ stand must also meet one other condition—it can only be harvested if the stand immediately "up-slope" of the AMZ stand also can be harvested. What this means is that the model does not show harvest yields within AMZ stands (which, over time will have substantial timber volume) unless the adjacent stand meets its own harvest triggers. This special constraint limits MRC's overall available harvest yield because it takes into consideration real-world operational limitations. Most companies would never cable log through a stand only to log the AMZ stand below it, however, if not constrained this special way in the model, one could still "count" on the AMZ yield and apply it to the overall yield available in a given year. There are certainly some AMZ conservation measures that MRC is unable to model—including large woody debris input due to falling trees into the streams; however these conservation measures are expected to have insignificant effects on growth and yield outputs for modeling. ? negligible

The second example of conservation measures that necessitated intensive modeling adaptations were the Terrain Stability Units (TSUs) developed within the HCP/NCCP to protect sensitive slopes. MRC developed TSUs to address sediment control and the potential for mass wasting to occur on covered lands (see HCP/NCCP Chapter 8 for more details). MRC consulted with a professional geologist, who utilized aerial photos with some field verification to delineate TSUs across the covered lands. During the operations of the project, there is an expectation that the delineations will change over time as the aerial photo assessments are validated with more ground visits. During the initial aerial photo assessment and delineation, each TSU polygon is assigned a hazard rating from 1–8, with 1 being the "highest" hazard, or most likely to undergo a mass wasting event.

Each TSU hazard rating has associated conservation measures within the HCP/NCCP, such as the requirement to maintain a percentage of canopy cover in "high hazard" (TSUs 1, 2, and 3). TSUs 1, 2, and 3 require maintaining a minimum of 50% of existing forest canopy; while TSUs 4, 5, and 8 have no requirement for canopy retention. TSUs 6 and 7 also require retention of a minimum of 50% of existing forest canopy; however, these TSUs are rare across covered lands. TSU 6 is defined as an area with active or dormant earth flow or earth flow complex. TSU 7 is similarly defined and limited to a few areas of the plan which are historically dominated by oak woodlands and grasslands. As part of MRC's conservation measures for natural communities (see HCP/NCCP Chapter 9 for more details), MRC has proposed to avoid intensive forest management in these areas. Given the geographical limitations of TSUs 6 and 7 and the limited constraints applied in TSUs 4, 5, and 8, MRC determined that these TSUs would have negligible effects on our yield model. For this reason, special constraints to TSUs 4, 5, 6, 7 and 8 were not included in our modeling efforts. TSUs 1, 2, and 3 were included due to their specific requirement to maintain 50% over-story canopy, and also because these 3 TSUs cover about 30% of the covered lands. The high hazard TSUs do not correspond to the delineation of stand boundaries. This is because the stand boundaries were delineated based on vegetation types, and the TSUs were delineated based on slope, slope condition, soil types, and aerial interpretation of landscape features. Because of these two different styles of interpretation, MRC determined that splicing up the vegetation stands and creating smaller, individual forest stands for each TSU 1, 2, and 3 polygon would be infeasible for several reasons. First, these TSU units often cross multiple stand and special area boundaries and would require us to split individual stands into 3 or 4 additional stands. These stands would be far too small to address as manageable forest units. Additionally, the number of stands we use to model would grow exponentially, causing modeling efforts to slow dramatically and become unwieldy. Finally, as field validation occurs, we expect delineations and assignment of hazard ratings for each unit to change, though we do expect the approximate acreages of stands assigned each TSU hazard rating to remain the same. What this means is that the actual TSU boundary will be determined during field planning, and the actual TSU boundaries are expected to change from the ones delineated at present; however, over the entire covered lands, the acreage of the high hazard TSUs is expected to remain static.

To model canopy retention in TSUs 1, 2, and 3 assess the percentage of each stand covered by a TSU 1, 2, or 3 polygon, MRC assigned special modeling constraints to mimic the 50% canopy retention requirement based on the proportion of each stand covered by the TSU:

Table 8. Timber modeling constraints for TSUs 1, 2, and 3.

Proportion of stand in TSU	Constraint applied
0-25%	None
26-50%	Limited to transition silviculture
> 50%	Limited to selection silviculture

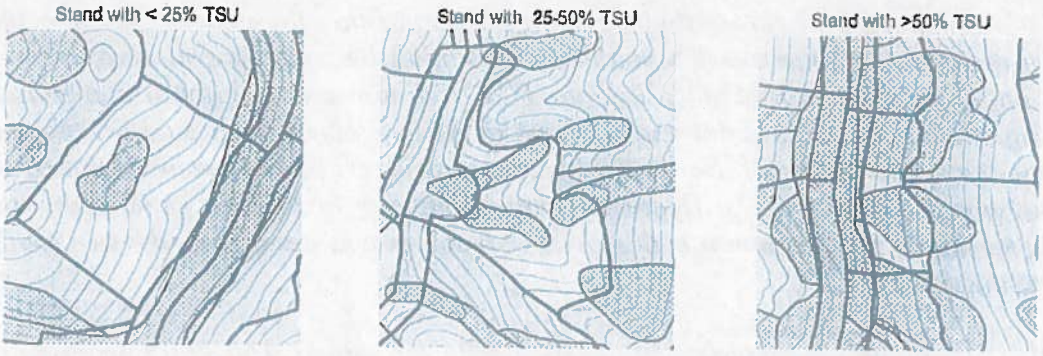


Figure 2. Illustration of stands with various proportions of TSUs contained within them.

1.4.4 Herbicide use

Herbicide use can be, and currently is, an important tool in the restoration of the MRC forestlands. Although not specified as a covered activity in the HCP/NCCP, MRC will continue to utilize this management tool while operating under the EIS/PTEIR. What this means is that MRC will not have the ability to "take" covered species while applying herbicides. This is a more protective strategy toward species protection, partaken by MRC due, not just because of the social sensitivity of the issue, but because of the fairly rapid pace of herbicide research and development. This pace, which provides research information on both old products, and new developing products, makes it very hard to predict necessary conservation measures to protect covered species, if herbicide use was a covered activity in the HCP/NCCP. The discussion below is from the combined MRC/HRC website (www.mrc.com), so references to HRC have been omitted. Conifer forests are reducing the hardwood naturally with their canopy acorss, the successionar hardwoods may be helping the conifers in their early stages

A key component of our forest management is to restore the conifer balance on our forestlands. Mendocino Redwood Company has an imbalance of hardwoods and conifers on a large portion of its forestlands. Herbicides are a key tool in restoring the conifer balance and also in controlling invasive, exotic plant species. Accordingly, MRC uses herbicides more commonly to promote redwood and Douglas-fir while reducing the density of tanoak (a native hardwood). The restoration of conifers on MRC forestlands is technically challenging and will take many years.

This has been an issue used recently as bad management practices

There are many reasons for the current imbalance of hardwoods on MRC forestlands. First, MRC has had to play "catch up" in order to grapple with forest conditions that were inherited from previous land owners and past land use. In the early part of the 20th century, persistent burning to convert forests to pastures produced thousands of acres of grass and brush. Tanoak was often the first and only tree species to re-occupy these sites when reverted back to forest. Once disturbed by cutting or burning, tanoak trees sprout aggressively; they rapidly overtake conifer seedlings and suppress regeneration of the redwood and Douglas-fir forest. Second, the past practice of "high-grading" – removing the best conifer trees from a forest and leaving only smaller ones along with the tanoak allowed tanoak to out-compete the conifers and become the dominant tree species. This is true and false, the majority of the Tan Oak imbalance is due to over harvesting reducing the canopy and climate, producing the environment for the hardwoods. The Tan Bark market was big and reduced most of the Tan Oak befor the oldgrowth was logged out, this is what caused the crippled tan oaks we see today, many sprouts off 1 stump.

– most of the oldgrow Redwood fo was here on the 1950s w intenses log of the 50s 60s deplete it. until th there was n market for growth

MRC uses herbicides as part of their forest restoration either to restore the conifer balance or control invasive, exotic plants. These herbicides are applied manually on a plant-by-plant basis. Manual applications include both "foliar" and "frill" treatments. In a foliar application, a competing tanoak tree is cut down and a follow-up crew returns and applies an herbicide mixture to the stump sprouts. For exotic species control, crews apply herbicide mixtures to individual invasive plants. A frill treatment entails cutting through the bark of the hardwood and applying herbicide to its cambium (the thin layer that moves water and food between roots and the top of the tree).

The use of herbicides is regulated by the Mendocino County Agricultural Commission; as well as the North Coast Regional Water Quality Control Board. We require all contractors employed for vegetation management to use protective gear and to confine applications of herbicides to use during appropriate weather conditions. We follow strict guidelines that meet and often exceed government regulatory requirements; these guidelines include:

OK • *Only using he bicides to address ecological imbalances on our forestlands;*

OK • *Applying herbicides manually on a plant-by-plant basis with fully-trained applicators who report herbicide usage to the County Agricultural Commissioner;*

OK • *Actively control invasive, exotic plants to protect native forest species working in cooperation with the Bureau of Land Management, state parks, and other landowners;*

OK • *Applying herbicides only outside watercourse protection zones of Class I and Class II streams and more than 25 feet from a Class III watercourse;*

Early on, MRC set an ambitious target to reduce its use of herbicides by 60% over 4 years. While this goal was not completely achieved, MRC did reduce herbicide use by 44% in 2000-2002 and by 48.5% in 2003. MRC continues to search for methods to reduce our needs for herbicides. In fact, MRC has tested and monitored several herbicide alternatives including eucalyptus oil, neem oil, and wheat gluten. So far, however, these alternative methods are not as effective and are more costly than the herbicides used today. In some stands where tanoak is less pervasive, MRC can use chainsaw cutting to reduce tanoak competition. It is likely that this method of control will be continued in these stands as an effective, non-chemical treatment for tanoak control. OK

In the future, the annual herbicide use will vary dependent on the level of harvest and which forest stands are chosen for restoration. The trend, however, is a reduction in herbicide use over the long-term. We are committed to phasing out the use of chemical herbicides as a routine management tool in keeping with Forest Stewardship Council principles as we transition towards uneven-aged silvicultural regimes. good, right on

From our past experience, we recognize that it is currently unrealistic to exclude herbicides as a management option. Nevertheless, we are committed to exploring alternatives for herbicides. Until better solutions become available that are practical, environmentally suitable, and economical, we will continue to use herbicides responsibly and in a limited fashion to:

- *Restock conifer stands previously impacted by hardwood competition;*
- *Promote conifer growth where there has been no effective vegetation management;*

TAN OAKS WERE A PART of the NATURAL OLDGROWTH Redwood. Fir forests AND ecosystem. With out them the halth of the forest is in jeperdy ALL species in the Redwood forests ARE shade Tolerant, closed CANOPY maybe the best ANSWER.

- *Foster conifer growth where it is being retarded;*
- *Contain non-native invasive plants; and*
- *Conduct experiments that could further reduce herbicide use.* yes - reduce tan oak canopy gradually while reintroducing conifers, and possible plant tan oak where poor conifer growing condition exist.

1.5 Silvicultural Considerations

MRC will use the following silvicultural treatments when harvesting timber for non-AMZ stands. The chart below gives a general overview of what stands will get which treatment. For AMZs and other constrained stands, MRC uses special selection silviculture, meant to model the intended constraint on the stand.

Table 9. General decision logic in selecting silvicutural methods.

Conifer Stocking (Basal Area (square feet) per Acre)	Hardwood Stocking (Basal Area (square feet) per Acre)		
	>60	20-60	<20
>125	Selection, Group Selection, Alternative Group Selection		
105-125	Restoration Variable		
50-105	Retention (Conifers must be large)	(Alternative) Transition	
<50	Rehabilitation		Alternative Seed Tree Removal (Conifers must be Large)
The trend in silviculture implementation will migrate stands toward a condition where they can continuously be managed under Selection and Group Selection methods. Each silviculture method has a 20 year re-entry period.			

trigger levels

1.5.1 Selection, Group Selection, or Alternative Group Selection

1.5.1.1 Description

Selection, Group Selection, or Alternative Group Selection will be used in stands that are well-stocked with conifers. The purpose of harvesting using the Selection, Group Selection, or Alternative Group Selection methods is to produce logs, adjust age classes to ensure strong growth in a structurally diverse (including trees in excess of 80 years) stand, maintain an uneven age condition, allow for effective regeneration, and reduce competitive forces in the stand. Generally, Selection will be chosen if the stand is composed of younger trees with the intent to thin trees and maintain uneven-aged composition while Group Selection will be chosen for older stands and stands with high hardwood competition to address conifer regeneration.

- 200 yrs

thining trees is a very important and necessary component in managing a Redwood forest. 2nd growth trees are not natural in the old growth forest which doesn't have the increased light conditions and multiple sprouts off stumps

1.5.1.2 Harvesting conditions

The stand (typically a discrete geographic unit 30 acres or less) is the spatial basis for determining if the forest unit meets the trigger conditions for the Selection, Group Selection, or Alternative Group Selection silvicultures. The Selection and Group Selection silvicultures are initiated if the average conifer basal area stocking exceeds 105 square feet per acre. The Alternative Group Selection silviculture is initiated if the average pre-harvest conifer basal area stocking exceeds 105 square feet per acre and harvesting of hardwoods will result in greater than 20% of the stand in group clearings. Although the opening size will not exceed 2.5 acres, as per the current FPRs, the removal of hardwoods may create a condition of greater than 20% of the stand has small group clearings.

— 225 sq ft/ac

.5 ACRE

The percent of growth per year on a seedling is ZERO and likewise the percent of growth on a large tree is considerable. the more BASAL AREA per acre the better the growth and quality of the forest.

1.5.1.3 Retention conditions

24 in

Large trees (> 16 inches dbh) will be retained at approximately 40 square feet per acre, averaged across the stand. The general goal in retaining large trees is to select for trees that have full crowns, are capable of seed production, and represent the best phenotypes in the stand. Exceptions to this goal include retention of trees for wildlife and/or structural purposes. These trees may not have full crowns, may not be capable of seed production, and may not represent the best phenotypes in the stand.

24 in dbh in a redwood forest is very small trees they are the trees that are just starting to really grow and become efficient.

The post harvest stocking standard will have at least 75 square feet of conifer basal area per acre in the areas outside the groups and no more than 20% of the stand will be in group openings, unless Alternative Group Selection is applied. Hardwoods will be retained at the level of approximately 15 square feet per acre of trees greater than 6 inches dbh, provided they were a component of the pre-harvest stand. Conifers will be planted, if necessary, to ensure adequate site dominance of conifers and to add an additional age class.

trigger levels are much to low for all silviculture methods they should be doubled and doubled after first harvest, doubled again after 2nd harvest,

CFPR are better for the southern Subdistric (Coast) and not nearly good enough

1.5.2 Transition and alternative transition

1.5.2.1 Description

The Transition Silviculture is used in stands that are unbalanced in terms of their age class distribution and/or species composition (particularly between hardwoods and conifers). Trees will be removed individually and in small groups to adjust size classes, reduce competition, and improve the structural diversity of conifers. Stands managed with Transition are usually followed up with Selection or Group Selection 20 years later. In no case will Transition be used more than twice in the same stand.

1.5.2.2 Harvesting conditions

The basis for determining if the stand meets the trigger conditions for the Transition silviculture is the stand (typically a discrete unit 30 acres or less) and is based on the average conifer basal area stocking being between 60 square feet and 105 square feet on a per acre basis across the stand. No more than 20% of the stand may be cleared in small group openings to provide for natural or artificial regeneration. Areas that have openings greater than 20% prior to harvest, such as where past grazing has removed Douglas-fir and grasslands now exist, can still be treated with the Transition method as long as not more than 20% of new openings are created through the harvest, and the retention targets below are met. The Alternative Transition silviculture is initiated if the average conifer basal area stocking is between 60 and 105 square feet per acre and harvesting of hardwoods will result in greater than 20% of the stand in group clearings.

1.5.2.3 Retention conditions

Large trees (> 16 inches dbh) will be retained at approximately 10 square feet per acre, averaged across the stand. The general goal in retaining large trees is to select for trees that have full crowns, are capable of seed production, and represent the best phenotypes in the stand. Exceptions to this goal include retention of trees for wildlife and/or structural purposes. These trees may not have full crowns, may not be capable of seed production, and may not represent the best phenotypes in the stand. Full crown trees are exposed to the sun, They have large taper trunks, short in height, limbs to the ground, and poor lumber quality

The post harvest stocking standard will have at least 50 square feet of conifer basal area per acre, outside of group openings created through the harvest. Hardwoods will be retained at the level of approximately 15 square feet per acre, provided they were a component of the preharvest stand. If natural regeneration is unlikely, due to the pre-harvest stand having too few, or no seed trees, new openings created through the harvest will be planted. Outside of new group openings, conifers will be planted, if necessary, to ensure adequate site dominance of conifers and to add an additional age class.

Harvesting condition need to be increased and Retention condition be at Harvesting conditions ~~and~~ with these condition increasing (doubling) after each harvest period.

This action should not impact MRCs bottom line as they have underestimate the real growth of the forest. Product of the forest could easily be ten times greater in the 80 year TMP that MRC has projected.

1.5.3 Rehabilitation

1.5.3.1 Description

Rehabilitation will be used in stands that are capable of growing conifers, but have high levels of hardwood stocking that impede the establishment and/or growth of conifers, or are stocked with non-countable conifer trees (usually trees with less than 30% crown, that are very stunted, etc—this is very limited). In either case, these stands do not meet the stocking standards defined in 14 CCR § 912.7. The purpose of the implementation of this silviculture activity is to enhance the productivity of the stand.

These areas are in early successional stages and should be managed with this in mind, minimal thinning and planting may speed up the process to return back to conifer

1.5.3.2 Harvesting conditions

The basis for determining if the stand meets the trigger conditions for the Rehabilitation silviculture is the stand (typically a discrete unit 30 acres or less) and is based on the average conifer basal area stocking being less than 50 square feet of basal area per acre and in need of management to hasten the recovery of productive conifer stands. These stands also do not meet the stocking standards of 14 CCR § 912.7(b)(1).

TPZ Cable Concept Practices could condition, soil moisture Retenti Humus/soil conditions

less erosion and compaction better micro biology for decompsition and the fertilizer for the next crop of conifers.

1.5.3.3 Retention conditions

Large trees (> 16 inches dbh) will be retained at approximately 5 square feet per acre, averaged across the stand. The general goal in retaining large trees is to select for trees that have full crowns, are capable of seed production, and represent the best phenotypes in the stand. Exceptions to this goal include retention of trees for wildlife and/or structural purposes. These trees may not have full crowns, may not be capable of seed production, and may not represent the best phenotypes in the stand. If the retention targets for trees > 16 inches dbh are not present prior to harvest, then all trees > 16 inches dbh will be left where there numbers are deficient.

questionable as a forest

The post harvest stocking standard will have at least 5 square feet of conifer basal area per acre, averaged across the stand, and may include openings where hardwood competition has been reduced that will be planted. Hardwoods will be retained at the level of approximately 15 square feet per acre, provided they were a component of the pre-harvest stand. Conifers will be planted to ensure adequate site dominance of conifers.

The biggest problem with these low growth areas is that they don't have enough canopy to protect the soils, small tree (conifer) growth, and climate change. Any harvesting in these areas probably will reduce the ability of that ground to maintain conifer growth. These areas should be studied as to what acceptable condition are in maintaining conifer forests.

1.5.4 Restoration variable retention

1.5.4.1 Description

Restoration Variable Retention is used where mature conifers are present in a stand that has a high level of hardwood competition. It may also be used in older second-growth stands that, because of disease or senescence, cannot maintain a leave stand of at least 50 square feet of countable trees after harvest. The purpose of the implementation of this silviculture activity is to enhance the productivity of the stand. The intent of this silviculture activity is to reduce hardwood competition, harvest merchantable conifer volume while retaining structural elements (trees, snags, logs, etc.) for integration into the post-harvest stand. The silviculture activity will retain large trees to provide a seed source, and will create a condition for favorable growth of young conifers, either planted or existing prior to the harvest. Retention of structural elements will be either aggregated or dispersed in the stands, or through a combination of both. Focal areas for retention include unstable areas, wet areas, unique habitat features, and important viewsheds.

1.5.4.2 Harvesting conditions

The basis for determining if the forested area meets the trigger conditions for the Restoration Variable Retention silviculture is the stand (typically a discrete geographic unit 30 acres or less, which is bound by the standard Watercourse and Lake Protections Zones (WLPZs) if adjacent to a watercourse) and is based on the average conifer basal area in trees larger than 16 inches dbh being between 25 square feet and 125 square feet per acre across the stand. Additionally, the hardwood stocking must be greater than 60 square feet of basal area per acre. Restoration Variable Retention is typically used only once in the life of a stand. ALDER TREES best Riparian 25 sq ft To 125 sq ft Unrealistic seperation ? over stream cover.

The stands that are harvested with a Restoration Variable Retention harvest are re-entered in 20-years and are managed with the Transition or Selection methods. These methods will continue to retain structural elements in perpetuity. These silviculture methods will harvest up to 50% of the retained trees that were retained during the Restoration Variable Retention harvest.

1.5.4.3 Retention conditions

Retention conditions will be driven by the pre-harvest stand conditions and may vary from stand to stand. At a minimum the following retention will occur

- Aggregated retention in portions of the stand requiring additional measures (areas greater than 150 feet from a Class I Watercourse, or greater than the Class II standard widths of 50, 75 or 100 feet (depending on slope), class III AMZs, TSUs, hardwood patches). (TSUs, or Terrain Stability Units are a categorization of a land area based on terrain similarity, mass wasting potential, and sediment delivery risk.)
- Dispersed retention will be made up of countable conifer regeneration < 12 inches dbh, trees left for
- TSU constraints, snags, old growth trees, wildlife trees, recruitment trees and/or screen trees as per the HCP/NCCP.

- If the above two retention standards, singly or in combination, do not equate to the following standards, than either aggregated retention or dispersed retention in the form of trees > 16 inches dbh need to be added to meet the following minimum standards.
  - Aggregated Retention must equate to a minimum of 10% of the pre-harvest stand, exclusive of Class I and Class II standard width WLPZ acres. These retention methods increase due to the size of the Variable Retention (VR) unit as follows:

Aggregated Retention	*Maximum Size Harvest Area*
> 10% Area	30 Acres
> 15% Area	40 Acres
> 20% Area	60 Acres
> 25% Area	80 Acres
> 30% Area	120 Acres
> 40% Area	200 Acres

  - Dispersed retention shall equate at least 10 square feet of basal area per acre with conifers representing at least 10 square feet. These retention methods increase due to the size of the VR unit as follows:

Dispersed Retention	*Maximum Size Harvest Area*
> 20% of 912.7 (b)(2)	30 Acres
> 30% of 912.7 (b)(2)	40 Acres
> 35% of 912.7 (b)(2)	60 Acres
> 45% of 912.7 (b)(2)	80 Acres
> 55% of 912.7 (b)(2)	120 Acres
> 75% of 912.7 (b)(2)	200 Acres

  - For areas with a combination of dispersed and aggregated retention types for determination of permissible unit size, the percentage of basal area in dispersed retention portions of the combination area may be reduced proportionately to the area in aggregated retention indicated in the above.
  - A minimum of 15 square feet of hardwoods of at least 6 inches dbh will be retained if they were present prior to harvest.
- As discussed above, although the unit sizes may vary on the ground, the modeling utilized the stands layer, which are typically 30 acres or less, and utilized some average basal area retention to try and capture overall variability of the ownership.

This page is greek to me and ununderstandable

1.5.5 Seed tree removal, alternative seed tree removal

1.5.5.1 Description

Seed Tree Removal will be used in stands with scattered predominant trees amidst an understory condition in which the conifer regeneration is generally adequate and not in need of thinning. Alternative Seed Tree Removal is used when the same conditions apply with a need to thin a dense understory of young trees in areas too small to map. Seed tree Removal is a evenage managment practice

1.5.5.2 Harvesting conditions

Harvest operations using this silviculture will harvest no more than 15 predominant trees or 50 square feet of conifers averaged across the stand per acre (whichever is achieved first). Harvesting may include thinning trees among the regenerated stand (understory) to promote growth and improve health. The stand will be considered for a Transition or Selection harvest approximately 20 years later.

The stand is the basis for determining if the forest unit meets the trigger conditions (typically a discrete geographic unit 30 acres or less). There are two requirements to trigger this harvest: an average conifer basal area in trees < 16 inches dbh of 10 to 60 square feet per acre and a well-stocked younger cohort (trees < 16 inches dbh). Alternative Seed Tree Removal will be applied when there are areas of young growth conifers underneath the seed trees where thinning will maintain or increase the average stand diameter.

1.5.5.3 Retention conditions

Large trees (> 16 inches dbh) will be retained at approximately 5 square feet per acre, averaged across the stand. The general goal in retaining large trees is to select for trees that have full crowns, are capable of seed production, and represent the best phenotypes in the stand. Exceptions to this goal include retention of trees for wildlife and/or structural purposes. These trees may not have full crowns, may not be capable of seed production, and may not represent the best phenotypes in the stand.

The post-harvest stocking standard will have at least 15 square feet of conifer basal area per acre, averaged across the stand, and may include openings where hardwood competition has been reduced that will be planted. Hardwoods will be retained at the level of approximately 15 square feet per acre, provided they were a component of the pre-harvest stand. Conifers will be planted to ensure adequate site dominance of conifers. This is evenage managment there are no large tree - no overstory canopy - causing extreem climate differences

1.5.6 Special selection

Special Selection is used for stands that have constraints. Constraints are built-in restrictions to harvest for such items as AMZs and NSO habitat retention to emulate conservation measures applied on the ground. Although normal harvest prescriptions will be utilized on the ground, such as selection, the Special Selection silviculture is applied in the model to reflect the higher retention guidelines to be used to meet the conservation guidelines within the HCP/NCCP.

Special Selection stands typically have higher retention standards than that of typical selection silviculture.

1.5.7 Site preparation (also see 3.6)

Site preparation is utilized by MRC to increase the opportunities for stocking and tree growth. Site preparation, either manually or through controlled burning, can open up areas for conifer planting that were historically conifer dominated, but are now occupied by other, non-coniferous species. Due to the specific conditions that must be present for many site preparation activities, no modeling efforts were undertaken to capture potential increased stocking, growth, and yield. Site preparation activities are opportunistic by nature, and are not a standard practice utilized in uneven-aged management. Unlike even-aged management, where practices such as controlled burning can be implemented on a regular schedule, both manual and fire-related site preparation occurs sporadically due to MRC's desire to promote stocking throughout its landscape and due to the irregularity of MRC's stands. Site preparation may be utilized in all silvicultural prescriptions described above, to increase conifer stocking, or decrease competing vegetation, in areas where conifers were the dominant species historically.

While MRC has practiced very little controlled burning, outside of slash piles generated from logging or brush piling, MRC recognizes that this practice can be important for both stocking and ecological reasons. The presence of fire within the coast ecosystem cannot be ignored, as many species natural to the landscape depend on fire for continued survival. MRC may still utilize this method, for either ecological purposes or site preparation in the future. When fire was in the natural redwood forest there was a completly different conditions mostly Site preparation must follow all of the conservation measures described within the HCP/NCCP. Balanced. For areas on the landscape where either specific conservation measures do not address, or no covered species are present to warrant conservation measures, MRC foresters will follow the practices and described within the HCP/NCCP Appendix E, Sections E.6 and E.8, and under 14 CCR § 915. The checklist will be utilized to provide the site preparation addendum under 14 CCR § 915.4. The standards from the 2012 FPRs (CAL FIRE 2012) concerning site preparation will be followed in areas not specifically addressed within the HCP/NCCP.

Burning will cause early successional stages to become earlier. If there is Brush and tan oak now there will be grass and brush after, planted trees will have poor growth and survival.

1.6 MSP Monitoring

14 maximum sustainable reduction.

MRC is in a continual process of improving its knowledge about the forest resource. The projections described in this TMP serve as a set of hypotheses under which the company will operate until better information becomes available that challenge the hypotheses. The improved information may alter either the baseline data, used for modeling future forest harvests and forest conditions, or the models themselves, used for projecting the baseline data through a set of management activities. The efforts employed to increase our knowledge serve as a monitoring tool and a feedback loop to the hypotheses presented in this TMP. Efforts aimed at increasing our understanding of the forestlands include:

- Re-measurement of permanent growth plots
- Sampling of post-harvest stands
- Experiments with different vegetation management alternatives
- Study old growth redwood forest and history to better management.

ALL important

- Watershed analysis work
- Wildlife inventories and monitoring
- Ecosystem relationships studies
- Monitoring planting efforts

ALL important in growing a healthy forest.
ecology is the study of the interaction between species and their environment

Tracking of the hypotheses related to silviculture is accomplished by tracking actual harvest activities with predicted harvest activities. The following reports are pertinent to the modeling of the TMP and will be provided to CAL FIRE on an annual basis:

- Harvest volume by silviculture prescription
- Harvest acres by silviculture prescription
- Current inventory estimates

ALL very important in forest management and should be expanded upon, especially natural forest growth

~~Net~~ growth volume in board feet compared to basic acre differences

Since the acquisition of inventory and growth data is an ongoing management activity, it is anticipated that the underlying assumptions of the baseline inventory and rate of growth will improve over time. While the impact of these adjustments is not expected to change the projections of harvest in this plan, certain circumstances would require a review by the CAL FIRE and may trigger a revision of the document. They are:

- A deviation from average harvest acreage projections in any 10-year period which exceeds 10 percent. A deviation from average harvest volumes projections
- A change of ownership which results in either an increase or a decrease to MRC's covered lands ownership by the amount prescribed in the HCP/NCCP, Chapter 1 and the Implementation Agreement for the HCP/NCCP (Appendix A of the HCP/NCCP). Any change, as described within the aforementioned chapters that necessitates an amendment for the HCP/NCCP may require an addendum to the EIS/PTEIR, a supplement to the EIS/PTEIR, or possibly a new EIS/PTEIR. Any change in the land base that was determined would only necessitate a minor modification to the HCP/NCCP would not precipitate an amendment to the EIS/PTEIR. Such instances will be evaluated on a case-by-case basis consistent with 14 CCR § 15162(a).
- A change of forest conditions from catastrophic events that result in an Unforeseen Circumstance, as described within the HCP/NCCP, Chapter 14.
- A negative deviation greater than 10 percent from the baseline inventory estimates, or modeled projections, as the result of ongoing inventory and growth monitoring (see Table 2).

MRC will notify CAL FIRE should any of the conditions stated above become fact.

2 IMPLEMENTATION VIA PROGRAM TIMBER HARVEST PLAN (PTHP)

MRC will primarily be using a checklist-based PTHP for submitting harvest plans to CAL FIRE for approval. The content and submittal of the PTHPs will be in accordance with 14 CCR § 1092. The checklist portion of the PTHP is to show that it is in conformance with the EIS/PTEIR, FPRs, HCP/NCCP, OWDRs and the MATO. A sample PTHP has been included as Attachment C, *Sample PTHP*. The final form and checklist will not be finalized until prior to certification of the PTEIR, to fully incorporate all of the measures arising from any revisions from the public draft EIS/PTEIR. Is the PTEIR looking at the redwood forest lands as a whole or are they looking at it through a spotted owls view. NARROW views will not solve the threatened spec problems. what about the biomass/CANOPY big picture?

The Board of Forestry and Fire Protection (BOF) and CAL FIRE provided a Guidance Document for the preparation and review of Program Timberland Environmental Impact Reports (*Guidance in the Preparation and Review of Program Timberland Environmental Impact Reports*) dated November 4, 2009 (BOF and CAL FIRE 2009). As stated in this guidance document, the CAL FIRE Director will review a PTHP and will determine the following:

No • *"PTHP is in compliance with the PTEIR and PTHP rules (CCR Article 6.8);*

? • *that the activities proposed under the PTHP are within the scope of the analysis conducted in the PTEIR; and*

No • *that the PTEIR provides the disclosure, impacts analysis and mitigation and avoidance measures required under CEQA."*

To determine whether a PTHP is "within scope" of the PTEIR, the Director will determine if one or more of the following exist:

Yes • *"activities proposed in the PTHP could result in significant environmental impacts not considered in the PTEIR;*

• *substantial changes have occurred leading to significant environmental impacts not covered in PTEIR; or*

Yes • *new information becomes available regarding impacts or mitigation showing:*

Yes o *the PTHP would have impacts not disclosed in the PTEIR;*

Yes o *impacts would be substantially more intensive/extensive than shown in PTEIR;*

o *mitigations and/or alternatives found to be infeasible at the time the PTEIR was certified are now found to be feasible; or*

o *new feasible mitigations or alternatives not previously considered are identified."*

climate change fr PAST MANAGM practice have not be AN issue. why? it CAN be restored by growing more NATURAL type forest.

If the Director finds that a PTHP is "out of scope" of the PTEIR, the plan submitter may use one of the following options:

- *"the PTHP may be modified to be within the scope of the PTEIR;*
- *the PTHP may be withdrawn and a THP submitted; or,*

California forest practice Rules do not protect the redwood forest of California. The Rules protect other type forest that are the majority of the State. The ecology of the redwood forest is quite different from Fir and pine forests, structure, fire, climate, rainfall, geography, age, growth are some of the -36- Reasons for adopting a different set of Rules. This has partially been realized with the Santa Cruz, Const

- *an addendum, supplement or subsequent PTEIR (CCR §§ 15162 to 15164) may be prepared and certified by CAL FIRE to address out of scope issues and a new PTHP submitted."*

It is MRC's intent to utilize the PTHP for all of its timber operations within the covered lands, and is utilizing this TMP, the HCP/NCCP, and the EIS/PTEIR process to ensure that the 80-year term of the HCP/NCCP and EIS/PTEIR has been thoroughly reviewed, with the possibility of future rule changes having been adequately addressed and mitigated. It is always possible that unforeseen rule changes necessitated by outside influences, such as new listed Threatened or Endangered species, may precipitate the need to submit THPs in the future, however, MRC has taken great strides to anticipate future rule changes in the HCP/NCCP and TMP. Minor changes in the FPRs are expected by MRC during the term of the EIS/PTEIR, as a natural process of decision making by the public or its representatives, or Board of Forestry and Fire Protection actions. The 80-year term of the HCP/NCCP and the EIS/PTEIR will likely experience normal changes in resource protection standards due to research, public opinion, changes in wood utilization, and any additional number of potential outside pressures. Therefore, MRC has researched the issues surrounding forest management in and around its ownership for the last 30 years while developing the HCP/NCCP and this TMP and feels that the property-wide plan presented in this document, the other documents, and the analysis within the EIS/PTEIR look as far into the future as possible to anticipate future resource protection standards. This allows MRC to maximize the protections for the various resources, and minimize the need to revise the documents in the future or prepare a new or revised EIS/PTEIR. ? ?

- FOR 80 YEAR MRC will be able to use these intense management practic that they have out lined in their TMP and maintain the forest condition as it is now, under stocked with reduced canopy. River and terrestial species are, have, & will continue to suffer. MRC is in compliance with Title 14 CCR § 1092 that do not protect the Redwood Coast environment and species. The CCR Rules are for state wide forest practices and creats the problem when imposed on the Coastal Redwood forest which has a different forest type environment. Redwood forest evolve without fires that complitely devistated the forest, also bug infestation isn't devistating. This forest maintain high biomass, and canopy, deversity etc and resisted change for millions of years. The sustainablity of these forest system is in question due to it's degraded condition and none of these plans should be approved by any goverment agencies, PTHP, TMP, HCP/NCCP, EIS/PTEIR USFWS, NMFS, CDFG, CAL FIRE, NCRWQCB.

- The growth and productive in the Redwood Coast forest is exceptional and better than any forest/vegitation system in the world. Managing this forest at these current reduce levels is ludicrous and difficult to understand. By increasing the biomass to 50% of it potential you could increase growth volumes and profits 100s of times. ks

3 MRC'S OPERATIONAL STANDARDS WITHIN THE TMP and EIS/PTEIR

In proposing operational standards in this plan, MRC uses current FPRs, as well as HCP/NCCP measures and other standards that differ from current FPRs. FPRs are relaxed for redwood Const forest management to the point of be non sustainable, what are the standards.

The discussion and description beginning with 3.2 below follow the basic outline as the FPRs. These are:

- Definitions (subchapter 1, Article 1)
- Ratings and Standards (subchapters 4, 5 and 6, Article 2)
- Cumulative Impacts Assessment Checklist and Technical Rule Addendum No. 2 (subchapters 4, 5 and 6, Article 2)
- Silvicultural Methods
- Harvesting Practices and Erosion Control (subchapters 4, 5 and 6, Article 4)
- Site Preparation (subchapters 4, 5 and 6, Article 5)
- Water Course and Lake Protection (subchapters 4, 5 and 6, Article 6)
- Hazard Reduction (subchapters 4, 5 and 6, Article 7)
- Fire Protection (subchapters 4, 5 and 6, Article 8)
- Wildlife Protection Practices (subchapters 4, 5 and 6, Article 9)
- Logging Roads and Landing (subchapters 4, 5 and 6, Article 12)
- Archaeological and Historical Resources Protection (subchapters 4, 5 and 6, Article 14)

Are these discussion on state standards being imposed on redwood Const forests with equivalent environment standards to its degraded conditions?

Each section discusses MRC's proposed operational standards, whether current FPRs or alternate standards. In addition, there is discussion of MRC's proposed alternate standards, rare plants, improving the effectiveness of prescriptions and addressing site-specific impacts not analyzed in the EIS/PTEIR.

I agree that alternate standards are needed as FPRs standards are not working. As long as they are positive in the protection of the overall redwood Const forest ecosystem.

how CAN MRC be trusted to do what's right for the environment when you can't trust the State.

3.1 Alternate Standards

Because MRC is preparing a TMP, and the EIS/PTEIR analyzes all aspects of its operations, including those not directly pertaining to the HCP/NCCP, MRC may propose "alternate standards" that vary from the FPRs. This process is described within 14 CCR § 1092(b) and is further clarified within CAL FIRE's Guidance Document (Board of Forestry and Fire Protection and CAL FIRE 2009). The preparation of alternate standards based on site-specific criteria allows the landowner to develop resource prescriptions based on the individual and unique site characteristics of the ownership. Because MRC developed a thorough resource protection model based primarily on the HCP/NCCP, it has decided to utilize alternate standards for many of the current FPRs. These alternate standard could be positive OR Negative when viewed in regards to the health of the overall Redwood ENVIRONMENT

The following scenarios reflect how MRC proposes alternate standards in relation to the FPRs:

- Use the current rule as it is at the time of EIS/PTEIR certification, without adhering to any future changes to that rule;
- Use an HCP/NCCP standard in place of the FPR standard, including future rule changes; and
- Use an alternate standard other than the FPR standard, including future rule changes.

Within the CAL FIRE guidance document, processes for proposing alternate standards are discussed under two main themes: (1) rule-by-rule, and (2) resource-based. MRC uses a hybrid of both methods for alternate standards. Assessment of impacts is performed based on MRC's management actions, in their entirety, which involves considering the use of a suite of current FPRs in combination with alternate standards. This is the resource-based portion of the hybrid alternate standards analysis. It is contained in the EIS/PTEIR for each resource affected. TMP Attachment D lists: (1) each specific FPR to which MRC proposes an alternate standard; (2) MRC's alternate standards; (3) references to the pertinent document used to provide the rationale for the proposed alternate standard; and (4) a list of the resource areas in the EIS/PTEIR for which effects of the alternate standard are analyzed. This is the rule-by-rule portion of the hybrid alternate standards analysis.

While the TMP can anticipate possible future rule changes and propose mitigations to either maintain the rule in place or propose something different to the current rule, the EIS/PTEIR must analyze whether the proposed standard provides a level of protection that is equal to or better than the standard current rule or equal to or better than a potential future rule (such as a rule that is being developed by the Board of Forestry and Fire Protection, but is not currently adopted). Equal or better protection means that implementation of the alternate standards will result in effects that are less than significant to the resources to which the alternate standards apply. With this in mind, MRC has proposed the alternate standards, including instances of using the current rule as it is at the time of EIS/PTEIR certification, without adhering to any future changes to that rule. This mean That MRC will be able to operate for 80 years without adhering to ANY future changes

Board of Forestry and fire protection needs to adopted the new rules being developed befor MRCs plan is approved.

3.2 Definitions

MRC will continue to use most of the definitions contained in 14 CCR § 895.1. However, MRC proposes alternative definitions within the HCP/NCCP which are reflective of the 10-year collaborative effort between MRC, USFWS, NMFS, CDFG, the North Coast Regional Water Quality Control Board, and CAL FIRE. These alternate definitions can be found on pages D-3 through D-13 of TMP Attachment D and will replace only the following definitions in 14 CCR § 895.1:

What ~~authority~~ Authority does MRC have to change any definition/rules

1. Activity Center	2. Bankfull Stage	3. Buffer Zone
4. Channel Migration Zone	5. Confined Channel	6. Equipment Exclusion Zone
7. Flood Prone Area	8. Functional Foraging Habitat	9. Functional Nesting Habitat
10. Functional Roosting Habitat	11. Historic Road	12. Inner Gorge
13. Mainline Road	14. Northern Spotted Owl Breeding Season	15. Owl Habitat
16. Permanent Watercourse Crossing	17. Pre-existing Large Wood	18. Seasonal Road
19. Temporary Road	20. Type A Owl Habitat	21. Type B Owl Habitat
22. Type C Owl Habitat	23. Winter Period	

What is the purpose of redefining these conditions? Does the FPR just have them wrong?

3.3 Ratings and Standards

MRC will operate under these current rules and all future changes to rules located in the Ratings and Standards sections, beginning on 14 CCR § 911. These ratings and standards have been fully incorporated into MRC's proposed project.

3.4 Cumulative Effects Analysis - The EIS/PTEIR analysis of the HCP/NCCP, TMP and MATO will be used to meet the overall objectives of 14 CCR §§ 898, 898.1, 912.9 Cumulative Impacts Assessment Checklist and Technical Rule Addendum No. 2.

On page 13 within the CAL FIRE PTEIR guidance document (BOF and CAL FIRE 2009), it states:

"PTHPs are not required to contain the Cumulative Effects Analysis required in typical THPs (THP Section IV: Technical Rule Addendum II) (CCR § 1092.09) and instead rely upon the cumulative effects analysis found in the PTEIR (CCR § 1092(c), 1092.01(b), 1092.01(c)). Mitigations developed in the PTEIR to address cumulative effects are implemented in the PTHP through the PTHP Checklist (see PTHP Checklist Development, below). The cumulative effects

Cumulative Effect ARE not being ~~Analyzed~~ Analyzed through out the PTHR period.

analysis in the PTEIR is largely guided by CEQA Guidelines §15130. In addition, the PTEIR preparer may wish to consider the cumulative effects assessment methodologies found in the Board of Forestry Technical Rule Addendum II (CCR §§ 912.9, 932.9, 952.9).

A periodic update to the cumulative effects analysis will be necessary to reflect changes (past, present and reasonably foreseeable projects) that have been approved since the PTEIR was certified. This may be accomplished through specific mitigations in the PTEIR to ensure that cumulative effects do not occur that are required in the Mitigation Monitoring and Reporting Plan (see Mitigation Monitoring and Reporting Plan (MMRP) discussion) and documented prior to PTHP approval in the PTHP Checklist. Depending on the level of activity anticipated the MMRP may require updates to occur at regular intervals (e.g., annually, decadally) or after significant activity occurs."

The EIS/PTEIR analyzes cumulative impacts throughout the primary and secondary assessment areas. The analysis is based on looking at the effects of implementation of the TMP, HCP/NCCP and MATO, representing the project as a whole, over its proposed 80-year term, while comparing the project's effects to those of other alternative actions. MRC currently assesses cumulative impacts on a THP-by-THP basis, and utilizes individual CalWater planning watersheds as the assessment area for the THP. The EIS/PTEIR analysis used the entire project area (spanning over 50 planning watersheds) over the term of the project (80 years) as the basis for assessment of impacts. This approach provides a more thorough, broad-scale evaluation of cumulative effects across MRC's covered lands (primary assessment area) and the secondary assessment area (lands MRC may include at a later time).

The long-term, project-wide assessment will provide a landscape-level approach to cumulative impacts assessment. The EIS/PTEIR analyzes cumulative effects using several different spatial scales, including larger watershed basins, inventory blocks, and Sustainability Units. The EIS/PTEIR analysis approach to the potential cumulative impacts of the project allows CAL FIRE and the wildlife agencies to address each resource at the most biologically appropriate scale. An analysis based on individual planning watersheds for northern spotted owls, for instance, fails to address impacts on spotted owl productivity; while a landscape-wide analysis (i.e., covered lands) provides the appropriate scale to evaluate such impacts. what about the coho salmon and the cumulative impact have had on them from poor forest practice rules?

3.5 Silvicultural Methods

MRC proposes to maintain most of the FPRs relating to silviculture at the time of EIS/PTEIR certification, without adhering to any future changes to those rules. There are some minor modifications requested for alternate standards under the silvilcultural rules where either the HCP/NCCP contains additional protections or where the TMP has modeled MSP utilizing slightly differing practices.

These alternate standards can be found on pages D-14 through D-51 of TMP Attachment D and will primarily maintain (or modify) the following rule sections in 14 CCR § 913:

1. blank	2. blank	3. blank	4. 913.1(a)(2)

Who is authorizing all these changes?? 291 total

5. 913.1(a)(2)(A)	6. 913.1(a)(2)(B)	7. 913.1(a)(2)(C)	8. 913.1(a)(2)(D)
9. blank	10. blank	11. blank	12. blank
13. blank	14. 913.1(a)(6)*	15. 913.1(a)(7)	16. 913.1(c)*
17. 913.1(c)(2)*	18. 913.2(a)	19. 913.2(a)(1)	20. 913.2(a)(2)
21. 913.2(a)(2)(A)	22. 913.2(a)(2)(A)(1)	23. 913.2(a)(2)(A)(2)	24. 913.2(a)(2)(A)(3)
25. 913.2(a)(2)(A)(4)	26. 913.2(a)(2)(B)	27. 913.2(a)(2)(B)(1)*	28. 913.2(a)(2)(B)(2)*
29. 913.2(a)(2)(B)(3)	30. 913.2(a)(2)(B)(4)	31. 913.2(a)(3)	32. 913.2(a)(4)
33. 913.2(a)(5)	34. 913.2(b)*	35. 913.2(b)(1)*	36. 913.2(b)(2)
37. 913.2(b)(3)	38. 913.2(b)(4)	39. 913.2(b)(5)	40. 913.2(b)(6)*
41. 913.2(b)(7)*	42. 913.2(b)(8)	43. 913.3(b)	44. 913.3(b)(1)
45. 913.3(b)(2)	46. 913.3(b)(3)	47. 913.4	48. 913.4(a)*
49. 913.4(b)	50. 913.4(b)(1)	51. 913.4(b)(2)	52. 913.4(d)
53. 913.4(d)(1)	54. 913.4(d)(2)	55. 913.4(d)(3)	56. 913.4(d)(3)(A)
57. 913.4(d)(3)(B)	58. 913.4(d)(3)(C)	59. 913.4(d)(3)(D)	60. 913.4(d)(3)(E)
61. 913.4(d)(3)(F)	62. 913.4(d)(3)(G)	63. 913.4(d)(3)(H)	64. 913.4(d)(3)(I)
65. 913.4(d)(3)(J)	66. 913.4(d)(3)(K)	67. 913.4(d)(4)	68. 913.4(d)(5)
69. 913.4(d)(6)	70. 913.4(d)(7)	71. 913.4(d)(8)	72. 913.4(d)(9)
73. 913.4(d)(10)	74. 913.4(d)(11)	75. 913.4(d)(12)	76. 913.4(d)(13)
77. 913.4(d)(14)	78. 913.4(d)(15)	79. 913.4(d)(16)	80. 913.6
81. 913.6(a)	82. 913.6(b)	83. 913.6(b)(1)	84. 913.6(b)(1)(A)
85. 913.6(b)(1)(B)	86. 913.6(b)(1)(C)	87. 913.6(b)(2)	88. 913.6(b)(3)
89. 913.6(b)(4)	90. 913.6(b)(5)	91. 913.6(b)(5)(A)	92. 913.6(b)(5)(B)
93. 913.6(b)(6)	94. 913.6(b)(6)(A)	95. 913.6(b)(6)(B)	96. 913.6(b)(6)(C)
97. 913.6(c)	98. 913.6(d)		

*These rule sections will either use an HCP/NCCP standard in place of the FPR standard, including future rule changes or will use an alternate standard other than the FPR standard, including future rule changes. The remaining rule sections will be maintained at the time of PTEIR certification, without adhering to any future changes to those rules. It is apparent that MRC is adimit about not being required To follow future Rule changes,

The following current rule sections apply with no applicable alternate standards:

1. 913.3(a)	2. 913.7

98

3.6 Harvesting Practices and Erosion Control

Harvesting practices and constraints are described throughout this TMP, the HCP/NCCP, and the MATO. The conservation measures prescribed within Chapters 8–11 and Appendix E of the HCP/NCCP describe measures that affect harvesting and erosion control practices. The MATO describes practices specifically related to the bed, bank, or channel of a stream (these exact practices are also duplicated within the HCP/NCCP). These alternate standards can be found on pages D-51 through D-82 of TMP Attachment D and will primarily modify (or maintain in a few instances) the following rule sections in 14 CCR § 914:

1. 914.1(a)	2. 914.1(c)	3. 914.1(d)	4. 914.2(d)	5. 914.2(f)
6. blank	7. 914.2(f)(1)(i)	8. 914.2(f)(1)(ii)	9. 914.2(f)(1)(iii)	10. blank
11. 914.2(f)(2)(i)	12. blank	13. blank	14. blank	15. blank
16. 914.2(i)	17. 914.3	18. 914.3(a)*	19. 914.6	20. 914.6(a)
21. 914.6(a)(1)	22. 914.6(a)(2)	23. 914.6(b)	24. 914.6(c)	25. 914.6(d)
26. 914.6(e)	27. 914.6(f)	28. 914.6(g)*	29. 914.6(h)*	30. 914.6(i)
31. 914.7(a)	32. 914.7(b)	33. 914.7(b)(3)	34. 914.7(b)(4)	35. 914.7(b)(5)
36. 914.7(b)(7)	37. 914.7(b)(9)	38. 914.7(b)(10)	39. 914.7(b)(11)	40. 914.8(d)
41. 914.8(e)				

*These rule sections will be maintained at the time of PTEIR certification, without adhering to any future changes to those rules. The remaining rule sections will either use an HCP/NCCP standard in place of the FPR standard, including future rule changes or will use an alternate standard other than the FPR standard, including future rule changes.

The following current rule sections apply with no applicable alternate standards:

1. 914.1(b)	2. 914.2(a)-(c)	3. 914.2(e)	4. 914.3(b)-(e)	5. 914.5
6. 914.8(a)-(c)				

3.7 Site Preparation (also see 1.5.7)

The proposed maintenance of current rules as alternate standards, in addition to measures for high hazard TSUs included in the HCP/NCCP, were designed to provide a suite of measures with greater overall protection for these resources. The standards from the 2012 FPRs concerning site preparation will be followed in areas not specifically addressed within the HCP/NCCP. These alternate standards can be found on pages D-82 through D-87 of TMP Attachment D and will primarily maintain the following rule sections in 14 CCR § 915:

1. 915	2. 915.1(a)	3. 915.1(b)	4. 915.1(c)	5. 915.1(d)

6. 915.2(a)	7. 915.2(b)	8. 915.3(a)	9. 915.3(b)	10. 915.3(c)

There are no current site preparation rule sections with no applicable alternate standards:

AMZ = aquatic militerized zone — NC bombing —

3.8 Watercourse and Lake Protection

In general, MRC's watercourse protection standards are implemented as AMZs under the HCP/NCCP. These AMZs will supplant the Watercourse and Lake Protections Zones (WLPZs) of the standard FPRs. The bulk of the conservation strategy for AMZs is described within Chapter 8 of the HCP/NCCP. The HCP/NCCP conservation measures for aquatic habitat provide a suite of protection measures around rivers, streams, flood plains, seeps, springs, and other aquatic type habitats. The watercourse protections of the HCP/NCCP have been designed to address the issues and concerns specific to MRC's covered lands. The protection measures are designed to provide for cleaner, colder, and more structurally complex aquatic environments than exist currently. These measures include: establishment of coho "core" watershed, AMZ buffer conservation measures, large woody debris (LWD) placement through physical input, protections of existing LWD within the streams, protections of inherently unstable areas from failure by tree retention and soil stabilization measures, and road improvements which reduce sediment input. In addition to aquatic geophysical resources, the protection measures in the HCP/NCCP have been specifically designed to provide protection for the following species: Chinook salmon, steelhead salmon, coho salmon, coastal tailed frog, California red-legged frog, and northern red-legged frog. These standard are diluted in the WLPZ

MRC's HCP/NCCP addresses surface soil erosion through its conservation measures listed under Chapter 8 and Appendix E. High hazard TSUs address areas of high slope failure probability across the landscape

Chapter 13 within the HCP/NCCP is MRC's monitoring plan for the 80-year term of the project. For watercourse protections, MRC is proposing nearly equal amounts of alternate standards and 2012 maintained rules, related to the overall conservation program of the HCP/NCCP or MATO measures. These alternate standards can be found on pages D-88 through D-121 of TMP Attachment D and will modify or maintain the following rule sections in 14 CCR § 916:

1. 916.2(b)	2. 916.3	3. 916.3(a)	4. 916.3(c)	5. 916.3(c)(1) *
6. 916.3(c)(2)	7. 916.3(c)(3)	8. 916.3(c)(4)	9. blank	10. 916.3(d)
11. 916.3(e)	12. blank	13. 916.3(g)	14. 916.4	15. 916.4(b)
16. blank	17. 916.4(b)(3)	18. 916.4(b)(4)	19. blank	20. 916.4(b)(6) *
21. 916.4(c)	22. 916.4(c)(1)	23. blank	24. 916.4(c)(3)	25. 916.4(d)
26. blank	27. 916.4(f)	28. 916.5	29. 916.5(a)	30. blank
31. blank	32. 916.5(a)(3)	33. 916.5(b)	34. 916.5(c)	35. 916.5(d)
36. 916.5(e)	37. blank	38. blank	39. blank	40. blank
41. blank	42. blank	43. 916.5(e)	44. 916.5(e)	45. 916.5(e)

55

		"(G"	"H"	"I"
46. blank	47. 916.7	48. blank	49. 916.7(b)	50. 916.7(c)
51. 916.11(a)				

*These rule sections will be maintained at the time of PTEIR certification, without adhering to any future changes to those rules. The remaining rule sections will either use an HCP/NCCP or MATO standard in place of the FPR standard, including future rule changes or will use an alternate standard other than the FPR standard, including future rule changes.

The following current rule sections apply with no applicable alternate standards:

1. 916.3(b)	2. 916.4(c)(4)	3. 916.10		

3.9 Hazard Reduction

Also see site preparation, above. For this section, MRC proposes alternate standards in the Lower Alder Creek Management Area (LACMA) which is designed to be greater than the standard rules. This highly sensitive area is located in extremely rugged terrain, and special treatments to avoid any possibility of wildfire have been incorporated into the HCP/NCCP. A description of the LACMA and other marbled murrelet protections are found within Chapter 10 of the HCP/NCCP. These alternate standards can be found on pages D-122 through D-124 of TMP Attachment D and will modify or maintain the following rule sections in 14 CCR § 917:

1. blank	2. 917.2(a)	3. 917.2(b)	4. 917.2(c)	5. blank

The following current rule sections apply with no applicable alternate standards:

1. 917.5	2. 917.7	3. 917.9	4. 917.10	

18

3.10 Fire Protection

There are no alternate standards proposed to the fire protection rules.

3.11 Wildlife Protection Practices

The HCP/NCCP has been developed to protect a variety of plant, aquatic and terrestrial species with the involvement of NMFS, USFWS and CDFG over a decade of negotiations with MRC. The two BOF Sensitive Species that are covered within the HCP/NCCP are Northern Spotted Owl (NSO) and Marbled Murrelet (MAMU). While the other BOF sensitive species (bald eagle, golden eagle, great blue heron, great egret, northern goshawk, osprey, peregrine falcon, California condor, and great gray owl) do not have alternate standards proposed within the TMP, the overall protections measures within the HCP/NCCP are expected to either benefit these species or not detract from the current protection measures. MRC will follow all current and

future rules changes related to BOF sensitive species not specifically covered under the HCP/NCCP. Two federally listed, non-BOF sensitive, terrestrial species are provided coverage under the HCP/NCCP. The California red-legged frog and the Point Arena mountain beaver have designated conservation measures described within Chapters 8 and 10 (for the frog species) and Chapter 10 (for the mountain beaver). Both state-listed and non-listed botanical species are provided coverage under the HCP/NCCP. Chapter 11 provides the conservation strategies for botanical species protections, and Chapter 9 provides protection to natural communities on the covered lands. MRC's wildlife tree retention practices designated within Chapter 9 of the HCP/NCCP policy requires that snags be left (with the exception of safety concerns), similar to the FPRs.

The HCP/NCCP provides coverage for the following species:

- Point Arena Mountain Beaver
- Northern Spotted Owl
- Marbled Murrelet
- Northern Red-legged Frog
- California Red-legged Frog
- Tailed Frog
- Coho Salmon
- Steelhead Salmon
- Chinook Salmon
- Numerous plant species listed within Chapter 11 of the HCP/NCCP

These species do not seem to be sufficent covered IN The # TMP

With the approval of the HCP/NCCP and issuance of the Incidental Take Permits (ITPs), the conservation strategy for the above species will be set on an 80-year course for species protections. The stocking standard on Redwood Coast Forest lands are very low and need to be concidered in the take of all endangered species.

3.11.1 Take of northern spotted owl (NSO) and protective measures

Take, as intended under 14 CCR § 919.10, is allowed within the HCP/NCCP. With approval of the HCP/NCCP, an ITP will be in effect on the covered lands of MRC's property. The ITP does not grant permission for direct killing of an NSO, and take in the HCP/NCCP is related to habitat modification after the breeding season is completed in any given year. Most of MRC's covered lands provided habitat suitable for NSO in the past, however many acres of MRC's lands have low populations of NSOs, while other areas have what are considered to be moderate to high population densities. The HCP/NCCP is designed to balance the populations over the entire covered lands by creating more mature forest conditions throughout the ownership.

OWLS are a very important species in the forest environment as they maintain the balance of voles, squirles, rats and mice. Young conifer are now being damag by these th choosing pr wood quality and tree health.

3.11.2 Take of marbled murrelet (MAMU) and protective measures

Like the NSO, MRC's HCP/NCCP provides for specific conservation measures for MAMU, described in detail in Chapter 10. As with NSO, take is limited to habitat modification only. Currently, MRC's only known population of MAMU resides within the Lower Alder Creek area,

and the HCP/NCCP provides for very strict operations in and near this area, in what is termed the "Lower Alder Creek Management Area," or LACMA. As the AMZs mature, and primary and secondary MAMU trees are left across the landscape, the covered lands are projected to increase habitat availability for this species. ? how ?

3.11.3 Late-succession forest stands

MRC's HCP/NCCP, Chapter 9, describes conservation measures for old-growth forests down to a 3-acre size, unlike the definition under 895.1, which denotes a minimum size of 20 acres. Although the terms "old growth" and "late succession" are not always synonymous, the wildlife agencies and MRC developed the old-growth protection measures within the HCP/NCCP to protect late successional forests. Historically the old growth term was not always u

MRC also provides for protection of individual old-growth trees, as defined within Chapter 9. These single trees provide for unique habitat conditions for non-listed species, such as bats and rodents, and provide denning structures for many species within the basal hollows present on many of these types of trees. The screen tree policies defined with Chapter 9 are designed not only to protect the individual old-growth trees, but to provide for pockets of habitat for both covered and non-covered species. mostly outlaws and rotten Tree left by previous loggers, the defect would make them unprofitable to log.

These alternate standards can be found on pages D-124 through D-135 of TMP Attachment D and will modify or maintain the following rule sections in 14 CCR § 919:

1. 919.2(b)	2. 919.2(c)	3. 919.2(d)	4. 919.4*	5. 919.9
6. blank	7. blank	8. blank	9. blank	10. blank
11. blank	12. 919.11	13. 919.16(a)	14. 919.16(a)(1)	15. 919.16(a)(2)
16. 919.16(a)(3)	17. 919.16(a)(4)	18. 919.16(a)(5)	19. 919.16(a)(6)	20. 919.16(b)

*This rule section will be maintained at the time of PTEIR certification, without adhering to any future changes to those rules. The remaining rule sections will either use an HCP/NCCP standard in place of the FPR standard, including future rule changes.

The following current rule sections apply with no applicable alternate standards:

1. 919.1	2. 919.3	3. 919.5

23

3.12 Logging Roads and Landings

MRC's HCP/NCCP describes practices for all logging roads, landings, and skid roads within Appendix E. Appendix E is the road plan for MRC's covered lands. The road plan specifies road standards for the covered lands and has been developed with agency input during development of the HCP/NCCP. Conservation measures to protect covered species that are also related to roads and landings are specifically described within Chapters 8–11 of the HCP/NCCP. So, while Appendix E describes overall practices for road construction and maintenance, Chapters 8–11

provide for site-specific measures concerning covered species protections. These alternate standards can be found on pages D-136 through D-175 of TMP Attachment D and will modify or maintain the following rule sections in 14 CCR § 923: site-specific measures don't seem to cover the overall health of the watershed as the whole

1. 923	2. 923(d)	3. 923(e)*	4. 923(f)
5. 923.1(a)	6. 923.1(c)	7. 923.1(d)	8. 923.1(e)
9. 923.1(f)*	10. 923.1(g)	11. 923.1(g)(1)	12. 923.1(g)(2)
13. 923.1(g)(3)	14. 923.1(h)	15. 923.1(j)	16. 923.2(b)
17. 923.2(c)	18. 923.2(f)*	19. 923.2(g)*	20. 923.2(h)
21. 923.2(i)	22. 923.2(j)	23. 923.2(k)*	24. 923.2(l)
25. 923.2(m)	26. 923.2(n)	27. 923.2(o)	28. 923.2(p)
29. 923.2(q)	30. 923.2(r)	31. 923.2(s)	32. 923.2(t)
33. 923.2(v)	34. blank	35. blank	36. 923.3(b)*
37. 923.3(c)	38. blank	39. 923.3(d)(1)*	40. 923.3(d)(2)*
41. 923.3(e)	42. 923.3(f)*	43. 923.3(g)	44. 923.4(a)
45. 923.4(b)	46. 923.4(c)	47. 923.4(d)	48. 923.4(f)
49. 923.4(g)	50. 923.4(h)	51. 923.4(i)	52. 923.4(l)
53. 923.4(m)	54. 923.4(n)	55. 923.4(o)	56. 923.5(a)*
57. 923.5(b)	58. 923.5(c)*	59. 923.5(d)*	60. 923.5(e)*
61. blank	62. 923.5(f)(1)*	63. 923.5(f)(2)*	64. 923.5(f)(3)*
65. 923.5(f)(4)*	66. 923.5(g)*	67. 923.5(h)	68. 923.8
69. 923.8(a)	70. 923.8(b)	71. 923.8(c)	72. 923.8(d)*
73. 923.8(e)*	74. 923.9	75. 923.9(a)*	76. 923.9(b)*
77. blank	78. 923.9(c)(2)*	79. 923.9(c)(3)	80. 923.9(c)(3)(A)*
81. 923.9(c)(3)(B)*	82. 923.9(d)*	83. 923.9(e)*	

*This rule section will be maintained at the time of PTEIR certification, without adhering to any future changes to those rules. The remaining rule sections will either use an HCP/NCCP standard in place of the FPR standard, including future rule changes.

The following current rule sections apply with no applicable alternate standards:

1. 923.1(i)	2. 923.2(d)	3. 923.2(e)	4. 923.2(u)
5. 923.4(e)	6. 923.4(j)	7. 923.6	8. 923.7

3
91 91
23
18
47
55
98
changes, modification, Alternate, total 332
-41 blw
291

MRC's overall roads goal is to lessen the amount of a permanent road base and utilize roads with low maintenance erosion control features. Over time, the culverted road crossings will diminish, and rocked crossings with seasonal use restrictions will become more prevalent. Rocked fords allow for less maintenance and need for inspections and provide for a water conveyance system with a lower propensity for sediment input into streams.

Appendix E utilizes a specific maintenance schedule for all of MRC's road types. New roads or features will have the most rigorous inspection schedule, while roads that had been decommissioned will have the least. Even fully decommissioned roads will have a feedback loop to provide for adaptive management techniques. The overall approach is to have roads that require less routine maintenance. with the increased fire risk due to over harvesting and early succession stages will these decommissi. Road to a problem for fighting forest fires?

3.13 Archaeological and Historical Resources Protection

No alternate standards to the FPRs are proposed concerning archaeological resources, however, the EIS/PTEIR is reviewed by the State Historic Preservation Officer per the requirements contained in the National Historic Preservation Act. MRC has a property-wide sensitivity study that was first developed and initiated by Louisiana-Pacific (LP). The initial study was created by Archaeologist Mark Gary for LP in 1990. There were updates in 1996, 2001, 2006 and 2011. Each update includes information on survey and site recordings since the previous update.

Most all ridge tops were inhabited and maintained by native tribes. These cleared ridge top made it possible for european to support themselfs and populate the areas of the Red forests

3.14 Rare Plants

The FPRs remain relatively silent in regards to rare plants, with the exception of 14 CCR § 898.2 and the rule sections pertaining to exemptions and timberland conversions. However, CEQA requires a thorough analysis of a project's possible impacts to rare plant resources. MRC's HCP/NCCP provides protections for up to 31 species of rare plants, including one state endangered plant species and one state threatened plant species. No federally threatened or endangered plants are covered by the HCP/NCCP, nor are any such federally listed plants known to occur within the covered lands. Eleven of the plant species are currently known to occur within the covered lands, and measures are included for the remaining 20 if they are found at a later date. Chapter 11 of the HCP/NCCP, "Conservation Measures for Rare Plants," is dedicated to rare plant species survey requirements and conservation standards. osc

3.15 Improving Effectiveness of Prescriptions and Addressing Site-Specific Impacts not Analyzed in the PTEIR

All PTHPs will go through a State agency review process, which will include an office review and, if CAL FIRE deems it necessary, a field inspection. The main purpose of a field inspection will be to discuss how best to apply the applicable prescriptions contained within the CFPRs, PTEIR, HCP/NCCP, TMP, MATO and OWDR to each PTHP. Though the state and federal lead agencies, responsible agencies, trustee agencies, and MRC worked to develop the best possible protection measures for all situations, there are specific resource areas where professional advice may improve the application and thus the effectiveness of the prescriptions at specific sites. The following resource areas often benefit from the on-the-ground knowledge of foresters, inspectors, geologists, hydrologists, and biologists: (1) roads, landings, and associated drainage structures and facilities; and (2) unstable areas. The review process afforded by the office review and, if necessary, a field inspection, provides an opportunity for MRC and reviewing agency staff to discuss how best to apply conservation measures for these resources based on site-specific conditions and constraints.[1]

add ecologist

Someone needs to connect the whole system together to be effective. The word environment is missing from this TMP.

This process is most appropriate for occurrences where consultation with experts or responsible or trustee agencies is required, and where analysis and mitigation would be too speculative to be

[1] Measures required by the HCP/NCCP may be changed only if allowed by the HCP/NCCP and in accordance with any applicable HCP/NCCP procedures.

fully addressed in the PTEIR. The PTEIR was developed to address all known and reasonably foreseeable impacts across MRC's covered lands. However, over time, certain impacts that have not been adequately addressed in the PTEIR could be identified in some PTHPs. Hence, in the review process we have included steps to identify these impacts and to determine how they will be avoided or minimized, including specific steps to identify and avoid or minimize any new, potentially significant impacts to sensitive plant species or Species of Special Concern that are not covered under our HCP/NCCP. This PTHP review process addresses: (1) identification, avoidance and minimization of significant project-specific (i.e., PTHP-specific) impacts to sensitive plant species that are not covered in the HCP/NCCP or adequately addressed in the PTEIR; (2) identification, avoidance and minimization of significant project-specific impacts to sensitive wildlife species that are not covered in the HCP/NCCP or adequately addressed in the PTEIR; (3) identification, avoidance and minimization of potentially significant environmental impacts that were too speculative to address in detail in the PTEIR; and (4) those situations where neither the TMP nor the PTEIR fully developed mitigation measures that avoid or minimize potentially significant environmental impacts (e.g., PTHP conditions are different from those evaluated in the TMP or PTEIR) identified in the PTHP.

I. For newly listed plants on the CRPR[2] list:

1) In consultation with CDFG, MRC will add List 1 or 2 plants (or of the same approximate level if the CRPR plant rankings change) to our proposed survey coverage for a PTHP if they:
   i) Have appropriate habitat within the PTHP area, and
   ii) Are within or adjacent to the accepted range of the plant.

2) If any of these plants are discovered during the survey process, in order to avoid or minimize any impacts to a less than significant level, they will receive a 50-ft no disturbance buffer (outside of existing roads) unless CDFG:
   i) Concurs that minimization or avoidance can be provided with a smaller buffer;
   ii) Provides substantial evidence that a larger buffer is necessary to avoid or minimize any impact; or
   iii) Concurs that a buffer is not necessary and that site-specific habitat retention will avoid or minimize any impact.

II. For Species of Special Concern:

1) If CAL FIRE, in consultation with CDFG, determines that implementation of the PTHP could result in a potentially significant effect to a Species of Special Concern that was not adequately addressed in the PTEIR, and determines that there are feasible measures that would avoid or minimize the potentially significant impact, MRC will incorporate them into the PTHP to ensure that the impact is avoided or reduced to a less than significant level. These measures may include, but are not necessarily limited to:
   i) Surveys that can be used to identify focused avoidance and minimization measures,

[2] CRPR = California Rare Plant Rank, a designation assigned by the California Department of Fish & Game.

ii) Habitat retention measures; and/or
iii) Seasonal disturbance buffers.

MRC and CDFG will communicate at least annually to share the most current information regarding Species of Special Concern for purposes of identifying avoidance and minimization measures. OK

2) If CAL FIRE concludes that the PTEIR did not include evaluation of a resource that may be significantly impacted and the PTEIR does not include feasible mitigation measures for the impact:
   i) MRC may revise the PTHP to avoid or minimize the new impact to a point where clearly no significant impact would occur;
   ii) CAL FIRE may require MRC to supplement the PTEIR analysis to address the new impact, in which case the PTHP (and subsequent PTHPs) will rely on the supplemental analysis in the PTEIR; or
   iii) MRC may utilize the standard THP process for timber operations instead of the PTHP process. OK

III. For all other potentially significant environmental impacts that arise in a PTHP that are not adequately addressed in the PTEIR:

1) If CAL FIRE or MRC identify a potentially significant adverse environmental impact in a PTHP that was not adequately addressed in the PTEIR, they will consult with the appropriate lead agency, responsible agency, or trustee agency and determine if existing PTEIR mitigation measures to avoid or minimize similar impact(s) can be feasibly refined or adapted to address on-site PTHP conditions. If existing avoidance or minimization measures are feasible for this purpose, MRC will incorporate them into the PTHP to ensure that the impact is avoided or reduced to a less than significant level.

2) If CAL FIRE concludes that the PTEIR did not include evaluation of a resource that may be significantly impacted and the PTEIR does not include feasible mitigation measures for the impact:
   i) MRC may revise the PTHP to avoid or minimize the new impact to a point where clearly no significant impact would occur;
   ii) CAL FIRE may require MRC to supplement the PTEIR analysis to address the new impact, in which case the PTHP (and subsequent PTHPs) will rely on the supplemental analysis in the PTEIR; or
   iii) If MRC does not supplement the PTEIR analysis, it may utilize the standard THP process for timber operations instead of the PTHP process.

Cal Fire is one of the biggest problems Regarding the Redwood Coast Forest by not seperating it from other forest systems in the State.

4 REFERENCES

BOF and CAL FIRE (California State Board of Forestry and Fire Protection and California Department of Forestry and Fire Protection). 2009. Guidance in the preparation and review of

program timberland environmental impact reports. http://www.fire.ca.gov/resource_mgt/resource_mgt_EPRP_PTEIR.php.

CAL FIRE. 2012. California forest practice rules. Title 14, California Code of Regulations, Chapters 4, 4.5 and 10. Prepared for California Licensed Timber Operators and California Registered Professional Foresters by California Department of Forestry and Fire Protection, Resource Management, Forest Practice Program, Sacramento, California.

CDFG (California Department of Fish and Game). 2004. Recovery strategy for California coho salmon. Species Recovery Strategy 2004-1. Prepared by the California Department of Fish and Game, Native Anadromous Fish and Watershed Branch, Sacramento, California to the California Fish and Game Commission.

McKillop, W. 1995. Industrial forestry and environmental quality. Lecture series. Professor of Forest Economics, College of Natural Resources, University of California, Berkeley.

McKillop, W., and M. Spriggs. 1993. Cumulative revenue losses to state and local government due to harvest restrictions. Building towards a better solution: position papers on Northwest Forest Issues, Presidential Forest Conference, Portland, Oregon. Northwest Forest Resource Council.

National Marine Fisheries Service (NMFS). 2010. Public draft recovery plan for central California coast coho salmon (*Oncorhynchus kisutch*) evolutionarily significant unit. National Marine Fisheries Service, Southwest Region, Santa Rosa, California.

weak

If MRC using these two nationals as excuses for there aggressive THP, because they are unrelated to forest management

None of these agencies have considered the Redwood Coast Forest system as a seperate system from other forest types. Redwood forest are so different they need different Forest practice Rules and can't be compared to other forests. Their Growth, habitat, climate, age, shade tolerance fire tolarance, biology, diversity, canopy density, balance between species, and inter connectivity of all species with in the Redwood coast environment just isn't comparable.

Attachment A - Landscape Planning

Landscape Planning refers to the suite of inventory databases, forest growth models, habitat models, and GIS programs that enable the analysis and presentation of current and projected forest conditions. Many efforts are made to ensure an approach that reflects actual on-the-ground conditions and constraints. The Landscape Planning approach is designed to allow planners to assess the effects of a broad range of management activities at the stand level, watershed units, and the ownership. Examples of the types of review provided through this approach include:

- Conifer and hardwood stocking levels on a periodic basis.
- Area harvested on a periodic basis.
- Forest structure types (habitat) on a periodic basis.

Stands – The Basis of Landscape Planning

Stands are smallest geographic units (polygons) in Landscape Planning. The size and extent of stands is based on vegetation, topography, and sensitivity attributes, as well as regulatory considerations. Inventory information can be interpreted at the stand level. That information can be grown and harvested in growth and yield simulations. Reports of all management activities can be prepared at the stand level. Critical information stored in the relational databases for each stand includes:

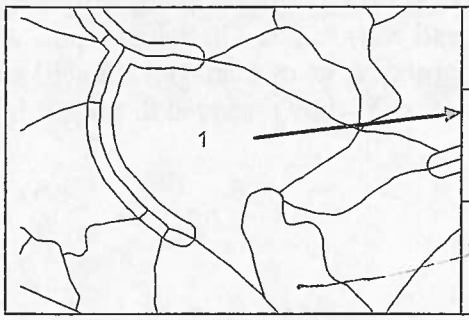
- Stand Identifier
- Acres
- Vegetation Codes
- Sensitivity (watercourse buffers, old growth stands, spotted owls, etc.).
- Site Class
- Harvest Timing

Each of these attributes will be described independently below. The management activities identified in Landscape Planning databases and models can be mapped using GIS and monitored on the ground to validate model outputs.

I-A. Stand Delineation

Stands are identified using aerial photos, drawn on a base map, assigned a unique identifier, and digitized into the GIS. Stands are manageable units that are accessible by a road or cable system and limited by ridges and/or watercourse buffers. Each stand is assigned a unique identifier so it can be 'joined' to relational databases (Table 1). Generally, the minimum mapping unit for stands is 20 acres, unless the stand has a particular sensitivity (such as a watercourse) or a sharp contrast in vegetation. Sensitivity constraints reduce the minimum mapping unit to an appropriate size to represent the sensitivity. Watercourse stands can be less than an acre since watercourse buffers are linked to the adjacent, upslope stand. A sharp contrast in vegetation could result in a minimum mapping unit of 10 acres.

Table 1. Example of relationship between stands in the GIS and stands in a relational database. The image on the left displays a stand with a unique identifier (1). Information about the stand is stored in a relational database.



Stand	Acres	Vegetation	Sensitivity	Site Class	Harvest Timing
1	25	CH2D	00010	III	10
2	14	RD3L	10001	III	5

I-B. Acres

Acres are calculated in the GIS and exported to the relational database. Acres are stored as gross acres (the total acres within the polygon) and net acres (an adjustment assigned to each stand to account for roads and landings that are not part of the forested stand). The road deduction assigned to all stands is 3% since roads and landings have been computed to represent approximately 3% of the ownership's area. It is the net acres that are used to expand per acre estimates of volume, habitat, and other features to larger scale units (planning watersheds, Sustainability Units, ownership).

I-C. Vegetation

Each stand is assigned a vegetation label that forms the basis of a stratified sample. Sampling generates tree lists that are used to estimate inventories of many forest variables, such as volume, density, basal area, and habitat conditions. Vegetation labels are determined for each stand from aerial photos or field visits. The vegetation label consists of a species class code, a size class code, and a density class code. Figure 1 below displays how vegetation labels are assigned to each stand.

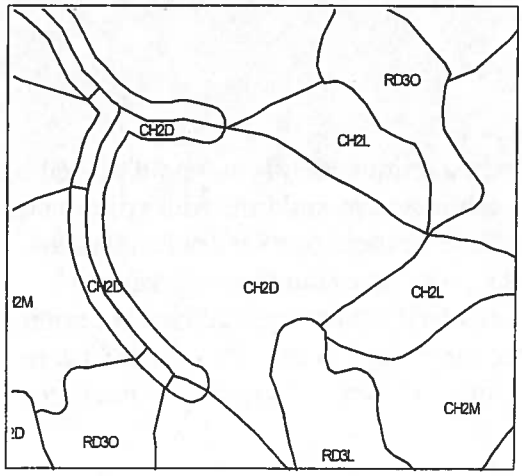


Figure 1. Example of how vegetation labels are assigned to each stand.

Tree lists for the stands that have been sampled are generated from the plots within the stand. Tree lists are developed for stands that have not been cruised by assigning all plots for a given stratum to the un-sampled stands of the same stratum.

Vegetation Classification Rules and Symbology – Introduction

Vegetation is classified according to a stand's species composition, the dominant size of the trees in the stand, and the canopy closure, or density, of the stand. The system has been developed to address mixed age stands and even age stands. Rules for classification have been created to reduce ambiguity in labeling stands. Standards have been established to ensure that vegetation classification is consistent.

Vegetation Classification Rules and Symbology – Determining Size Classes

Size classification is the first component of vegetation classification to be determined. A diameter size class label is assigned to each of the forested stands. Vegetation polygons are classified into one of five "diameter at breast height (dbh)" classes (Table 2).

Table 2. Class assignments for Diameter at Breast Height (dbh) ranges.

Class	dbh
1	0–8 inches
2	8–16 inches
3	16–24 inches
4	24–32 inches
5	>32 inches

Rules have been developed to assign a size class to each vegetation polygon which accounts for trees of many age classes and many diameter classes (Table 3).

Table 3. Decision matrix for determining dominant diameter class.

Is total tree cover greater than 5%? Of the stand's area?
→ No → Are there at least 300 trees per acre? → No → Non-forest
↓ Yes
↓ Yes
Size Class = 1

Do the trees greater than 32" (Size Class 5) dbh comprise more than 50% of the total basal area in the stand?
→ Yes → Size Class = 5
↓ No

Do the trees greater than 24 inches (Size Class 4 and 5) dbh comprise more than 50% of the total basal area in the stand?
→ Yes → Size Class = 4
↓ No

Do the trees greater than 16 inches (Size Class 3, 4 and 5) dbh comprise more than 50% of the total basal area in the stand?
→ Yes → Size Class = 3
↓ No

Do the trees greater than 8" (Size Class 2, 3, 4 and 5) dbh comprise more than 50% of the total basal area in the stand?
→ Yes → Size Class = 2
↓ No

Size Class = 1

1) what is the 5% canopy or basal area?

2) If the tree cover is more than 5% of stand cover it can be classified and if it has 50% of the tree assinted to that class it can be harvested. that is only 2½% of stand cover.

Vegetation Classification Rules and Symbology – Species Classification

Vegetation polygons that have 5 percent or more of their area covered by tree crowns are classified as forest and will be labeled with a three-part labeling system that includes species, size, and density. The vegetation labels are developed for inventory purposes. They are not intended to define natural communities. Definitions and symbols for each are as follows.

Species Classification – Non-Forest Symbols

Vegetation polygons that have less than 5 percent of their area covered by tree crowns should be classified as non-forest and will be labeled with one of the following symbols, depending on the predominant cover. Table 4 displays the vegetation symbols applied to stands that do not have forest cover, or the forest cover is a non-timber species.

Table 4. Vegetation symbols assigned to non-forest stands.

BR	Brush – Chaparral
GR	Grass and Meadows
BG	Bare ground, including rocks and watercourse beds
WA	Water
PG	Pygmy Forest
GX	Oak Woodland
RK	Rock Outcrop
BP	Bishop Pine Forest

A forested polygon is labeled with an appropriate conifer or hardwood species symbol when 70 percent or more of the basal area in the stand can be attributed to that species. If no one species represents 70 percent or more of the basal area, a mixed-species symbol will be used.

Species Classification – Dominant-Conifer Species Symbols

Table 5. Vegetation labels assigned to stands that have at least 70 percent of the stand's basal area in the conifer species identified.

RW	Coast redwood
DF	Douglas-fir

Species Classification – Dominant-Hardwood Species Symbols

Table 6. Vegetation labels assigned to stands that have at least 70 percent of the basal area is in the species identified.

AL	Alder
TO	Tanoak
LO	Live oak
BO	Black oak
MO	Madrone

HARDWOOD

Species Classification – Two-Species Symbols (Conifers)

Table 7. Vegetation labels assigned to stands where no one conifer species has 70 percent of the stand's basal area, but two species combined do have at least 70 percent of the basal area and each of the dominant species constitute at least 30 percent of the overall basal area.

RD	Redwood/Douglas-fir
RM	Redwood/Monterey Pine

Species Classification – Two-Species Symbols (Conifers and Hardwoods)

Table 8. Vegetation labels assigned to stands where conifer species do not comprise 70 percent or more of the stand's basal area. The stand is comprised of a mixture of species that make up 70 percent of the basal area and each of the dominant species (species groups) constitutes at least 30 percent of the overall basal area.

CH	Conifer/Hardwood mix
MH	Mixed Hardwood – Upland Broadleaf Forest
RE	Redwood/Eucalyptus

Vegetation Classification Rules and Symbology – Density Classification

Table 9. Density classes are based the canopy closure of all trees greater than 8 inches dbh for Size Class 2 and above. All trees are considered for the canopy closure estimates in Size Class 1 stands.

Canopy Cover	Description	Code
0 – 20 %	Open Canopy Coverage	O
20 – 40%	Low Canopy Coverage	L
40 – 60%	Medium Canopy Coverage	M
60 – 80%	Dense Canopy Coverage	D
80 – 100%	Extremely Dense Canopy Coverage	E

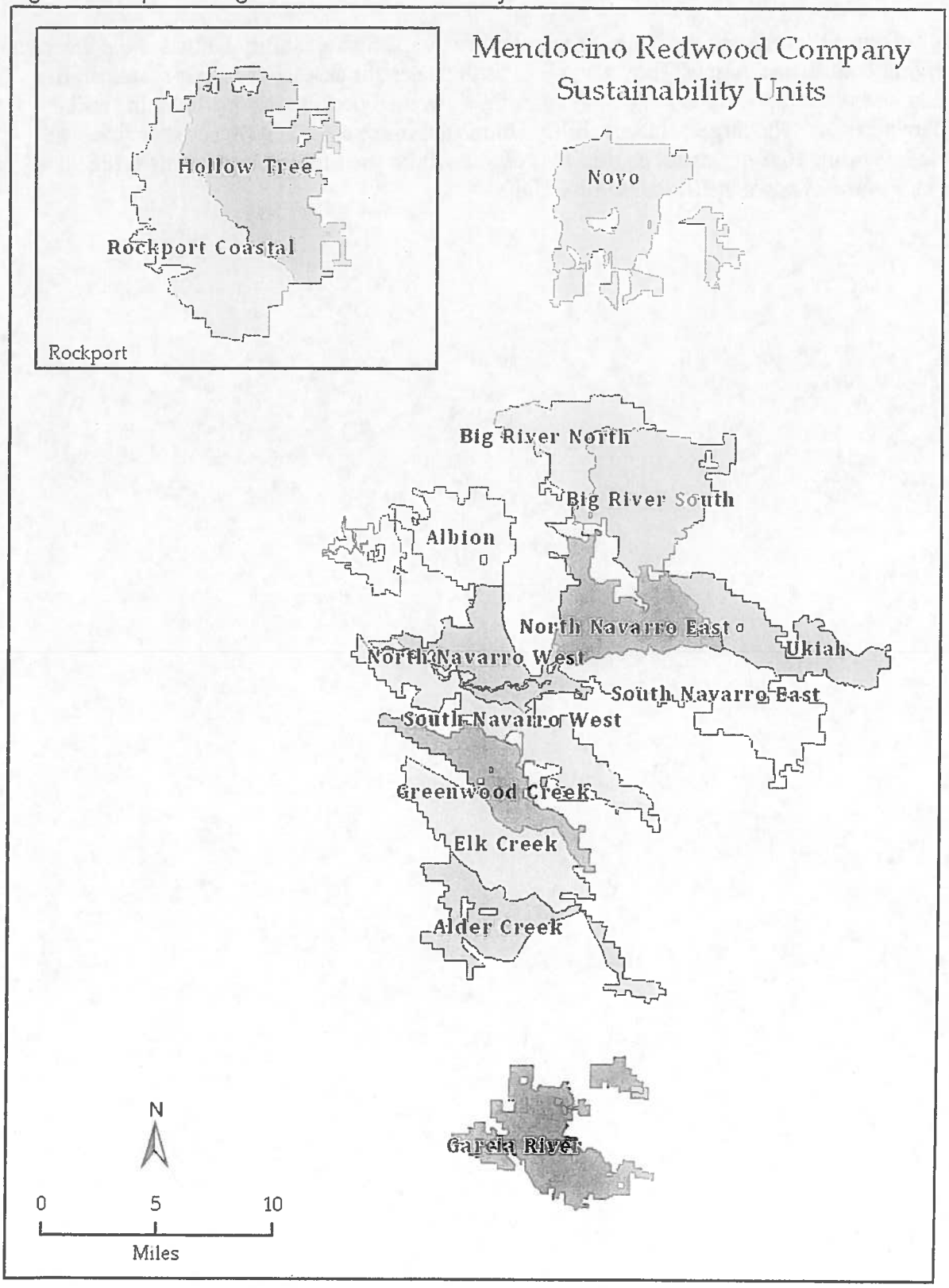
Height is not consider in canopy closure it could be 50% of trees greater than 8" dbh as they are classified, and also this canopy would be down to ground level. tree tops make up a small portion of the crown.

Canopy Trees should be 100ft high with 24" dbh and 225ft² per/acre basal area at minimum values.

Sampling Methodology

The ownership is broken into smaller units called Sustainability Units. Sustainability Units are the basis for sampling and deriving confidence targets. They also serve as the basis for assessing timber sustainability. Sustainability Units were developed by aggregating planning watershed boundaries that contain similar environmental characteristics. The largest Sustainability Unit is approximately 20,000 acres in size. The sampling goal is to be within 10% of the net board foot volume within the Sustainability Unit at the 90% confidence interval. Figure 2 shows the Sustainability Units.

Figure 2. Map showing location of Sustainability Units.



II-A Stratified Sampling

The vegetation labels, or strata, that are assigned to a stand using photo interpretation or field visits are the basis for a stratified sampling system. Strata types with higher expected volume levels are sampled at a higher intensity (more stands sampled) than strata types with lower volume levels, since the principal goal of sampling is to derive confidence in volume estimates.

II-B. Selecting Stands for Sampling

Stands are randomly selected for sampling across a Sustainability Unit and/or planning watersheds. No effort is made to separate sensitivity classes within a vegetation stratum for sampling. The application of management policies (treatments) to stands of the same vegetation stratum in different sensitivity classes results in different outcomes for the vegetation. Vegetation labels are updated when stands are harvested or, at least every 20 years if a stand is not harvested.

Sampling priorities are identified at the beginning of each calendar year based on an assessment of the number and age of plots that represent each stratum within each planning watershed. MRC has established a goal of having at least 30 plots in 3 different stands for each planning watershed in a Sustainability Unit for strata that are estimated to have at least 100 square feet of conifer basal area. The goal for strata that are estimated to have less than 100 square feet of conifer basal area, but at least 30 square feet of conifer basal area, is 20 plots in 2 different stands. Strata that are estimated to have less than 30 square are assigned 10 plots in 2 different stands.

II–C Sampling Procedure

The allocation of plots is based on an effort to achieve an estimate that has adequate confidence to represent the stand being cruised and to distribute the plots in enough stands of a given stratum to represent potential variation between polygons, thus achieving a higher level of confidence at the stratum level. We have determined that 10 plots are adequate for the stand level confidence and 20 to 50 plots are adequate for the stratum level confidence. The variation in the number of plots is based on the anticipated volume in the stratum and the proportion the stratum represents in the overall inventory. A stratum with a high anticipated volume that represents a high proportion of the acres will be allocated more plots than a stratum that represents a small proportion of the acres and has low volume.

Points (plot centers) are located on the stand map at the appropriate chain intervals that evenly distributes the desired number of plots throughout the stand along cardinal bearings. Once in the field, an entry point to the first plot is determined. Common entry points are landmarks such as landings, watercourse crossings or other identifiable stand boundaries. This point will be the anchor point from which all cruise lines will be established. A GPS coordinate is taken (if possible) and directions to the first plot are written on flagging displayed at the entry point. Plot locations will be referenced by flagging that identify the plot number and specify directions to the next plot.

II-D Data Collection at Plots

The plots are sampled using a set of nested plots. All trees equal to or greater than six inches (Diameter at Breast Height) are sample with a variable radius plot. A fixed 10th acre plot is used to measure down logs and brush cover. A 100th acre fixed plot is used to tally trees smaller than 6 inches.

1) **Trees greater than six inches are measured if they fall in the variable radius plot. The basal area factor (BAF) selected for the stand is based on getting, on the average, five to six trees 'in' per plot. Trees will be tallied and measured in a clockwise direction beginning at a North line.**

2) Species: Species are coded on the plot sheets with the codes shown in Table 10.

Table 10. Codes and scientific names for common species found in Mendocino Redwood Company's forests.

Species Code	Common Name
AL	Red Alder
BM	Big Leaf Maple
BO	Black Oak
BP	Bishop pine
CB	California Bay
DF	Douglas-fir
EU	Eucalyptus
GC	Golden chinquapin
GF	Grand fir
LO	Live Oak
MO	Madrone
MP	Monterey pine
NM	California Nutmeg
PY	Pacific yew
RW	Redwood
SP	Sugar pine
SS	Sitka spruce
TO	Tanoak
UK	Unknown
WH	Western Hemlock
WM	Wax Myrtle
WO	White Oak

3) Diameter at Breast Height (dbh) Diameters are measured at a point 4.5 feet above the ground level or root collar on the uphill side of the tree. Measurement accuracy is to the nearest inch. In the case of irregularities

in dbh, such as swelling, bumps, depressions, branches, etc., diameters are measured immediately above the irregularity at the place where it ceases to affect the normal stem form.

4) Height. Total height is measured on all trees on every third plot starting with the first plot. If the angle from level to the point of measurement exceeds 45 degrees (i.e., 100% or 66 topo), the distance from the measured tree must be increased to reduce the angle. At least 30% of the total trees should have height measurements while emphasizing a good distribution throughout the diameter classes. A regression equation is derived from the measured trees to estimate the unmeasured tree heights. Species that are uncommon in a particular stand should be measured for height if they are in any plot, since the sample size for developing a regression estimator might be inadequate.

5) Height to Crown Base (HTCB). This measurement provides an estimate of the total crown area. The measurement is taken on every tree that is measured for height. The measurement is taken from the base of the tree to the visually balanced base of the crown. since tree crowns are often irregular.
What is the HTCB on the average of MRC's TMP lands?
6) Status. A status code is entered for each tree. Status codes describe the physical condition of the tree (Table 11).

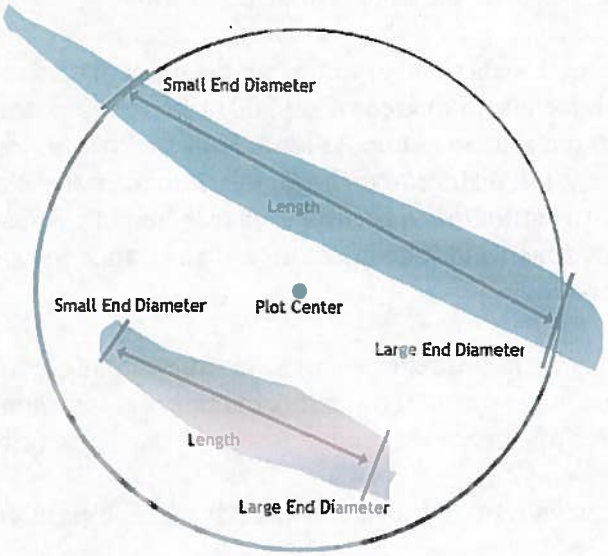
Table 11. Status codes for trees sampled.

Status Codes		
Code	Features	Description
L	Live	Default code for trees with normal form.
S	Snag	Standing trees that are dead.
H	Live Snag	Standing trees that retain little live component – mostly dead.
W	Old growth	Old growth trees.
R	Snag Recruitment	Trees that will be retained for future snags.
P	Broken Top	Trees that are not snags or old growth and are not of normal form.
P	Dead Top	
P	Forked	
P	Suppressed	

7) Down Logs. Down logs are measured on every plot. The sample area for downed logs is a fixed 1/10th acre plot (37.2 feet radius). Down logs must meet the following criteria to be sampled:
- The log must have an average diameter of at least six inches (as determining by summing the large end diameter and the small end diameter and dividing by two),
- The log must have a length of at least ten feet, for average diameters less than 16 inches, or
- a length of at least six feet, for average diameters greater than 15.9".

Are these down logs figured in Total biomass for forest health

Figure 3. Figure displays how downed logs are measured on each plot.



Down logs are determined to be either hard (no material gives way when kicked, sound when kicked is a thud) or soft (material falls of when kicked, sound is muffled). Hard logs generally have the top intact, the bark on, and the wood is sound. Soft logs usually have a broken top, the bark is sloughing off, and the wood is decaying. A status code 'H' is applied to hard down logs and a status code 'S' is applied to soft down logs. Is the species of the log recorded

8) Regeneration. Trees less than 6 inches dbh are tallied on every plot. The sample area measured for regeneration is a fixed 1/100th acre plot (11.8 feet radius). Record all conifers and hardwoods by species and tally seedlings and saplings in two size classes: 0-2.9 inch dbh and 3-5.9 inch dbh. These calculation are very important in the staking levels after harvest basal area/canopy?

9) Shrub Cover. Shrubs are defined as any plant species less than 10 feet tall with crown diameters equal to at least 75% of the height. The measurement is derived from an ocular estimate of the shrub cover within a 1/10th acre plot (37.2 feet radius). The dominant shrub species is recorded along with the following density codes shown in Table 12:

Table 12. Density codes for understory vegetation sampled on each plot. — is this Canopy? —

Density Code	Description of Understory Coverage	Percent Coverage of Understory
O	Open	0 – 19.9%
L	Low	20 – 49.9 %
M	Medium	40 – 59.9 %
D	Dense	60 – 79.9 %
E	Extremely Dense	80 – 100%

Table 12: Additional Notes. Any further information concerning the stand being cruised can be extremely important. Items that should be noted are the location of skid trails, springs, watercourses and historical artifacts. Wildlife observations should also be noted, such as woodrat nests, bird nests, owls, raptors, mountain lions, and bears. – Salmon

II – E Site Index Sampling

Site trees are sampled to derive an estimate of the height of the co-dominant trees (by species) at age 50. Stands that share similar environmental variables, particularly soil are grouped together into various site classes. The site indices derived from sampling are used to assign an average site index for each species to the stands that share the same site class. The current data applies site index estimates to an ownership stratification of site classes.

Approximately 3 to 5 trees per stand are selected for site trees and measured for species, dbh, height, HTCB, and age. Selected site trees are conifer trees that display no deformities and are in a co-dominant position in the stand. The trees measured for site index are averaged for each species. The allocation of site index to the landscape is based on expanding the results of the estimated site index from the sampled trees to other stands within the Planning Watershed based on soil stratification.

II – F Measurement Tolerance Standards

Listed below (Table 13) are the tolerance standards that will be used to evaluate the accuracy of field measurements. MRC performs inventory sampling with company personnel. Periodic check cruises are performed by senior inventory staff to ensure the following standards are being met. good

Table 13. Tolerance standards allowed for each measurement theme.

Measurement	Tolerance
Percent slope	±10%
Percent brush cover	±20%
Species identification	±1% of the total trees recorded
Diameter at breast height	±1.0 in.
Total tree height	±5 ft
Height to crown base	±10 ft
Breast height age	±5 yr

II – G Inventory Updates

Maintaining a forest inventory requires consideration of changes to the basis of the estimates over time. These changes result from forest growth, harvesting events, and natural disturbances. The inventory is updated in the first quarter of each calendar year. Annual reports are produced after updating the inventory. This section discusses the methodology used in updating inventory records.

Growth – All plots 10 years of age or less are 'grown' on an annual basis using the CRYPTOS (Cooperative Redwood Yield Project's Timber Output) growth model. Any plot older than 10 years of ages is deleted from the inventory database records. This is to minimize an over-reliance on the growth model for maintaining the inventory. Growth modeling is described in later sections. The growth assigned to each plot is based on the age of the plot. With uneven age management there should not be a need for Cryptos

Harvested Stands – A harvested stand is placed into a vegetation stratum based on an ocular examination of the stand in the field, using the vegetation typing rules described in Section I-C above. The existing tree list for the stratum (in the same planning watershed) is applied to the stand.

Natural Disturbances - A natural disturbance has a similar effect on a stand as a harvest. They are treated in the same way as a harvest in terms of making adjustments to strata assignments and applying the appropriate tree lists. Is a forest fire a natural disturbances in a Redwood forest or is it a man made disturbance caused by degraded forest condition caused by man

Stand strata assignments are examined and updated every 20 years regardless of whether a stand is harvested or not. This helps to maintain integrity with the strata label assigned to the stand, as growth can be irregular between stands with the same vegetation label.

III Growth and Yield Modeling

Growth and yield modeling projects the tree lists derived from inventory sampling through time (forest growth) and management activities (harvest) over a long period of time (100 years in this case). The growth model used in this TMP planning effort uses the CRYPTOS equations for height and diameter growth, crown recession, and mortality. CRYPTOS estimates growth for 5-year timeframes. The model is set to 'harvest' stands (if they are scheduled for harvest) before they are grown. This is a more conservative approach to estimating harvest

Cryptos is a even age model based on century of 50 years or more. How is it possible to use this model? Above it's for 10 years or less.

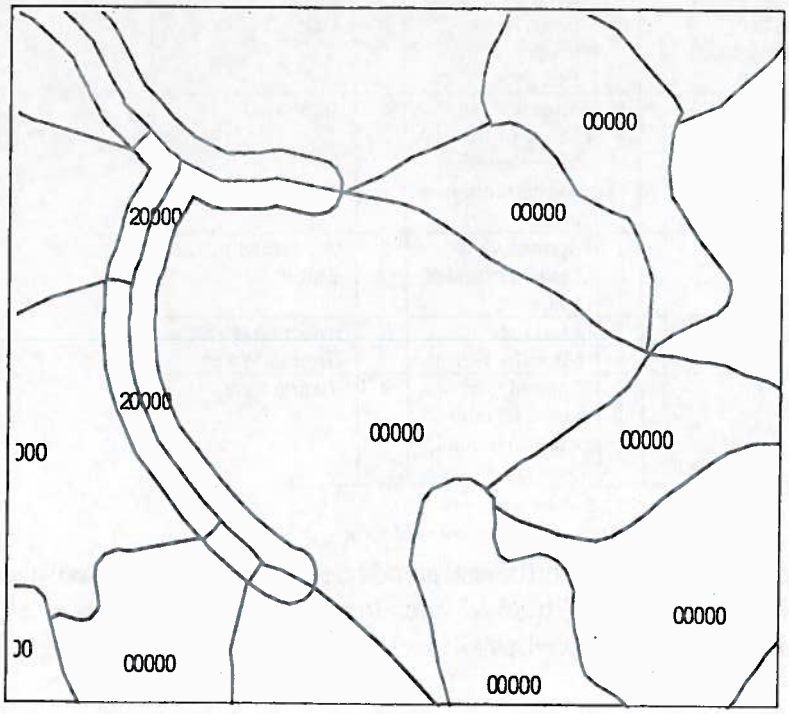
volumes than growing the stands before they are harvested, since the harvest estimate doesn't consider the real growth that occurs in the forest for periods 2 through 5 in any five-year planning period. Projected inventory, harvest estimates, and growth estimates are reported for every 5 year period in this TMP.

this must be an even age management strategy — UNDERSTANDABLE ? Redwood growth volume ARE stable when growing IN A stable environment unlike like the extreme condition of even-age UNEVEN AGE management

III-A Stand Sensitivity Attributes

Each stand is assigned a code that indicates any special management considerations for the stand. The code allows maps to be made that display the geographic extent of the sensitive areas. The codes also direct the stands to silviculture strategies in growth and yield modeling that are consistent with management policies. Figure 4 displays a set of stands with their respective concern codes.

Figure 4. Map displaying how a sensitivity code is assigned to each stand.



The sensitivity code consists of five digits. Each digit indicates a specific theme. Table 14 displays the key to the sensitivity code.

Table 14. Key to the sensitivity code assigned to each stand. As an example, a stand with a code of 20000 has watercourse sensitivity (Large Class II) and has no visual, special considerations, wildlife, or vegetation sensitivities.

Watercourse		Visual		Special Considerations		Wildlife		Vegetation	
0	No Concern	0	No Concern	0	No Concern	0	No Concern	0	No Concern
1	Class I	1	Special Viewshed	1	Special Treatment Area	1	Spotted Owl – Level I	1	Old Growth – Type I
2	Large Class II	2		2	Deeded Conservation Easement	2	Spotted Owl – Level II	2	Pygmy Forest
3	Class I Floodplain	3		3	Non-deeded special conservation	3	Spotted Owl – Level III	3	Old Growth – Type II
4	Class II Floodplain	4		4	Carbon Management	4	Marbled Murrelet	4	Rock and Talus
5	Floodplain	5		5	MaMu Easement	5	Point Arena Mountain Beaver	5	Oak Woodland
6	Small Class II	6		6	TSU 25-50%	6	Spotted Owl – Level I/Marbled Murrelet/Point Arena Mountain Beaver	6	Low site
7		7		7	TSU >50%	7	Spotted Owl – Level I/Marbled Murrelet	7	Old Growth Buffer
8		8		8		8	Marbled Murrelet Buffer	8	Brush/Grass/Bare Ground/Water
9		9		9		9	Spotted Owl – Level I/Point Arena Mountain Beaver	9	Bishop Pine

whose 95 th 2nd growth redw and fir stands

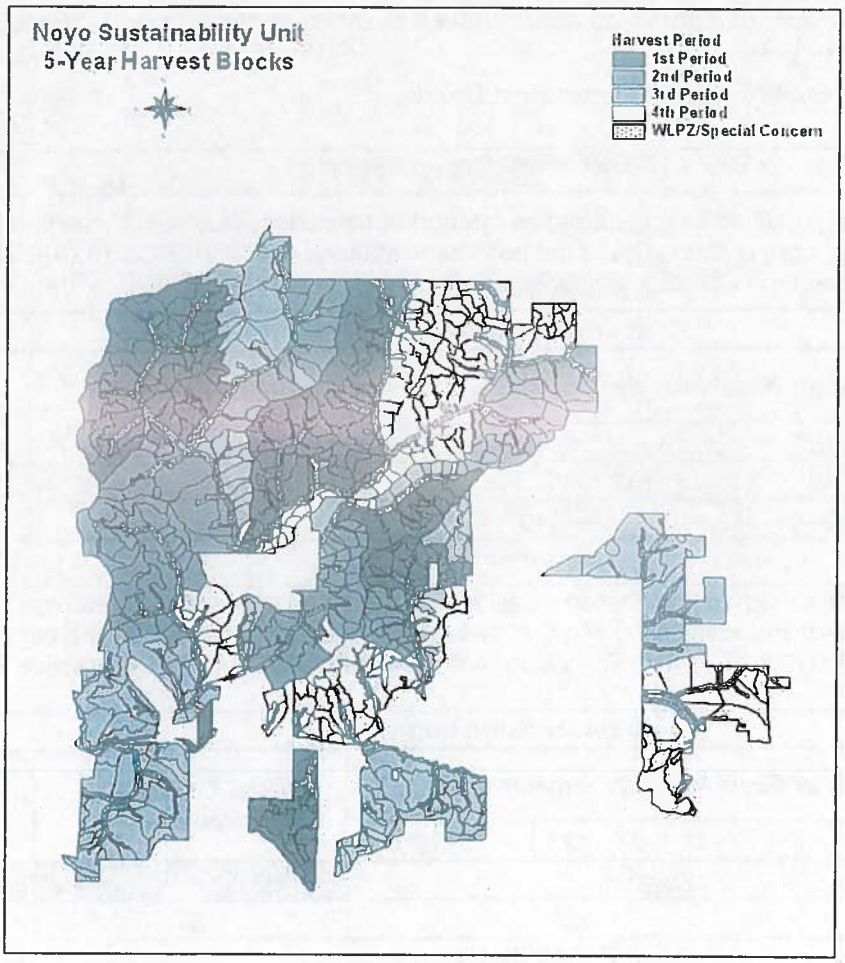
? Salmon frogs, salamanders etc,

Many stands have multiple concerns. Management activities in these stands default to the most conservative treatment. Table 15 describes the various forest conditions found on Mendocino Redwood Company along with the model formulation of silviculture regimes. Table 18 describes silviculture and model decision logic allowed for stands within the sensitivity class.

III-B Harvest Timing

Each stand is attributed with a harvest period (5-year periods) of 0, 5, 10, and 15. This establishes the initial harvest period for each stand. Subsequent harvests within the stand are based on the re-entry period assigned to each silviculture regime. All silviculture regimes in this plan have the same re-entry period (20-years). This facilitates the use of area control, referred to as Harvest Blocks, which are based on dividing the Sustainability Units into four near equal geographic parts. This facilitates an even and efficient flow of harvest. The careful establishment of Harvest Blocks minimizes the use of roads and allows for the longest period of rest to areas not scheduled for harvest. Figure 5 displays how the Harvest Blocks are established for a portion of the 'Noyo' Sustainability Unit. good: but roads are used through non harvest blocks on a 5 year intervals to get to the 20 year harvest blocks.

Figure 5. Example of harvest blocks (conceptual) in the Noyo Sustainability Unit.



III-C Silviculture

The general goal of the all silviculture methods is to restore and maintain conifer-dominated stands where appropriate – (oak woodland management has a different focus, for example) that are structurally diverse. For stands that do not have any specific sensitivity, Selection and Group Selection are considered the 'steady state' silviculture methods once conifer-dominated conditions have been developed. Restoration harvests (all silviculture methods other than Selection and Group Selection) are used no more than twice in the life of a stand. Very important

The conifer retention levels modeled are intended to address Forest Practice Rule standards and the Wildlife Tree retention of the HCP/NCCP. FPRs standards for conifer retentions are much to low for the redwood const forests, causing degraded forest conditic MRC's landscape model 'grows' and 'harvests' trees in 5-year periods. A stand is only considered for harvest and the silviculture logic applied to the stand if the stand is scheduled for harvest in the specific period. Possible silviculture regimes for any particular stand are based on the stand's specific sensitivity constraints, if any. Stands constrained for a particular sensitivity usually have only one possible regime available. Non-constrained

stands are assigned a silviculture regime based on a decision hierarchy. The decision hierarchy results in a silviculture selection that is based on conifer and hardwood stocking criteria. Some stands do not meet any of the criteria and fall into a 'no harvest' category and are reviewed at the next entry cycle – 20 years later.

Stocking = Retention ?

MARIN County: Site 1 125 sqft
Site 2+3 100 "
Site 4+5 75 "

The modeled retention for the proposed action is described below.

ALL → **Table 15. Selection/ Group Selection**

MSP

The Alternative Group Selection is identified as an alternative method of achieving Maximum Sustained Production due to the allowance of group clearings greater than 20% of the post-harvest stand (14 CCR 913.2 (a)(4)). The conifer stocking retention standards will meet the Forest Practice Rule retention standards per 913.2. ? Non-Redwood ?

Model Decision Logic

Triggers and Retention	*Conifer Basal Area by Diameter Class*				*Total Conifer BA Retained*	*Hardwood BA*
	0 - 16"	*16 - 24"*	*24 - 32"*	*>32"*		
Triggers	>=105					
Average Retention	30	40			70	15

Transition

MSP

The Alternative Transition silviculture method is identified as an alternative method of achieving Maximum Sustained Production due to the harvest of hardwoods resulting in group clearings that are greater than 20 percent of the post-harvest plan area (stand) (14 CCR 913.2(b)(7). The Transition method follows standard Forest Practice Rule guidelines (14 CCR 913.2b).

Model Decision Logic

Triggers and Retention	*Conifer Basal Area by Diameter Class*				*Total Conifer BA Retained*	*Hardwood BA*
	0 - 16"	*16 - 24"*	*24 - 32"*	*> 32"*		
Triggers	>60<105					
Average Retention	40	10			50	15

Rehabilitation

The rehabilitation method described here does not include any alternative methods to the standard silviculture practices.

Model Decision Logic

Triggers and Retention	*Conifer Basal Area by Diameter Class*				*Total Conifer BA Retained*	*Hardwood BA*
	0 - 16"	*16 - 24"*	*24 - 32"*	*> 32"*		
Triggers	>=30<50					
Average Retention	0	5			5	15

Restoration Variable Retention

The Restoration Variable Retention method does not include any alternative methods to the standard silviculture practices (14 CCR 913.4(d)(16)).

? *Triggers and Retention* ?	*Conifer Basal Area by Diameter Class*				*Total Conifer BA Retained*	*Hardwood BA*
	0 - 16"	*16 - 24"*	*24 - 32"*	*> 32"*		
	20	10				>60

What is the trigger and retention for this method.

Redwood forests suffer when using stock and retention standards that cover all state forest. FPRs have to be changed to maintain a health forest environment for all species coho salmon, spotted

Average Retention	20	10	30	15

Seed Tree Removal

The Alternative Seed Tree Removal silviculture method is identified as an alternative method of achieving Maximum Sustained Production due to the allowance of thinning among the regenerated stand. All other applications of this silviculture method meet the description of this method and restrictions defined in 14 CCR 913.1 (7)(c)(2).

Model Decision Logic

Triggers and Retention	*Conifer Basal Area by Diameter Class*				*Total Conifer BA Retained*	*Hardwood BA*
	0 - 16"	*16 - 24"*	*24 - 32"*	*>32"*		
Triggers	> 10		> 10 < 60			
Average Retention	10		5		15	15

Table 16 describes the various silviculture regimes used in this landscape plan (for non-sensitive stands) and their general application based on stocking levels of conifers and hardwoods. This page can be used by MRC staff, agency staff, and the public to understand the general 'rules of the road' related to silviculture operations.

Table 16. General Decision Logic in Selecting Silviculture Methods

Conifer Stocking (Basal Area (square feet) per Acre)	Hardwood Stocking (Basal Area (square feet) per Acre)		
	>60	20-60	<20
>125	Selection, Group Selection, Alternative Group Selection		
105-125	Restoration Variable		
50-105	Retention (Conifers must be large)	(Alternative) Transition	
<50	Rehabilitation	Alternative Seed Tree Removal (Conifers must be Large)	

The trend in silviculture implementation will migrate stands toward a condition where they can continuously be managed under Selection and Group Selection methods. Each silviculture method has a 20 year re-entry period.

these basal areas different than the previous page?

Table 17 describes the generalized retention standards assigned to silviculture regimes.

CH

Table 17. Quick Reference Guide to Generalized Retention Minimums for Conifers for Non-Constrained Stands ?		
Silviculture	Conifer Basal Area Retention (per Acre)	Other – NON conifer
Selection	75	
(Alternate) Group Selection	60*	An alternate group selection is used where the harvest of hardwoods results in more than 20% of the stand in group clearings**.
(Alternative) Transition	50	An alternate transition is used where the harvest of hardwoods results in more than 20% of the stand in group clearings**.
Restoration Variable Retention	20	
(Alternative) Seed Tree Removal	15	An alternative seed tree removal is used when thinning operations occur in the regenerated stand. The area to which this is applied must meet the retention standards for commercial thinning activities, defined in the Forest Practice Rules.
Rehabilitation	5	

*The stand will average 75 square feet of conifer basal area per acre outside of group clearings. Group Selection is the preferred silviculture to promote conifer regeneration where needed. ND not good

**For the purposes of implementation of this plan, "group clearings" are stated in the California Practice Rules are defined as areas of 0.25 to 2.5 acres where harvest results in stocking below the minimum stocking standards (14 CCR 912.7 (b)(2)). If there are no operations in an area with less than the minimum stocking, the area is not considered a group clearing.

? ? So there is no minimum acres that can be cle

These conifer basal area retentions per acre per silviculture methods are below FPRs standards that are already to low to maintain the Redwood Coast forest in a healthy state.

The best conifer growth comes with a closed canopy and increasing tree height, volumes go up dramatically with tree height not necessarily with basal area. Quality of wood increases with tree height. Volumes go up because competition is minimal and the forest floor conditions produce more nutrients and water retention. Canopy closer and tree height maintains the climate conducive to Redwood forest health and all the species that rely on it, Aquatic, terrestial, vegitative to include coho salmon, spotted owls, fern that also create the balance in the forest system.

Table 18: Silviculture Descriptions and Model Decision Logic For Specific Sensitive Areas what is the % of TMP?

Silviculture	Triggers and Retention	Conifer Basal Area by Diameter Class 0-16"	16-24"	24-32"	>32"	Total Conifer Trigger / BA Retained	Hardwood BA	Descriptions
Silviculture Regimes for Stands with Special Constraints								
Selection (High Retention)	Triggers	>260				>260		Class I and Large Class II Watercourse Buffers (Inner and Middle Bands - set at 150 ft.)
	Average Retention	25	75	100sq.ft. + 20% of largest trees		200	55	
Selection-Carb (High Retention)	Triggers	>240				>240		Carbon Sequestration
	Average Retention	50	50	50	50	200	15	
Selection MR (MaMu Buffers)	Triggers	>=130				>=130		MaMu Buffer Stands. These stands will be managed to retain and promote larger trees.
	Average Retention	30	30	30	30	120	15	
Selection (NSO Buffers)	Triggers	>=105				>=105		NSO Buffer stands adjacent to "No Harvest" core areas.
	Average Retention	20	25	20	10	75	15	
Selection (OG Type II)	Triggers	>=160				>=160		Selection employed for Old Growth Type II stands.
	Average Retention	50	50	25	25	150	15	
Selection TSU (Terrain Stability Units)	Triggers	>=105				>=105		Terrain Stability Units. TSU 1 and TSU 2 can only be harvested under Selection silviculture. TSU 3 can trigger Transition silviculture if >25 and < 50% of stand is covered by TSU 3. These stands (identified on the ground) may be harvested with other silvicutures depending on site specific conditions. Selection and Transition silvicultures were employed for modeling purposes.
	Average Retention	20	25	20	10	75	15	
Selection (Floodplain)	Triggers	>300				>300		Areas identified as floodplain by watershed analysis
	Average Retention	75	75	75	75	300	55	
Selection (Visual)	Triggers	>=105				>=105		Stands selected to retain aesthetic values
	Average Retention	20	25	20	10	75	15	
Selection (Small Class II)	Triggers	>=105				> 105		Small Class II Watercourse Stands - set at 75 ft. retention.
	Average Retention	20	25	20	10	75	15	
Selection (Coastal Zone STA)	Triggers	> 130				> 130		Coastal Zone Special Treatment Areas STA
	Average Retention	20	50	40	10	120	15	

TOTAL Conifer Trigger and BA (Conifer Mean) Retained should have two different basal areas They are the same through out this table. ?

No Harvest		NSO Core Stands, Marbled Murrelet Core Stands, Type I Old Growth Stands, Pygmy Forest, Rock Outcrops, Brush. Also for special concern stands that don't meet the trigger conditions for harvest.

small area of old growth trees

A 22

Structure Classes

Stratification of the forest cover into units that share common features is accomplished using a variety of tools, including aerial photos and other forms of remote sensing. The units, or strata, derived from stratification are the basis for field sampling activities designed to obtain tree lists that represent the forested condition for each stratum. Distinct tree lists are produced from sampling for each planning watershed (sub-watersheds defined by the State of California) from sampling. Therefore, the tree list for a given stratum in one planning watershed is distinct, albeit similar, from that of a stratum with the same label in another planning watershed. X

Forest structural conditions have strong associations with habitat value. TRUE MRC's landscape planning tools include a component in the Growth and Yield model that classifies forest vegetation into groupings or classes of forest structure classes. Forest structure classes are based on:

- Species dominance
- Size dominance
- Density of the forest

The structure classes are fewer in number than the total number of vegetation strata. The purpose with identifying structure classes is to combine forested areas into similar vegetation units for habitat purposes, not for determining levels of timber stocking. Although highly correlated to vegetation strata, forest structure classes are computed from empirical data acquired from field samples. While both vegetation strata and forest structure classes are based on the same set of rules, strata are assigned a priori (before sampling) and structure classes are computed a posteriori (post sampling).

MRC developed this system for determining structure classes in order to understand both the current condition of the forest and changes to forest structure resulting from forest growth and harvesting activities. The system was developed as an alternative to the California WHR (Wildlife Habitats Relationship) model because the WHR system was developed for even-aged management, where trees in a forest stand are very close to the same size and age. MRC manages its forest with uneven age harvesting. This means that there are trees from more than one age and size group in forested stands at all times. WHR determines the size of the forest stand utilizing an average. Averaging works well for forested stands where the distribution of tree sizes within a stand is minimal. It does not describe the condition of a forest with a wide distribution of sizes, as in uneven age management. A crosswalk was developed to address NSO habitat, WHR, and Successional stages. For a given structure class, a specific habitat is assigned. For example, structure class 10 would be labeled as Foraging NSO habitat, have a WHR of MHC4M, and would be classified as Mid-Successional. Table 19 below shows the crosswalk between structure class and other habitat designations.

The WHR follows FPR in how they concider forest in and across the state of California, this is evident in the changes that MRC is making with their TMP for unevenage forest management, it is also in the degraded state the redwood forest is in regarding habitat of endanger species coho salmon, spotted owles, frogs, etc.

Table 19. Structure Class and Habitat Relationships.

Structure Class	NSO Habitat	Dominant WHR	Successional Stage
0	Non_Suitable	N/A	Non Timber
1	Non_Suitable	MHW2P	Early Successional
2	Non_Suitable	MHW4P	Mid Successional
10	Foraging	MHC4M	Mid Successional
11	Non_Suitable	MHC2D	Early Successional
12	Foraging	MHC4D	Mid Successional
13	Non_Suitable	RDW2P	Early Successional
14	Non_Suitable	RDW4S	Mid Successional
15	Non_Suitable	RDW5P	Mid Successional
16	Non_Suitable	RDW5P	Mid Successional
17	Foraging	RDW3M	Mid Successional
18	Foraging	RDW4M	Mid Successional
19	Foraging	RDW5M	Mid Successional
20	Foraging	RDW5M	Advanced Successional
21	Foraging	RDW3D	Mid Successional
22	Roosting/Nesting	RDW4D	Mid Successional
23	Roosting/Nesting	RDW5D	Advanced Successional
24	Roosting/Nesting	RDW6D	Advanced Successional

1) What is the average basal area of these successional area across MRC TMP lands?
2) Do structure classes have minimum basal areas?
3) Do dominant WHRs have minimum basal areas?

Attachment B – EIS/PTEIR Growth and Yield Modeling - Alternatives Modeling
Attachment: Includes No-Action, Proposed, Alternatives A, B and C

Simulation Model

The simulation model used to estimate growth and yield on MRC timberlands is CRYPTOS (Cooperative Redwood Yield Research Project). For each tree in a list of tree species, CRYPTOS "grows" and estimates forest mortality, crown canopy, and competition, as well as the site conditions in each stand. Growth estimates of the forest include assumptions on regeneration of new trees after harvest. Harvest is simulated in the model. This allows the application of a myriad of silvicultural applications to be tested against a unique set of vegetation, site class, and sensitivity levels in each stand. The use of a simulation model has enabled MRC to compare multiple scenarios with different management strategies and identify the best scenario to meet our objectives. The simulation model provides a prediction of periodic inventory, harvest, growth, and habitat levels over time

Growth and yield modeling projects the tree lists derived from inventory sampling through time (forest growth) and management activities (harvest) over a long period of time (100 years in this case). The growth model used in the PTEIR planning effort uses the CRYPTOS equations for height and diameter growth, crown recession, and mortality. CRYPTOS estimates growth for 5-year timeframes. The model is set to 'harvest' stands (if they are scheduled for harvest) before they are grown. This is a more conservative approach to estimating harvest volumes than growing the stands before they are harvested, since the harvest estimate doesn't consider the real growth that occurs in the forest for years 2 through 5 in any 5-year planning period. Projected inventory, harvest estimates, and growth estimates are reported every 5 years.

For the EIS/PTEIR, 5 management alternatives were modeled:

1. No Action (No HCP/No Permit)
2. Proposed Action (HCP/NCCP)
3. Alternative A (Enhanced HCP/NCCP)
4. Alternative B (Reserves)
5. Alternative C (HCP Only and Shorter ITP Term – HCP 40 yrs)

Tables 1-4 display the modeling logic used to determine silviculture activity for each alternative. A stand must be scheduled for harvest for the silviculture logic to be considered. Possible silviculture regimes for any particular stand are based on the stand's specific sensitivity constraints, if any. Constrained stands have usually only one possible regime available. Non-constrained stands are assigned a silviculture regime based on a decision hierarchy. The stand continues through the set of regimes if the stand does not trigger the first regime in the decision hierarchy. If the stand's conditions do not meet any of the trigger conditions it receives a 'no harvest' and is reviewed at the next entry cycle.

The retention displayed in the table below shows the 'desired' distribution of basal area by diameter classes. Few stands will initially be at the desired distribution of diameter classes. In such cases, the model will retain the sum of the specified retention and distribute the retention to those size classes that meet or exceed the specified retention level. The model will not harvest below the desired

condition by size class. The following tables display the silviculture triggers and retention used in the growth and yield model for non-constrained (no specific sensitivity) and constrained stands.

In other words this is all stands across the THP.

No Action Alternative

Silviculture	Triggers and Retention	Conifer Basal Area by Diameter Class 0-16"	16-24"	24-32"	>32"	Total Conifer Trigger / BA Retained	Hardwood BA	Descriptions
Silviculture Descriptions and Model Decision Logic								
Silviculture Regimes for Stands with Special Constraints								
Selection (High Retention2)	Triggers	>230				>230		Class I Watercourse Stands (Buffer 150 ft.)
	Average Retention	70	70	20	20	180	55	
Selection (High Retention3)	Triggers	>180				>180		Large Class II Watercourse Stands (Buffer 150 ft.)
	Average Retention	50	40	15	15	120	55	
Selection (High Retention)	Triggers	>260				>260		Small Class II Watercourse Stands (Buffer 75 ft.)
	Average Retention	50	50	50	50	200	55	
Selection - Carb (High Retention)	Triggers	>240				>240		Stands selected for carbon sequestration.
	Average Retention	50	50	50	50	200	15	
Selection (Medium Retention-OG)	Triggers	>160				>160		Type II Old Growth Stands
	Average Retention	50	50	25	25	150	15	
Selection (NSO & MaMu Buffers)	Triggers	>=105				>=105		Stands selected as NSO and MaMu buffers
	Average Retention	50	30	5	5	75	15	
Selection (Floodplain)	Triggers	>300				>300		Areas identified as floodplain by watershed analysis
	Average Retention	75	75	75	75	300	55	
Selection (Visual)	Triggers	>=105				>=105		Stands selected to retain aesthetic values
	Average Retention	50	30	5	5	75	15	
Selection (Coastal Zone STA)	Triggers	>=120				>=120		Coastal Zone Stands

Table 1 - No Action Alternative

Silviculture Descriptions and Model Decision Logic								
Silviculture	*Triggers and Retention*	*Conifer Basal Area by Diameter Class*				*Total Conifer Trigger / BA Retained*	*Hardwood BA Trigger / Retention*	**Descriptions** what % is this off the total TMP
		0-16"	*16-24"*	*24-32"*	*>32"*			
Silviculture Regimes for Stands with no Special Constraints (Matrix Stands)								
Selection	Triggers		>=120			>=120	0	these are the best guess models using CRYPTOS decision logic.
	Average Retention	50	30	5	5	90	15	
Selection (Stepped Approach	Triggers	>=220				>=220	0	
	Average Retention	45	65	20	10	140	15	
Selection (Grp)	Triggers	>=100 and <120				>=100 and <120	0	
	Average Retention	50	30	5	5	90	15	
Transition	Triggers	>=60 <100				>=60 <100	0	
	Average Retention	25	15	5	5	50	15	These silviculture regimes are employed for stands with no special constraints.
Variable Retention (Restoration)	Triggers	>20 sq. ft Conifer >16" dbh and total Con BA <120 and >60 sq. ft. Hardwoods >0" dbh				<120	>60	the Triggers and Retention levels are extremly low for redwood Const forest types.
	Average Retention	10	0	5	5	20	15	
Rehabilitation	Triggers	>5				>5	0	
	Average Retention	0	0	2	3	5	15	
Seed Tree Removal	Triggers	>5	>10			>15	0	
	Average Retention	5	0	5	5	15	15	
No Harvest								Matrix stands that do not meet the basal area harvest triggers.

	Average Retention	20	35	35	10	100	15	
No Harvest								NSO Core Stands, Marbled Murrelet Core Stands, Type I Old Growth Stands, Pygmy Forest, Rock Outcrops, Brush. Also for special concern stands that don't meet the trigger conditions for harvest.

Table 2 - Proposed Alternative (HCP/NCCP)

Silviculture Descriptions and Model Decision Logic								
Silviculture	*Triggers and Retention*	*Conifer Basal Area by Diameter Class*				*Total Conifer Trigger / BA Retained*	*Hardwood BA Trigger / Retention*	Descriptions
		0-16"	*16-24"*	*24-32"*	*>32"*			what is Th percentage of TmP
Silviculture Regimes for Stands with no Special Constraints (Matrix Stands)								
Selection	Triggers	>=105				>=105	0	Those Triggers and retention levels ARE very very extremely low
	Average Retention	20	25	20	10	75	15	
Transition	Triggers		>=50 <105			>=50 <105	0	
	Average Retention	35	10	2	3	50	15	
Rehabilitation	Triggers	>15				>15	0	
	Average Retention	10	0	2	3	15	15	
Variable Retention (Restoration)	Triggers	>20 sq. ft Conifer >16" dbh and total Con BA <105 and >60 sq. ft. Hardwoods >0" dbh				<105	>60	These silviculture regimes are employed for stand with no special constraints.
	Average Retention	10	0	5	5	20	15	
Seed Tree Removal	Triggers	>5	>10			>15	0	
	Average Retention	5	0	5	5	15	15	
No Harvest								

Proposed Alternative (HCP/NCCP)

Silviculture Descriptions and Model Decision Logic

Silviculture	*Triggers and Retention*	*Conifer Basal Area by Diameter Class* 0-16"	16-24"	24-32"	>32"	*Total Conifer Trigger / BA Retained*	*Hardwood BA*	Descriptions (what is the percentages over TMP)
Silviculture Regimes for Stands with Special Constraints								
Selection (High Retention)	Triggers	>260				>260		Class I and Large Class II Watercourse Buffers (Inner and Middle Bands - set at 150 ft.)
	Average Retention	25	75	100sq.ft. + 20% of largest trees		200	55	
Selection-Carb (High Retention)	Triggers	>240				>240		Carbon Sequestration
	Average Retention	50	50	50	50	200	15	
Selection MR (MaMu Buffers)	Triggers	>=130				>=130		MaMu Buffer Stands. These stands will be managed to retain and promote larger trees.
	Average Retention	30	30	30	30	120	15	
Selection (NSO Buffers)	Triggers	>=105				>=105		NSO Buffer stands adjacent to "No Harvest" core areas.
	Average Retention	20	25	20	10	75	15	
Selection (OG Type II)	Triggers	>=160				>=160		Selection employed for Old Growth Type II stands.
	Average Retention	50	50	25	25	150	15	
Selection TSU (Terrain Stability Units)	Triggers	>=105				>=105		Terrain Stability Units. TSU 1 and TSU 2 can only be harvested under Selection silviculture. TSU 3 can trigger Transition silviculture if >25 and < 50% of stand is covered by TSU 3. These stands (identified on the ground) may be harvested with other silvicutures depending on site specific conditions. Selection and Transition silvicultures were employed for modeling purposes.
	Average Retention	20	25	20	10	75	15	
Selection (Floodplain)	Triggers	>300				>300		Areas identified as floodplain by watershed analysis
	Average Retention	75	75	75	75	300	55	
Selection (Visual)	Triggers	>=105				>=105		Stands selected to retain aesthetic values
	Average Retention	20	25	20	10	75	15	
Selection (Small Class II)	Triggers	>=105				>105		Small Class II Watercourse Stands - set at 75 ft. retention.
	Average Retention	20	25	20	10	75	15	
Selection (Coastal Zone STA)	Triggers	>130				>130		Coastal Zone Special Treatment Areas
	Average Retention	20	50	40	10	120	15	

No Harvest		NSO Core Stands, Marbled Murrelet Core Stands, Type I Old Growth Stands, Pygmy Forest, Rock Outcrops, Brush. Also for special concern stands that don't meet the trigger conditions for harvest.

Table 3 - Enhanced HCP (Alternative A)

Silviculture Descriptions and Model Decision Logic								
Silviculture	*Triggers and Retention*	*Conifer Basal Area by Diameter Class*				*Total Conifer Trigger / BA Retained*	*Hardwood BA Trigger / Retention*	Descriptions
		0-16"	*16-24"*	*24-32"*	*>32"*			percentages
Silviculture Regimes for Stands with no Special Constraints (Matrix Stands)								
Selection	Triggers	>=105				>=105	0	Triggers and ~~Retain~~ retention levels 1/4 of what they should be
	Average Retention	20	25	20	10	75	15	
Transition	Triggers	>=50 <105				>=50 <105	0	
	Average Retention	35	10	2	3	50	15	
Rehabilitation	Triggers	>15				>15	0	
	Average Retention	10	0	2	3	15	15	
Variable Retention (Restoration)	Triggers	>20 sq. ft Conifer >16" dbh and total Con BA <105 and >60 sq. ft. Hardwoods >0" dbh				<105	>60	These silviculture regimes are employed for stands with no special constraints.
	Average Retention	10	0	5	5	20	15	
Seed Tree Removal	Triggers	>5	>10			>15	0	
	Average Retention	5	0	5	5	15	15	
No Harvest								

Enhanced HCP (Alternative A)

Silviculture Descriptions and Model Decision Logic

Silviculture	Triggers and Retention	Conifer Basal Area by Diameter Class				Total Conifer BA Retained	Hardwood BA	Descriptions
		0 - 16"	16 - 24"	24 - 32"	>32 "			percentages
Silviculture Regimes for Stands with Special Constraints								
Selection (High Retention)	Triggers	>260				>260		Small Class II Watercourse Stands
	Average Retention	50	50	50	50	200	55	
Selection-Carb (High Retention)	Triggers	>240				>240		Carbon Sequestration
	Average Retention	50	50	50	50	200	55	
Selection MR (NSO & MaMu Buffers)	Triggers	>=130				>=130		Selected stands that are adjacent to NSO core areas. MaMu buffer stands will be managed to retain and promote larger trees. Enhanced for NSO – thats all
	Average Retention	30	30	30	30	120	15	
Selection (OG Type II)	Triggers	>=160				>=160		Selection employed for Old Growth Type II stands.
	Average Retention	50	50	25	25	150	15	
Selection TSU (Terrain Stability Units)	Triggers	>=105				>=105		Terrain Stabilty Units. TSU 1 and TSU 2 can only be harvested under Selection silviculture. TSU 3 can trigger Transition silviculture if >30 and < 50% of stand is covered by TSU 3. These stands (identified on the ground) may be harvested with other silvicutures depending on site specific conditions. Selection and Transition silvicultures were employed for modeling purposes.
	Average Retention	20	25	20	10	75	15	
Selection (Floodplain)	Triggers	>300				>300		Areas identified as floodplain by watershed analysis
	Average Retention	75	75	75	75	300	55	
Selection	Triggers	>=105				>=105		Stands selected to retain aesthetic values
	Average Retention	20	25	20	10	75	15	
Selection (Coastal Zone STA)	Triggers	>130				>130		Coastal Zone Special Treatment Areas
	Average Retention	20	50	40	10	120	15	

No Harvest		Class I and Large Class II Watercourses, NSO Core Stands, Marbled Murrelet Core Stands, Type I and Type II Old Growth Stands, Pygmy Forest, Rock Outcrops, Brush. Also for special concern stands that don't meet the trigger conditions for harvest.

Table 4 - Reserves Alternative (Alternative B)

Silviculture Descriptions and Model Decision Logic								
Silviculture	***Triggers and Retention***	***Conifer Basal Area by Diameter Class***				***Total Conifer Trigger / BA Retained***	***Hardwood BA Trigger / Retention***	**Descriptions**
		0-16"	***16-24"***	***24-32"***	***>32"***			percentages
Silviculture Regimes for Stands with no Special Constraints (Matrix Stands)								
Clearcut	Triggers		>=80			>=120	0	clearcuts ? Triggers and retention level very low 1/4 of what they should be. to maintain a health forest environment
	Average Retention	0	0	0	0	0	15	
Commercial Thin	Triggers	>=100				>=100	0	
	Average Retention	25	25	25	25	100	15	
Rehabilitation	Triggers	>15				>15	0	
	Average Retention	10	0	2	3	15	15	
Seed Tree Removal	Triggers	>5	>10			>15	0	
	Average Retention	5	0	5	5	15	15	
No Harvest								These silviculture regimes are employed for stands with no special constraints.

Reserves Alternative (Alternative B)

Silviculture Descriptions and Model Decision Logic

Silviculture	Triggers and Retention	Conifer Basal Area by Diameter Class 0-16"	16-24"	24-32"	>32"	Total Conifer Trigger / BA Retained	Hardwood BA Trigger / Retention	Descriptions
								percentages
Silviculture Regimes for Stands with Special Constraints								
Selection (High Retention)	Triggers	>160				>160		Class I and Large Class II Watercourse Buffers outside of reserves. (Inner and Middle Bands)
	Average Retention	75	75	5	5	160	55	
Selection-Carb (High Retention)	Triggers	>240				>240		Carbon Sequestration outside of reserves.
	Average Retention	50	50	50	50	200	15	
Selection (OG Type I)	Triggers	>=260				>=260		Old Growth Type I outside of reserves.
	Average Retention	50	50	50	50	200	15	
Selection (Floodplain)	Triggers	>300				>300		Areas identified as floodplain by watershed analysis outside of reserves.
	Average Retention	75	75	75	75	300	55	
Selection	Triggers	>=105				>=105		Stands selected to retain aesthetic values
	Average Retention	20	25	20	10	75	15	
Selection (Small Class II)	Triggers	>=95				>95		Small Class II Watercourse Stands outside of reserves.
	Average Retention	40	30	10	5	85	15	
Selection (Coastal Zone STA)	Triggers	>130				>130		Coastal Zone Special Treatment Areas outside of reserves.
	Average Retention	20	50	40	10	120	15	
No Harvest								NSO Reserves, MaMu Reserves, MaMu/Point Arena Mtn. Beaver Reserves, Pygmy Forest, Rock Outcrops, Brush. Also for special concern stands that don't meet the trigger conditions for harvest.

All Trigger and Retention level are extremly low. 1/4 of what they should be to maintain a healthy Redwood forest environment.

40 Year HCP Alternative (Alternative C)

Modeling constraints for this alternative are the same as for the proposed action, with only a forty year term, as compared to the 80 year term of the proposed action.

Variable Retention (Restoration)

Description
This regime is utilized primarily to rotate stands with low conifer basal area and relatively high hardwood basal area back to a conifer dominated stand. The regime is considered an even-aged regime and is employed only in upslope stands with no special constraints. Pockets of the pre-harvest stand are retained to provide habitat structure and forest complexity. The stand will be managed using uneven-age silviculture in successive entries.

Timing Options
The regime is available for harvest for the first six decades. The re-entry period is 20-30 years.
60 years

Trigger Conditions
Stands must have between 50 square feet and 120 square feet of conifer basal area per acre. The stand must also have at least 60 square feet of hardwood basal area per acre. The regime is considered for mixed conifer and hardwood stands and mixed hardwood stands. The stand must have 50% or more of its overall basal area in trees greater than 16 inches to be considered for harvest.

Residual Stand Conditions
The modeled retention is 20% of both the conifer and hardwood pre-harvest basal area, representing both species and size distribution found in the pre-harvest stand.

Regeneration
Natural regeneration and planted seedlings are assumed for this regime.
Assumptions The growth model assumes that post-harvest stands are regenerated with 300 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood trees and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality. Self thinning should not be consider as mortality or competitions as it is a natural process toward a natural stand condition and health in a

Vegetation Control
Hardwoods are modeled for management within each of the silviculture regimes. The targeted uneven hardwood basal area retention level is 15 square feet per acre in each stand following harvest. This is for to ensure that hardwoods remain part of the complex structural conditions we are seeking in our stands.

Rehabilitation

Description
The rehabilitation regime is reserved for those stands experiencing excessive hardwood competition. This regime is considered as an even-aged regime. Rehabilitation removes the hardwood competition and allows conifer regeneration to take place. Successive harvests will incorporate uneven-aged silviculture.

Timing Options
The regime is available throughout the planning horizon. Subsequent harvest will be treated with uneven-age silviculture. The minimum re-entry period is 30 years.

Trigger Conditions
Stands must have less than 50 square feet of conifer basal area
per acre and more than 50 square feet of hardwood basal area per acre. The regime is considered for mixed conifer and hardwood stands and mixed hardwood stands. The stand must have 50% or more of its overall basal area in trees larger than 8" dbh.

Residual Stand Conditions
Minimum conifer basal area retention is 10 square feet of conifer basal area per acre. Minimum hardwood retention is 15 square feet of hardwood basal area per acre.

Regeneration
Natural regeneration and planted seedlings are assumed for this regime.
Assumptions The growth model assumes that post-harvest stands are regenerated with 300 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood trees and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality. Regeneration in the redwood forest of the fir tree is increasing because of it's seeding nature and need of light which has increased with decreased canopy

Vegetation Control
Hardwoods are modeled for management within each of the silviculture regimes. The targeted hardwood basal area retention level is 15 square feet per acre in each stand following harvest. This is to ensure that hardwoods remain part of the complex structural conditions we are seeking in our stands.

↳ from timber management practices. it is ovious that Douglas fir will be another successional set for Redwood trees conquer.

Transition

Description

The goal of the transition regime is to develop uneven-aged stands from even-aged stands and/or to improve stocking levels in understocked stands.

Timing Options

The regime is available throughout the planning horizon. Subsequent harvest will be treated with selection silviculture. The minimum re-entry period is 20 years.

Trigger Conditions

Stands must have between 60-105 square feet of conifer basal area per acre to be selected for transition. Stands must also have less than 60 square feet of hardwood basal area per acre. The regime is considered for conifer-dominated stands, mixed conifer/hardwood stands, and mixed harwood stands. Stands must have 50% or more of its overall basal area in trees larger than 16 inches dbh. Hardwood harvest is triggered if hardwood basal area exceeds 15 square feet of basal area per acre. Stands that have a portion (25-50%) of their area within a TSU 3 unit may also be harvested with this regime if there is high basal area (60 square feet) in hardwoods.

Residual Stand Conditions

Minimum conifer basal area retention is 50 square feet of conifer basal area per acre. Minimum hardwood retention is 15 square feet of hardwood basal area per acre.

Regeneration

The stand is assumed to have 200 seedlings per acre, representing the pre-harvest conifer species mix. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control

Hardwoods are modeled for management within each of the silviculture regimes. The targeted hardwood basal area retention level is 15 square feet per acre in each stand following harvest. This is to ensure that hardwoods remain part of the complex structural conditions we are seeking in our stands.

Selection (High Retention)

Description

The goal of this regime is to create and maintain dense, multistoried, uneven-aged stands with a variety of diameter classes. The regime is considered for stands with 50% or more of the stands overall basal area in trees greater than 16 inches dbh. The regime is applied to sensitive areas, such as watercourse buffers.

Timing Options

The regime is available throughout the planning horizon. If the stand is a watercourse buffer, it cannot be harvested unless the adjacent upslope stand is harvested. The minimum re-entry period is dependent on the specific alternative.

Trigger Conditions

Trigger conditions vary among alternatives. Plese refer to the ***Silviculture Descriptions and Model Decision Logic*** tables for each alternative.. The regime is considered for conifer-dominated stands and mixed conifer/hardwood stands. No harvest can occur within a size class unless the minimum conifer basal area is present in the stand.

Residual Stand Conditions

Minimum conifer basal area retention is dependent on the specific alternative. Under the "Proposed" and "Enhanced HCP-Alt A" alternative, there is the additional retention of 20% of the largest trees in the stand. The basal area retention simulates a canopy closure of at least 70% and a presence of large trees. In general, all hardwoods will be retained.

Regeneration

Natural regeneration and planted seedlings are assumed for this regime. The growth model assumes that post-harvest stands are regenerated with 40 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control

No vegetation control is modeled with this regime.

Selection

Description

The goal of this regime is to create and maintain continuous cover of multistoried, uneven-aged stands with a variety of diameter classes. The regime is applied to stands that are not experiencing a high level of hardwood competition. The regime is designed to develop and maintain a variety of age classes.

Timing Options

The regime is available for harvest throughout the planning horizon. The minimum re-entry period is 20 years.

Trigger Conditions

Stands must have a minimum of 105 square feet of conifer basal area per acre to be selected for harvest. The regime is considered for conifer-dominated stands and mixed conifer/hardwood stands. No harvest can occur within a size class unless the minimum conifer basal area is present in the stand.

Residual Stand Conditions

Minimum conifer basal area retention is 75 square feet of conifer basal area per acre. If hardwoods are harvested, retention is 15 square feet of basal area per acre.

Regeneration

Natural regeneration and planted seedlings are assumed for this regime. The growth model assumes that post-harvest stands are regenerated with 100 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control

Vegetation management will occur if hardwoods comprise greater than 15 square feet per acre.

Seed Tree removal

Description

The seed tree removal regime is the final step in rotating the stand that preceded it. Seed trees are removed when the younger stand established in part by the seed trees fully occupies the stand. While considered an even-aged regime, the developing stand will be treated in subsequent treatments with uneven-age silviculture.

Timing Options

The regime is available for harvest for the first four decades.

Trigger Conditions

Stands must have between 15 and 60 square feet of conifer basal area per acre to be selected for harvest. The regime is considered for conifer-dominated stands and mixed conifer/hardwood stands. The stand must have 50% or more of its overall basal area in trees larger than 16 inches dbh, with a vigourous and well stocked understory satnd of smaller trees. Hardwood harvest is triggered if the hardwood basal area exceeds 15 square feet per acre. No harvest can occur within a size class unless the minimum conifer basal area is present in the stand.

Residual Stand Conditions

Minimum conifer basal area retention is 15 square feet of conifer basal area per acre. If hardwoods are harvested, retention is 15 square feet of basal area per acre.

Regeneration

Natural regeneration and planted seedlings are assumed for this regime. The growth model assumes that post-harvest stands are regenerated with 250 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control

Vegetation management will occur if hardwoods comprise greater than 15 square feet per acre.

Selection (Stepped Approach)

Description

The goal of this regime, used only within the No Action, is to create and maintain continuous cover of multistoried, uneven-aged stands with a variety of diameter classes. The regime is applied to upslope stands that have a high basal area and are not experiencing a high level of hardwood competition. The regime is designed to develop and maintain a variety of age classes.

Timing Options

The regime is available for harvest throughout the planning horizon. The minimum re-entry period is 20 years.

Trigger Conditions

Stands must have a minimum of 220 square feet of conifer basal area per acre to be selected for harvest. The regime is considered for conifer-dominated stands and mixed conifer/hardwood stands. No harvest can occur within a size class unless the minimum conifer basal area is present in the stand.

Residual Stand Conditions

Minimum conifer basal area retention is 90 square feet of conifer basal area per acre. If hardwoods are harvested, retention is 15 square feet of basal area per acre. To low of BA to maintain a continuous cover canopy with desent tree height, also will promote understore competition.

Regeneration

Natural regeneration and planted seedlings are assumed for this regime. The growth model assumes that post-harvest stands are regenerated with 100 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control

Vegetation management will occur if hardwoods comprise greater than 15 square feet per acre.

Selection (Grp)

Description

The goal of this regime is to create and maintain continuous cover of multistoried, uneven-aged stands with a variety of diameter classes. The regime is applied to stands that are not experiencing a high level of hardwood competition. The regime is designed to develop and maintain a variety of age classes.

Timing Options

The regime is available for harvest throughout the planning horizon. The minimum re-entry period is 10 years.

Trigger Conditions

Stands must have a minimum of 100 square feet and less 120 square feet of conifer basal area per acre to be selected for harvest. The regime is considered for conifer-dominated stands and mixed conifer/hardwood stands. No harvest can occur within a size class unless the minimum conifer basal area is present in the stand.

Residual Stand Conditions

Minimum conifer basal area retention is 90 square feet of conifer basal area per acre. If hardwoods are harvested, retention is 15 square feet of basal area per acre.

Regeneration

Natural regeneration and planted seedlings are assumed for this regime. The growth model assumes that post-harvest stands are regenerated with 100 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control

Vegetation management will occur if hardwoods comprise greater than 15 square feet per acre.

Selection (High Retention2)

Description

The goal of this regime is to create and maintain dense, multistoried, uneven-aged stands with a variety of diameter classes. The regime is considered for stands with 50% or more of the stands overall basal area in trees greater than 16 inches dbh. The regime is applied to sensitive areas, such as watercourse buffers.

Timing Options

The regime is available throughout the planning horizon. If the stand is a watercourse buffer, it cannot be harvested unless the adjacent upslope stand is harvested. The minimum re-entry period is 20 years.

Trigger Conditions

Stands must have a minimum of 230 square feet of conifer basal area per acre to be selected for harvest. The regime is considered for conifer-dominated stands and mixed conifer/hardwood stands. No harvest can occur within a size class unless the minimum conifer basal area is present in the stand.

Residual Stand Conditions

Minimum conifer basal area retention is 180 square feet of conifer basal area per acre. This simulates a canopy closure of at least 70% and a presence of large trees. In general, all hardwoods will be retained.

Regeneration

Natural regeneration and planted seedlings are assumed for this regime. The growth model assumes that post-harvest stands are regenerated with 40 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control

No vegetation control is modeled with this regime.

Selection (High Retention3)

Description

The goal of this regime is to create and maintain dense, multistoried, uneven-aged stands with a variety of diameter classes. The regime is considered for stands with 50% or more of the stands overall basal area in trees greater than 16 inches dbh. The regime is applied to sensitive areas, such as watercourse buffers.

Timing Options

The regime is available throughout the planning horizon. If the stand is a watercourse buffer, it cannot be harvested unless the adjacent upslope stand is harvested. The minimum re-entry period is 20 years.

Trigger Conditions

Stands must have a minimum of 260 square feet of conifer basal area per acre to be selected for harvest. The regime is considered for conifer-dominated stands and mixed conifer/hardwood stands. No harvest can occur within a size class unless the minimum conifer basal area is present in the stand.

Residual Stand Conditions

Minimum conifer basal area retention is 200 square feet of conifer basal area per acre. Under the "Proposed" alternative, there is the additional retention of 20% of the largest trees in the stand. This simulates a canopy closure of at least 70% and a presence of large trees. In general, all hardwoods will be retained.

Regeneration

Natural regeneration and planted seedlings are assumed for this regime. The growth model assumes that post-harvest stands are regenerated with 40 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control

No vegetation control is modeled with this regime.

Selection_Carb (High Retention)

Description

The goal of this regime is to create and maintain dense, multistoried, uneven-aged stands with a variety of diameter classes. A select project area was defined for testing carbon sequestration.

Timing Options

The regime is available throughout the planning horizon. If the stand is a watercourse buffer, it cannot be harvested unless the adjacent upslope stand is harvested. The minimum re-entry period is 20 years.

Trigger Conditions

Stands must have a minimum of 240 square feet of conifer basal area per acre to be selected for harvest. The regime is considered for conifer-dominated stands and mixed conifer/hardwood stands. No harvest can occur within a size class unless the minimum conifer basal area is present in the stand.

Residual Stand Conditions

Minimum conifer basal area retention is 200 square feet of conifer basal area per acre. This simulates a canopy closure of at least 70% and a presence of large trees.

Regeneration

Natural regeneration and planted seedlings are assumed for this regime. The growth model assumes that post-harvest stands are regenerated with 40 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control

No vegetation control is modeled with this regime.

Selection (Medium Retention - OG)

Description

The goal of this regime is to create and maintain dense, multistoried, uneven-aged stands with a variety of diameter classes. The regime is considered for stands with 50% or more of the stands overall basal area in trees greater than 16 inches dbh. This regime is applied to Type II Old Growth stands.

Timing Options

The regime is available throughout the planning horizon. If the stand is a watercourse buffer, it cannot be harvested unless the adjacent upslope stand is harvested. The minimum re-entry period is 20 years.

Trigger Conditions

Stands must have a minimum of 160 square feet of conifer basal area per acre to be selected for harvest. The regime is considered for conifer-dominated stands and mixed conifer/hardwood stands. No harvest can occur within a size class unless the minimum conifer basal area is present in the stand.

Residual Stand Conditions

Minimum conifer basal area retention is 150 square feet of conifer basal area per acre. This simulates a canopy closure of at least 60% and a presence of large trees. All residual old growth trees are retained. If pre-harvest basal area in hardwoods exceeds 15 suare feet, then 15 square feet of basal area will be retatained.

Regeneration

Natural regeneration and planted seedlings are assumed for this regime. The growth model assumes that post-harvest stands are regenerated with 40 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control

Hardwoods will be reduced to 15 square feet of basal area.

Selection (OG Type I)

Description

The goal of this regime is to create and maintain dense, multistoried, uneven-aged stands with a variety of diameter classes. The regime is considered for stands with 50% or more of the stands overall basal area in trees greater than 16 inches dbh. This regime is applied to Type I Old Growth stands.

Timing Options

The regime is available throughout the planning horizon. If the stand is a watercourse buffer, it cannot be harvested unless the adjacent upslope stand is harvested. The minimum re-entry period is 20 years.

Trigger Conditions

Stands must have a minimum of 260 square feet of conifer basal area per acre to be selected for harvest. The regime is considered for conifer-dominated stands and mixed conifer/hardwood stands. No harvest can occur within a size class unless the minimum conifer basal area is present in the stand.

Residual Stand Conditions

Minimum conifer basal area retention is 200 square feet of conifer basal area per acre. This simulates a canopy closure of at least 60% and a presence of large trees. All residual old growth trees are retained. If pre-harvest basal area in hardwoods exceeds 15 suare feet, then 15 square feet of basal area will be retatained.

Regeneration

Natural regeneration and planted seedlings are assumed for this regime. The growth model assumes that post-harvest stands are regenerated with 40 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control

Hardwoods will be reduced to 15 square feet of basal area.

Selection (NSO & MaMu Buffers)

Description

The goal of this regime is to create and maintain continuous cover of multistoried, uneven-aged stands with a variety of diameter classes. The regime is applied to stands that are not experiencing a high level of hardwood competition. The regime is designed to develop and maintain a variety of age classes.

Timing Options

The regime is available for harvest throughout the planning horizon. The minimum re-entry period is 20 years.

Trigger Conditions

Stands must have a minimum of 105 square feet of conifer basal area per acre to be selected for harvest. The regime is considered for conifer-dominated stands and mixed conifer/hardwood stands. No harvest can occur within a size class unless the minimum conifer basal area is present in the stand.

Residual Stand Conditions

Minimum conifer basal area retention is 75 square feet of conifer basal area per acre. If hardwoods are harvested, retention is 15 square feet of basal area per acre.

Regeneration

Natural regeneration and planted seedlings are assumed for this regime. The growth model assumes that post-harvest stands are regenerated with 100 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control

Vegetation management will occur if hardwoods comprise greater than 15 square feet per acre.

Selection (Floodplain)

Description

The goal of this regime is to create and maintain dense, multistoried, uneven-aged stands with a variety of diameter classes. The regime is considered for stands with 50% or more of the stands overall basal area in trees greater than 16 inches dbh. The regime is applied to sensitive areas, such as watercourse buffers. This regime is applied to a unique group of stands that were identified as being within a floodplain.

Timing Options

The regime is available throughout the planning horizon. If the stand is a watercourse buffer, it cannot be harvested unless the adjacent upslope stand is harvested. The minimum re-entry period is 20 years.

Trigger Conditions

Stands must have a minimum of 300 square feet of conifer basal area per acre to be selected for harvest. The regime is considered for conifer-dominated stands and mixed conifer/hardwood stands. No harvest can occur within a size class unless the minimum conifer basal area is present in the stand.

Residual Stand Conditions

Minimum conifer basal area retention is 300 square feet of conifer basal area per acre. Under the "Proposed" alternative, there is the additional retention of 20% of the largest trees in the stand. This simulates a canopy closure of at least 70% and a presence of large trees. In general, all hardwoods will be retained.

Regeneration

Natural regeneration and planted seedlings are assumed for this regime. The growth model assumes that post-harvest stands are regenerated with 40 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control

No vegetation control is modeled with this regime.

Selection (Visual)

Description

The goal of this regime is to create and maintain continuous cover of multistoried, uneven-aged stands with a variety of diameter classes. The regime is applied to stands that are not experiencing a high level of hardwood competition. The regime is designed to develop and maintain a variety of age classes. A select group of stands were identified adjacent to public roads, etc. and will be managed for aesthetic purposes.

Timing Options

The regime is available for harvest throughout the planning horizon. The minimum re-entry period is 20 years.

Trigger Conditions

Stands must have a minimum of 105 square feet of conifer basal area per acre to be selected for harvest. The regime is considered for conifer-dominated stands and mixed conifer/hardwood stands. No harvest can occur within a size class unless the minimum conifer basal area is present in the stand.

Residual Stand Conditions

Minimum conifer basal area retention is 75 square feet of conifer basal area per acre. If hardwoods are harvested, retention is 15 square feet of basal area per acre.

Regeneration

Natural regeneration and planted seedlings are assumed for this regime. The growth model assumes that post-harvest stands are regenerated with 100 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control

Vegetation management will occur if hardwoods comprise greater than 15 square feet per acre.

Selection (Coastal Zone STA)

Description

The goal of this regime is to create and maintain continuous cover of multistoried, uneven-aged stands with a variety of diameter classes. The regime is applied to stands that are not experiencing a high level of hardwood competition. The regime is designed to develop and maintain a variety of age classes. A select group of stands were identified within the Coastal Zone Special Treatment Area and will be managed with selection silviculture only.

Timing Options

The regime is available for harvest throughout the planning horizon. The minimum re-entry period is 20 years.

Trigger Conditions

Stands must have a minimum of 120 square feet of conifer basal area per acre to be selected for harvest. The regime is considered for conifer-dominated stands and mixed conifer/hardwood stands. No harvest can occur within a size class unless the minimum conifer basal area is present in the stand.

Residual Stand Conditions

Minimum conifer basal area retention is 100 square feet of conifer basal area per acre. If hardwoods are harvested, retention is 15 square feet of basal area per acre.

Regeneration

Natural regeneration and planted seedlings are assumed for this regime. The growth model assumes that post-harvest stands are regenerated with 100 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control

Vegetation management will occur if hardwoods comprise greater than 15 square feet per acre.

Selection TSU (Terrain Stability Units)

Description

The goal of this regime is to create and maintain continuous cover of multistoried, uneven-aged stands with a variety of diameter classes. The regime is applied to stands that are not experiencing a high level of hardwood competition. The regime is designed to develop and maintain a variety of age classes. This regime applies to stands within identified TSU units that have 50% or more of the area within a TSU 3 unit.

Timing Options

The regime is available for harvest throughout the planning horizon. The minimum re-entry period is 20 years.

Trigger Conditions

Stands must have a minimum of 105 square feet of conifer basal area per acre to be selected for harvest. The regime is considered for conifer-dominated stands and mixed conifer/hardwood stands. No harvest can occur within a size class unless the minimum conifer basal area is present in the stand.

Residual Stand Conditions

Minimum conifer basal area retention is 75 square feet of conifer basal area per acre. If hardwoods are harvested, retention is 15 square feet of basal area per acre.

Regeneration

Natural regeneration and planted seedlings are assumed for this regime. The growth model assumes that post-harvest stands are regenerated with 100 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control

Vegetation management will occur if hardwoods comprise greater than 15 square feet per acre.

Selection (Small Class II)

Description

The goal of this regime is to create and maintain continuous cover of multistoried, uneven-aged stands with a variety of diameter classes. The regime is applied to stands that are not experiencing a high level of hardwood competition. The regime is designed to develop and maintain a variety of age classes. This regime applies to stands identified as small class II watercourses.

Timing Options

The regime is available for harvest throughout the planning horizon. The minimum re-entry period is 20 years.

Trigger Conditions

Stands must have a minimum of 105 square feet of conifer basal area per acre to be selected for harvest. The regime is considered for conifer-dominated stands and mixed conifer/hardwood stands. No harvest can occur within a size class unless the minimum conifer basal area is present in the stand.

Residual Stand Conditions

Minimum conifer basal area retention is 75 square feet of conifer basal area per acre. If hardwoods are harvested, retention is 15 square feet of basal area per acre.

Regeneration

Natural regeneration and planted seedlings are assumed for this regime. The growth model assumes that post-harvest stands are regenerated with 100 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control

Vegetation management will occur if hardwoods comprise greater than 15 square feet per acre.

Clearcut

Description
This regime is utilized in the "Reserves" alternative to rotate stands under an even-aged regime.

Timing Options
The regime is available for harvest throughout the planning horizon. The rotation cycle is 60 years.

Trigger Conditions
Stands must have greater than120 square feet of conifer basal area per acre. The regime is considered for mixed conifer and hardwood stands and mixed hardwood stands. The stand must have 80 square feet of basal area or more of its overall basal area in trees greater than 16 inches to be considered for harvest.

Residual Stand Conditions
All conifers greater than 6" dbh are harvested. 15 square feet of hardwoods are retained if present in the pre-harvest stand.

Regeneration
Natural regeneration and planted seedlings are assumed for this regime.
Assumptions The growth model assumes that post-harvest stands are regenerated with 300 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood trees and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control
Hardwoods are modeled for management within each of the silviculture regimes. The targeted hardwood basal area retention level is 15 square feet per acre in each stand following harvest.

Commercial Thin

Description

The goal of this regime is to thin clearcut stands to achieve optimal spacing, growth, and maintain or enhance the average diameter. This regime is considered even-aged as it is an intermediate step in the clearcut cycle

Timing Options

The regime is applied midway (30 years) between 60 year clearcut events.

Trigger Conditions

Stands must have greater than of 100 square feet of conifer basal area per acre to be selected for harvest. The regime is considered for conifer-dominated stands and mixed conifer/hardwood stands. No harvest can occur within a size class unless the minimum conifer basal area is present in the stand.

Residual Stand Conditions

Minimum conifer basal area retention is 100 square feet of conifer basal area per acre. If hardwoods are harvested, retention is 15 square feet of basal area per acre.

Regeneration

Natural regeneration and planted seedlings are assumed for this regime. The growth model assumes hat post-harvest stands are regenerated with 10 seedlings per acre. The assumed regeneration mimics the species composition of the pre-harvest stand by determining the proportion of redwood and Douglas-fir trees present in the pre-harvest stand and assigning the same proportion to the seedlings. The small trees 'grow' in the model with a small tree modeling routine which adds 1 foot height growth per year until the tree achieves 10 feet in height, upon which the trees are assumed to have a dbh of 4 inches. At this point the small trees are subject to competition and mortality.

Vegetation Control

Vegetation management will occur if hardwoods comprise greater than 15 square feet per acre.

Structure Classes

Stratification of the forest cover into units that share common features is accomplished using a variety of tools, including aerial photos and other forms of remote sensing. The units, or strata, derived from stratification are the basis for field sampling activities designed to obtain tree lists that represent the forested condition for each stratum. Distinct tree lists are produced from sampling for each planning watershed (sub-watersheds defined by the State of California) from sampling. Therefore, the tree list for a given stratum in one planning watershed is distinct, albeit similar, from that of a stratum with the same label in another planning watershed.

Forest structural conditions have strong associations with habitat value. MRC's landscape planning tools include a component in the Growth and Yield model that classifies forest vegetation into groupings or classes of forest structure classes. Forest structure classes are based on:

- Species dominance
- Size dominance
- Density of the forest

The structure classes are fewer in number than the total number of vegetation strata. The purpose with identifying structure classes is to combine forested areas into similar vegetation units for habitat purposes, not for determining levels of timber stocking. Although highly correlated to vegetation strata, forest structure classes are computed from empirical data acquired from field samples. While both vegetation strata and forest structure classes are based on the same set of rules, strata are assigned a priori (before sampling) and structure classes are computed a posteriori (post sampling).

MRC developed this system for determining structure classes in order to understand both the current condition of the forest and changes to forest structure resulting from forest growth and harvesting activities. The system was developed as an alternative to the California WHR (Wildlife Habitats Relationship) model because the WHR system was developed for even-aged management, where trees in a forest stand are very close to the same size and age. MRC manages its forest with uneven age harvesting. This means that there are trees from more than one age and size group in forested stands at all times. WHR determines the size of the forest stand utilizing an average. Averaging works well for forested stands where the distribution of tree sizes within a stand is minimal. It does not describe the condition of a forest with a wide distribution of sizes, as in uneven age management. A crosswalk was developed to address NSO habitat, WHR, and Successional stages. For a given structure class, a specific habitat is assigned. For example, structure class 10 would be labeled as Foraging NSO habitat, have a WHR of MHC4M, and would be classified as Mid-Successional.