

# **Option A**

**Mendocino Redwood Company, L.L.C.**

Revised April 25, 2008

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## Summary

Mendocino Redwood Company's (MRC's) stated purpose is to be a company that utilizes high standards of environmental stewardship while operating a successful business.

This document addresses the requirement of the California Forest Practice Rules (14 CCR 913.11) for a forest landowner to achieve "Maximum Sustained Production of High Quality Timber Products" (MSP). Forest landowners with 2,500 acres or less are able to use a Non-Industrial Timber Management Plan (NTMP) to demonstrate MSP. Forest landowners in the State of California with 50,000 acres or more are required to submit an MSP document to the Department of Forestry and Fire Protection (CDF) that displays methodologies and results of a planning effort that achieves a stated MSP. Landowners have the option of demonstrating MSP through:

- A Sustained Yield Plan (SYP), which addresses management affects on timber, watersheds, fisheries, wildlife, recreation, employment, and more. The 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 Act.
- A Programmatic Timber Environmental Impact Report (PTEIR), which addresses the same issues as an SYP, but accomplishes CEQA compliance through traditional CEQA processes.
- An Option A, which addresses management affects on timber resources, while considering watersheds, fisheries, wildlife, recreation, employment, and more. The non-timber resources are given a thorough analysis with each site plan (Timber Harvest Plan) that is submitted to CDF, rather than in the MSP document.

Guidelines for completing an Option A document are included in the rules (14 CCR 913.11(a)). The Option A is intended to address some of the key metrics of a well managed forest. This document addresses:

- Harvest levels
- Growth of forest stands
- Silviculture activities on the landscape
- Consideration of non-timber forest values, as related to the long term sustainability of the forest.

This document is a revision to MRC's current Option A which was submitted in 1998. MRC is in the process of finalizing a Habitat Conservation Plan (HCP) and a Natural Communities Conservation Plan. MRC is also conducting watershed analysis throughout all watersheds in its ownership, which will result in a set of documents that describes watershed conditions and restoration opportunities. MRC's intent is to pursue a PTEIR, once the suite of planning efforts listed above, and their associated documents, are completed.

The planning approach in this Option A reflects harvesting methods that are compliant with the California Forest Practice Rules, adhere to the Forest Stewardship Council's Pacific Coast Standards, and are compatible with strategies for habitat management being developed by biologists with United States Fish and Wildlife Service, California Department of Fish and Game, National Marine Fisheries Service and MRC. These strategies will result in a Habitat Conservation Plan and a Natural Communities Conservation Plan. The intent of our harvest methods is to maintain and improve habitat conditions for both terrestrial and aquatic species, while managing the forest in an economically and socially responsible manner.

Mendocino Redwood Company (MRC) has been operating under its current Option A since 1998. MRC is submitting an updated Option A to enable the implementation of strategies that increase operational efficiency, reduce environmental impacts, and increase habitat complexity across our forestlands. The key strategy components in the revised plan include:

1. The establishment of Harvest Blocks. Harvest Blocks are constructed by grouping adjacent stands that can be managed efficiently as a unit. Harvest Blocks are assigned to one of four 5-year periods. The acres identified in each Harvest Block sets harvest limits by 5-year period.
2. Reduced road use, since Harvest Blocks are built around the road networks that service them. This reduces the amount of road used per acre harvested.
3. Harvest methods that are compatible with each stand's unique characteristics and that provide longer periods of rest between harvests.
4. An approach to harvesting that increases the aquatic and terrestrial habitat for sensitive species such as salmon and northern spotted owls.

Long Term Sustained Yield (LTSY) is defined in the California Forest Practice Rules (14 CCR 895.1) as "the average growth sustainable by the inventory predicted at the end of a 100-year planning horizon." The Option A outlines the approach to harvesting, related growth and overall inventory levels over this 100-year period. The calculated Long Term Sustained Yield (LTSY) for the conifer portion of MRC forestlands is 151 million board feet (mmbf) per year, or 654 board feet per acre per year.

The LTSY considers growth from all forested stands, regardless of the harvest level applied to individual stands. Some of the important outcomes of this approach to LTSY include:

- Conifer volumes continue to increase throughout the 100-year planning horizon. Much of the growth that exceeds harvest at the end of the 100-year period occurs in sensitive stands, such as special habitat areas and watercourse buffers.
- The maximum harvest percentage of growth is 92% in any 5-year planning period. The average harvest throughout the 100-year planning horizon is 77% of growth. This statistic indicates that harvest predictions are conservative.
- Conifer inventory will be twice the level at 2045 then it was when MRC acquired the property in 1998.
- An average 20-year rotation for harvest of MRC forestlands means our acreage limit on harvest will be 25% of our forestlands in every five-year period. For instance, in our first five year period, we will be limited to a total of 57,195 acres available for harvest (since our current acreage is 228,780). Since we started this planning effort in 2006, the first year of the first 5-year period is 2006 with the last year being 2010 for acreage limitation considerations.

The LTSY was calculated with the use of computer models described in detail in the Landscape Planning Appendix.

Table 1 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 2007-2010 (effectively a four year planning period) for the first period volume harvest.

| 5-Year Period | Conifer Inventory | Conifer Growth | Conifer Harvest | Harvest as a Percent of Growth | Harvest as a Percent of Inventory (Annual) |
|---------------|-------------------|----------------|-----------------|--------------------------------|--|
| 1             | 2,740,722         | 515,344        | 246,413         | 48%                            | 2.25%                                      |
| 2             | 3,009,652         | 540,355        | 344,437         | 64%                            | 2.29%                                      |
| 3             | 3,205,570         | 567,561        | 417,485         | 74%                            | 2.60%                                      |
| 4             | 3,355,647         | 589,286        | 478,520         | 81%                            | 2.85%                                      |
| 5             | 3,466,413         | 619,386        | 395,354         | 64%                            | 2.28%                                      |
| 6             | 3,690,445         | 654,847        | 377,177         | 58%                            | 2.04%                                      |
| 7             | 3,968,114         | 688,044        | 454,555         | 66%                            | 2.29%                                      |
| 8             | 4,201,603         | 719,902        | 488,163         | 68%                            | 2.32%                                      |
| 9             | 4,433,341         | 724,882        | 555,939         | 77%                            | 2.51%                                      |
| 10            | 4,602,284         | 725,697        | 547,461         | 75%                            | 2.38%                                      |
| 11            | 4,780,521         | 723,617        | 585,657         | 81%                            | 2.45%                                      |
| 12            | 4,918,480         | 712,774        | 600,867         | 84%                            | 2.44%                                      |
| 13            | 5,030,387         | 715,404        | 656,380         | 92%                            | 2.61%                                      |
| 14            | 5,089,412         | 724,964        | 633,293         | 87%                            | 2.49%                                      |
| 15            | 5,181,082         | 730,100        | 665,720         | 91%                            | 2.57%                                      |
| 16            | 5,245,462         | 734,801        | 668,685         | 91%                            | 2.55%                                      |
| 17            | 5,311,578         | 739,001        | 645,682         | 87%                            | 2.43%                                      |
| 18            | 5,404,897         | 747,449        | 617,115         | 83%                            | 2.28%                                      |
| 19            | 5,535,230         | 754,043        | 631,532         | 84%                            | 2.28%                                      |
| 20            | 5,657,741         | 758,930        | 640,742         | 84%                            | 2.27%                                      |

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

The last section of this document describes our approach to monitoring the assumptions of inventory, growth, and harvest in this plan. The objective of this monitoring activity is to determine if the calculation of Maximum Sustained Production (MSP) remains valid through time given growth, inventory and consideration of non-timber forest resources. Each Timber Harvest Plan (THP) will link constraints in the Option A with actual on the ground conditions and silviculture used in the THP. Harvest activities that vary from this Option A plan will be accompanied with an explanation of the variance and discuss potential variances to the calculated Long Term Sustained Yield (LTSY). Cumulative effects, unstable soils analysis, sediment capture, and other site-specific operational analyses will be addressed in individual Timber Harvest Plans (THPs).

## **The Requirement to Demonstrate Maximum Sustained Production: California Forest Practice Rule 913.11(a)**

### **913.11, 933.11, 953.11 Maximum Sustained Production of High Quality Timber Products**

The goal of this section is the achieve Maximum Sustained Production of High Quality Timber Products (MSP). MSP is achieved by meeting the requirements of either (a) or (b) or (c) in a THP, SYP or NTMP, or as otherwise provided in Article 6.8, Subchapter 7.

- (a) Where a Sustained Yield Plan (14 CCR 1091.1) or Nonindustrial Timber Management Plan (NTMP) has not been approved for an ownership, MSP will be achieved by:
- (1) Producing the yield of timber products specified by the landowner, taking into account biologic and economic factors, while accounting for limits on productivity due to constraints imposed from consideration of other forest values, including but not limited to, recreation, watershed, wildlife, range and forage, fisheries, regional economic vitality, employment and aesthetic enjoyment.
  - (2) Balancing growth and harvest over time, as explained in the THP for an ownership, within an assessment area set by the timber owner or timberland owner and agreed to by the Director. For purposes of this subsection the sufficiency of information necessary to demonstrate the balance of growth and harvest over time for the assessment area shall be guided by the principles of practicality and reasonableness in light of the size of the ownership and the time since adoption of this section using the best information available. The projected inventory resulting from harvesting over time shall be capable of sustaining the average annual yield achieved during the last decade of the planning horizon. The average annual projected yield over any rolling 10-year period, or over appropriately longer time periods for ownerships which project harvesting at intervals less frequently than once every ten years, shall not exceed the projected long-term sustained yield.
  - (3) Realizing growth potential as measured by adequate site occupancy by species to be managed and maintained given silvicultural methods selected by the landowner.
  - (4) Maintaining good stand vigor.
  - (5) Making provisions for adequate regeneration.

This rule (913.11) establishes the framework of this planning document.



## The Assessment Area

This Option A covers all forestlands owned by the Mendocino Redwood Company (MRC). The forestlands are comprised of approximately 228,780 acres situated in the western portion of Mendocino County and the northwestern portion of Sonoma County in the redwood forests of northwestern California. MRC began operations with the purchase of these lands on June 30, 1998.

MRC's forestlands are situated south of the Humboldt County line, west of Highway 101, north of the Willow Creek Road (near the mouth of the Russian River) in Sonoma County, and east of the Pacific Ocean. The forestlands are located in three distinct areas: the Rockport Tract (39,188 acres) just south of the Humboldt County line; the major ownership block (180,722 acres) south of the headwaters of the Noyo River, north of the ridge between the Garcia and the Gualala River in southern Mendocino County, east of the Pacific Ocean, and west of highway 101; and the Sonoma County forestlands (8,857 acres) in the Willow Creek and Wheatfield Fork watersheds near the Pacific Ocean.

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

Most of the MRC forestlands are young growth stands of redwood and Douglas-fir, mixed conifers and hardwoods, or mixed hardwoods. Table 2 displays the area of MRC's broad land cover types and their associated acres.

**Table 2. Acres by Land Cover Types on Mendocino Redwood Company's Ownership**

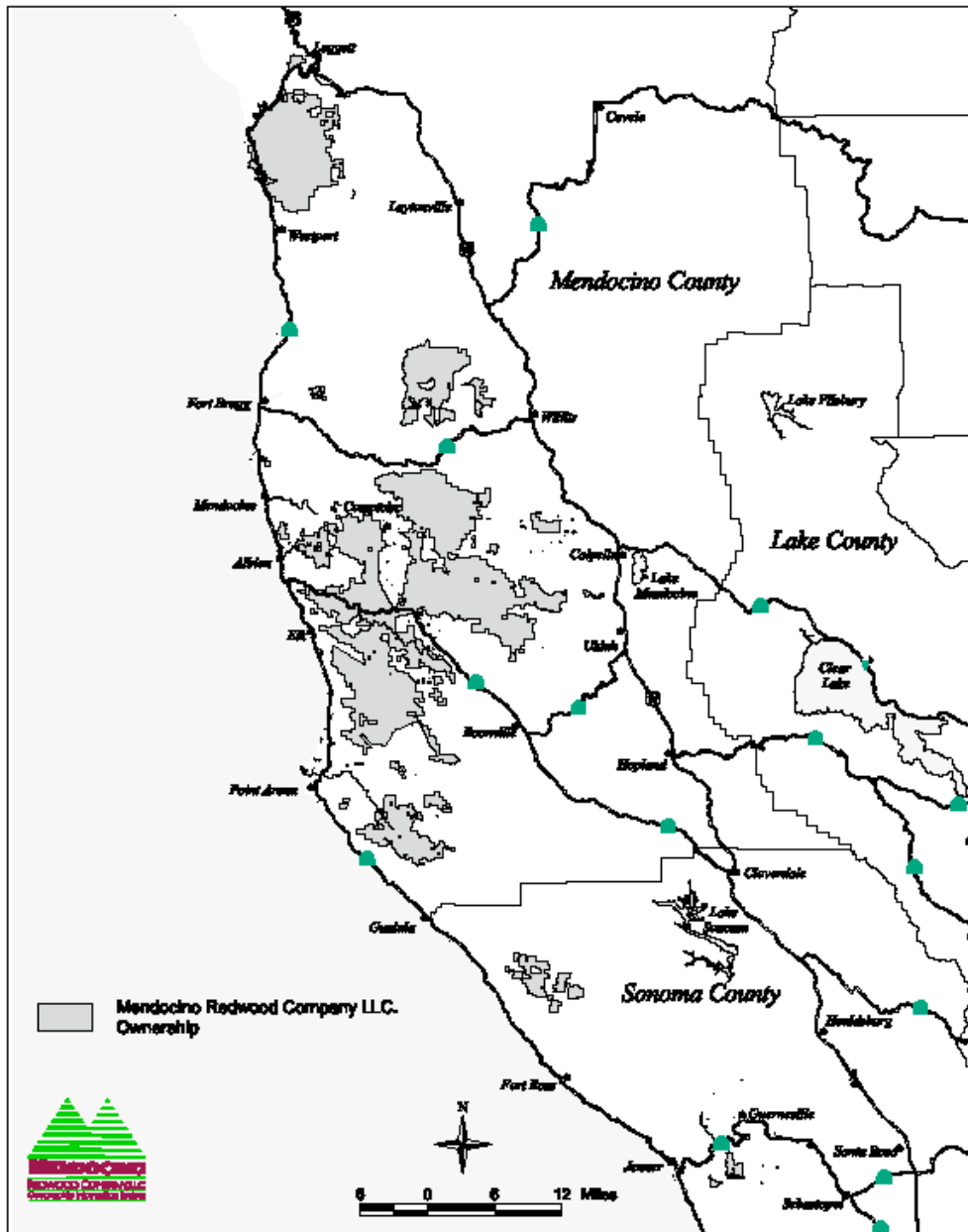
| Land Cover Types   | Gross Acres* |
|--|--------------|
| Redwood/Douglas-fir  | 139,030      |
| Mixed Conifers and Hardwoods                                       | 76,248       |
| Mixed Hardwoods  | 5,556        |
| Brush and Grassland  | 2,917        |
| Douglas-fir  | 2,146        |
| Oak Woodlands  | 1,105        |
| Pygmy Forest   | 730          |
| Redwood/Monterey Pine  | 697          |
| Tanoak   | 226          |
| Rocky Outcrops   | 94           |
| Water, swamps  | 30           |
| *Gross Acres include the roads that traverse the land cover types. |              |

The range in elevation on MRC forestlands 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 forestlands lie within the rugged Coast Range province that is underlain by marine sandstones of the Franciscan Formation.

Previous companies that have operated on what is today MRC's ownership 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, 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.

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 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 and this Option A includes silviculture strategies that will continue this restoration effort. The map below displays MRC's ownership in Mendocino and Sonoma Counties.



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## **The Requirement to Balance Growth and Harvest over Time California Forest Practice Rule 913.11(a)(2)**

*Balancing growth and harvest over time, as explained in the THP for an ownership, within an assessment area set by the timber owner or timberland owner and agreed to by the Director. For purposes of this subsection the sufficiency of information necessary to demonstrate the balance of growth and harvest over time for the assessment area shall be guided by the principles of practicality and reasonableness in light of the size of the ownership and the time since adoption of this section using the best information available. The projected inventory resulting from harvesting over time shall be capable of sustaining the average annual yield achieved during the last decade of the planning horizon. The average annual projected yield over any rolling 10-year period, or over appropriately longer time periods for ownerships which project harvesting at intervals less frequently than once every ten years shall not exceed the projected **long-term sustained yield**.*

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The California Forest Practice Rules define Long Term Sustained Yield (LTSY) as “the average growth sustainable by the inventory predicted at the end of a 100-year planning horizon” (14 CCR 895.1). Mendocino Redwood Company (MRC) determined Long Term Sustained Yield (LTSY) by utilizing the estimate of growth from the last 5-year period. Only growth associated with forested land types (timber sites 1 through 5) were included for the LTSY analysis. Approximately 5,100 acres of lands that do not meet this definition were excluded in the calculation. Conifer LTSY has been calculated at 845 board feet per acre per year or 189 mmbf per year across the entire acreage. Harvest levels throughout the planning period are always less than the calculated LTSY.

### **Summary of Inventory and Growth and Yield Methods**

The following section summarizes the methodology behind MRC’s inventory methodology and growth and yield modeling. A more detailed explanation is included in the attached Landscape Planning Appendix. 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 ownership is divided into ‘Sustainability Units’. Sustainability Units are 22,000 acres or less and are organized geographically as groups of watershed areas. MRC’s ownership is divided into 17 such units. This geographic stratification increases the resolution of the inventory estimates and the overall accuracy of the estimates.

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 Research Project). CRYPTOS 'grows' (and estimates forest mortality) for each tree in a tree list based on the tree species, 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 which allows the application of a myriad of silvicultural applications to be 'tested' against the 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 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 the Landscape Planning Appendix.

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).

| 5-Year Period | Conifer Inventory (mbf) | Conifer Growth (mbf) | Conifer Growth per Acre per Year (Board Feet) | Conifer Growth as a Percent of Inventory |
|---------------|-------------------------|----------------------|---|--|
| 1             | 2,740,722               | 515,344              | 444   | 3.8%                                     |
| 2             | 3,009,652               | 540,355              | 466   | 3.6%                                     |
| 3             | 3,205,570               | 567,561              | 489   | 3.5%                                     |
| 4             | 3,355,647               | 589,286              | 508   | 3.5%                                     |
| 5             | 3,466,413               | 619,386              | 534   | 3.6%                                     |
| 6             | 3,690,445               | 654,847              | 564   | 3.5%                                     |
| 7             | 3,968,114               | 688,044              | 593   | 3.5%                                     |
| 8             | 4,201,603               | 719,902              | 621   | 3.4%                                     |
| 9             | 4,433,341               | 724,882              | 625   | 3.3%                                     |
| 10            | 4,602,284               | 725,697              | 626   | 3.2%                                     |
| 11            | 4,780,521               | 723,617              | 624   | 3.0%                                     |
| 12            | 4,918,480               | 712,774              | 614   | 2.9%                                     |
| 13            | 5,030,387               | 715,404              | 617   | 2.8%                                     |
| 14            | 5,089,412               | 724,964              | 625   | 2.8%                                     |
| 15            | 5,181,082               | 730,100              | 629   | 2.8%                                     |
| 16            | 5,245,462               | 734,801              | 633   | 2.8%                                     |
| 17            | 5,311,578               | 739,001              | 637   | 2.8%                                     |
| 18            | 5,404,897               | 747,449              | 644   | 2.8%                                     |
| 19            | 5,535,230               | 754,043              | 650   | 2.7%                                     |
| 20            | 5,657,741               | 758,930              | 654   | 2.7%                                     |

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

### **Methodology to Determine Maximum Sustained Production (MSP)**

The methodology to determine Maximum Sustained Production (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. 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 GIS to tabular data in Microsoft Access databases. Each stand contains information (vegetation, sensitivity, site class, harvest timing) that assist 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 a 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.

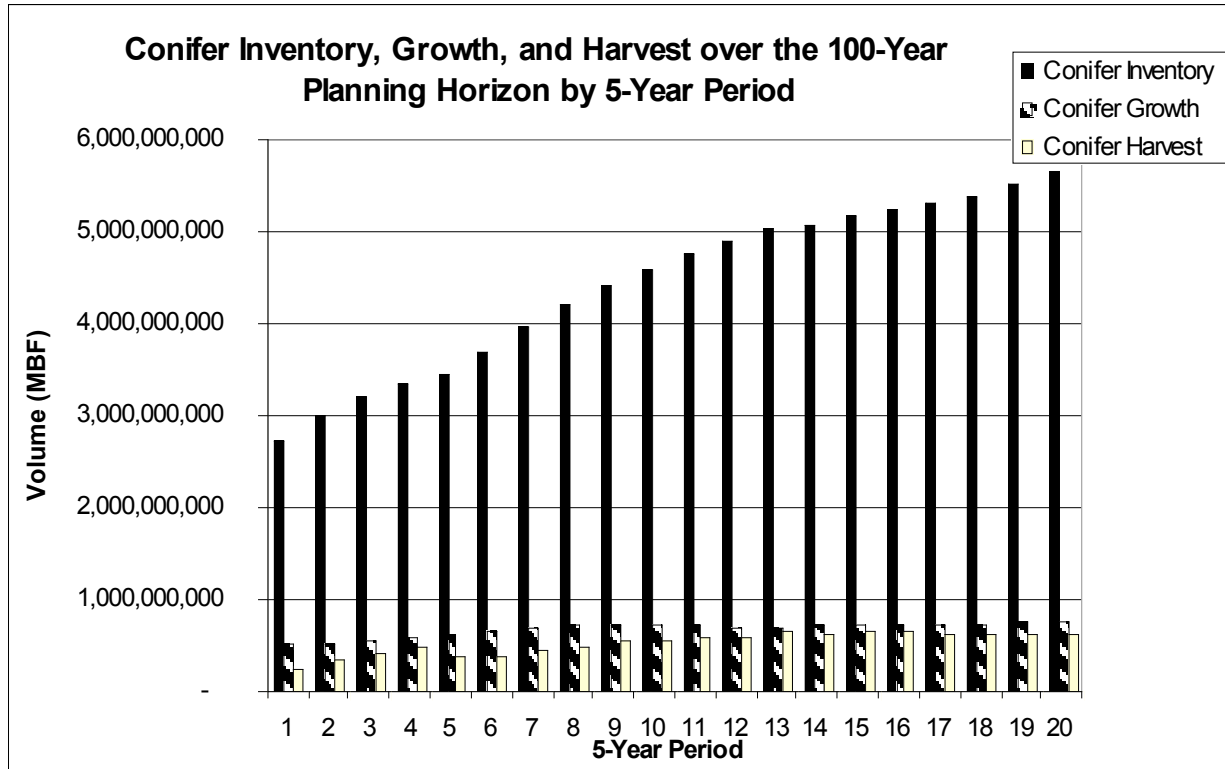
- Site Class – Site class is used to assign site indices to trees based on their species. This sets the growth trajectory for each tree in the tree list.
- Sensitivity Codes – Sensitivity codes direct the stand toward appropriate silviculture techniques according to MRC policies and any laws related 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 MRCs 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.

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.
- Reliance on uneven-age management techniques. Long-term silviculture management will rely on single-tree and group selection.
- 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.
- 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.
- Appropriate management of sensitive areas (described in detail in a later section).

## **Option A Tables and Charts**

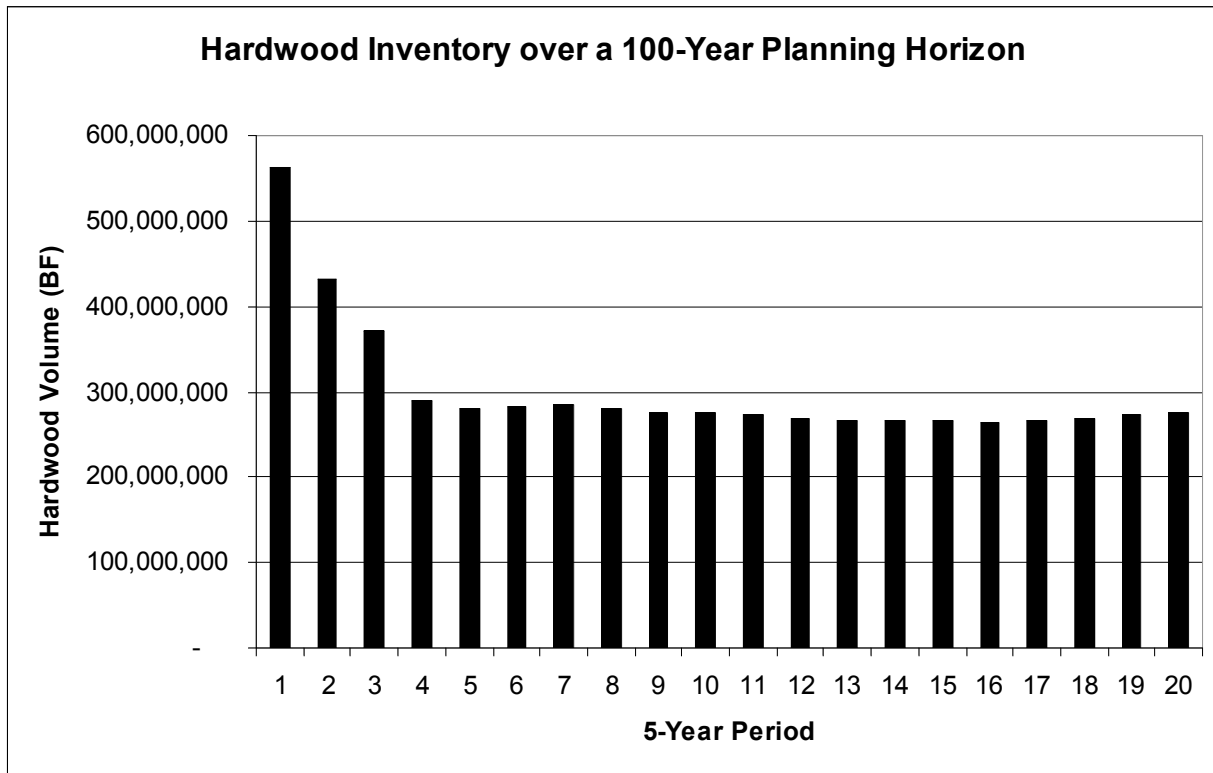
The following tables and charts display data related to the calculation of Maximum Sustained Production (MSP) on Mendocino Redwood Company (MRC) forestlands. All data displayed is the result of the growth and yield simulation using MRC’s landscape planning model.



**Chart 1: Modeled Conifer Inventory, Growth, and Harvest by 5-Year Period**

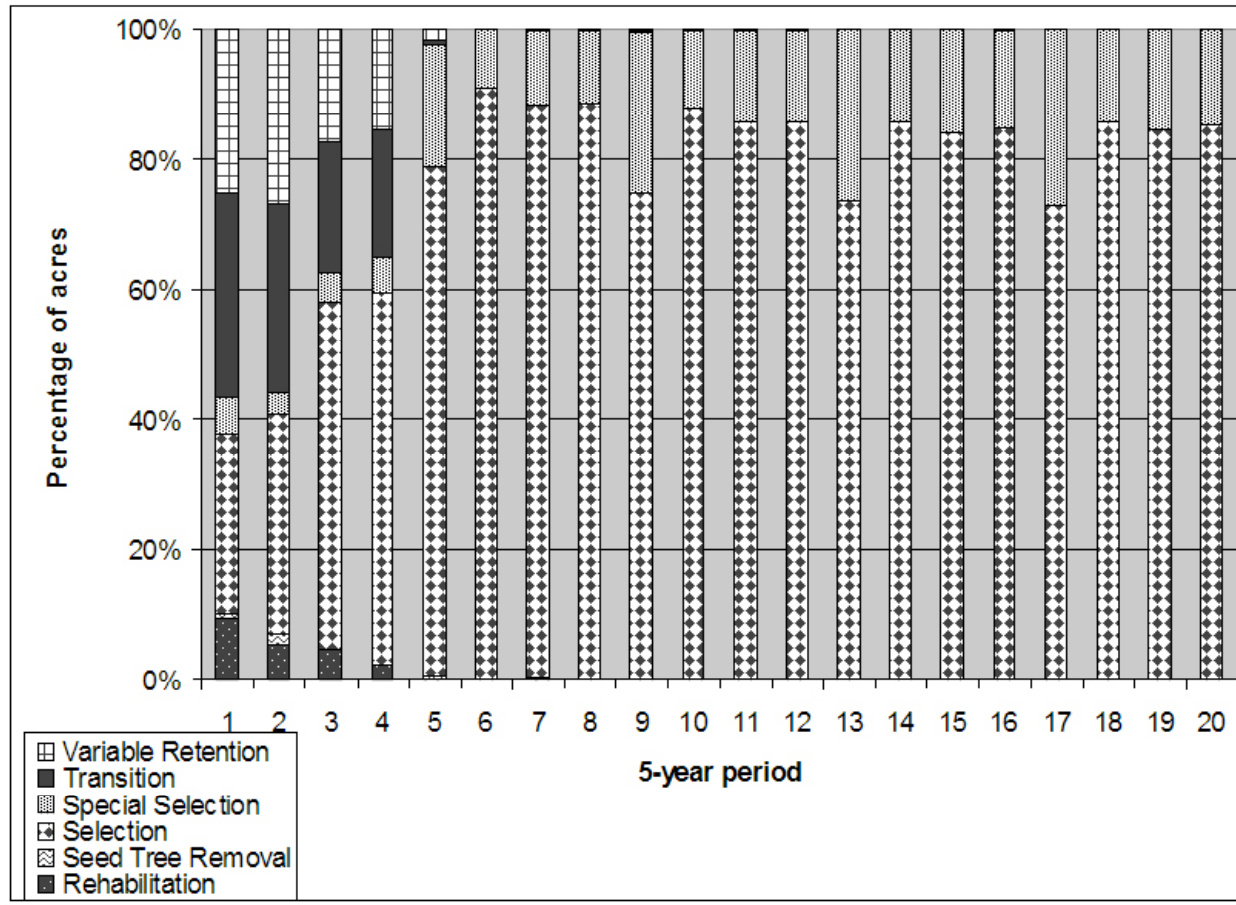
This chart displays the trend of increasing inventory levels and the relationship between growth and harvest over the 100-year planning period.





**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.



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

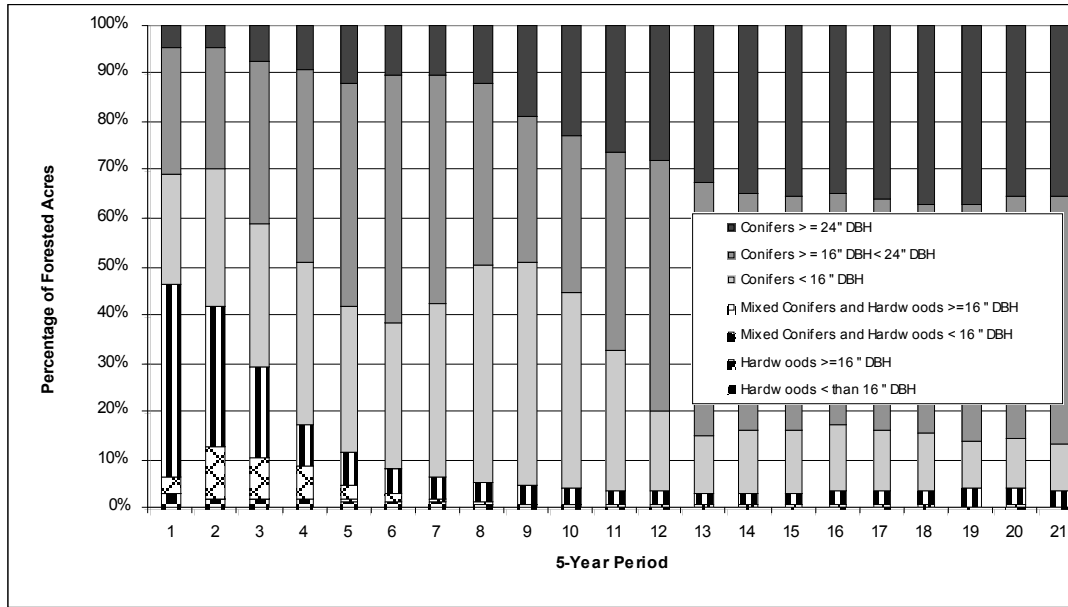
The overall percentages of silviculture methods incorporated by 5-year period are shown above. Restoration silviculture includes rehabilitation, seed-tree removal, and variable retention.

**Table 3A – Acres Harvested by Silviculture Type.**

| <b>5- Year Period</b> | <b>Selection</b> | <b>High Retention Selection</b> | <b>Transition</b> | <b>Restoration Silviculture*</b> |
|-----------------------|------------------|---------------------------------|-------------------|----------------------------------|
| 1                     | 11,429           | 725                             | 11,447            | 12,955                           |
| 2                     | 14,565           | 472                             | 11,755            | 13,516                           |
| 3                     | 22,336           | 749                             | 8,036             | 8,886                            |
| 4                     | 22,250           | 1,023                           | 7,256             | 6,656                            |
| 5                     | 34,971           | 2,971                           | 198               | 955                              |
| 6                     | 39,184           | 2,099                           | 23                | 45                               |
| 7                     | 39,006           | 2,630                           | 30                | 181                              |
| 8                     | 36,381           | 2,488                           | 4                 | 80                               |
| 9                     | 35,863           | 5,379                           | 30                | 156                              |
| 10                    | 40,482           | 3,312                           | 1                 | 141                              |
| 11                    | 40,298           | 3,889                           | -                 | 99                               |
| 12                    | 36,983           | 3,710                           | -                 | 149                              |
| 13                    | 37,733           | 6,088                           | 34                | 10                               |
| 14                    | 41,679           | 4,547                           | 4                 | 51                               |
| 15                    | 41,545           | 4,957                           | 13                | -                                |
| 16                    | 38,184           | 4,302                           | 9                 | 92                               |
| 17                    | 38,609           | 5,742                           | 5                 | -                                |
| 18                    | 41,968           | 4,570                           | 2                 | -                                |
| 19                    | 41,630           | 4,672                           | 2                 | -                                |
| 20                    | 38,515           | 4,215                           | 3                 | -                                |
| 21                    | 37,675           | 6,675                           | 1                 | -                                |

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

Trends of Dominant Vegetation and Size (Diameter at Breast Height)



**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.

\*\*\*\*\*

### **The Requirement to Consider Site Occupancy, Stand Vigor, Regeneration California Forest Practice Rule FPR 913.11(a)(3-5)**

*...MSP will be achieved by:*

- (3) Realizing growth potential as measured by **adequate site occupancy** by species to be managed and maintained given silvicultural methods selected by the landowner.*
- (4) Maintaining **good stand vigor**.*
- (5) Making **provisions for adequate regeneration**.*

\*\*\*\*\*

Ensuring adequate site occupancy, maintaining good stand vigor, and making provisions for adequate regeneration are provisions for ensuring Maximum Sustained Production (MSP) that 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 tree planting, site preparation work, vegetative management work, and pre-commercial thinning. Regeneration work 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. The details of modeling regeneration activities are discussed with each silviculture method in the Landscape Planning Appendix.

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.

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. Approximately 40% of MRC’s lands have hardwood levels above desired conditions. The hardwoods are typically the dominant overstory species in these stands. It is our 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.

\*\*\*\*\*

## The Requirement to Consider Other Forest Resources California Forest Practice Rule FPA 913.11(a) (1)

*...MSP will be achieved by:  
producing the yield of timber products specified by the landowner, taking into account biologic and economic factors, while accounting for limits on productivity due to constraints imposed from consideration of other forest values, including but not limited to, **recreation, watershed, wildlife, range and forage, fisheries, regional economic vitality, employment and aesthetic enjoyment.***

\*\*\*\*\*

Non-timber forest values considered in the calculation of Maximum Sustained Production (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. These 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 the Landscape Planning Appendix. Table 4 below displays the acres constrained for non-timber values. More detailed management goals are described in the Landscape Planning Appendix.

Table 4. Acres Constrained in Modeling Activities for Non-Timber Forest Values.

| Forest Management Types                               | Descriptions   | Acres        |                |
|---|--|--------------|----------------|
|   |  | Total Acres* | Unique Acres** |
| <b>Old Growth Management (Type I)</b>                 | <b>Description:</b> 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.   | 106          | 106            |
| <b>Old Growth Management (Type II)</b>                | <b>Description:</b> Forest stands that have been previously harvested yet contain a significant level of old growth trees.   | 741          | 529            |
| <b>Class I and Large Class II Watercourse Buffers</b> | <b>Description:</b> 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. Option A 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. | 22,710       | 20,620         |
| <b>Small Class II Watercourses Buffers</b>            | <b>Description:</b> Small II watercourses that support aquatic life that are non-fish-bearing and have watershed area $\leq$ 100 acres in size. Option A modeling assumed a 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.   | 6,373        | 5,832          |
| <b>Pygmy Forest</b>                                   | <b>Description:</b> 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).  | 730          | 730            |

| Forest Management Types  | Descriptions  | Acres |       |
|--|---|-------|-------|
| <b>Rock Outcrop</b>  | <b>Description:</b> Natural rock outcrops are a unique feature in the forested landscape. Some of these features may be suitable habitat for peregrine falcons.         | 94    | 65    |
| <b>Conservation Easement</b>   | <b>Description:</b> MRC has three separate conservation easements on the property where certain harvesting and development rights have been legally restricted          | 926   | 1,076 |
| <b>Viewshed</b>  | <b>Description:</b> Viewsheds are important scenic areas in areas adjacent to State Parks, non-industrial neighbors, state highways, county roads, and the Skunk Train. | 3,552 | 1,905 |
| <b>Oak Woodlands</b>   | <b>Description:</b> Forested areas consisting largely of true oaks and madrone.   | 1,128 | 1,128 |
| <b>Lower Alder Creek Marbled Murrelet Management Area (Core Areas)</b>   | <b>Description:</b> Un-entered and second growth stands in Lower Alder Creek that support marbled murrelet nesting activities.  | 496   | 107   |
| <b>Lower Alder Creek Marbled Murrelet Management Area (Buffer Areas)</b> | <b>Description:</b> Largely second growth stands that surround marbled murrelet core nesting areas.   | 804   | 675   |
| <b>Lower Alder Creek Marbled Murrelet Management Area (Buffer Areas)</b> | <b>Description:</b> Largely second growth stands that surround marbled murrelet core nesting areas.   | 804   | 675   |
| <b>Coastal Zone Special Treatment Areas</b>                              | <b>Description:</b> Stands that have been identified from Coastal Commission maps   | 647   | 613   |



|   |   |       |       |
|---|---|-------|-------|
| <b>Northern Spotted Owl (Core Area)</b>   | <b>Description:</b> Stands that have been identified as NSO core activity centers or nesting sites. | 7,450 | 7,384 |
| <b>Northern Spotted Owl (Buffer Area)</b>   | <b>Description:</b> Stands that have been identified as buffers surrounding NSO nesting sites.      | 9,087 | 7,995 |
| <b>Point Arena Mountain Beaver</b>  | <b>Description:</b> Stands that have been identified as Point Arena Mountain Beaver habitat.        | 14    | 14    |
| <b>Carbon Sequestration</b>   | <b>Description:</b> Stands that are experimentally managed to maximize carbon sequestration.        | 341   | 298   |
| * The acres reported may include a combination of other sensitivities. They are not necessarily independent from other sensitivities. |   |       |       |
| ** These acres are independent. The acreages shown indicate that the forest value is the highest sensitivity.                         |   |       |       |

The following tables provide general descriptions of the silviculture methods that will be applied on Mendocino Redwood Company’s forestlands in areas without specific sensitivities. It is important to note that MRC does not use hardwood retention to count towards stocking standards. A more detailed description of the modeling logic and relationship to the Forest Practice Rules is included in the Landscape Planning Appendix (Appendix A).

| <b>Table 5. Selection, Group Selection, and Alternative Group Selection</b>  |
|--|
| <b>Description</b>   |
| Selection/Group Selection and 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. |
| <b>Harvesting Conditions</b>   |
| The stand (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 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.   |
| <b>Retention Conditions</b>  |
| Large trees (>16" 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.  |
| 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, provided they were a component of the preharvest stand. Conifers will be planted, if necessary, to ensure adequate site dominance of conifers and to add an additional age class.  |

| <b>Table 6. Transition and Alternative Transition</b>  |  |
|--|--|
| <b>Description</b>   |  |
| Transition and Alternative Transition 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 or Alternative Transition are usually followed up with Selection or Group Selection 20 years later.   |  |
| <b>Harvesting Conditions</b>   |  |
| The basis for determining if the stand meets the trigger conditions for the Transition and Alternative Transition silvicultures is the stand (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. 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. |  |
| <b>Retention Conditions</b>  |  |
| Large trees (> 16" 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.   |  |
| The post harvest stocking standard will have at least 50 square feet of conifer basal area per acre, averaged across the stand, and may include openings where hardwood competition was 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 preharvest stand. Conifers will be planted, if necessary, to ensure adequate site dominance of conifers and to add an additional age class.  |  |
| <b>Table 7. Rehabilitation</b>   |  |
| <b>Description</b>   |  |
| 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. 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.   |  |
| <b>Harvesting Conditions</b>   |  |
| The basis for determining if the stand meets the trigger conditions for the Rehabilitation silviculture is the stand (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, having less than 300 point count (14CCR 913.4(b)), and being in need of management to hasten the recovery of productive conifer stands.   |  |
| <b>Retention Conditions</b>  |  |
| Large trees (> 16" 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 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 preharvest stand. Conifers will be planted to ensure adequate site dominance of conifers.  |  |

| <b>Table 8. Restoration Variable Retention</b>  |
|---|
| <b>Description</b>  |
| Restoration Variable Retention is used where mature conifers are present in a stand that has a high level of hardwood competition. 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 both aggregated and dispersed in the stands. Focal areas for retention include unstable areas, wet areas, unique habitat features, and important viewsheds.  |
| <b>Harvesting Conditions</b>  |
| The basis for determining if the forested area meets the trigger conditions for the Restoration Variable Retention silviculture is the stand (a discrete geographic unit 30 acres or less, which is bound by the standard WLPZ if adjacent to a watercourse) and is based on the average conifer basal area in trees larger than 16" 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 used once in the life of a stand. The stands that are harvested with a Restoration Variable Retention harvest may be re-entered in 20-years to be managed with Transition, they may also be entered in 40-years to be managed with Selection. These methods will continue to retain structural elements in perpetuity. These silviculture methods will result in harvest of some retention trees prior to 50 years after the variable retention harvest (14 CCR 914.3(d)(3)(K)). All objectives of the initial variable retention harvest will be met including restoration of the conifer forest and recruitment and retention of wildlife trees and snags.             |
| <b>Retention Conditions</b>   |
| Large trees (> 16" 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. Retention standards in individual harvests will be based on site specific conditions and size of harvest unit, however, we have modelled the average retention for all variable retentions in each planning period at 30 square feet per acre. Hardwoods will be retained at the level of approximately 15 square feet per acre, provided they were a component of the preharvest stand. Conifers will be planted to ensure adequate site dominance of conifers and to add an additional age class.  |
| <b>Table 9. Seed Tree Removal and Alternative Seed Tree Removal</b>   |
| <b>Description</b>  |
| Seed Tree Removal will be used in stands with scattered predominant trees amidst an understory condition in which the conifer regeneration is generally adequate. 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.   |
| <b>Harvesting Conditions</b>  |
| Harvest operations using this silviculture will harvest no more than 50 square feet of conifers consisting of not more than 15 predominant trees per acre may be removed. Unless an alternative seed tree removal silviculture is prescribed, regeneration shall not be harvested unless the trees are dead, dying, diseased, or substantially damaged during harvest operations. 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 (a discrete geographic unit 30 acres or less). There are two requirements to trigger this harvest: an average conifer basal area in trees greater than 16" DBH of 10 to 60 square feet per acre and a well-stocked younger cohort (trees < 16" 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.  |
| <b>Retention Conditions</b>   |
| Large trees (> 16" 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 preharvest stand. Conifers will be planted to ensure adequate site dominance of conifers. The stand must meet the retention standards of (14 CCR 912.7 (b) (1)) post-harvest. Additionally, if an alternative seed tree removal is removed, post-harvest stocking in areas thinned must meet the commercial thinning standards (14 CCR 913.3 (a) (1)). |

\*\*\*\*\*

## The Requirement to Consider Regional Economic Vitality and Employment FPA 913.11(a)(1)

*...MSP will be achieved by:*

*producing the yield of timber products specified by the landowner, taking into account biologic and economic factors, while accounting for limits on productivity due to constraints imposed from consideration of other forest values, including but not limited to, recreation, watershed, wildlife, range and forage, fisheries, **regional economic vitality, employment** and aesthetic enjoyment. FPA 913.11(a) (1)*

\*\*\*\*\*

MRC currently employs 53 full-time and 9 part-time and seasonal workers. This group represents a set of individuals with wide variety of scientific backgrounds and expertise. MRC's associated mills, treating and distribution businesses employ an additional 350 full-time and 20 to 30 part-time and seasonal workers.

In addition to the employment of MRC and its two associated companies, 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.

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.

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 table shows the effect of timber harvest on the local economy per million board feet of conifers harvested.

| 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   |
| Estimated Contribution by 2006 Harvest (37 mmbf)       |               |                 |                   |           |           |
| 451  | 899           | \$10,149,100    | \$16,228,200      | \$504,310 | \$231,102 |

\*\*\*\*\*

### The Requirement to Consider Range and Forage FPA 913.11(a)(1)

*...MSP will be achieved by: producing the yield of timber products specified by the landowner, taking into account biologic and economic factors, while accounting for limits on productivity due to constraints imposed from consideration of other forest values, including but not limited to, recreation, watershed, wildlife, **range and forage**, fisheries, regional economic vitality, employment and aesthetic enjoyment.*

\*\*\*\*\*

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.

## Option A Monitoring

Mendocino Redwood Company is in a continual process of improving its knowledge about the forest resource. The projections described in this Option A 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 Option A. 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
- Watershed analysis work
- Wildlife inventories and monitoring
- Ecosystem relationships studies
- Monitoring planting efforts

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 Option A and will be provided to the California Department of Forestry on an annual basis:

- Harvest volume by even-aged, uneven-aged, or variable retention prescriptions
- Harvest acres by even-aged, uneven-aged, or variable retention prescriptions
- Predicted harvest and volume by even-aged, uneven-aged, or variable retention prescriptions
- Current inventory estimates

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 California Department of Forestry and may trigger a revision of the document. They are:

- A deviation from average harvest acreage projections in any 5 year period which exceeds 10 percent (for the first five-year period, total acres exceeding 62,915).
- A change of ownership which results in either an increase or a decrease to Mendocino Redwood Company's ownership by more than 10 percent (23,000 acres).

- A change of forest conditions from catastrophic events that result in a net change of more than 10 percent of Mendocino Redwood Company's net conifer volume (see Table 1).
- Any deviation from the plan that could result in a significant change in timber operations and could result in significant adverse effects to watershed, fish, or wildlife values.
- A conifer volume estimate that is less than 90% of the projected conifer inventory volume during any period in the Option A planning horizon.

Mendocino Redwood Company will notify the California Department of Forestry and Fire Protection should any of the conditions stated above become fact.

## Appendix A - Landscape Planning

July 30, 2007

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Landscape Planning refers to the suite of inventory databases, forest growth models, habitat models, and Geographic Information Systems (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:

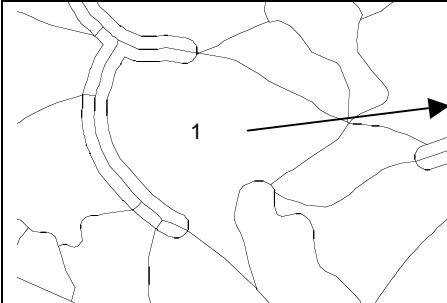
- Stand Identifier
- Acres
- Vegetation Codes
- Sensitivity (watercourse buffers, old growth stands, spotted owls, etc.).
- Site Class
- Harvest Timing

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.

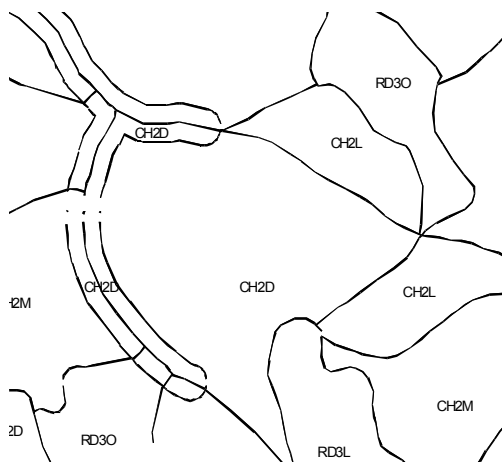
|   | Stand | Acres | Vegetation | Sensitivity | Site Class | Harvest Timing |
|---|-------|-------|------------|-------------|------------|----------------|
|  | 1     | 25    | CH2D       | 00010       | III        | 10             |
|   | 2     | 14    | RD3L       | 10001       | III        | 5 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

**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.



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).

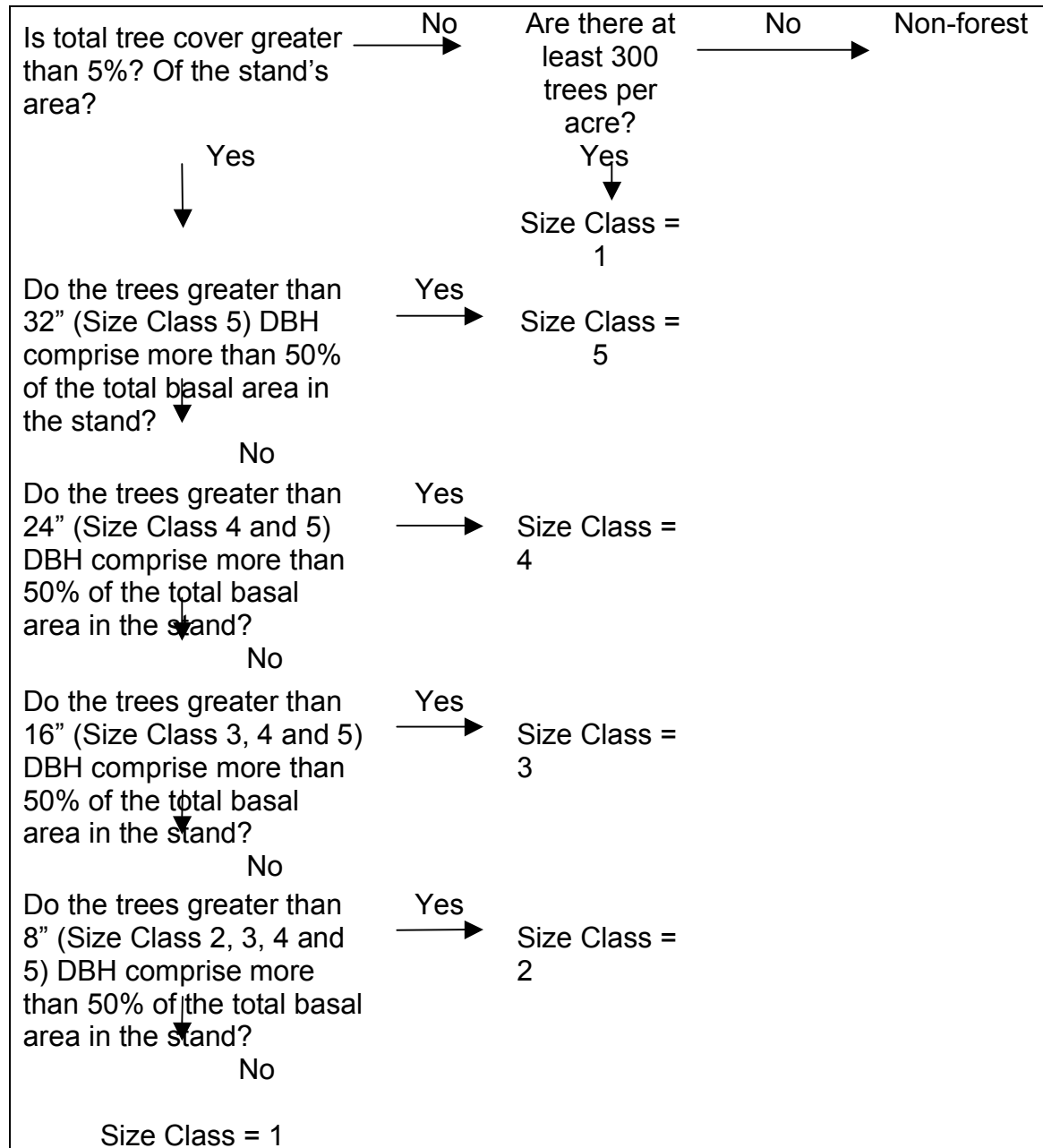
Table 2. Class assignments for Diameter at Breast Height (DBH) ranges.

DBH Classes

| 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.



## 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   |

### 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' DBH for Size Class 2 and above. All trees are considered for the canopy closure estimates in Size Class 1 stands.

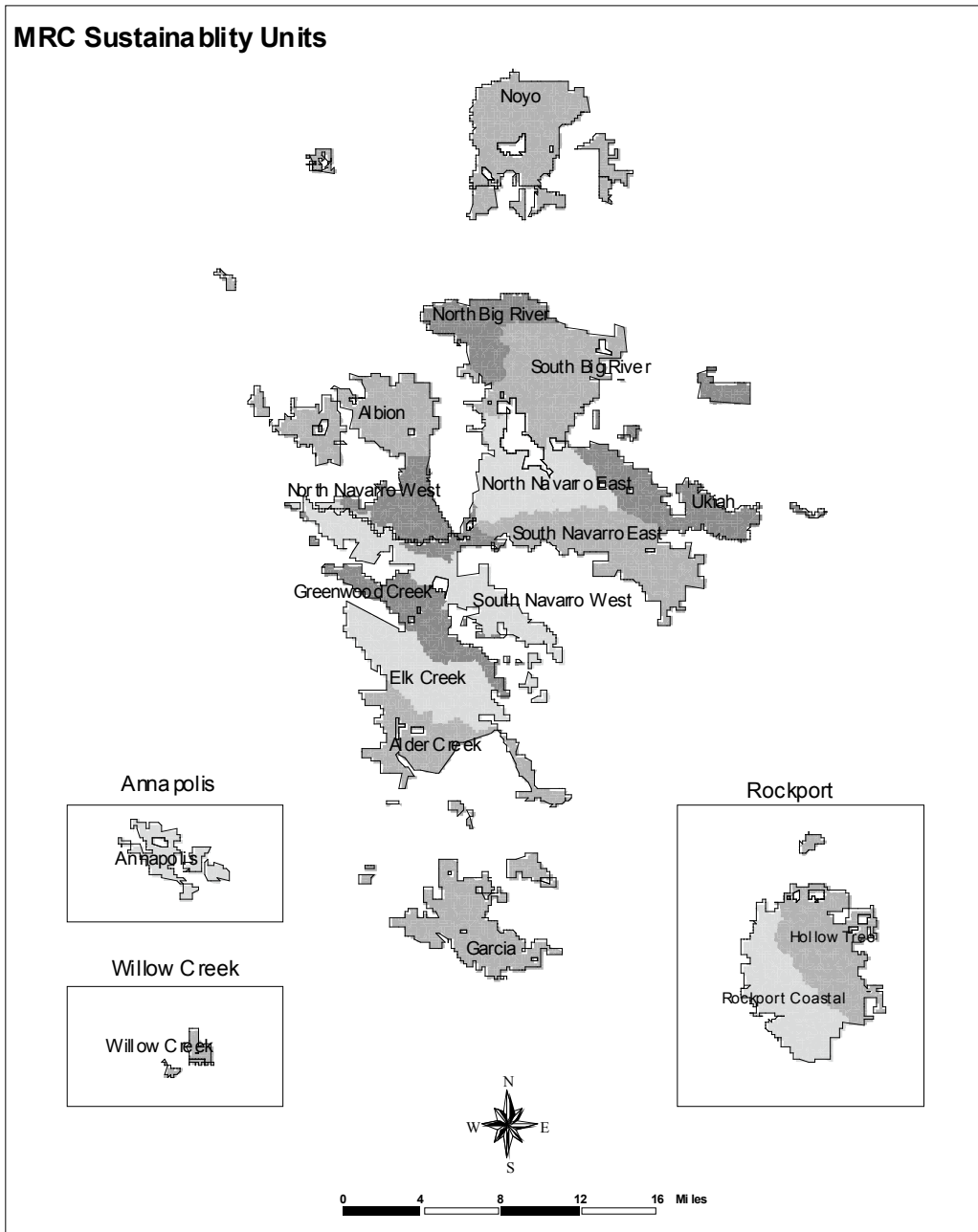
| Canopy Cover | Description                     | Code |
|--------------|---------------------------------|------|
| 0 – 20 %     | Open Canopy Coverage            | O    |
| 20 – 40%     | Low Canopy Coverage             | L    |
| 40 – 60%     | Medium Canopy Coverage          | M    |
| 60 – 80%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

### 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 10<sup>th</sup> acre plot is used to measure down logs and brush cover. A 100<sup>th</sup> 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.
- 6) Status. A status code is entered for each tree. Status codes describe the physical condition of the tree (Table 11).

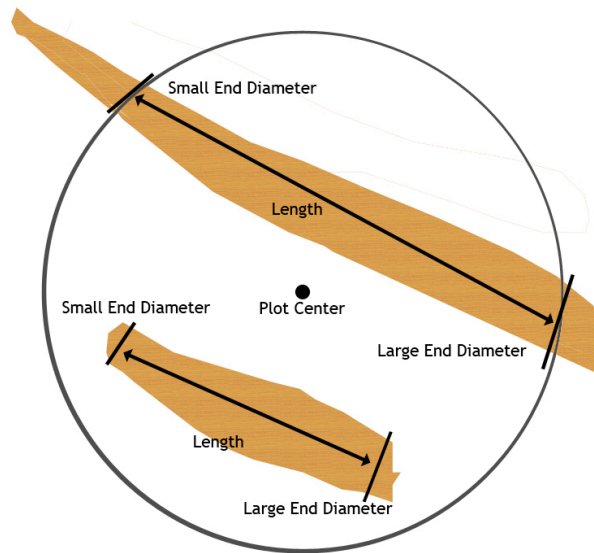
Table 11. Status codes for trees sampled.

| <b>Status Codes</b> |                  |  |
|---------------------|------------------|--|
| 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 1/10<sup>th</sup> 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 determined 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”.

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 off 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.

- 8) Regeneration. Trees less than 6” DBH are tallied on every plot. The sample area measured for regeneration is a fixed 1/100<sup>th</sup> 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.
- 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 1/10<sup>th</sup> 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.

| 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 17. 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.

## 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. An ongoing effort will shift Planning watersheds are the basis for the expansion of estimated site indices to 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. Mendocino Redwood Company performs inventory sampling with company personnel. Periodic check cruises are performed by senior inventory staff to ensure the following standards are being met.

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.

**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.

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

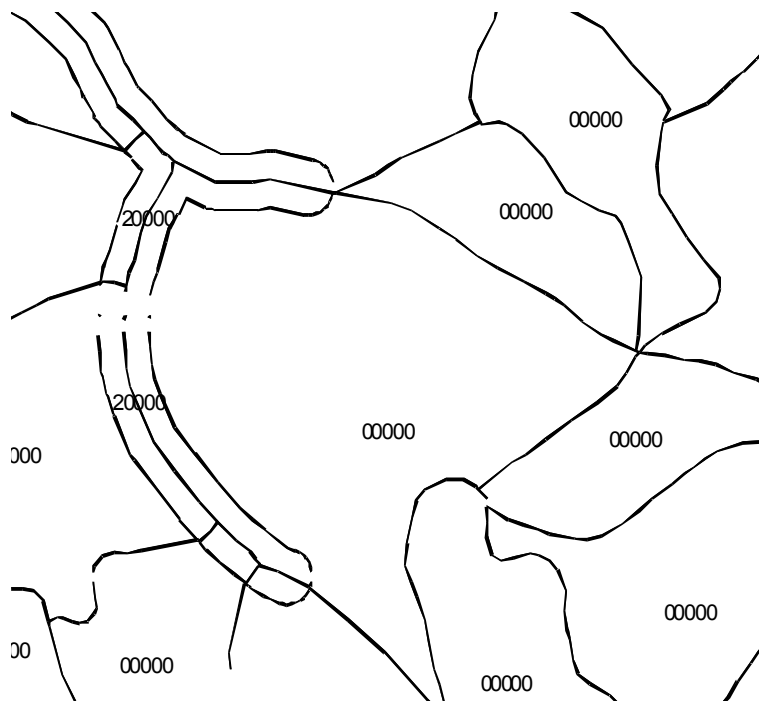
Growth and yield modeling projects the tree lists derived from inventory sampling through time (forest growth) and management activities (harvest) over a long period of time (100 years in this case). The growth model used in this Option A planning effort uses the CRYPTOS equations for height and diameter 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 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 Option A.

### 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                      |                                 | 5        | Point Arena Mountain Beaver  | 5          | Oak Woodland         |
| 6           | Small Class II      | 6      |                  | 6                      |                                 | 6        | Spotted Owl – Level I/Marbled Murrelet/Point Arena Mountain Beaver | 6          | Old Growth Buffer    |
| 7           |                     | 7      |                  | 7                      |                                 | 7        | Spotted Owl – Level I/Marbled Murrelet                             | 7          |                      |
| 8           |                     | 8      |                  | 8                      |                                 | 8        | Marbled Murrelet Buffer  | 8          |                      |
| 9           |                     | 9      |                  | 9                      |                                 | 9        | Spotted Owl – Level I/Point Arena Mountain Beaver                  | 9          |                      |

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 allowed for stands within the sensitivity class.

Table 15. Description of forest management types, management goals, and management activities.

| Forest Management Types             | Descriptions   | Acres   |
|-------------------------------------|--|---------|
| <b>Redwood / Douglas-Fir Forest</b> | <b>Description:</b> This forest type is the majority (approximately 75%) of the landscape outside of explicitly identified sensitive areas.  | 179,703 |
|                                     | <b>Management Goals:</b> Management activities in these areas are focused on economical and ecological sustainability. Redwoods and Douglas-fir in these stands will, on the average across the landscape, become bigger and denser for the next 50 years, and then be maintained. These stands will retain habitat features such as snags, downed logs, and old growth trees. |         |

| <b>Silviculture:</b> All silviculture regimes described in Silviculture Regimes are available to this forest area. |  |              |                |
|--|--|--------------|----------------|
|  |  | Total Acres* | Unique Acres** |
| <b>Old Growth Management (Type I)</b>  | <b>Description:</b> 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. | 106          | 106            |
|  | <b>Management Goals:</b> These stands will be managed primarily as ecological preserves. Harvesting will not occur in these stands.  |              |                |
|  | <b>Silviculture:</b> No Harvest will occur in these stands.  |              |                |
| <b>Old Growth Management (Type II)</b>   | <b>Description:</b> Forest stands that have been previously harvested yet contain a significant level of old growth trees.   | 741          | 529            |
|  | <b>Management Goals:</b> These stands will be managed for ecological diversity and timber production. Conservation measures include the retention of all old growth trees as well as other forest structures such as snags and downed logs.  |              |                |
|  | <b>Silviculture:</b> Single tree selection will be the most likely harvesting method in these stands. Old growth trees will not be harvested.  |              |                |



| Forest Management Types                    | Descriptions  | Acres        |                |
|--|---|--------------|----------------|
|  |   | Total Acres* | Unique Acres** |
| <b>Aquatic Management Zone</b>             | <b>Description:</b> 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, and certain floodplains. Option A 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. | 22,710       | 20,620         |
|  | <b>Management Goals:</b> The key management themes in these areas are to keep creeks and rivers cool, to reduce sediment delivered to watercourses and to provide a source of large woody material to these watercourses. These areas will contain very large and dense stands of redwoods and Douglas-fir over time and will conserve habitat features such as snags, downed logs, and old growth trees.   |              |                |
|  | <b>Silviculture:</b> Harvesting will be conducted with high retention selection (Class I) and medium retention selection (Class II) with adequate retention to ensure large woody debris recruitment and a high level of shade to the watercourse.  |              |                |
| <b>Small Class II Watercourses Buffers</b> | <b>Description:</b> Small II watercourses are watercourses that support aquatic life that are non-fish-bearing and begin beneath a watershed area that is less than or equal to 100 acres in size. Option A modeling assumed a 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.   | 6,373        | 5,832          |
|  | <b>Management Goals:</b> The key management themes in these areas are to keep creeks and rivers cool, to reduce potential sediment delivered to watercourses and to provide a source of large woody material to these watercourses. These areas will contain very large and moderately dense stands of redwoods and Douglas-fir over time and will conserve habitat features such as snags, downed logs, and old growth trees.  |              |                |
|  | <b>Silviculture:</b> Medium retention selection will be the most likely harvesting method in these stands. Adequate retention will remain to ensure large woody debris recruitment and a moderate level (50% canopy cover or greater) of shade to the watercourse.  |              |                |

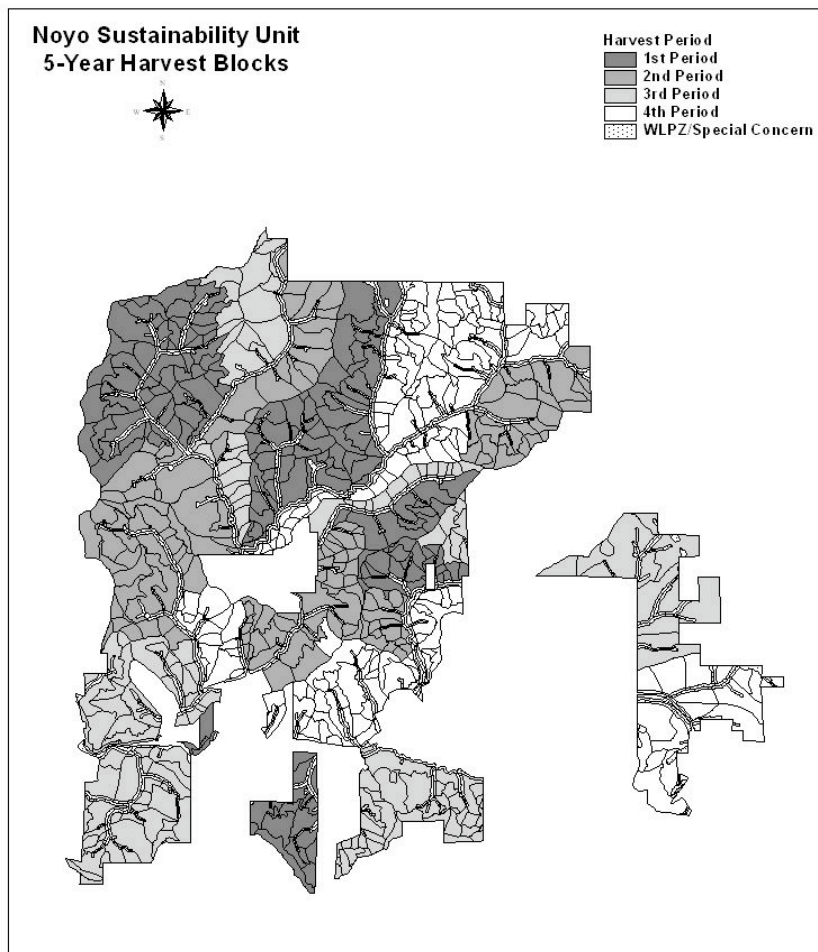
| Forest Management Types | Descriptions  | Acres        |                |
|-------------------------|---|--------------|----------------|
|                         |   | Total Acres* | Unique Acres** |
| Pygmy Forest            | <b>Description:</b> Pygmy forests are rare and unique ecosystems that 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) and rhododendrons.                 | 730          | 730            |
|                         | <b>Management Goals:</b> Conservation measures include minimizing road disturbance.   |              |                |
|                         | <b>Silviculture:</b> No Harvest will occur in these stands.   |              |                |
| Rock Outcrop            | <b>Description:</b> Natural rock outcrops are a unique feature in the forested landscape. Some of these features may be suitable habitat for Peregrine falcons.   | 94           | 65             |
|                         | <b>Management Goals:</b> Management goals for protecting these sites include minimizing road building and providing vegetative buffer zones.  |              |                |
|                         | <b>Silviculture:</b> No Harvest will occur in these stands.   |              |                |
| Conservation Easement   | <b>Description:</b> MRC has three separate conservation easements on the property where certain harvesting and development rights have been legally restricted  | 926          | 1,076          |
|                         | <b>Management Goals:</b> MRC's Conservation Easements are in important aesthetic areas or adjacent to park areas.   |              |                |
|                         | <b>Silviculture:</b> Conservation Easements on MRC's lands are no harvest easements.  |              |                |
| Viewshed                | <b>Description:</b> Viewsheds are important scenic areas in areas adjacent to State Parks, non-industrial neighbors, state highways, county roads, and the Skunk Train.   | 3,552        | 1,905          |
|                         | <b>Management Goals:</b> Maintaining a high quality of aesthetic value is given priority.   |              |                |
|                         | <b>Silviculture:</b> Computer simulation of these areas includes adequate retention in all silviculture methods to allow for aesthetically-pleasing viewsheds. Field implementation of this practice will focus retention in areas that will protect the aesthetic value. |              |                |
| Oak Woodlands           | <b>Description:</b> Forested areas consisting largely of true oaks and madrone.   | 1,128        | 1,128          |
|                         | <b>Management Goals:</b> Management will include activities such as harvest and controlled burns to maintain these areas as oak woodlands.  |              |                |
|                         | <b>Silviculture:</b> Computer simulation modeled these areas as no harvest. Actual management will include activities such as harvest and controlled burns to maintain these areas as oak woodlands.  |              |                |

| Forest Management Types   | Descriptions  | Acres        |                |
|---|---|--------------|----------------|
|   |   | Total Acres* | Unique Acres** |
| <b>Lower Alder Creek Marbled Murrelet Management Area (Core Areas)</b>  | <b>Description:</b> Un-entered and second growth stands in Lower Alder Creek that support marbled murrelet nesting activities.                        | 496          | 107            |
|   | <b>Management Goals:</b> Maintain area in favorable condition for nesting marbled murrelets.  |              |                |
|   | <b>Silviculture:</b> No harvest will occur in this area.  |              |                |
| <b>Lower Alder Creek Marbled Murrelet Management Area (Buffer Areas)</b>  | <b>Description:</b> Largely second growth stands that surround marbled murrelet core nesting areas.   | 804          | 675            |
|   | <b>Management Goals:</b> Management will ensure that a forest stand with a medium to dense canopy will be adjacent to the core marbled murrelet area. |              |                |
|   | <b>Silviculture:</b> Selection silviculture only.   |              |                |
| <b>Coastal Zone Special Treatment Areas</b>   | <b>Description:</b> Stands that have been identified from Coastal Commission maps   | 647          | 613            |
|   | <b>Management Goals:</b> To maintain an aesthetically pleasing landscape.   |              |                |
|   | <b>Silviculture:</b> Selection silviculture will occur in these areas.  |              |                |
| <b>Northern Spotted Owl (Core Area)</b>   | <b>Description:</b> Stands that have been identified as NSO core activity centers or nesting sites.   | 7,450        | 7,384          |
|   | <b>Management Goals:</b> To maintain high quality nesting habitat.  |              |                |
|   | <b>Silviculture:</b> No harvest.  |              |                |
| <b>Northern Spotted Owl (Buffer Area)</b>   | <b>Description:</b> Stands that have been identified as buffers surrounding NSO nesting sites.  | 9,087        | 7,995          |
|   | <b>Management Goals:</b> To assist in maintaining high quality nesting habitat.   |              |                |
|   | <b>Silviculture:</b> Medium retention selection silviculture.   |              |                |
| <b>Point Arena Mountain Beaver</b>  | <b>Description:</b> Stands that have been identified as Point Arena Mountain Beaver habitat.  | 14           | 14             |
|   | <b>Management Goals:</b> To maintain habitat conditions.  |              |                |
|   | <b>Silviculture:</b> No harvest will occur.   |              |                |
| <b>Carbon Sequestration</b>   | <b>Description:</b> Stands that are experimentally managed to maximize carbon sequestration.  | 341          | 298            |
|   | <b>Management Goals:</b> Develop and test hypotheses related to management related to carbon sequestration.   |              |                |
|   | <b>Silviculture:</b> High retention selection   |              |                |
| * The acres reported may include a combination of other sensitivities. They are not necessarily independent from other sensitivities. |   |              |                |
| ** These acres are independent. The acreages shown indicate that the forest value is the highest sensitivity.                         |   |              |                |

### 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.

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.

The conifer retention levels modeled are intended to address Forest Practice Rule standards and the Wildlife Tree Agreement (Appendix B) and the Planning Agreement (Appendix C) between MRC and The California Department of Fish and Game. Both of these agreements will serve to focus the retention in the field. The agreements include retention guidelines for:

1. Unstable areas such as steep streamside slopes, headwall swales, and inner gorges. Implementation will focus a higher level of retention in these areas and recruit and retain large trees.
2. Class III watercourse protections. An average 50% canopy retention level will be maintained.
3. Rare plants. Up to 50’ protective buffers
4. Wildlife trees. An average of at least 2 trees greater than 16” Diameter at Breast Height (DBH) and 1 tree greater than 24” DBH per acre will be retained for wildlife.

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.

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. Note that this table indicates a stand with 105-125 square feet of conifer may fit into either selection or restoration variable retention, dependent on the amount of hardwood stocking in the unit. If the stand had > 60 sq. ft of hardwood stocking pre-harvest, the stand would be targeted for restoration variable retention, otherwise the stand would be targeted for selection.

| Table 16. General Decision Logic <sup>a</sup> in Selecting Silviculture Methods |  |   |      |
|---|--|---|------|
| Conifer Stocking<br>(Basal Area (square feet) per Acre)                         | Hardwood Stocking<br>(Basal Area (square feet) per Acre)   |   |      |
|   | > 60   | 20 - 60   | < 20 |
| >125  | Selection, Group Selection, Alternative Group Selection    |   |      |
| 105 - 125   | Restoration Variable Retention                             |   |      |
| 50 - 105  | Restoration Variable Retention<br>(Conifers must be Large) | (Alternative) Transition                                    |      |
| <50   | Rehabilitation   | (Alternative) Seed Tree Removal<br>(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.

Table 17 describes the generalized retention standards assigned to silviculture regimes. A more thorough description of retention standards can be found in the detailed silviculture descriptions.

| Table 17. Quick Reference Guide to Generalized Retention Minimums for Conifers for Non-Constrained Stands |   |   |
|---|---|---|
| Silviculture  | Conifer Basal Area Retention (per Acre) | Other   |
| 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  | Per CCR 14 913.4 (d) (3))               |   |
| (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                                       |   |

<sup>a</sup>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.

<sup>\*\*</sup>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.

The following pages provide a detailed description of the silviculture practices. The **retention standards** describe the post-harvest requirements required by the Forest Practice Rules and additional MRC internal guidance while the **model decision logic** at the bottom of each page describes how forested stands were harvested under the modeling regime. If a retention standard is required by the Forest Practice Rules, the specific rule is referenced in the retention standard section, other guidance is required by MRC's internal policies including our **Wildlife Tree Policy (Appendix B)** and our **Planning Agreement** with the State Department of Fish and Game (**Appendix C**) as well as any updates or amendments to that agreement. It is important to note that MRC does not use hardwoods to count towards stocking standards.

MRC follows the principles of uneven-aged management by recruiting and retaining large trees on all harvests by following our Wildlife Tree Policy (see Appendix B). Additionally, our on-the-ground implementation standards for all uneven-aged prescriptions aim to recruit and retain other large trees as part of every stand. These requirements are consistent with the principles of uneven-aged management. These include:

For selection silvicultures: a minimum of 40 sq. ft retained of trees larger than 16" dbh

For transition silviculture: a minimum of 10 sq. ft. retained of trees larger than 16" dbh

We will insure consistency on this requirement by including a description of the retention standards in each timber harvest plan submitted under this Option A.

| <b>Restoration Variable Retention</b>  |                                      |          |          |      |                           |             |
|--|--------------------------------------|----------|----------|------|---------------------------|-------------|
| <b>Introduction and Description</b>  |                                      |          |          |      |                           |             |
| Restoration Variable Retention is used where mature conifers are present in a stand that has a high level of hardwood competition. 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 (14 CCR 913.4(d)). 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 both aggregated and dispersed in the stands.  |                                      |          |          |      |                           |             |
| <b>Trigger and Harvesting Conditions</b>   |                                      |          |          |      |                           |             |
| The basis for determining if the forested area meets the trigger conditions for the Restoration Variable Retention silviculture is the stand (a discrete geographic unit 30 acres or less, which is bound by the standard WLPZ if adjacent to a watercourse) and is based on the average conifer basal area in trees larger than 16" 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 used once in the life of a stand. The stands that are harvested with a Restoration Variable Retention harvest may be re-entered in 20-years to be managed with Transition, they may also be entered in 40-years to be managed with Selection. These methods will continue to retain structural elements in perpetuity. These silviculture methods will result in harvest of some retention trees prior to 50 years after the variable retention harvest (14 CCR 913.4(d)(3)(K)). All objectives of the initial variable retention harvest will be met including restoration of the conifer forest and recruitment and retention of wildlife trees and snags.  |                                      |          |          |      |                           |             |
| <b>Retention Conditions</b>  |                                      |          |          |      |                           |             |
| Restoration Variable Retention may include the retention of trees specifically for wildlife and/or structural purposes. Modeling silviculture activities considers the retention of wildlife trees, as described in the planning agreements attached in Appendix B and Appendix C. The trees retained may not have full crowns, may not be capable of seed production, and may not represent the best phenotypes in the stand - however, to be considered as part of stocking requirements, they must be countable trees. The modeled retention (shown in the matrix below) is intended to mimic average conditions. Implementation will include retention of wildlife trees as described in the attached planning agreements (Appendix B and Appendix C).   |                                      |          |          |      |                           |             |
| <b>Retention Standards</b>   |                                      |          |          |      |                           |             |
| The area for determination of retention levels of all trees is the stand as defined above. Therefore, the retained stocking may be clumped, as in group retention or dispersed, with the standard for retention based on the average basal area per acre across the stand. The stand will include any area outside the standard width WLPZ (14 CCR 913.4(d)(2)).   |                                      |          |          |      |                           |             |
| The stand will meet the standards described in 14 CCR 913.4(d)(3), including:<br>*maximum area standards based on level of retention (14 CCR 913.4(d)(3)(B)).<br>*Late Succession Forest Stands counted as 1.5 the acres in aggregated retention (14 CCR 913.4(d)(3)(C)).<br>*Retained trees that are classified as Dunning's Class 3,4,5, or 7 which exceed the size standards of 14 CCR 912.7 may be counted as contributing 1.5 times their actual basal area toward providing retention (14 CCR 913.4(d)(3)(D)).<br>*Retention standards met on each 20-acre area 14 CCR 913.4(d)(3)(E)).<br>*No retained tree will be greater than 300 feet apart, unless no tree is available for retention prior to harvest 14 CCR 913.4(d)(3)(F)), where dispersed retention is used.<br>*the average height of dispersed retention trees will be at least the average height of dominants and codominants of like species in the pre-harvest stand, with the exception of 14 CCR 913.4(d)(3)(J) (14 CCR 913.4(d)(3)(G)).<br>*dispersed retention trees intended to provide natural seedfall to obtain regeneration meet the standards of 14 CCR 913.1(c)(1) (14 CCR 913.4(d)(3)(H)).<br>*alternatives to the standards of subsections 14 CCR 913.4(d)(3)(G) and (H), where WHR habitat elements are insufficient to provide functional wildlife habitat (14 CCR 913.4(d)(3)(I)).<br>*Decadent and deformed trees, including snags, of value to wildlife that meet the standards of 14 CCR 912.7(b)(3)(A,B, or C) and 14 CCR 912.7(c) may be counted up to 15 square feet of basal area per acre of retention in excess of the minimum variable retention standards (14 CCR 913.4(d)(3)(J)).<br>*Explaining how a shorter period of time (than 50 years) is justified (14 CCR 913.4(d)(3)(K)). See note at bottom of page identifying our justification. |                                      |          |          |      |                           |             |
| Retention standards will be met immediately after harvest and at the time the stocking report is approved (14 CCR 913.4(d)(4)). The stocking standards of 14 CCR 912.7(b)(1) will be met within five years following completion of operations (14 CCR 913.4(d)(5)). All retained trees will be protected to the extent feasible during timber operations consistent with 14 CCR 914.1, 914.2(e), 914.3, 915.2, 915.3 and 917.7 (14 CCR 913.4(d)(6)). Each harvest plan will indicate the estimated average pre-harvest and post-harvest basal area by species and diameter class, grouped in no greater than 6" DBH classes (14 CCR 913.4(d)(7)). Each logging unit in the harvest plan will provide a general description and/or map of the group retention locations (14 CCR 913.4(d)(8)). Trees to be harvested or trees to be retained will be marked by or under the supervision of an RPF before felling operations. A sample area will be marked before the preharvest inspection for evaluation. The sample area will include at least 10% of the harvest area per stand type (combined set of stands using the same silviculture method in a harvest plan) which is representative of the range of conditions present (14 CCR 913.4(d)(9)).   |                                      |          |          |      |                           |             |
| <b>Additional Management Measures</b>  |                                      |          |          |      |                           |             |
| The harvest plan will include a regeneration plan which will include site preparation, method of regeneration, and other information appropriate to evaluate the regeneration plan. The site preparation activities will be designed to protect retention elements and maintain ground cover to the extent practicable while at the same time result in seedling establishment on the site and encourage long-term site occupancy of the regenerated trees(14 CCR 913.4(d)(10)). Restoration Variable Retention will be used only once in a stand. It will be followed with uneven-aged silviculture methods (14 CCR 913.4(d)(11), (13),(14) and (15)). No Restoration Variable Retention harvest will occur in a logical logging unit contiguous to a previously harvested Restoration Variable Retention harvest unless the previously harvested Restoration Variable Retention unit has an approved report of stocking, and the dominant and codominant trees, not counting retention trees, average at least five years of age or average at least five feet tall and three years of age from the time of establishment on the site either by the planting or by natural regeneration. (14 CCR 913.4(d)(12)).  |                                      |          |          |      |                           |             |
| <b>Relationship to Standard Silviculture Practices</b>   |                                      |          |          |      |                           |             |
| The Restoration Variable Retention method does not include any alternative methods to the standard silviculture practices (14 CCR 913.4(d)(16)).   |                                      |          |          |      |                           |             |
| Model decision logic   | Conifer Basal Area by Diameter Class |          |          |      | Total Conifer BA Retained | Hardwood BA |
|  | 0 - 16"                              | 16 - 24" | 24 - 32" | >32" |                           |             |
|  | 20                                   |          | 10       |      | >60                       |             |
| Average Retention  | 20                                   |          | 10       |      | 30                        | 15          |

**Note:** Our programmatic justification for harvesting retention trees prior to 50 years post-harvest includes our policies (Wildlife Tree Policy, see Appendix C of the Option A document) to retain key structural elements in the forest as well as our goal to restore conifer forests across the balance of our forestlands. Variable retention will be applied initially then, in 20 years the stand will be assessed to determine if a transition silviculture can or should be applied. After 40 years, the stand should proceed to selection silviculture. The goal throughout is to proceed towards application of uneven-aged management with retention of important structural attributes throughout the forest. We believe this application of silvicultures will move our forestlands towards uneven-aged management in the most effective manner.



| <b>Selection, Group Selection, and Alternative Group Selection</b>  |   |                 |                 |                |                                  |                    |
|---|---|-----------------|-----------------|----------------|----------------------------------|--------------------|
| <b>Introduction and Description</b>   |   |                 |                 |                |                                  |                    |
| <p>Selection, Group Selection, and Alternative Group Selection will be used in stands that are well-stocked with conifers. The purpose of harvesting using the Selection, Group Selection, and 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 with older stands requiring more regeneration opportunities. Alternative Group Selection will be chosen if the harvest of hardwoods results in group clearings that are greater than 20% of the stand.</p>   |   |                 |                 |                |                                  |                    |
| <b>Trigger and Harvesting Conditions</b>  |   |                 |                 |                |                                  |                    |
| <p>The stand (a discrete unit 30 acres or less) is the spatial basis for determining if the forest unit meets the trigger conditions for the Selection, Group Selection, and Alternative Group Selection silvicultures. A Selection, Group Selection, or Alternative Selection silviculture is initiated if the average conifer basal area stocking exceeds 105 square feet per acre and the stand did not meet the trigger conditions for Restoration Variable Retention. Large trees (&gt;16" DBH) in excess of the retention standard below will be harvested, but the absence of these trees will not prevent the Selection, Group Selection, and Alternative Selection methods from being used since all harvests will achieve MSP pursuant to 14 CCR 913.11 (14 CCR 913.2(a)(2)(A)(4)) and (14 CCR 913.2 (a)(2)(B)(4)). Alternative Group Selection will be used if harvest results in group clearings that are greater than 20% of the stand (alternative to 14 CCR 913.2 (a)(4)).</p> <p>Should a deficit (less basal area than the retention goals) exist for the large trees (&gt;16" DBH) prior to harvest, large trees will only be harvested if their removal would enhance growth in trees immediately effected by the tree's competitive forces. Trees will be harvested in small groups (up to 2.5 acres) and individually (14 CCR 913.2 (a)). Marking of trees to be harvested or retained will be conducted under the supervision of an RPF prior to felling operations. Small group openings (&gt;.25 acres) may be identified through a boundary mark (14 CCR 913.2(a)(1)). At least 10% of the harvest area up to 20 acres per stand type (combined set of stands using the same silviculture method in a harvest plan) that represents the range of conditions will be marked prior to the preharvest inspection (14 CCR 913.2 (a)(1)).</p> |   |                 |                 |                |                                  |                    |
| <b>Retention Conditions</b>   |   |                 |                 |                |                                  |                    |
| <p>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. Modeling silviculture activities considers the retention of wildlife trees, as described in the planning agreements attached in Appendix B and Appendix C. The trees retained may not have full crowns, may not be capable of seed production, and may not represent the best phenotypes in the stand - however, to be considered for stocking standards, they must be countable trees. The post harvest stocking standard will be 75 square feet of conifer basal area per acre outside of group openings. MRC modelled 70 square feet of conifer basal area retention throughout the stand as this is expected to be the average among the Selection, Group Selection, and Alternative Group Selection. No more than 20 percent of the harvested stand will be composed of small group openings (14 CCR 913.2 (a)(4)), unless an Alternative Group Selection is requested. The retention standard will be stated in the THP (14 CCR 913.2(a)(2)(A)) and (14 CCR 913.2(a)(2)(B)).</p>   |   |                 |                 |                |                                  |                    |
| <b>Retention Standards</b>  |   |                 |                 |                |                                  |                    |
| <p>After completion of operations and prior to filing a final notice of completion and stocking:</p> <ul style="list-style-type: none"> <li>* have at least 75 square feet of conifer basal area outside of group clearings averaged across the stand</li> <li>* have at least 40 square feet of conifer basal area greater than 16" DBH outside of group clearings averaged across the stand, provided they were present in the preharvest stand. If these trees are not present or are below 40 sq. ft prior to harvest, these trees can only be harvested to enhance growth in trees immediately effected by the tree's competitive forces.</li> <li>* have retained at least 35 square feet of conifer basal area in trees less than, or equal to, 16" DBH outside of group openings average across the stand, provided they were present in the preharvest stand and did not excessively inhibit growth among codominant trees or understory trees.</li> <li>*for group selection, have less than 20% of the stand in group clearings (unless Alternative Group Selection)</li> </ul>  |   |                 |                 |                |                                  |                    |
| <b>Additional Management Measures</b>   |   |                 |                 |                |                                  |                    |
| <p>Additional management activities include, at the discretion of MRC:</p> <ul style="list-style-type: none"> <li>* reduce excessive vegetation competition.</li> <li>* plant additional conifer seedlings to enhance regeneration and the development of an additional age class.</li> <li>* retain 15 square feet of hardwoods equal to, or greater than, 6" DBH (provided they were present in the preharvest stand) to ensure species diversity.</li> </ul>   |   |                 |                 |                |                                  |                    |
| <b>Relationship to Standard Silviculture Practices</b>  |   |                 |                 |                |                                  |                    |
| <p>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.</p>  |   |                 |                 |                |                                  |                    |
| <b>Model Decision Logic</b>   |   |                 |                 |                |                                  |                    |
| <i>Model Decision Logic</i>   | <i>Conifer Basal Area by Diameter Class</i> |                 |                 |                | <i>Total Conifer BA Retained</i> | <i>Hardwood BA</i> |
|   | <i>0 - 16"</i>                              | <i>16 - 24"</i> | <i>24 - 32"</i> | <i>&gt;32"</i> |                                  |                    |
| Triggers  | >=105                                       |                 |                 |                |                                  |                    |
| Average Retention   | 30  |                 | 40              |                | 70                               | 15                 |

| <b>Seed Tree Removal and Alternative Seed Tree Removal</b>  |                                      |          |          |      |                           |             |
|---|--------------------------------------|----------|----------|------|---------------------------|-------------|
| <b>Introduction and Description</b>   |                                      |          |          |      |                           |             |
| Seed Tree Removal will be used in stands with scattered predominant trees amidst an understory condition in which the regeneration exceeds the minimum stocking requirements set forth in 14 CCR 912.7(b)(1). Alternative Seed Tree Removal is used when the same conditions apply with a need to thin a dense understory of young trees in areas that are considered too small to map.   |                                      |          |          |      |                           |             |
| <b>Trigger and Harvesting Conditions</b>  |                                      |          |          |      |                           |             |
| Harvest operations using this silviculture will harvest no more than 50 square feet of conifers consisting of not more than 15 predominant trees per acre may be removed. Unless an alternative seed tree removal silviculture is prescribed, regeneration shall not be harvested unless the trees are dead, dying, diseased, or substantially damaged during harvest operations. 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. There are two requirements to trigger this harvest: an average conifer basal area in trees greater than 16" DBH of 10 to 60 square feet per acre and a well-stocked younger cohort (trees < 16" DBH). |                                      |          |          |      |                           |             |
| <b>Retention Conditions</b>   |                                      |          |          |      |                           |             |
| Exceptions to this goal include retention of trees for wildlife and/or structural purposes. Modeling silviculture activities considers the retention of wildlife trees, as described in the planning agreements attached in Appendix B and Appendix C. The trees retained may not have full crowns, may not be capable of seed production, and may not represent the best phenotypes in the stand - however, to be considered for stocking standards, they must be countable trees.   |                                      |          |          |      |                           |             |
| <b>Retention Standards</b>  |                                      |          |          |      |                           |             |
| After completion of operations and prior to filing a final notice of completion and stocking, the stand will:<br>* have retained at least 15 square feet of conifer basal area per acre.<br>* have retained at least 5 square feet of conifer trees acre greater than 16" DBH<br>* have retained at least 10 square feet of conifer trees per acre less than, or equal to, 16" DBH.<br>* exceed the stocking standards of 14CCR 912.7(b)(1).<br>* in areas where thinning occurs for Alternative Seed Tree Removal, meet the commercial thinning stocking standards (14 CCR 913.3 (a)(1)).  |                                      |          |          |      |                           |             |
| <b>Additional Management Measures</b>   |                                      |          |          |      |                           |             |
| Additional management activities include, at the discretion of MRC:<br><br>* be managed to reduce excessive vegetation competition.<br>* have retained at least 15 square feet of hardwoods (provided they were present in the preharvest stand) to ensure species diversity.<br>* have been managed to reduce vegetative competition to young conifer trees.   |                                      |          |          |      |                           |             |
| <b>Relationship to Standard Silviculture Practices</b>  |                                      |          |          |      |                           |             |
| 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).   |                                      |          |          |      |                           |             |
| <b>Model Decision Logic</b>   |                                      |          |          |      |                           |             |
| Model Decision Logic  | 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          |

| <b>Transition and Alternative Transition</b>  |   |                 |                 |                |                                  |                    |
|---|---|-----------------|-----------------|----------------|----------------------------------|--------------------|
| <b>Introduction and Description</b>   |   |                 |                 |                |                                  |                    |
| <p>Transition and Alternative Transitions are 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. Alternative Transition will be chosen if harvest of hardwoods results in group clearings greater than 20% of the post-harvest stand.</p> <p>The application of the silviculture method will also provide logs. Modeling activities associated with demonstrating MSP have indicated that most stands harvested with Transition or Alternative Transition are subsequently harvested by Selection at their next entry 20 years later (14 CCR 913.2(b)(8)). The method will be used no more than twice in the stand to prepare the stand for management using selection techniques (14 CCR 913.2 (b)(2)).</p>  |   |                 |                 |                |                                  |                    |
| <b>Trigger and Harvesting Conditions</b>  |   |                 |                 |                |                                  |                    |
| <p>The basis for determining if the stand meets the trigger conditions for the Transition or Alternative Transition silviculture is the stand (a discrete unit 30 acres or less) and is based on the average conifer basal area stocking being between 60 and 105 square feet on a per acre basis across the stand. However, any 20 acre subdivision of the stand should meet the trigger conditions per 14 CCR 913.2(b)(1)). The Alternative Transition will result in small group clearings that exceed 20 percent of the 20-acre area due to hardwood harvest (This is an alternative application to (14CCR 913.2(b)(7)).</p> <p>Trees to be harvested or trees to be retained will be marked by or under the supervision of an RPF before felling operations. A sample area will be marked before the preharvest inspection for evaluation. The sample area will include at least 10% of the harvest area up to a maximum of 20 acres per stand type (combined set of stands using the same silviculture method in a harvest plan) which is representative of the range of conditions present (14 CCR 913.2 (b)(4)). Large trees (&gt;16" DBH) in excess of the retention standard below will be harvested (but the absence of these trees will not prevent the Alternative Transition method from being used since all harvests will achieve MSP pursuant to 14 CCR 913.11 (14 CCR 913.2 (b)(6))).</p> |   |                 |                 |                |                                  |                    |
| <b>Retention Conditions</b>   |   |                 |                 |                |                                  |                    |
| <p>The area for determination of retention levels of large trees is the stand as defined above, provided large trees are present in the preharvest stand (14 CCR 913.2 (b)(6)). 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. Transition and Alternative Transition may include the retention of trees for wildlife and/or structural purposes. Modeling silviculture activities considers the retention of wildlife trees, as described in the planning agreements attached in Appendix B and Appendix C. The trees retained may not have full crowns, may not be capable of seed production, and may not represent the best phenotypes in the stand - however, to be considered for stocking standards, they must be countable trees.</p>   |   |                 |                 |                |                                  |                    |
| <b>Retention Standards</b>  |   |                 |                 |                |                                  |                    |
| <p>The post harvest stocking standard will be 50 square feet of basal area per acre, averaged across the stand, and includes the group openings. After completion of operations and prior to filing a final notice of completion and stocking, the stand will:</p> <ul style="list-style-type: none"> <li>* have met the minimum basal area stocking standards of 14 CCR 912.7 (b)(2), as averaged across the stand.</li> <li>* have retained at least 10 square feet in conifers greater than 16" DBH, provided they are present in the preharvest stand.</li> <li>* have retained at least 40 square feet of conifer basal area in trees less than, or equal to, 16" DBH, provided they were present in the preharvest stand.</li> </ul> <p>The spatial distribution of trees in the stands that Alternative Transition is applied is often heterogeneous in nature and an Alternative Transition will be used when harvest of hardwoods will result in greater than 20% of the post-harvest stand being in group clearings (alternative to 14 CCR 913.2 (b)(7)).</p>   |   |                 |                 |                |                                  |                    |
| <b>Additional Management Measures</b>   |   |                 |                 |                |                                  |                    |
| <p>Additional management activities include, at the discretion of MRC:</p> <ul style="list-style-type: none"> <li>* the reduction of excessive vegetation competition.</li> <li>* the planting of additional conifer seedlings to enhance regeneration and the development of an additional age class.</li> <li>* the retention of 15 square feet of hardwoods equal to, or greater than, 6" DBH (provided they were present in the preharvest stand) to ensure species diversity.</li> </ul>   |   |                 |                 |                |                                  |                    |
| <b>Relationship to Standard Silviculture Practices</b>  |   |                 |                 |                |                                  |                    |
| <p>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).</p>  |   |                 |                 |                |                                  |                    |
| <b>Model Decision Logic</b>   |   |                 |                 |                |                                  |                    |
| <i>Model decision logic</i>   | <i>Conifer Basal Area by Diameter Class</i> |                 |                 |                | <i>Total Conifer BA Retained</i> | <i>Hardwood BA</i> |
|   | <i>0 - 16"</i>                              | <i>16 - 24"</i> | <i>24 - 32"</i> | <i>&gt;32"</i> |                                  |                    |
| Triggers  | >60<105                                     |                 |                 |                |                                  |                    |
| Average Retention   | 40  | 10              |                 |                | 50                               | 15                 |

| <b>Rehabilitation</b>   |                                      |          |          |      |                           |             |
|---|--------------------------------------|----------|----------|------|---------------------------|-------------|
| <b>Introduction and Description</b>   |                                      |          |          |      |                           |             |
| 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. 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.  |                                      |          |          |      |                           |             |
| <b>Trigger and Harvesting Conditions</b>  |                                      |          |          |      |                           |             |
| The basis for determining if the stand meets the trigger conditions for the Rehabilitation silviculture is the stand (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, having less than 300 point count, and being in need of management to hasten the recovery of productive stands.   |                                      |          |          |      |                           |             |
| <b>Retention Conditions</b>   |                                      |          |          |      |                           |             |
| Hardwood retention areas may be designated for structural and species diversity. These areas will not exceed 20% of the stand's area and will be described in the harvest plan. They will not be evaluated for the stocking standards described above. Rehabilitation may include the retention of trees for wildlife and/or structural purposes. Modeling silviculture activities considers the retention of wildlife trees, as described in the planning agreements attached in Appendix B and Appendix C. The trees retained may not have full crowns, may not be capable of seed production, and may not represent the best phenotypes in the stand - however, to be considered for stocking standards, they must be countable trees. |                                      |          |          |      |                           |             |
| <b>Retention Standards</b>  |                                      |          |          |      |                           |             |
| After completion of operations and prior to filing a final notice of completion and stocking, the stand will:   |                                      |          |          |      |                           |             |
| * have retained at least 5 square feet of conifer trees/acre greater than 16 inches DBH, if they are there prior to harvesting activities (to meet wildlife tree agreement in attached planning agreements (Appendix B and Appendix C).   |                                      |          |          |      |                           |             |
| * be stocked to the stocking standards of 14 CCR 912.7(b)(1).   |                                      |          |          |      |                           |             |
| <b>Additional Management Measures</b>   |                                      |          |          |      |                           |             |
| A regeneration plan will be included with the harvest plan, which will describe site preparation, method of regeneration, and other information relevant to the restocking of the site (14 CCR 913.4 (b)). The area will be considered acceptably stocked if the site meets the standards of 14 CCR 912.7 within 5 years of completion of timber operations, or if it contains at least 10 planted countable trees for each tree harvested on sites I, II, and III, and 5 planted countable trees for each tree harvested on sites IV and V (913.4 (b) (1)).  |                                      |          |          |      |                           |             |
| Additional management activities include, at the discretion of MRC:   |                                      |          |          |      |                           |             |
| * reduce excessive vegetation competition.  |                                      |          |          |      |                           |             |
| * retain 15 square feet of hardwoods equal to, or greater than, 6" DBH (provided they were present in the preharvest stand) to ensure species diversity.  |                                      |          |          |      |                           |             |
| <b>Relationship to Standard Silviculture Practices</b>  |                                      |          |          |      |                           |             |
| The rehabilitation method described here does not include any alternative methods to the standard silviculture practices.   |                                      |          |          |      |                           |             |
| <b>Model Decision Logic</b>   |                                      |          |          |      |                           |             |
| Model Decision Logic  | 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          |

The special selection regimes noted below are identified in order to more precisely model stands that have specific restrictions. This section provides specific information on the triggers and retentions used to model harvest of these stands (they will generally be harvested under a selection regime with a greater retention standard than what is called for by the California Forest Practice Rules). Some retention standards we follow in our planning agreement (Appendix C) simply do not translate well to basal area retention on a stand by stand basis, though for modeling purposes, they tend to average to an expected retention (for instance, retaining 50% over story canopy in the outer zone of Large Class II stream buffer, page 3 Appendix C). The following table is provided for reference to our model logic only.

| <b>Special Selection Regimes</b>   |
|--|
| <b>Introduction and Description</b>  |
| Special Selection will be used in stands that have special constraints such as Watercourse/Lake Protection Zones (WLPZ), stands selected for Carbon Sequestration, and wildlife habitat enhancement. The purpose of harvesting using the Special Selection method is to produce logs, adjust age classes to ensure strong growth in a structurally diverse (including trees in excess of 60 years), uneven age condition, provide enhanced fish and wildlife habitat, and for carbon sequestration.  |
| <b>Trigger and Harvesting Conditions</b>   |
| The stand (a discrete unit 30 acres or less) is the spatial basis for determining if the forest unit meets the trigger conditions for the Special Selection, the Special Selection II, the Special Selection III, the Floodplain Selection, the Low Site Watercourse Selection or the Coastal Zone (Special Treatment Area) Selection. Harvest trigger conditions are displayed in the table below.<br>Large trees (>16" DBH) in excess of the retention standard below will be harvested, but the absence of these trees will not prevent these Selection regimes from being used. Trees will be harvested individually under these regimes since all harvests will achieve MSP pursuant to 14 CCR 913.11 (14 CCR 913.2(a)(2)(A)(4)). Marking of trees to be harvested or retained will be conducted under the supervision of an RPF prior to felling operations. At least 10% of the harvest area up to 20 acres per stand type (combined set of stands using the same silviculture method in a harvest plan) that represents the range of conditions will be marked prior to the preharvest inspection (14 CCR 913.2 (a)(1)). |
| <b>Retention Conditions</b>  |
| 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 for the Special Selection will be 200 square feet of conifer basal area per acre (14 CCR 913.2(a)(2)(A)(2)). This will be stated in the THP (14 CCR 913.2(a)(2)). The post harvest stocking standard for the Special Selection II will be 120 square feet of conifer basal area per acre (14 CCR 913.2(a)(2)(A)(2)). This will be stated in the THP (14 CCR 913.2(a)(2)). The post harvest stocking standard for the Special Selection III will be 130 square feet of conifer basal area per acre (14 CCR 913.2(a)(2)(A)(2)). This will be stated in the THP (14 CCR 913.2(a)(2)).   |
| <b>What to Expect in a Post-Harvest Stand</b>  |
| After completion of operations and prior to filing a final notice of completion and stocking, the Special Selection stand will:<br><br><ul style="list-style-type: none"> <li>* have at least 200 square feet of basal area, as averaged across the entire stand (14 CCR 913.2(a)(2)(A)(2)).</li> <li>* have at least 150 square feet of conifers averaged per acre greater than 16" DBH, but the absence of these trees will not prevent the Special Selection method from being used since all harvests will achieve MSP pursuant to 14 CCR 913.11 (14 CCR 913.2(a)(2)(A)(4))</li> <li>* have retained at least 50 square feet of conifer basal area in trees less than, or equal to, 16" DBH, if they were present in the pre-harvest stand.</li> <li>* be managed to reduce excessive vegetation competition.</li> <li>* have retained at least 15 square feet of hardwoods (provided they were present in the preharvest stand) to ensure species diversity.</li> </ul>   |
| After completion of operations and prior to filing a final notice of completion and stocking, the Special Selection II stand will:<br><br><ul style="list-style-type: none"> <li>* have at least 130 square feet of basal area, as averaged across the entire stand (913.2(a)(2)(A)(2)).</li> <li>* have at least 80 square feet of conifers averaged per acre greater than 16" DBH, but the absence of these trees will not prevent the Special Selection method from being used since all harvests will achieve MSP pursuant to 14 CCR 913.11 (14 CCR 913.2(a)(2)(A)(4))</li> <li>* have retained at least 30 square feet of conifer basal area in trees less than, or equal to, 16" DBH, provided they were present in the preharvest stand.</li> <li>* be managed to reduce excessive vegetation competition.</li> <li>* have retained at least 15 square feet of hardwoods (provided they were present in the preharvest stand) to ensure species diversity.</li> </ul>   |
| After completion of operations and prior to filing a final notice of completion and stocking, the Special Selection III stand will:<br><br><ul style="list-style-type: none"> <li>* have at least 120 square feet of basal area, as averaged across the entire stand (913.2(a)(2)(A)(2)).</li> <li>* have at least 90 square feet of conifers averaged per acre greater than 16" DBH, but the absence of these trees will not prevent the Special Selection method from being used since all harvests will achieve MSP pursuant to 14 CCR 913.11 (14 CCR 913.2(a)(2)(A)(4))</li> <li>* have retained at least 50 square feet of conifer basal area in trees less than, or equal to, 16" DBH, provided they were present in the pre-harvest stand.</li> <li>* be managed to reduce excessive vegetation competition.</li> <li>* have retained at least 15 square feet of hardwoods (provided they were present in the preharvest stand) to ensure species diversity.</li> </ul>   |
| After completion of operations and prior to filing a final notice of completion and stocking, the Floodplain Selection stand will:<br><br><ul style="list-style-type: none"> <li>* have at least 300 square feet of basal area, as averaged across the entire stand (913.2(a)(2)(A)(2)).</li> <li>* have at least 225 square feet of conifers averaged per acre greater than 16" DBH, but the absence of these trees will not prevent the special selection method from being used since all harvests will achieve MSP pursuant to 14 CCR 913.11 (14 CCR 913.2(a)(2)(A)(4))</li> <li>* have retained at least 75 square feet of conifer basal area in trees less than, or equal to, 16" DBH, provided they were present in the pre-harvest stand.</li> <li>* be managed to reduce excessive vegetation competition.</li> <li>* have retained at least 15 square feet of hardwoods (provided they were present in the preharvest stand) to ensure species diversity.</li> </ul>   |
| After completion of operations and prior to filing a final notice of completion and stocking, the Low Site Watercourse Selection stand will:<br><br><ul style="list-style-type: none"> <li>* have at least 160 square feet of basal area, as averaged across the entire stand (913.2(a)(2)(A)(2)).</li> <li>* have at least 120 square feet of conifers averaged per acre greater than 16" DBH, but the absence of these trees will not prevent the special selection method from being used since all harvests will achieve MSP pursuant to 14 CCR 913.11 (14 CCR 913.2(a)(2)(A)(4))</li> <li>* have retained at least 40 square feet of conifer basal area in trees less than, or equal to, 16" DBH, provided they were present in the preharvest stand.</li> <li>* be managed to reduce excessive vegetation competition.</li> <li>* have retained at least 15 square feet of hardwoods (provided they were present in the preharvest stand) to ensure species diversity.</li> </ul>  |

*Silviculture Regimes for Stands with Special Concerns*

| Silviculture                                    | Triggers and Retention | Conifer Basal Area by Size Class |      | Total Conifer BA | Total Hardwood BA | Special Concern  |
|---|------------------------|----------------------------------|------|------------------|-------------------|--|
|   |                        | <16"                             | >16" |                  |                   |  |
| Special Selection (High Retention)              | Triggers               | >260                             |      |                  |                   | Class I and Large Class II Watercourse Buffers (inner and Middle Bands) and areas identified for carbon sequestration.   |
|   | Average Retention      | 50                               | 150  | 200              | 15                |  |
| Special Selection II                            | Triggers               | >260                             |      |                  |                   | NSO Level I and Level II Buffer Stands. These stands will be managed to retain the current NSO habitat type.   |
|   | Average Retention      | 50                               | 80   | 130              | 15                |  |
| Special Selection III                           | Triggers               | ≥130                             |      |                  |                   | Marbled Murrelet Buffer Stands. These stands will be managed to retain large trees for potential nesting habitat..   |
|   | Average Retention      | 30                               | 90   | 120              | 15                |  |
| Floodplain Selection                            | Triggers               | ≥300                             |      |                  |                   | Areas identified as floodplain by watershed analysis.  |
|   | Average Retention      | 75                               | 225  | 300              | 15                |  |
| Low Site Watercourse Selection                  | Triggers               | ≥220                             |      |                  |                   | Class I and Large Class II Watercourse Buffers (inner and Middle Bands) on Site Class IV.  |
|   | Average Retention      | 40                               | 120  | 160              | 15                |  |
| Coastal Zone (Special Treatment Area) Selection | Triggers               | ≥120                             |      |                  |                   | Areas identified within the Coastal Zone (Special Treatment Area) will be managed with a Selection silviculture that retains visual aesthetics and wildlife structures.  |
|   | Average Retention      | 20                               | 80   | 100              | 15                |  |
| Old Growth (Type II) Selection                  | Triggers               | ≥ 105                            |      |                  |                   | Areas identified as Type II old growth will be managed with a Selection silviculture that retains visual aesthetics, residual old growth trees, and other wildlife structures.   |
|   | Average Retention      | 75% of Pre-Harvest Basal Area    |      |                  |                   |  |
| Small Class II Selection                        | Triggers               | ≥105                             |      |                  |                   | Small Class II Watercourse Buffers. Will retain 50% canopy.  |
|   | Average Retention      | 30                               | 40   | 70               | 15                |  |
| Small Class II Transition                       | Triggers               | ≥50<105                          |      |                  |                   |  |
|   | Average Retention      | 30                               | 20   | 50               | >15               |  |
| Viewshed Selection                              | Triggers               | ≥105                             |      |                  |                   | Areas identified as sensitive to visual impacts.   |
|   | Average Retention      | 30                               | 40   | 70               | 15                |  |
| No Harvest                                      | Triggers               |                                  |      |                  |                   | NSO Core areas, Marbled Murrelet Core areas, Point Arena Mountain Beaver Core areas, Type I old growth stands, conservation easements, Pygmy Forest, Rocky Outcrops, brush and other special concern stands that do not meet the trigger conditions. |
|   | Average Retention      |                                  |      |                  |                   |  |

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. Table 18 displays the re-entry cycles and ingrowth assumptions associated with each silviculture method.

Table 18. Re-entry cycles and ingrowth assumptions associated with each silviculture method.

| <i>Silviculture</i>                                    | <i>Re-entry Cycle</i> | <i>Ingrowth at Each Harvest</i>  | <i>Assignment Guidance</i>   |
|--|-----------------------|--|--|
| <b>Selection</b>                                       | 20                    | 60 conifers added at harvest. Species proportioned by pre-harvest conifer basal area proportion. Hardwood ingrowth (TPA) is computed at 10% of pre-harvest hardwood basal area at harvest (Example: 75 feet squared tanoak = 7.5 trees per acre added) | All Non-Constrained Stands, Visual Concerns, Old Growth Type II Stands   |
| <b>Variable Retention</b>                              | 20                    | 175 conifers added at harvest. Species proportioned by pre-harvest conifer basal area proportion. Hardwood ingrowth (TPA) is computed at 10% of pre-harvest hardwood basal area at harvest.  | All Non-Constrained Stands   |
| <b>Transition</b>                                      | 20                    | 60 conifers added at harvest. Species proportioned by pre-harvest conifer basal area proportion. Hardwood ingrowth (TPA) is computed at 10% of pre-harvest hardwood basal area at harvest.   | All Non-Constrained Stands   |
| <b>Transition I</b>                                    | 20                    | 80 conifers added at harvest. Species proportioned by pre-harvest conifer basal area proportion. Hardwood ingrowth (TPA) is computed at 10% of pre-harvest hardwood basal area at harvest.   | All Non-Constrained Stands   |
| <b>Rehabilitation</b>                                  | 20                    | 200 conifers added at harvest. Species proportioned by pre-harvest conifer basal area proportion. Hardwood ingrowth (TPA) is computed at 10% of pre-harvest hardwood basal area at harvest.  | All Non-Constrained Stands   |
| <b>Seed Tree Removal</b>                               | 20                    | 200 conifers added at harvest. Species proportioned by pre-harvest conifer basal area proportion. Hardwood ingrowth (TPA) is computed at 10% of pre-harvest hardwood basal area at harvest.  | All Non-Constrained Stands   |
| <b>Special Silviculture Regimes</b>                    |                       |  |  |
| <i>Special Silviculture Regimes</i>                    | <i>Re-entry Cycle</i> | <i>Ingrowth at Each Harvest</i>  | <i>Assignment Guidance</i>   |
| <b>Special Selection (High Retention)</b>              | 20                    | 15 conifers added at harvest. Species proportioned by pre-harvest conifer basal area proportion. Hardwood ingrowth (TPA) is computed at 10% of pre-harvest hardwood basal area at harvest.   | Class I and Large Class II Watercourse Buffers, Carbon Sequestration Areas   |
| <b>Special Selection II</b>                            | 20                    | 15 conifers added at harvest. Species proportioned by pre-harvest conifer basal area proportion. Hardwood ingrowth (TPA) is computed at 10% of pre-harvest hardwood basal area at harvest.   | NSO Level I and II buffer stands   |
| <b>Special Selection III</b>                           | 20                    | 60 conifers added at harvest. Species proportioned by pre-harvest conifer basal area proportion. Hardwood ingrowth (TPA) is computed at 10% of pre-harvest hardwood basal area at harvest.   | Marbled Murrelet buffer stands   |
| <b>Floodplain Selection</b>                            | 20                    | 20 conifers added at harvest. Species proportioned by pre-harvest conifer basal area proportion. Hardwood ingrowth (TPA) is computed at 10% of pre-harvest hardwood basal area at harvest.   | Class I and Large Class II Floodplains   |
| <b>Low Site Watercourse Selection</b>                  | 20                    | 20 conifers added at harvest. Species proportioned by pre-harvest conifer basal area proportion. Hardwood ingrowth (TPA) is computed at 10% of pre-harvest hardwood basal area at harvest.   | Class I and Large Class II Watercourse Buffers on Site Class IV  |
| <b>Coastal Zone (Special Treatment Area) Selection</b> | 20                    | 20 conifers added at harvest. Species proportioned by pre-harvest conifer basal area proportion. Hardwood ingrowth (TPA) is computed at 10% of pre-harvest hardwood basal area at harvest.   | Areas identified within the Coastal Zone (Special Treatment Area) will be managed with a Selection silviculture that retains visual aesthetics and wildlife structures.  |
| <b>Old Growth (Type II) Selection</b>                  | 20                    | 20 conifers added at harvest. Species proportioned by pre-harvest conifer basal area proportion. Hardwood ingrowth (TPA) is computed at 10% of pre-harvest hardwood basal area at harvest.   | Areas identified as Type II old growth will be managed with a Selection silviculture that retains visual aesthetics, residual old growth trees, and other wildlife structures.   |
| <b>Small Class II Selection</b>                        | 20                    | 60 conifers added at harvest. Species proportioned by pre-harvest conifer basal area proportion. Hardwood ingrowth (TPA) is computed at 10% of pre-harvest hardwood basal area at harvest.   | Small Class II Watercourse Buffers. Will retain 50% canopy.  |
| <b>Small Class II Transition</b>                       | 20                    | 60 conifers added at harvest. Species proportioned by pre-harvest conifer basal area proportion. Hardwood ingrowth (TPA) is computed at 10% of pre-harvest hardwood basal area at harvest.   |  |
| <b>Viewshed Selection</b>                              | 20                    | 20 conifers added at harvest. Species proportioned by pre-harvest conifer basal area proportion. Hardwood ingrowth (TPA) is computed at 10% of pre-harvest hardwood basal area at harvest.   | Areas identified as sensitive to visual impacts.   |
| <b>No Harvest</b>                                      | 20                    | 20 conifers added at harvest. Species proportioned by pre-harvest conifer basal area proportion. Hardwood ingrowth (TPA) is computed at 10% of pre-harvest hardwood basal area at harvest.   | NSO Core areas, Marbled Murrelet Core areas, Point Arena Mountain Beaver Core areas, Type I old growth stands, conservation easements, Pygmy Forest, Rocky Outcrops, brush and other special concern stands that do not meet the trigger conditions. |

## Appendix B – Wildlife tree policy

July 30, 2007

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## I. Snag and Wildlife Trees

Snags and wildlife trees add complexity to forest habitat and provide critical elements for the survival of many species; both are essential to a healthy forest ecosystem. In order to meet the needs of snag-dependent species, MRC has set a target of 2 hard snags per acre. While snags are of value to wildlife species, their presence on the landscape is short-lived; hence we have also set a target of 1 wildlife tree per acre. These numbers represent a future desired condition and in areas where snags or wildlife trees are deficient, MRC will mark and retain trees likely to recruit to wildlife trees or snags sooner than surrounding trees.

### DEFINITION

A **snag** is any standing dead tree. A **hard snag** is composed primarily of sound wood.

A **recruitment tree** is a standing live tree that is retained during a harvest because an area is below a snag or wildlife tree density target so that it might develop into, and then provide the desired habitat element. These generally exhibit signs of decadence, deformity, structure, and large size.

A **wildlife tree** is any standing live tree that possesses special and uncommon characteristics providing valuable habitat for wildlife. We have defined the characteristics of trees that MRC considers to be wildlife trees below.

Specifically, the targets for snags, wildlife trees, and recruitment trees are:

- 1 hard snag or recruitment tree at least 24" dbh and 40' tall per acre<sup>1</sup>, and
- 1 hard snag or recruitment tree at least 16" dbh and 30' tall per acre, and
- 1 wildlife or recruitment tree as described below per acre.

Wildlife trees and snags will be retained<sup>2</sup> along with their associated screen trees (even if the targets above have been met).

<sup>1</sup> When recruiting for this size class, foresters must choose recruitment trees from those within the upper 20<sup>th</sup> percentile for diameter in the THP unit.

<sup>2</sup> Wildlife trees and snags will be retained unless they present a safety or fuel load hazard. If MRC needs to fell a snag or wildlife tree we will cut it to a stump height of 4-6 ft and leave the felled tree in place unless it is blocking a road right-of-way, an existing road, or skid trail. If it is necessary to move a felled snag or wildlife tree, MRC will place it near the location where it originally was felled. If MRC removes a snag or wildlife tree for this reason and there are less than 2 snags per acre or 1 wildlife tree per acre a tree of similar value will be retained and the wildlife agencies will be advised.

It is the intent of this policy to retain the highest value snags and wildlife trees and if density is low, to recruit snags and wildlife trees up to three trees per acre on average. Our intent is that recruitment trees retained during a previous entry would be retained during subsequent harvests unless a) they no longer exist, b) better wildlife trees have developed during the re-entry period and these trees now supersede the previous recruitment trees, or c) additional trees of equal wildlife value have developed in densities that exceed three trees per acre. It is our expectation that these retained trees will provide the highest quality wildlife habitat. Once the average wildlife tree, snag, and recruitment trees have met or exceeded three trees per acre, however, recruitment trees of equal or lesser wildlife value may be harvested.

We will assess targets as an average across each silvicultural unit (for instance a 30-acre silvicultural unit would require 30 snags > 24" dbh, 40' tall, 30 snags >16" dbh 30' tall, and 30 wildlife trees or an equivalent number of recruitment trees). If snags or wildlife trees are deficient within the THP, recruitment trees will be marked for retention by the appropriate size class. Only 50% of the recruitment trees may be hardwood trees. This information will be maintained in MRC's geographic information system.

A tree with any of the following characteristics is considered a **wildlife tree**:

- Old growth trees (see MRCs old growth tree definitions below)
- Trees that are potential nest trees for marbled murrelets: (a) conifer species; and (b) diameter must exceed 48 in for redwood, 36 in for Douglas-fir, 36 in for grand fir, 36 in. for Sitka spruce, 30 in. for western hemlock, 30 in. for other conifers; and (c) have at least one platform capable of retaining an egg (must be 6 in. in diameter, nearly horizontal, within the canopy of the stand but lower than tree tops within 100' radius, and covered, directly above, by at least 50% canopy).
- Trees with known raptor nests.
- Trees in which the entrance hole leading to a cavity is > 3 in. diameter and 10 ft or more above the ground.
- Granary trees (any tree with at least 100 small holes either filled with acorns or that are capable of holding acorns—that are either tightly clustered or spread throughout the bark or limbs of the tree).
- Trees > 24 in. dbh with basal hollows that are >12 in. wide and deep and extend vertically above the outside cavity.

We have established priorities for selecting **recruitment trees** that reflect signs of decadence as well as indications that trees are valuable for wildlife. The recruitment priority is:

- 1) Wildlife trees (in the case where MRC needs to recruit for snags)
- 2) Trees with the following characteristics (the intent is that trees with the most characteristics are recruited for snags and/or wildlife trees):
  - trees with less than 10% live crown and no terminal leader
  - whitewoods likely to become snags (conk, fire scars, etc)
  - broken tops
  - forked tops

- reiterated crowns
- large limbs
- old growth characteristics in the old growth definitions (each characteristic counts as one characteristic for recruitment)
- vegetative deformities (e.g. witches broom)
- trees in the upper 20<sup>th</sup> percentile for diameter within that unit
- Usnea source trees
- snags in excess of required snag objectives

## II. Old-growth definitions

Trees defined as old growth trees have the following characteristics:

1. Any redwood tree, 48" dbh and larger, established prior to 1800.
2. Any Douglas-fir tree, 36" dbh and larger, established prior to 1800.
3. Any tree established prior to 1800 (conifer or hardwood), regardless of diameter size, with a preponderance of species-specific old growth characteristics
4. In addition to the above, MRC retains any tree (conifer or hardwood), established prior to 1800, that cannot be replaced in size or ecological function within 80-130 years, regardless of diameter or presence of old growth characteristics.  
Generally, this fourth "trigger" is applicable to areas of exceptionally low site, for example-pygmy forest, pygmy transition soil, serpentine soils, site five and shallow rocky outcroppings.

We use the following species-specific characteristics to assess if an individual tree is an old growth tree:

### Redwood Old Growth Characteristics

- Trees generally are in the upper 20% diameter class of the species on site
- Deep, plate-like bark patterns, fire resistant
- Flattened or irregular crowns, highly complex structure
- Highly reiterated crowns (multiple sprouting, replicated growth patterns)
- Large limbs, in excess of 6-8 in diameter
- Crown debris accumulation
- Platforms
- Cavities, partial snag formation
- High presence of complex lichens and moss
- Cat-facing or basal burn cavities

### **Douglas-fir Old Growth Characteristics**

- Trees generally are in the upper 20% diameter class for the species on site
- Bark deeply fissured, thick and fire resistant
- High presence of lichens and moss, where crown soils present, ferns
- Large lateral limbs in excess of 8-10 inches in diameter
- Fattened, irregular crowns with lower limbs with signs of decay and crown thinning
- Conks
- Partial sagging in tops
- Broken out tops
- Crown debris accumulation
- Specific to fir, trees along the margins of vegetation types, which represent the pioneer, tree individuals, which reoccupied the sites following disturbances. These normally will have limbs extending nearly to the ground and at times is wind shaped.

### **Hardwood Old Growth Characteristics** (tanoak, live oak, black oak, madrone, laurel, chinquapin)

- Trees generally are in the upper 20% diameter class for the species on site
- Flattened or irregular crowns, highly complex structure
- Multiple branching crowns with few large well developed main limbs
- Large limbs, in excess of 4-12 inches in diameter
- Crown debris accumulation
- Platforms
- Cavities, partial snag formation
- Crown die-back
- Cat-facing or basal burn cavities

### **III. Downed wood**

Downed wood includes downed logs and large limbs on the forest floor. It provides a moist microclimate for various plants and animals, including many mosses, invertebrates, and terrestrial amphibians. Downed wood also supports a feeding

substrate for invertebrates, as well as for mammals and birds that eat these invertebrates. As wood decays, a downed log contributes additional nutrients to the forest. In order to meet the needs of a properly functioning forest, MRC has established a target of 5 downed logs greater than 16" diameter at the large end and longer than 10 feet. To achieve this target the following standards are followed during timber harvest operations:

- Retain and recruit downed wood.
- Return all unmerchantable logs from the current operation to the forest floor prior to removal of equipment.
- Return unmerchantable logs from previous operations to the woods or use for watercourse enhancement projects when equipment is available.

#### **IV. Hardwoods**

MRC recognizes the role of hardwoods in a functioning conifer forest and as such provides the following standards for hardwood management:

- All true oaks > 18" dbh will be retained unless they need to be removed for safety, road right of way, or yarding corridors.
- A minimum of 15 square feet per acre of hardwoods will be retained post-harvest provided there was a minimum of 15 square feet per acre of hardwoods prior to harvest.
- Retention of hardwoods will be concentrated in the upper 10% diameter of hardwoods and those that exhibit high wildlife value. Deviations from this goal are appropriate when groups are hardwoods are retained in the unit to attain other conservation goals.
- The post-harvest stand shall have a similar relative proportion of each native hardwood species as the pre-harvest stand (e.g. if tanoak represented 50% of the basal area of hardwoods pre-harvest, it will represent approximately 50% of the basal area of hardwoods in the post-harvest stand).
- With the exception of rehabilitation and variable retention harvest, MRC will not harvest non-tan oak native hardwoods unless necessary for safe harvest operations.

## Appendix C – Planning agreement

July 23, 2007

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## Interim Guidelines

Pending completion of the NCCP/HCP and DFG's issuance of an incidental take authorization, or termination of this Agreement, MRC will adhere to these Interim Guidelines in carrying out Interim Activities. The Interim Guidelines are in addition to the requirements of MRC's Option A Report and applicable interim or permanent **Board of Forestry Forest Practice Rules ("FPR")**. The Interim Guidelines prescribe certain standard measures and consultation requirements that ensure a high minimum level of protection and mitigation that will apply to all new Timber Harvest Plans ("**THPs**") within the Planning Area that MRC submits to the California Department of Forestry and Fire Protection after the effective date of the Planning Agreement, unless specifically superseded by alternative, site-specific measures developed in consultation with DFG, as described below. The Interim Guidelines will not apply to THPs that were submitted to or approved by the California Department of Forestry and Fire Protection before the effective date of the Planning Agreement.

As part of THP development, MRC's Registered Professional Foresters ("**RPFs**") will evaluate site-specific conditions within the THP area and determine whether the standard protection measures identified herein will be practicable and effective, whether modifications of the standard measures are warranted, or whether alternative measures are warranted. If the RPFs' site-specific analysis reveals the need for modifications of the standard measures or alternative protection measures, MRC will develop appropriate modifications or alternative measures and present them to DFG for review. Any use of modified or alternative protection measures will require advance consultation and approval of DFG during THP development. DFG will approve any modified or alternative protection measures that provide the same or higher level of protection for the applicable resource (e.g., chinook salmon or freshwater streams) as the standard measures. DFG will ensure that it is reasonably available to meet and consult with MRC regarding proposed modified or alternative measures.

MRC will continue to comply with Section 1603 of the Fish and Game Code. As required by Section 1603, MRC will notify DFG before substantially diverting or obstructing the natural flow or substantially changing the bed, channel, or bank of any river, stream or lake designated by DFG, or using any material from streambeds.

The Interim Guidelines are designed foremost to protect and avoid take of threatened or endangered anadromous fish species, northern spotted owls, marbled murrelets, and Point Arena mountain beaver. However, the Guidelines will also protect other sensitive species and sensitive habitats such as riparian habitat, freshwater streams, and old growth stands.

### **1. Riparian habitat and stream protection measures**

The following guidelines are intended to protect riparian habitat and freshwater streams, and avoid take of chinook salmon; coho salmon, steelhead trout and other threatened or endangered aquatic wildlife species. These guidelines prescribe standard measures



that exceed, or are in addition to, the requirements of the FPR and MRC's Option A Report.

**1.1. Standard measures for specific watercourse classes** The following conservation measures will be implemented based on applicable watercourse classifications.

**1.1.1. Class I watercourses** The following protections apply to Class I watercourses:

- **Watercourse and Lake Protection Zones ("WLPZs")** will be measured from the Watercourse and Lake Transition Line as defined in the FPRs, or on watercourses with floodplains, from the outside edge of floodplains as defined by the 20-year flood.
- No timber will be harvested within 100 feet of the Watercourse and Lake Transition Line of Class I watercourses (the "**Class I inner zone**").
- Within a zone extending from the edge of the Class I inner zone out to 190 feet from the Watercourse and Lake Transition Line of Class I watercourses (i.e., an additional 90 feet; the "**Class I outer zone**"), MRC will retain at least 50% of the overstory canopy.
- MRC will retain all trees in the Class I inner zone or Class I outer zone leaning over Class I watercourses.
- The Class I inner zone will be an equipment exclusion zone, except on designated crossings and existing truck roads.
- The Class I outer zone will be considered a riparian management zone ("**RMZ**"), as defined in the FPR.
- Where necessary, trees may be felled to accommodate cable yarding corridors. Trees felled within the first 100' of the Watercourse and Lake Transition Line to accommodate yarding will be left as LWD.
- Trees within the channel or bank will be retained
- There shall be no sanitation/salvage within the inner zone.

**1.1.2. Large Class II watercourses** The following protections apply to Large Class II watercourses (> 100 acre drainage area):

- No harvest shall occur within 75 feet from the Watercourse and Lake Transition Line of a Large Class II watercourse (the "**Class II inner zone**"). The zone extending from the edge of this no harvest zone out to 190 feet (the "**Class II**

**outer zone**") will be considered a RMZ, and MRC will retain 50% of the overstory canopy when adjacent silviculture is uneven-aged, and 65% where the adjacent silviculture is even-aged.

- MRC will retain all trees within a WLPZ that are leaning over a Large Class II watercourse.
- The Class II inner zone will be an equipment exclusion zone, except on designated crossings and existing truck roads.
- Crossing placement, reconstruction or removals in Class II watercourses shall be permitted only with an approved Streambed Alteration Agreement. All restoration projects will be carried out in accordance with DFG's publication entitled "California Salmonid Stream Habitat Restoration Manual" (October 1994 - Second Edition).
- Where necessary, trees may be felled to accommodate cable yarding corridors. Within the inner zone, trees felled will be left on site as LWD.
- There shall be no sanitation/salvage within the inner zone.

**1.1.3. Small Class II watercourses** Small Class II watercourses (<100 acre drainage area, or not expected to flow continuously throughout its length throughout the year) will be protected as follows:

- Within the WLPZ as defined in the FPRs, MRC will preserve a no-cut zone at least 10 feet from the edge of the channel bank.
- Where active sliding occurs, the no-cut zone will extend 10 feet above any active scarp.
- The WLPZ around Small Class II watercourses will be an equipment exclusion zone, except on designated crossings and existing truck roads.
- MRC will retain all conifer trees leaning over watercourses within a Small Class II watercourse WLPZ.
- MRC will retain non-sprouting tree species directly adjacent to the stream channel where singular root masses provide for stability of banks and channel bottoms. Such trees shall be retained when their crowns extend into a plane directly above

the edge of the stream channel. MRC shall not take more than 50% basal area of redwood clumps directly adjacent to the stream channel.

- Outside of the 10-foot no cut zone as described in the first 2 bullet points, in Small Class II watercourse WLPZs as defined in the FPRs, MRC will retain at least 50% canopy cover of all tree species when adjacent silviculture is uneven-aged, and 75% canopy where the adjacent silviculture is even-aged. Only selection harvest can be done in the WLPZ.
- Where necessary, trees may be felled to accommodate cable-yarding corridors. Trees cut within the WLPZ for this purpose will be retained as LWD if the tree is not a harvestable tree as defined above.
- There shall be no sanitation/salvage within the WLPZ.

#### **1.1.4. Class III watercourses that exhibit active down-cutting and eroding banks**

The following protections will apply to Class III watercourses that exhibit active down-cutting and eroding banks:

- The zone extending from the bank full channel edge of the watercourse out to fifty feet, as measured on the slope, will be considered a RMZ.
- MRC will preserve a no-cut zone at least 10 feet from the edge of the channel bank.
- Where active sliding occurs, the no-cut zone will extend 10 feet above any active scarp.
- MRC will retain all conifer trees leaning over watercourses within the RMZ.
- MRC will retain all non-sprouting tree species directly adjacent to the stream channel where singular root masses provide for stability of banks and channel bottoms. Such, trees shall be retained when their crowns extend into a plane directly above the edge of the stream channel.
- In the balance of the RMZ, MRC will retain at least 50% canopy cover of all tree species using single tree selection.
- Trees may be felled where necessary to accommodate cable-yarding corridors. Within the no-cut zone at least 10 feet from the edge of the channel bank, trees felled for cable yarding will be left as LWD.

**1.1.5. Small Class II waters other than watercourses (e.g., springs & seeps) and wet areas within a WLPZ** Small Class II watersheds and wet areas within a WLPZ will be protected as follows:

- Within the FPR-defined Class II WLPZ, MRC will perform single-tree selection harvest only.

- MRC will retain at least 50% overstory canopy cover of all tree species. Where adjacent silviculture is even-aged, the canopy will be at least 65%.
- MRC will retain all trees leaning over watercourses.
- MRC will retain all non-sprouting tree species directly adjacent to the stream channel, where singular root masses provide for stability of banks and channel bottoms. Such trees shall be retained when their crowns extend into a plane directly above the edge of the stream channel.
- Trees may be felled where necessary to accommodate cable yarding corridors.
- This area will be considered an equipment exclusion zone, except on designated crossings and existing truck roads.
- All trees proposed for harvest will be marked prior to a Pre-Harvest Inspection.
- Seeps and Springs associated with roads will be surveyed for covered species. If present the above protection measures will be implemented.

**1.1.6. Other Class III watercourses** For all other Class III watercourses, MRC will implement the following protections within 50 feet from the edge of the bankfull channel of the watercourse, as measured on the slope:

- This area shall be considered an RMZ and managed as an ELZ.
- MRC will retain at least 50% overstory canopy cover of all tree species.
- MRC will retain all conifer trees leaning over Class III watercourses.
- MRC will retain all non-sprouting tree species directly adjacent to the stream channel where singular root masses provide for stability of banks and channel bottoms. Such trees shall be retained when their crowns extend into a plane directly above the edge of the stream channel.
- Trees may be felled where necessary to accommodate cable yarding corridors

**1.2. General riparian habitat protection measures** The following general conservation measures will be implemented where similar prescriptions are not otherwise identified by MRC in an applicable watershed analysis that has been reviewed and approved by DFG or in MRC's Option A Report.

**1.2.1. Logging roads** All existing and proposed logging roads under the ownership or control of MRC that are proposed for use within a THP and are within a WLPZ or a RMZ will be rocked, abandoned, seeded and mulched or equivalently stabilized prior to the winter period. The applicable Registered Professional Forester must consult with and

obtain the approval of DFG before implementing any proposed alternative to these measures. DFG will approve any alternative to these measures that provides the same or better level of protection as rocking or abandoning the road (including offsite mitigation that would protect the same resource to the same degree as rocking the road). In evaluating a proposed alternative, factors to be considered must include the condition of the buffer strip between the road and the watercourse (width, slope, and post-harvest filter capacity), the condition of the road (grade, soil type, and level of use following completion of harvest), present levels of sediment loading within the watercourse, and the ability of the watercourse to move sediment downstream to key Coho in-stream habitat components such as spawning gravel and rearing pools.

**1.2.1.1. Wet weather restrictions** From April 1 to May 15, timber hauling will be suspended on roads that are not rocked or paved (“dirt roads”) when precipitation exceeds .25” (as reported by the Santa Rosa Press Democrat for Fort Bragg) in any 24-hour period. The suspension will continue for 48 hours after the precipitation stops. Before resuming hauling, and during hauling on the first day after it is resumed, the applicable Registered Professional Forester will inspect potential sources of sediment input into watercourses along dirt roads to identify and prevent such input. Potential sources of sediment input to be inspected include, but are not limited to, watercourse crossings and drainage ditches. If timber hauling on the dirt roads causes visible sedimentation in a watercourse after the 48-hour suspension period, the suspension will be extended until visible sedimentation will not be caused.

**1.2.2. Tractor roads** All tractor roads within a WLPZ and a RMZ used during timber operations will be covered with tractor-packed slash or heavy mulch prior to the winter period to prevent transport of sediment to the watercourse.

**1.2.3. Other exposed areas** All other areas exposed to mineral soil (excluding logging roads and tractor roads) as a result of timber harvest operations that are within a WLPZ or RMZ equal to or greater than 100 square feet will be covered with mulch or slash prior to the winter period.

**1.2.4. Pre-Harvest Inspections** A sufficient sample marking of trees proposed for harvest in a RMZ will be completed prior to the pre-harvest inspection to allow for evaluation of harvest effects on stream temperature, over-stream canopy vegetation and LWD recruitment.

**1.2.5. Erosion control maintenance and monitoring** Erosion controls on permanent and seasonal roads and associated landings within a WLPZ or RMZ, which are not abandoned in accordance with 14 CCR 923.8, will be maintained for three years. MRC will provide winter erosion control monitoring reports for all roads proposed for use under these conservation measures.

**1.2.6. Erosion control within equipment exclusion zones** Where there are specific crossings or roads within any equipment exclusion zones established under these

Interim Guidelines, the applicable RPF must implement site-specific measures designed to avoid generation of sediment that could be transported by a Class III watercourse to downstream Class I or Class II watercourses. In addition, all tractor road watercourse crossings must be flagged prior to the pre-harvest inspections to enable crafting of measures to minimize the potential to generate sediment.

**1.2.7. Felling and yarding** Tractor road crossings and felling and yarding practices must be located so as to avoid disturbance to existing LWD lodged within the channel of Class III watercourses and functioning to slowly meter sediment downstream, or in the position to recruit into those functions.

**1.2.8. Site preparation** Site preparation activities that result in soil disturbance within or cause sediment movement into the channel of class III watercourses will occur only to the extent allowed under 14 CCR 915.3. Broadcast burns will not be ignited within the EEZ or ELZ of any classified watercourse. Prescriptions for broadcast burning will include retention of LWD as a goal.

**1.2.9. Site-specific watershed analyses** Where MRC has completed a watershed analysis within the Planning Area, MRC will adhere to any specific considerations/prescriptions regarding harvesting activities in areas of high potential for mass wasting. Where a watershed analysis has not yet been completed, MRC shall utilize the Shalstab Model as a tool for predicting high, shallow-seated landslide hazard, make on-site field investigations of those sites, determine the validity of the prediction and where high shallow-seated landslide hazard is present, and limit harvest operations and road construction as described in the Option A Report.

**1.2.10. Winter log hauling** Hauling of logs during the winter period beyond November 15<sup>th</sup> and before April 1<sup>st</sup> will be confined to roads with either an asphalt or rock surface and where all road drainage structures meet or exceed FPR 923.3. Hauling on roads during any season will cease if fines are being eroded and delivered to flowing inside ditches or watercourses.

**1.2.11. Streambed crossing mitigation strategy** MRC will consult with DFG to prepare a streambed crossing mitigation strategy for the Planning Area that includes standard minimization and mitigation measures for adverse impacts resulting from streambed crossings and landings. The streambed crossing strategy will account for individual watershed differences. MRC will submit appropriate standard measures identified in the strategy in its notification to DFG regarding streambed alterations for specific activities in those watersheds pursuant to Fish and Game Code §1603. The streambed crossing strategy will apply to all THP's and forest management activities proposed in the Planning Area.

**1.3. Guidelines for developing anadromous fish protection measures** MRC's RPFs will adhere to the following general guidelines for purposes of developing and explaining riparian habitat and stream protection measures for anadromous fishes and

meeting the requirements for Board of Forestry Technical Rule Addendum No. 2 (regarding cumulative impacts assessment).

**1.3.1. Review of relevant information** MRC RPFs or RPF technical advisors will become familiar with the following information:

- The life cycles, life history requirements and habitat needs of anadromous fishes, to the extent necessary to understand and address negative impacts that timber harvest operations may cause. Relevant information includes DFG's petition to the Board of Forestry to list Coho as a sensitive species, DFG's publication entitled "Coho Salmon Habitat Impacts - Qualitative Assessment Technique for Registered Professional Foresters" (November 1994 - Draft #2), DFG's publication entitled "California Salmonid Stream Habitat Restoration Manual" (October 1994 - Second Edition), DFG's report entitled "A Status review of the Coho Salmon (*Oncorhynchus kisutch*) in California South of San Francisco Bay" (March 1995), various reports published by State and Federal agencies and the scientific literature. DFG will provide copies of this information to MRC upon request.
- Additional information as necessary to clarify detailed site specific habitat problems in order to evaluate direct project impacts pursuant to 14 CCR §916.4

and cumulative impacts pursuant to Technical Rule Addendum No. 2. To develop a proposed THP or other timber harvest activity, MRC's RPFs will carefully review all available information regarding current in-stream habitat conditions and problems on a stream-by-stream basis. Other sources of information such as the scientific literature, environmental documents and various reports pertinent to the watershed in which activities will occur should be used as supporting information.

- As required by Technical Rule Addendum No. 2, MRC's RPFs will confer informally with various local and appropriate experts for site specific information regarding present in-stream habitat conditions and specific locations of anadromous fishes' habitat areas (e.g. spawning sites and rearing pools), including the presence of refugia and key or sensitive habitats. The RPFs will also confer with professionals with knowledge or expertise regarding existing watershed conditions and watershed processes to gain insights into natural and human caused factors that have contributed to the formation of present in-stream habitat conditions.

**1.3.2. Direct and Cumulative Impact Assessments** MRC RPFs will conduct cumulative impacts assessments pursuant to 14 CCR §898 and §1034, and direct impact evaluations of sensitive conditions near Watercourse and Lake Protection Zones pursuant to 14 CCR §916.4 (a) and (b), with an emphasis on the five key watershed products (water, woody debris, sediment, nutrients, temperature or solar radiation) that

can affect the habitat of anadromous fishes and the existing stream conditions, specifically emphasizing the following factors:

- water temperature control
- stream bed and flow modification by large woody debris
- filtration of organic and inorganic material
- up slope stability
- bank and channel stabilization
- vegetation and structure diversity for fish habitat, possibly including but not limited to:
  - vertical diversity (such as cover produced from side-stream structure)
  - migration corridor
  - cover for nesting redds, roosting habitat (rearing and refugia pools, etc.), and escape from predators.
  - food abundance (terrestrial insect and leaf drop, etc.).
  - microclimate modification.
  - snags (where they apply to in-stream habitat such as LWD or recruitment) and surface cover (dark habitat).

## **2. *Northern spotted owl protection measures***

The following guidelines are intended to protect and avoid take of the northern spotted owl. These guidelines prescribe measures that exceed, or are in addition to, the requirements of the **FPR** and MRC's Option A Report.

**2.1. Technical Assistance guidelines** MRC will continue to follow the State process of obtaining a current letter of technical assistance from the USFWS prior to implementation of any THP. MRC will include the information below in each Technical Assistance request to the USFWS.

**2.1.1. Activity Center Map and other information** In each TA request and THP, MRC will include a map of known northern spotted owl activity centers in or near (within 1.3 miles) the THP ("**Activity Center Map**"). The Activity Center Map will include, at a minimum, all activity centers identified in the previous three years. The Activity Center Map will also include activity centers identified prior to the previous \three years if there is no evidence that the Activity Center is inactive. Inactivity can be determined by 1) 3 years of negative results to surveys as described in #2 below, 2) confirmed movement of marked (banded) owls to another activity center, or 3) agreement with MRC by the FWS that an Activity Center is inactive. The Activity Center Map will identify any portion of the THP that is within 1.3 miles of a northern spotted owl activity center. If no portion of the THP is within 1.3 miles of an activity center, the THP will include a statement to



that effect and no map will be included. For the THP area and areas within 0.7 and 1.3 miles of each activity center, MRC will also provide maps and data tables that display both pre-and post-harvest acreages of nest/roost habitat, foraging habitat, and non-habitat. MRC will also provide information on proposed silviculture in the THP area, excluding former activity centers that are confirmed to be inactive.

**2.1.2. Surveys Results** Using the USFWS endorsed NSO survey protocol (revised March 17, 1992); MRC will conduct northern spotted owl surveys throughout the THP area and all areas within 1.3 miles of the THP. MRC will provide the results of these surveys and survey station layout in the TA request to the USFWS. MRC may propose an alternative survey regime to the USFWS, identifying an appropriate number and location of survey stations. USFWS would review any alternatives and, approve it as proposed, or approve it subject to specific, appropriate modifications needed to achieve equivalent efficiency for detecting NSOs. MRC will conduct the survey and provide the survey results to the USFWS. USFWS will review the survey results and inform MRC if a field assessment of the proposed THP area is warranted.

**2.1.3. Field assessment** If USFWS informs MRC a field assessment is necessary for any reason, USFWS may conduct a field assessment with MRC personnel prior to issuance of a letter of TA.

**2.1.4. Incorporation of technical assistance in the THP** Following receipt of the above information and the proposed protection measures the USFWS will identify any measures in addition to the Standard Protection Measures below that are necessary to avoid take. The RPF responsible for the THP will include the necessary take avoidance measures, if any, as an enforceable amendment to the THP before timber harvest is initiated.

**2.2. Standard Protection Measures** If a northern spotted owl activity center is discovered in the surveys described in Section II.A.2, the Standard Protection Measures described below will be implemented and adhered to, unless alternatives are proposed and accepted by the USFWS.

**2.2.1. Core Area Habitat Protection** MRC will create a buffer zone within a 1000-ft. radius from any activity center identified on the Activity Center Map and any tree or trees that contain an active northern spotted owl nest. The buffer zones will be protected as follows:

- No timber harvest shall occur within a 500 ft. radius from any activity center or nest tree.
- The habitat qualities of functional roosting habitat (a minimum of 60% canopy cover and average stand trees > 11" DBH) will be preserved within the area extending from the edge of the 500 ft. radius to the 1000 ft. radius.

- No timber harvest will occur from February 1 to August 31, May 31 if the nest is confirmed inactive according to protocol, or 4 weeks after confirmed fledging, or approved in alternative protection measure by the USFWS.

**2.2.2. Disturbance buffers** Helicopter yarding will not occur within 0.5 miles of an activity center identified on the Activity Center Map from February 1 to August 31, and not within 500 feet during the remainder of the year. Ground based timber operations, including falling, yarding, and hauling, will not occur within 0.25 miles of an activity center from February 1 to August 31. These disturbance buffers may be removed if activity centers are determined to be non-nesting or failed using methods in the USFWS-approved protocol. Those roads approved by the USFWS, as “main-line haul roads” are exempt from timber hauling seasonal restrictions if they are greater than 500’.

**2.2.3. Habitat retention within 0.7 miles of Activity Centers** At least 500 acres of suitable northern spotted owl habitat will be retained following timber harvest within a

radius of 0.7 miles from any nest tree or trees supporting an activity center. Timber harvest will occur in less than 50% of the retained area during any one-year period.

**2.2.4. Habitat retention within 1.3 miles of Activity Centers** Within a radius of 1.3 miles from a nest tree or trees supporting an activity center, a minimum of 1336 acres of suitable northern spotted owl habitat will remain following timber harvest.

### **3. *Marbled murrelet protection measures***

The following guidelines are intended to protect and avoid take of marbled murrelet. These guidelines prescribe measures that exceed, or are in addition to, the requirements of the **FPR** and MRC’s Option A Report.

**3.1. Consultation guidelines** MRC will use the following process to develop appropriate marbled murrelet protection and take avoidance measures. Marbled murrelet consultations will be conducted with DFG, although USFWS retains the discretion, and MRC or DFG may request the USFWS to provide binding input at any time on matters related to ensuring no-take of marbled murrelets under FESA.

**3.1.1. Field Inspection** MRC will survey for and identify trees that potentially contain marbled murrelet nests, or provide potential nesting habitat in and adjacent (use Standard Protection Measure habitat and disturbance buffer distances to define adjacent) to the THP area. These trees will be identified on a map included with each proposed THP within the Planning Area. The areas may be identified on the northern spotted owl Activity Center Map, if applicable.

**3.1.2. Pre-harvest consultation** For each THP within the Planning Area, MRC will provide DFG information about habitat structure and location, a survey history for the THP area, a description of proposed activities and a description of past marbled

murrelet detections. MRC will consult with DFG to establish a standard format for this information. MRC will request DFG to provide a habitat assessment or other appropriate technical assistance for THPs that have potential nest trees as determined in Section III.A.1, above. DFG will review the information provided by MRC and inform MRC if a field assessment of the proposed THP area is warranted.

**3.1.3. Field assessment** At the request of MRC or DFG, a field assessment will be conducted by DFG and/or USFWS to evaluate the THP area and nearby areas for suitability as marbled murrelet nesting habitat.

**3.1.4. Surveys** If MRC or DFG conclude that areas included in, or nearby a proposed THP are likely to provide nesting habitat for marbled murrelets, MRC may conduct surveys consistent with the survey protocols developed by the Pacific Seabird Group and endorsed and amended by the DFG and the USFWS. MRC may propose an alternative

survey regimen, identifying an appropriate number and location of survey stations. DFG will review the proposed survey, and will approve it as proposed, or approve it subject to specific, appropriate modifications needed to achieve an equivalent probability of detection. MRC will conduct the survey and provide DFG and the USFWS with the survey results. Until surveys are complete and the results submitted to DFG for a determination that there is a low likely hood that the proposed activities will result in take, the standard protection measures shall be applied unless alternative protection measures have been approved by DFG.

**3.1.5. Incorporation of technical assistance in the THP** Following the marbled murrelet survey, if applicable, DFG will provide MRC with an evaluation of the potential for take of marbled murrelet if the proposed THP is implemented. If DFG determines that take is likely to occur, DFG will consult with MRC to develop necessary or appropriate take avoidance measures based on the Standard Protection Measures for inclusion in the proposed THP.

**3.2. Standard Protection Measures** If a stand is determined to be Marbled Murrelet habitat, the Standard Protection Measures described below will be implemented and adhered to unless DFG finds that modifications are appropriate.

**3.2.1. Buffer habitat from adverse modification.** Timber operations will not be conducted within 300 feet of the identified habitat.

**3.2.2. Disturbance buffer.** Timber operations will not be conducted within 0.25 miles for ground-based operations, or 0.5 miles for helicopter operations, from March 24 to September 14.

**3.2.3.** The RPF responsible for the THP will include the standard protection measures, or others derived by DFG to avoid “take,” if any, as an enforceable amendment to the THP before timber harvest is initiated.

#### **4. Point Arena mountain beaver protection measures**

**4.1. Technical assistance guidelines** MRC will use the following process to ensure no-take of Point Arena mountain beaver (“**PAMB**”).

**4.1.1. Technical Assistance letter** MRC will obtain a current Technical Assistance letter (“**TA letter**”) from the USFWS whenever suitable habitat is located within 500 feet of the THP. When no suitable habitat is found, this will be stated in the THP, along with information on who, when, and where the habitat assessment was conducted.

**4.1.2. Field Inspection and surveys** On MRC lands within an area bounded to the north by Cliff Ridge, to the east by a line 5 miles from marine waters, and on the south by the south edge of the Garcia Inventory Block, MRC will use USFWS approved personnel to survey for and identify any potential PAMB habitat within 500 feet of any ground or vegetation disturbing activities proposed. If suitable habitat is located, PAMB surveys by USFWS-approved individuals may be conducted. MRC will provide all of the above information to the USFWS in a request for technical assistance. USFWS may conduct a field review at their discretion.

**4.1.3. Incorporation of technical assistance in the THP** Following receipt of the above information, a complete description of proposed activities and the proposed protection measures (see below), the USFWS will identify any additional protection measures that are necessary to avoid take. In the TA letter, the USFWS will also state how long the TA letter is valid, and when, or if, pre-project surveys or additional TA letters will be required. A negative PAMB survey (a survey that does not detect PAMB) will be valid for one year if the survey covers all areas with 250 feet of any impacts, and will be valid for two years if the survey covers all areas within 500 feet of any impacts. The RPF responsible for the THP will include the necessary take avoidance measures, if any, as an enforceable amendment to the THP before timber harvest is initiated.

**4.2. Proposed Protection Measures** If PAMB are located within 500 feet of any operations, the following SPMs will be implemented and adhered to.

**4.2.1.** Operation of above-ground noise-generating equipment (including chainsaws and heavy equipment) shall not occur within 100 feet of active burrows or unsurveyed potential habitat between December 15 and June 30.

**4.2.2. Operation** of mechanical equipment that is in direct contact with, or below, the ground that causes ground vibration (including soil excavators and air compressors) shall not occur within 100 feet of active burrows or unsurveyed potential habitat between December 15 and June 30. Operation of the same equipment shall not occur within 50 feet during the remainder of the year. Those roads approved by USFWS, as “main-line haul roads” are exempt from timber hauling prescriptions.

**4.2.3.** Operation of mechanical equipment that is in direct contact with the ground or is below ground that causes severe vibrations (including operation of log landings and soil compactors) within 500 feet of active burrows or unsurveyed potential habitat shall not occur between December 15 and June 30. Operation of the same equipment shall not occur within 100 feet during the remainder of the year.

**4.2.4. No** ground disturbing or vegetation altering activities (including felling, yarding, removal of existing down wood, herbicide application, or burning) shall occur within 400 feet of active burrows or within unsurveyed potential habitat at any time.

**4.2.5. No** vehicle use, cattle grazing or other activities that may cause burrow collapse shall occur within 25 feet of active burrows or unsurveyed potential habitat at any time.

**4.2.6.** MRC does not permit livestock grazing within the PAMB mgt. zone as described above. MRC does not take responsibility for damage caused by livestock not permitted on the property.

## **5. *Other biological resources***

**5.1. Other species** MRC will assess and mitigate potential impacts to other species on a THP and site-specific basis. THPs will disclose their scoping process, and their assessment of potential impacts including any surveys needed to consider presence or absence, and the means of avoiding significant impacts from their proposed timber operations.

**5.2. Habitat elements (snags/downed logs)** MRC will retain snags in accordance with Section 919.1 (b). In the event MRC federal and state safety laws require the removal of a snag, such removal is allowed under Section 919.1(b). If MRC removes a snag greater than 20 inches dbh for this reason and there are less than 2 snags per acre upland (outside of WLPZs) or 3 snags per acre when within the WLPZ, a tree of equal value will be retained and girdled as a replacement in a similar landscape position for future snag development. The wildlife agencies will be advised when such an action has been implemented, and MRC will allow the agencies to review the product.

Except for sanitation/salvage THPs, pre-existing downed logs will not be harvested. In sanitation/salvage THPs, the THP shall describe the distribution, density, and condition of downed logs and the recruitment potential that will exist post harvest.

**5.3. Hardwoods** With the exception of rehabilitation and variable retention harvests, MRC will not harvest non-tan oak native hardwoods unless necessary for safe harvest operations. In all THPs, hardwoods will be retained at no less than 15% of the preharvest basal area, provided hardwoods comprised 15% of the pre-harvest basal area. Retention shall be concentrated in the largest 10 % diameter of hardwoods and those that exhibit high wildlife value. Deviations from the 'largest size class' goal are

appropriate when groups of hardwoods are retained in the unit to achieve other conservation goals. The post harvest stand shall have a similar relative native hardwood species proportion of the pre harvest stand.

**5.4. Old Growth** MRC has identified approximately 85 acres of (FSC Type I) old growth stands. These acres will be permanently protected by MRC from any kind of harvesting. MRC has approximately 868 acres of previously harvested (FSC Type II) old growth stands where significant old growth characteristics are still present. The residual old growth trees and late successional characteristics of these stands are protected and

only silviculture such as thinning from below is allowed to enhance or extend these stands.

**5.4.1. Individual Old Growth Trees** The remaining previously logged second growth forests on MRC lands are estimated to contain up to 12,000 scattered residual old growth trees in very low densities. These old trees are being preserved based on a policy that protects them by age, size, function and characteristics specific to particular species. As far as we know, MRC is the only large industrial forestland owner to have such a comprehensive old growth protection policy. Trees preserved from harvesting include:

- Any redwood tree, 48" dbh and larger, established prior to 1800.
- Any Douglas fir tree, 36" dbh and larger, established prior to 1800.
- Any tree established prior to 1800 (conifer or hardwood), regardless of diameter size, with a preponderance of species-specific old growth characteristics
- In addition to the above, MRC retains any tree (conifer or hardwood), established prior to 1800, that cannot be replaced in size or ecological function within 80-130 years, regardless of diameter or presence of old growth characteristics (generally most applicable to areas of exceptionally low site, for example- pigmy forest, pigmy transition soil, serpentine soils, site five and shallow rocky outcroppings)

**5.4.2. Screen trees** In addition to the policies above, generally it's been MRC practice to maintain screen trees around retained old growth trees. Where they exist, screening trees are generally maintained to provide additional cover. The screen trees will usually be immediately adjacent trees or trees, which are, close enough to influence the growth and form of the retained old growth tree. These may have intermingling crowns or crowns, which if left to grow will eventually intermingle with the retained old growth crown. For redwoods, trees with shared root systems (i.e. crown sprouts) indicated suitable candidates for screen trees.

**5.4.3. Special Circumstances** In rare instances, the cutting of old growth trees is required for road construction, skyline corridors, or for other workplace safety considerations. If MRC determines that an old growth tree as defined in #1 above should be felled for these reasons, MRC will contact DFG. If requested by DFG, a site

visit will be arranged within 10 working days. MRC and DFG will confer to identify alternatives to removal, or mitigation (e.g., marking for permanent retention a tree most likely to replace the lost values in the shortest time) for removal of the old growth tree, consistent with federal and state safety laws. Trees cut under these special circumstances will be left in the forest to provide large wood on the forest floor and for wildlife refuge. If old growth trees are mistakenly cut due to misjudgment of age, they will also be left in the woods.