USAL REDWOOD FOREST COMPANY

FOREST MANAGEMENT PLAN

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Table of Contents

1. INTRODUCTION

1.1. THE USAL REDWOOD FOREST COMPANY (URFC) FOREST MANAGEMENT PLAN OBJECTIVES

This Usal Redwood Forest Company Forest Management Plan provides an action plan for activities on Usal Redwood Forest that embodies the mission of its parent company, the 501(c)(3) nonprofit Redwood Forest Foundation, Inc. (RFFI).

The plan guides management of the Usal Forest in a thorough and scientifically credible manner that incorporates community involvement. The plan also communicates RFFI's overall management goals and objectives for the Usal Redwood Forest to the public and describes how those objectives will be achieved.

This plan integrates key individual elements from several documents required for management of Usal, including: the 2004 Management Plan Template; the 2011 Usal Forest Conservation Easement; growth and yield modeling; the draft Northern Spotted Owl Safe Harbor Agreement; road management plans; and many others.

The plan also forms the foundation for the Usal Redwood Forest's certification as a "well managed forest" through a third-party forest management certification program, as required by the Usal Forest's 2011 conservation easement. RFFI has chosen to fulfill this requirement by seeking Forest Stewardship Council (FSC) certification. Any changes or updates to this plan will be consistent with that forest certification.

It is important to note that the Usal Forest Management Plan is a "living" document, and will be reviewed annually and amended as needed to reflect new information, changes in RFFI policy, legal mandates, public input and advances in technology.

The plan provides a summary and guidance to all those involved in the management of the Usal Redwood Forest. Its intent is to explain in broad terms the RFFI's management approaches in order to achieve RFFI's desired future condition of the forest. In all cases, management decisions will be dictated by stand conditions, conservation objectives and common sense, with the expressed focus on practicing adaptive management to achieve this desired future condition of the forest.

2. GENERAL BACKGROUND ON URFC AND THE REDWOOD FOREST FOUNDATION, INC.

The Usal Redwood Forest Company (URFC) is a wholly-owned for-profit subsidiary of the Redwood Forest Foundation, Inc. RFFI was incorporated in 1997 in the State of California and is an IRS-recognized 501(c)(3) public benefit nonprofit corporation (EIN 68-0404767). URFC was incorporated in 2007 in the State of Delaware.

The concept of RFFI originated in 1997 when Louisiana Pacific announced the sale of its northern California timberlands, including 240,000 acres in Mendocino County. Local leaders conceived of RFFI with the objective of partnering with communities to purchase and manage industrial timberland on a sustainable basis using FSC certification for the long-term benefit of those communities and the region. RFFI Founders believed that a diverse Board of Directors

(by both sectorial representation and perspectives) intentionally engaging residents in management planning could move the region politically away from confrontation over forestry issues and into a more cooperative and inclusive forest management style.

RFFI spent ten years engaging the residents of Mendocino County in a dialogue about forest management tenets before its first purchase—the Usal Redwood Forest—in 2007.

2.1. THE REDWOOD FOREST FOUNDATION MISSION AND VISION

RFFI's Mission	**RFFI's Vision**
is to acquire, protect, restore, and manage forestlands and other related resources in the Redwood Region for the long-term benefit of the communities located there.	is to establish community-based forests that provide both critical habitat for increased biodiversity and improved regional economic vitality.

2.2. RFFI'S BASIC TENETS ASSOCIATED WITH ALL FOREST MANAGEMENT ACTIVITIES

RFFI established the basic tenets below with community input to guide forest management decisions. Management of the Usal Redwood Forest will balance *Social*, *Environmental* and *Economic* considerations in a way that:

- Prioritizes and maximizes benefits to local communities,
- Protects, and enhances environmental attributes, and
- Employs exemplary sustainable forest management techniques that support operations and economic viability.

2.2.1 Social Concerns

- Employ local labor and expertise for staffing forest management and restoration activities
- Sell logs and other wood products to local mills of all capacities
- Local residents will have priority when issuing permits for non-commercial forest products
- Always be a good neighbor when operating near property lines or when potentially impacting adjacent water supplies
- Engage the public during the forest management planning process
- Recognize the working forest is a living laboratory influencing ongoing management and serving as a teaching tool for public benefit.

2.2.2 Environmental Concerns

- All RFFI forest lands will be managed to conform to FSC standards and guidelines, including standards pertaining to:
  - The use of forest pesticides
  - The management of old growth stands and individual trees

- Forest-dependent fish, wildlife and floristic species

- The chosen silvicultural system shall encourage and maintain an all-aged all-species mix forest composition.
- Priority shall be given to the protection of soil, water quality and wildlife habitat when planning, designing and conducting all timber harvest operations.
- Priority shall be given to restoration activities that are focused on the protection of soil, water quality and wildlife habitat.
- All of RFFI's "Working Community Forests" will be managed for long-term production of high-quality saw logs.

2.2.3 Economic Concerns

- Timely payment of interest and the scheduled retirement of all debt
- Revenues received from the sale of logs will cover management and restoration costs
- RFFI shall seek supplemental revenue opportunities from non-timber forest products such as recreation, education, etc.
- When additional revenues are available, they shall be distributed for public benefit purposes in conformance with RFFI's nonprofit status

2.2.4 Management Concerns

- RFFI's Board of Directors shall exclusively formulate all forest management policies
- RFFI's Forest Management Staff shall be expected to carry out such policies
- RFFI's Subcommittee on Forest Management shall serve as an oversight committee for the forest management staff on matters directly related to the execution of such policies

3. ABOUT THE USAL REDWOOD FOREST

The Usal Redwood Forest is a 49,636 acre forest covering two watersheds: the majority of the Usal Creek drainage and the South Fork of the Eel River. The western property boundary is formed by the Usal County Road running along Timber Ridge and is separated from the Pacific Ocean by the Sinkyone Wilderness State Park and the Intertribal Sinkyone Wilderness. The eastern property boundary is primarily defined by the South Fork of the Eel River drainage and the Highway 101 corridor. The southern property boundary is bisected by State Highway 1. To the north, the Usal Forest is bounded by private property and the Mendocino/Humboldt County line. A detailed legal description of the property is included in the Usal Forest Conservation Easement (see Appendix G).

3.1. MANAGEMENT HISTORY

The Usal Redwood Forest property has a long history as industrially managed timberland. The western portion of the property, located in the lower Usal Creek drainage, was originally developed by industrialist Robert Dollar. In 1889, Dollar built a mill, wharf and town at the mouth of Usal Creek to ship lumber, which continued until the mill was destroyed by fire in 1902. This portion of the ownership was later sold to the Malarkey and Malarkey Wood Working Company and later to Simpson Timber, Union Lumber, Boise Cascade, Georgia Pacific and Hawthorne Timber Companies. The eastern portion of the property was primarily owned by Pacific Coast Lumber, a subsidiary of Union Lumber with a mill located in Leggett, and Hollow Tree Lumber Company, with a mill at Hales Grove. Other owners to the north include Sage Land and Timber, Andersonia Lumber Company and Dimmick Lumber, with mills in the Piercy area. In addition, small private in-holdings were also scattered throughout the ownership.

Prior to the Forest Practices Act in 1974, all timberland owners in the area practiced diameter limit harvesting in order to reduce their tax liabilities (AD Valorem Taxes). These diameter limits progressed from 48” to 24” to 18,” and the majority of the stands had multiple entries. Recent harvest activity has consisted of clear-cuts in the advanced second growth along the Western portion of the property associated with the Usal Forest as well as mill and overstory removals, many utilizing helicopter yarding, along the eastern portion of the property.

3.2. GENERAL PHYSIOGRAPHIC FEATURES OF THE USAL REDWOOD FOREST

3.2.1 Climate

The climate of the Usal Redwood Forest is temperate, characterized by hot, dry summers and wet, stormy winters. Annual precipitation along the Eel River drainages averages 64 inches based on data from the monitoring station in Leggett. Annual precipitation along the Usal Creek coastal drainages averages approximately 50 inches. Most of precipitation occurs during the winter months in the form of rain, although snow along the higher elevations (over 1000’) is not uncommon. Forest fires are a high risk during the dry summers, and during the rainy winters, erosion and mass wasting are exacerbated.

“The climatic variables influencing redwood forests are related to summer fog and a maritime setting. Temperature extremes generally increase inland because of increasing elevation. However, topographical factors add to this, with interior valleys having broad ranges of

temperature, from high maxima in summer to low minima in winter. The position relative to the coast controls the gradient of increasing maximum temperatures and, to a lesser degree, minimum temperatures, resulting in the wider range of temperatures as one proceeds inland. Redwood has very little thermoperiodism and thus does well in a stable temperature regime. Optimum site quality or productivity of redwood to occur at a mean summer temperature of 17.8 °C. The wind patterns in the area and the influx of marine air, particularly during the summer, are partly the result of this heating of inland areas during the summer, and the influx of marine air, as into a furnace. There is a pattern of such inflow of marine air up the Eel River canyon, as indicated by the windflagging of trees at various places in the redwood forest and adjacent forest types in the area. The influx of marine air seems to be related to the distribution of the redwood forest. Immediately along the coast, where the incoming wind is high in salt spray aerosols, there is a grassland strip, or forest area with trees that are tolerant to salt spray damage, such as Sitka spruce and Douglas fir. It is only inland of this effect that one begins to see a redwood forest, which extends inland until the marine air influence is overcome by inland heating of the land." (Zinke, 1977, pg 690-691).

3.2.2 Topography

Elevations of the Usal Redwood Forest range from less than 40 feet at the junction of the North and South Forks of Usal Creek to over 2,500 feet along the ridge above Low Gap Creek east of Leggett. The topography is characterized by moderate to very steep terrain with slopes ranging from 10% along narrow ridge tops, mid-slope benches and valley bottoms to greater than 80% along local steep streamside slopes and upper headwater areas of the smaller drainages, with aspects facing in all directions.

"Topography across the north coastal forest area shows an increasing elevation inland, dissected by deep valleys. This increase in elevation may be very abrupt. The rivers of the area have cut into these mountain ranges along fault alignments which tend to parallel the coastline and the San Andreas Fault. Thus the interior valleys from southeast to northwest. This tends to accentuate the inland climatic aspects of some of the interior valleys in their headwaters areas, isolating them from the coastal climate although they are only a short distance inland. As a result, one finds gaps in the range of species such as redwood which depend on the more equable marine climate. On the other hand, where the valleys open toward the ocean so as to reinforce the summer marine air indraft whit its prevailing flow from northwest, as at the mouth of the Eel River, the redwood belt extends further inland."

"As one progresses inland, the climate becomes more severe because of extremes of summer heat and low humidity. The topographical effect of north slopes and of long slopes as sources of seepage water in their lower reaches becomes of more importance. Thus, in the upper south fork of the Eel River near Leggett Valley, the main extent of redwood forest ends abruptly with a general change from northerly to the southerly slopes." (Op cit. pg 691-692)

3.2.3 Soils Description

Bedrock within the ownership is mantled by a thin to thick veneer of colluvium. Colluvial deposits are found nearly everywhere across the hillsides and are typically thickest toward the axes of swales and drainages. The lower and gentler segments of several of the larger watercourses are aggraded with a relatively thick accumulation of colluvial and alluvial sediments. In general, colluvial deposits consist of sandy loam with local, angular clasts of fractured sandstone and siltstone. Most of the watercourses are incised to varying degrees

through these old deposits. Small debris/alluvial fans have formed at the mouth of steeper gradient channels.

"The geology of the north coastal forest area in terms of the major rock types and the soils derived from them plays and important role in determining vegetation and the abrupt boundaries to some vegetation types. The geological types trend in a manner similar to the topography of the area. Thus the topographical, geological, and soil controls on vegetation distribution reinforce each other. The rocks of the area are predominantly sedimentary. Younger, less consolidated sedimentary rocks near the coast give rise to deeper soils with greater water holding capacities than those farther inland from older and harder sedimentary rocks. Coastal terraces adjacent to the coastline often have very old surfaces with old, infertile soils, and on these occurs the depauperate vegetation of pygmy forest types. There are abrupt boundaries of these pygmy forest areas where erosion has cut into underlying rock types to expose younger, more fertile soils, on which the north coastal redwood and Douglas fir forests do better."

"Intrusions of serpentine and peridotite rock trend across the north coastal area from southwest to northwest, forming soil anomalies that are high in magnesium and lo in potassium, calcium, and phosphorous. Frequently in contact with these are metamorphic rocks such as glaucophane schists weathering to heavy clay soils with high magnesium contents supporting grassland vegetation. The serpentine and peridotite areas themselves have anomalous vegetation for the area. The boundary of the main redwood belt often ends abruptly at a change in rock type/An example of these occurs at Jedidiah Smith Redwoods State Park." (Op cit. pg 692-693)

"Another exception in the vegetation composition related in part to geology is the redwood groves that occur on deposits of recent alluvium along the major rivers in the north coastal forest area. These form the redwood forests which many think of as typical redwood forests, although they are only a small proportion of the area of the region." (Op cit. pg 693)

3.2.4 Erosion Hazard

The erosion hazard rating (EHR) system is the standard for assessing potential surface soil impacts and movement. This system will be applied to each soil type, slope class, protective vegetation remaining after harvest and rainfall intensity utilizing the Board of Forestry Technical Rule Addendum Number 1, as required by the California Forest Practice Rules (FPRs) when submitting timber harvesting plans (THPs). The USDA Soil Conservation Service conducted a soils survey of Mendocino County forest soils in 1987.

The Mendocino County Resource Conservation District developed an Erosion Hazard Guide for Mendocino County Forest Soils in 1988 to assist foresters in estimating surface soil erosion as required under the FPRs.

Certain timber harvest activities are inherently less disruptive to soils. By limiting most equipment activity to trails, roads and landings, in combination with cable-yarding operations, relatively small percentages of the existing organic material will be disturbed on site. Slash generated by the operations will be left in place to contribute to the existing organic material or scattered to aid in erosion prevention. Certain areas may be lopped to facilitate slash decomposition and aesthetic qualities. Broadcast burning will be limited to stable areas near ridge lines designated for fire suppression.

Operations will be conducted in such a manner that soil compaction and/or erosion will be minimized; Wet areas can be avoided by equipment and other activities related to timber harvest, and winter-time operations will be limited to only those activities that minimize

impact to soil and water resources.

Logging road, landing and tractor road construction can influence potential soil surface erosion. The FPRs contain numerous rules to minimize erosion through a variety of techniques and requirements.

3.2.5 Biological Resources

RFFI recognizes the importance of maintaining the forest's natural community while managing for timber products. We further recognize the importance of both aiding in the recovery of depleted biological resources while at the same time not causing the decline of other species. This plan identifies rare, threatened and endangered wildlife and plants that occur or have potential to occur within the plan area.

Management of the property will protect and maintain suitable habitats for the diversity of plants and animals of the area and recruit structural habitat elements utilized by these species. Operational guidelines provide for retention and recruitment of old trees, snags, downed logs, hardwoods, and structural diversity for wildlife habitat. Wildlife and plant species listed as rare, threatened or endangered under federal or state law have restricted entry areas and times which will be complied with.

"Throughout the region, along a typical transect progressing inland from the coast there is a narrow coastal bench with grassland and bishop pine (Pinus muricata), followed by a narrow 1-2 km wide strip of Douglas fir, redwood, and grand fir, with hardwoods, tanoak and madrone. Redwood continues as the major conifer until 12 km inland, after which Douglas fir predominates. Sugar pine enters the forest between 13 and 16 km from the coast. Black oak, madrone and tan oak dominate beyond 19 km, with Douglas fir the only conifer. The redwood belt is usually only about 16 km wide, and it is not always near the coast except as one approaches its southern limit. Hardwoods (except red alder) increase with distance inland" (Op cit. pg 684).

"After disturbance, there is a general increase in young stands of Douglas fir in the region, with age classes from 50 to 75 yr. These are invading either grassland areas near the coast or oak forests in the interior. The interior oak forests are gradually invaded by an understory of Douglas fir. In time these become oak-Douglas fir forests, with the Douglas fir gradually crowding the oaks to make pure young Douglas fir stands with an understory of oaks which gradually die out" (Op cit. pg 690).

Table 19.2. Vegetation type groups in the north coastal forests of California (Op cit. pg 685)

Physiognomy	Type	Dominant Species
Conifer forest	Fir-spruce	G, S, H, R
	Redwood-fir	R, G
	Redwood-Douglas fir	R, D
	Redwood	R
	Douglas fir	D
Conifer-hardwood forest	Redwood, Douglas fir, tan oak, madrone	R, D, T, M
	Douglas fir-hardwood	D, T, M, D, G
	Oak woodlands	G, B, T
Hardwood forest	Baccharis-coastal shrub	*Baccharis, Garrya, Ceanothus*
Shrub	Manzanita-chamise	*Adenostoma, Ceanothus*
Grasslands and fern prairie	Acid coastal grasslands	*Aira, Elymus, Danthonia, Rumex, Pteridium*
	Interior grasslands	*Bromus, Elymus*
Miscellaneous	Pine-cedar-cypress pygmy forest	J, I, *Cupressus sargentii, Arctostaphylos viscida*
	Redwood, sugar pine, hardwood	R, D, S, T, M

3.2.6 Literature Cited

Zinke, Paul J. (1977). The redwood forest and associated north coast forests. In Barbour, Michael G. and Major, Jack (Eds.), *Terrestrial vegetation of California* (pg 679-698). United States of America: Wiley Interscience.

3.3. TENURE AND USE RIGHTS

3.3.1 Conservation Easements, Deed Restrictions and Certifications

The 2011 Usal Redwood Forest conservation easement establishes the commitment of RFFI to ensure that the Usal Redwood Forest is maintained in a contiguous ownership in perpetuity. We believe that this is beneficial for habitat and timber management purposes.

A link to view or download a copy of the conservation easement is provided in Appendix G. The easement establishes basic deed requirements that were incorporated into the Forest Management Tenets described in this Forest Management Plan.

4. URFC COMPLIANCE WITH ALL APPLICABLE LAWS

The Usal Redwood Forest Company is unaware of any conflicts between applicable laws and regulations and the FSC Principles and Criteria. If a conflict arises, URFC will notify the certifying body and the FSC.

The Usal Redwood Forest Company complies with all applicable laws and regulations, including:

APPLICABLE REGULATIONS	
At the National and International Level	***At the State/Local Level***
Americans with Disabilities Act	California Civil Code Section 1008
Archaeological and Historic Preservation Act	California Endangered Species Act
Architectural Barriers Act	California Environmental Quality Act
Clean Water Act (Section 404 wetland protection)	California Fish and Game Code and California Endangered Species Act (CESA)
Endangered Species Act	California implementation of the Federal Clean Air Act
Forest Resources Conservation and Shortage Relief Act	California Tax Policies
Lacey Act	Mendocino County General Plan
Migratory Bird Treaty Act	Mendocino County Tax Assessment
National Environmental Protection Act	Native Plant Protection Act
National Historic Preservation Act	Porter-Cologne Water Quality Control Act
National Resource Protection Act	The California Forest Practice Regulations (FPR)
National Wild and Scenic River Act	Timberland Productivity Act
Native American Grave Protection and Repatriation Act	Williamson Act
Occupational Safety and Health Act	Z'Berg-Nejedly State Forest Practices Act of 1973
Rehabilitation Act	
U.S. ratified treaties, including CITES	

APPLICABLE REGULATIONS Continued

International Treaties and Agreements to Which the U.S. is a Signatory:

Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere (Washington, DC, 1940)

Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar, Iran, 2 Feb 1971)

United Nations Conference on the Human Environment (UNCHE) (Stockholm, Sweden, June 1972)

Convention Concerning the Protection of the World Cultural and Natural Heritage; (Paris, France, 16 Nov 1972)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (Washington DC, 1973)

International Plant Protection Convention (IPPC) (1979 Revised Text) (Rome, Italy, 1979)

Convention on the Conservation of Migratory Species of Wild Animals (Bonn, Germany, 23 Jun 1979).

5. INDIGENOUS PEOPLES' RIGHTS

5.1. POLICY

Local Native American tribes are our neighbors and are stakeholders in the success of RFFI and URFC. Many native peoples have a long history on these lands and have made their livings in the forests for generations, including in the wood products industry. As part of RFFI's commitment to community forestry, we have a responsibility to communicate openly and honestly with local tribes, provide them opportunities to provide input to our management activities and work with them to protect traditional activities and significant archaeological sites.

Management of the Usal Redwood Forest will recognize and respect the legal and customary rights of California's North Coastal Native American peoples and will be implemented in a way that minimizes potential impacts to Native American archaeological and historical sites. A key component of protection will be communication with tribal representatives prior to undertaking activities that could impact traditional uses. URFC and RFFI recognize that traditional uses of the Usal Forest by Native Americans may be extremely sensitive, and are committed to both protection of the use as well as maintaining the confidentiality of information shared by the tribes.

Consultation will be triggered by any activity at a recorded archeological site that could result in site disturbance. In addition, tribal representatives will be invited to participate in all public meetings sponsored or conducted by RFFI or URFC.

The goal in addressing historical sites is to protect these sites from degradation or destruction as part of our forest management. As required by the California Forest Practice Rules, archaeological surveys also include surveys for historical sites – when sites are discovered they are protected in a similar fashion to pre-historic archaeological sites.

5.2. NATIVE CULTURE AND ACCESS

Several local tribal members (Cahto, Wailaki and the Sinkyone Intertribal Council) attended community outreach meetings beginning in 2008 and expressed interest in preservation of archeological and cultural sites, along with access to acorns and other materials traditionally used. Early on, RFFI expressed interest in working with the tribes to create a "Native cultural easement" on the property, which could serve as a long term commitment to Native access to key areas for cultural uses.

RFFI and our forest manager have increased the level of interactions with local indigenous peoples through the notification process in Timber Harvest Plans (THP). Additionally, meetings have taken place with specific tribes as a way to open lines of communication between the organizations. Recent meetings have focused on acorn gathering, management of the forest, tribal relationships, and FSC certification.

6. EMPLOYEES

6.1. USE OF LOCAL LABOR AND EXPERTISE

Management of the Usal Redwood forest involves a host of activities, including harvesting, road construction and maintenance, restoration of terrestrial and stream habitat, and applied forestry. Consistent with RFFI's Basic Tenets and policy directives, actions taken to implement this Management Plan will prioritize and maximize social benefits to the local community wherever possible. Actions taken will strive to:

- Employ local labor and staffing for forest management and restoration activities;
- Sell logs to local sawmills of all capacities;
- Encourage market development for non-traditional forest products;
- Support traditional uses and cultural needs of native Americans;
- Engage stakeholders in forest management planning processes; and
- Encourage the use of the Usal Redwood Forest as a working laboratory for the benefit of education and science.

6.1.1 Employee Relations and Rights

RFFI and URFC can only achieve our objectives with the help of dedicated employees and contractors. To retain and attract creative, motivated people, URFC is committed to employee and contractor relations that will foster a safe workplace, attractive pay and benefits,

opportunities for personal development, and a chance to impact RFFI's and URFC's strategies and goals. RFFI and URFC are also committed to ensuring that employee and contractor rights are maintained.

6.1.2 Employee and Contractor Relations

RFFI and URFC currently employ a full-time President/CEO, Business manager and an Administrative Assistant, all who provide services for both corporations. URFC currently employs a forester staff of a Chief Forester, a Forest Operations Manager, a Forest Conservation Specialist and two Forest Technicians. This staff oversees the majority of the day to day operations of the Usal Forest.

URFC continues to hire contractors to provide specialty services on a regular basis. Such services include, but are not limited to, Wildlife and Biological surveys, Botanical Surveys, Certified Engineering Geologist, and Forestry services for our Carbon Offset project, additional inventory and Timber Harvest Plan layout.

In addition, all on the ground operations are contracted out to local Licensed Timber Operators, Heavy Equipment Operators, and other forest workers that provide tree planting and timber stand improvement services.

While the responsibility for developing contracts, soliciting bids, bid award and contractor oversight is administered by the RFFI/URFC staff, contractors who operate on the property receive appropriate briefings, orientation and training to ensure that project objectives are met.

Where timber harvesting, road construction, vegetative treatment activities, or other ground disturbing activities are to be conducted, additional briefing, orientation or training will be provided for contractors consistent with the Contractor Relations Policy outlined below.

CONTRACTOR RELATIONS POLICY

- Advise all contractors on company practices as they relate to specific forest management activities.
- Provide written direction on project objectives and specifications.
- Meet with contractor supervisors prior to initiation of contract activities.
- Communicate information clearly to logging contractors on harvest operations.
- Post contract completion review will be completed to assure adherence to THP and/or contract performance details.

6.1.3 Maintenance of Contractor and Employee Rights

RFFI and the URFC are active in ensuring that contractor and individual employee rights are recognized. Specific grievance procedures are required to be included in all contacts to ensure that contractors have appropriate avenues to address grievances. An example of existing URFC contract language is found in Appendix C.

Concerns or issues raised by contractors or employees will be promptly evaluated by the URFC Chief Forester and staff and addressed as appropriate or referred to the RFFI CEO/President, and if appropriate, referred to the RFFI Board of Directors for their consideration and action no later than their next regularly scheduled board meeting.

7. SOCIO-ECONOMIC SETTING AND PUBLIC INVOLVEMENT

7.1. DESCRIPTION OF SOCIO-ECONOMIC FACTORS

Part of the legacy of industrial forestry in the Redwood Region from the late 1800's to the 1990's was the aggressive harvesting of redwood and Douglas fir by large national corporations until the forests were increasingly depleted. Under pressure from regulators to change forest practices beginning in the 1970's, many of these corporations sold their lands, sometimes subdividing them for other uses. Often, the local communities that depended on forest jobs were negatively impacted by these practices. In 1997, RFFI was founded by Redwood Region community members who wanted to buy large tracts of depleted forest land and return them to forest health, sustainability and productivity.

For this reason, acting as a good neighbor and community member is a fundamental management objective of RFFI and the URFC. Forest management activities and traditional recreational use will need to be accommodated, while at the same time ensuring that impacts to infrastructure, wildlife, scenic values and water quality will be avoided.

Management activities on the Usal Redwood Forest will also be designed and carried out to reflect RFFI's intent to be a good neighbor. This will be reflected in planning and implementation of projects to ensure that domestic water supplies are identified and protected, activities are coordinated and consistent with traditional Native Americans uses, and concerns of neighbors are addressed, as appropriate.

7.2. ENGAGING THE PUBLIC IN MANAGEMENT PLANNING

Even before the 2007 Usal Forest purchase was complete, RFFI began community outreach meetings and developed an expanded community advisory group to help identify key issues and address those through the Usal Redwood Forest Management Plan development process, some of which are addressed below. The community advisory group consisted of approximately fifteen residents of the northern Mendocino and southern Humboldt area and included environmental activists, artists, filmmakers, self-employed portable mill operators, foresters, economic development professionals, recreational forest users, volunteer firefighters, parents and grandparents. From the beginning, there were both men and women who helped guide decisions with RFFI. Native Americans have also been invited and encouraged to join the

community advisor group to increase their connection to Usal Forest management decision making.

In 2008, RFFI (the Board along with the Community Advisory Group) hosted a series of small community meetings and two larger meetings in Fort Bragg and Redway to educate the public about RFFI, the Usal Forest transaction and the FSC certification process and engage them in identifying key issues they were interested in being actively involved in. Those issues included: Tan Oak Management and Herbicide use, Cultural considerations and Native access, and recreation/tourism access for the community and others. One of RFFI's primary concerns was, and continues to be, meeting the expectations of residents for access to the Usal Forest under non-profit ownership as a "Community Forest."

RFFI also began outreach to get input from the community about management tenets and silviculture practices that would guide RFFI's ownership management before there was even a project in sight. In the development of the Usal Redwood Forest Management Plan, RFFI engaged both a community advisory group and had public meetings to explain RFFI goals, talk about the structure of the Usal Forest purchase and management strategies and identify issues of concern beginning in early 2008. Notes from public and community advisory group meetings are maintained in RFFI's electronic archives.

RFFI is structured for ongoing community input through the members of our diverse community advisory group, known as the Redwood Forest Council, who interact with the Board of Directors both formally and informally. The advisory group meets at least six times per year and are invited to all URFC committee meetings as well as RFFI board meetings. All members receive most documents that staff and board members receive prior to these meetings.

The public will continue to be encouraged to participate in the development or revisions of plans that will impact the direction to be taken for management of the property or management of specific resources (i.e., Northern Spotted Owls, Road Management Plans, etc.). Opportunities for the public to participate are provided on the Redwood Forest Foundation website (www.rffi.org), at public meetings including the annual meetings, and by notifications to individuals and organizations on stakeholder mailing lists. RFFI has also created a stakeholder list of individuals and organizations with whom RFFI has engaged during the planning process. In addition to the list, RFFI maintains a database of more than 1,000 supporters who receive two newsletters annually as well as an invitation to attend the annual meeting. These lists are reviewed and updated yearly or as requests are made to add or delete parties from the list.

7.2.1 Web Postings

RFFI maintains a website accessible to the public that provides access to all current management documents and non-proprietary information and data. As part of the website, RFFI includes "News," "Community Input," and "Join" pages to provide information on meetings, post draft documents for review, etc. along with a portal or process for the public to comment on plans or raise concerns regarding management activities. Comments specific to a proposed draft document are solicited through the website as well as by other means.

Comments solicited about a specific document or project will be directed to the website through use of an on-line form to be developed and posted by RFFI for that purpose as well as through other means.

7.2.2 Public Meetings

RFFI's annual meeting is held in early summer and both the stakeholder list and the community list are used for outreach. The annual meeting is used to present an overview of past year accomplishments, present information regarding planned activities for the coming year and solicit public input.

Additional public meetings are also held as needed during the year to encourage and receive public input on Usal Redwood Forest restoration and management activities.

It is a RFFI goal to schedule all meetings at times and locations to maximize the opportunity for the public to participate. In general, meetings are held in the evenings or on weekends and located on the coast and inland Mendocino County. Periodically meetings are also held in southern Humboldt County as the property is along the Mendocino/Humboldt County line and interested communities exist in both counties. Generally, where public input is being sought on a programmatic document, the meetings are scheduled to run 2 to 3 hours with time allotted to presentations as well as breakout sessions to receive input and answer questions. In most instances, where new plans are to be developed or significant revisions to existing plans needed, the process involves both a scoping meeting to solicit comments prior to development or revision of the plan and a session to receive input on draft documents. Sessions may be facilitated. The goal of these meetings is to provide the baseline information on the change and to provide the majority of the meeting time for discussion and question and answer sessions. Notes from the meetings are maintained in RFFI's records and are available upon request.

7.2.3 Public Comment

Public comment may be received in any form. Public comments will also be captured at public meetings. Other forms of public comment, including letters and faxes, will also be accepted. All postings soliciting comments will include a timeframe during which comments will be received. RFFI staff will review comments and respond directly or, where appropriate, refer comments or questions to the RFFI Board of Directors for resolution.

7.3. KEY COMMUNITY ISSUES

A matrix of key community concerns raised in RFFI's public meetings since 2008 are included in Appendix F, Redwood Forest Foundation, Inc. Social Impact Analysis Community Input Summary.

7.3.1 Tan Oak Management and Herbicide Use

Herbicide use has long been a concern of residents, particularly those living close to the edge of an industrial timber operation. Even when assured that the products being used are only those approved for use in the State of California and that the applications are done responsibly, residents resist. The expectation for a "Community Forest" to avoid using herbicides is great.

RFFI immediately began outreach to other foresters in the region and engaged community members in tours of the property to discuss silviculture practices that could minimize or eliminate the use of herbicides. We have had several tours and have taken a group to Mendocino Redwood Company lands to see what experimentation they have done for vegetation management without using herbicides (with little or no success.)

To accommodate the period of planning and community education around hardwood management and control (to avoid the need for herbicides), RFFI placed on the Usal Forest a three-year moratorium on the use of herbicides. Logging in 2012 and 2013 was restricted to selection cuts in primarily redwood stands to further prevent the need for herbicides while we investigate our options. 2014 was the first year using Variable Retention as a practice for restoring the conifer-hardwood balance and an extensive girdling of hardwoods was done along with a clearing of all hardwoods in a ten-foot circle around harvested trees. Six years later, the moratorium is still in place. To date, no feasible alternative has been determined and RFFI has extended the moratorium to allow additional options to be explored. It is anticipated the moratorium will continue until the end of 2021, at which time it will be reevaluated.

7.3.2 Biomass Utilization

In partnership with the Mendocino Woody Biomass Working Group (WBWG), a community group working to identify ways to bring economics to bear on the challenge of managing excess forest biomass, RFFI submitted, and was awarded, a grant for a biochar conversion unit. During the planning process, the community voiced concerns about how much biomass was appropriate to take out of the woods. In response, University of California Forestry Extension agent Greg Giusti undertook a literature review and made a set of recommendations for managing biomass. On the Usal Forest, a demonstration plot was identified and hardwood trees were harvested according to the recommendations.

RFFI has provided tours of the site for community members interested in seeing our first harvest of biomass. The biochar machine has gone through in its pilot operation phase and created high quality biochar. The marketing of the final product, used as a soil amendment, has been challenging. Most other producers of biochar do so as a byproduct of another product, such as sawlogs and electricity. We continue to keep interested community members apprised of our progress in hardwood management both through the WBWG, the community advisory group, property tours, our annual meetings and newsletters.

7.3.3 Public Access

The Usal Redwood Forest has a history of use by local residents and groups for a variety of recreational activities, including fishing, hunting, hiking, biking, woodcutting and horseback riding. It is the intent of RFFI, wherever possible, to continue these traditional use on a permit basis. Permits specify the conditions of use and duration of permitted activities. Public access will be limited where active forestry activities are present, and where there is potential for damage to roads, adverse impacts to water quality, disturbance of wildlife, or a significant risk of fire danger.

Community members voiced a strong desire to create both recreation opportunities on the property and economic activity through tourism. In 2012, RFFI submitted a grant application to the State of California for funds to create an environmental camp and a Native Culture and Forest Ecosystem visitor's center on a tract near Highway 101. RFFI worked closely with tribal members as well as many other residents to design the proposed project, which carried an estimated cost of $8.8 million. This was RFFI's first attempt at responding to the desire to provide a cultural and educational experience for tourist driving on Highway 101 as well as to provide camping space for local use. We have had several tours with local outdoor adventure

guides scoping preferred trails and have engaged in discussions about a trail from Highway 101 to the coast through the Usal Forest as well as neighboring properties. The property is not yet open to the public except on a very limited basis, due to a lack of adequate staffing on the part of RFFI to create a program of access. We intend to accommodate public access as our capacity grows.

PUBLIC ACCESS POLICY

- Provide access to the Usal Forest as capacity allows by permit only to accommodate activities including: hiking; group events/camping; cross-country running events; mountain biking events; fee-based hunting; fishing; and collection of acorns, mushrooms, greens and basket making material.
- Manage designated areas for group use for event staging and develop a master recreation plan to guide recreational use of the property by individuals and groups that will balance public recreation needs with safety and protection of the environment.

7.3.4 Protection of Adjacent Recreation Areas and Scenic Corridors

The Usal Redwood Forest is adjacent to portions of CA Highway 1, the Eel River Scenic River corridor, the US Highway 101 view shed between Leggett and Piercy, the Sally Bell Grove, Sinkyone Wilderness State Park, Intertribal Sinkyone Wilderness, Standish-Hickey State Recreation area and other areas where forest management activities have the potential to adversely impact use. In addition, there are a number of landowners adjacent to or surrounded by the Usal Redwood Forest who could potentially be impacted by management activities. Management activities will be conducted in a manner that maintains view sheds and avoids impacts to recreational use, wherever feasible and provides the adjacent landowner(s) an opportunity to provide input to the planned activity. Planning and implementation of projects will be designed based on the policy outlined below.

POLICY FOR PROTECTION OF ADJACENT RECREATION AREAS AND SCENIC CORRIDORS

- Implement a Special Treatment Area within 200 feet of State Parks, the Sinkyone Wilderness State Park and Intertribal Sinkyone Wilderness that incorporates practices to minimize impacts while achieving project objectives.
- Plan activities within the view shed of Highway 101 to minimize visual impacts through management of opening size, canopy retention, etc.
- Minimize impacts to views from and directly adjacent to Highway 1.
- Advise all landowners within 300' of planned timber harvesting operations or herbicide applications at least 30 days prior to initiation of the activity (except in emergencies).
- Maintain a 200 foot Special Treatment Area on forestlands adjacent to Highway 1.

7.3.5 Protection of Domestic Water Supplies

Protection of domestic water supply sources will be given priority in all land management activities. Consistent with this objective, pre-project planning for projects other than timber harvesting will involve outreach to adjacent landowners, those within 1,000 feet downslope of the project who could receive overland flow from the project areas, and owners of known legal water diversions used for domestic purposes for the purpose of developing project implementation measures that will protect identified domestic water supplies. Procedures to be followed for notifications associated with timber harvesting activities will be consistent with current or future regulatory requirements. All riparian habitats will be protected to FSC standards. The following Riparian Protection matrix provides guidance to the harvest planners on FSC standard departures (emphasized in yellow) from required FPA requirements.

DOMESTIC WATER SOURCE POLICY

- Prior to implementing projects, other than timber harvesting, that involve the use of pesticides or will involve significant ground disturbance, notify landowners within 1000' downslope of the planned activity.
- Follow Forest Practice notification procedures for timber harvesting projects.
- Protect sources of domestic water with appropriate buffers, vegetative retention or other practices to be incorporated into project specifications.

Riparian Protection Matrix - FSC and CA FPRs

Stream	SMZ/WLPZ				Silviculture		Slopes		Classification Criteria
FSC Stream Category or FPR Class-Type	No-Harvest Core Zone	High Retention Inner Zone Width Ft.-Canopy%	Outer Zone Width Ft.	Total Width Ft.	Permitted Silviculture in Inner or Outer Buffer	Adjacent Silviculture Constraint	Side Slope Class	Estimated Occurrence of Watercourse Type on Landscape	Comments
A		**50**	**100**	**150**	**STS**		**Any**		**Fish Streams** or provides DWS
I	30	70'-OS80%	50	150*	STS/CT	If Even Age-VR requires an Outer Zone	Any		Fish-Bearing Watercourses or provides DWS
I	30	70'-OS80%		100	I-STS/CT	If STS/CT no Outer Zone	Any		Fish-Bearing Watercourses or provides DWS
I-FP	30	70'+	50	100+			Any		Fish-Bearing Watercourses Streams with Flood Prone Areas; much wider buffers could be required
B		**25**	**75**	**100**	**STS/GSel**		**Any**		**Perennial** non-fish
II-L	30	70'-OS80%		100	STS/CT		Any		Significant Perennial/Intermittent; drainage areas ≥ 100 acres /Only for first 1000'
II-S	15	85'-TC50%		100	Thin from below		>50%	85%	Smaller Perennial /Intermittent and on CII-L beyond 1000'
II-S	15	60'-TC50%		75	Thin from below		30%-50%	13%	Smaller Perennial /Intermittent and on CII-L beyond 1000'
II-S	15	35'-TC50%		50	Thin from below		≤30%	2%	Smaller Perennial /Intermittent
C				**75**	**STS**		**Any**		**Intermittent**
II-S	15	85'-TC50%		100	Thin from below		>50%	85%	Smaller Perennial /Intermittent
II-S	15	60'-TC50%		75	Thin from below		30%-50%	13%	Smaller Perennial /Intermittent
II-S	15	35'-TC50%		50	Thin from below		≤30%	2%	Smaller Perennial /Intermittent
D							**Any**		**Ephemeral**, no aquatic species
III				ELZ-50'	50 ft²/300pt.ct.		>30% slopes	85%	No Aquatic Species
III				ELZ-30'	50 ft²/300pt.ct.		<30% slopes	15%	No Aquatic Species

FPR - Forest Practice Rules
DWS - Domestic Water Supply
STS - Single Tree Selection
CC - Clearcut
GSel- Group Selection
CT - Commercial Thinning
OS - Overstory Canopy
TC - Total Canopy
OS - Overstory Canopy
ELZ - Equipment Limitation Zone

*50' wide outer zone STS or CT only
Departures from FSC Standard

7.3.6 Use of the Usal Forest for Scientific Research or Educational Purposes

RFFI and URFC are committed to the development of educational programs that will demonstrate the benefits derived from working forests that are managed for long-term sustainability.

7.3.7 Resolving Community Disputes

A key principle of the URFC Dispute Resolution Procedure is that disputes should be addressed at the lowest level possible, meaning between the parties most directly involved in the issue. Only when resolution fails at the lowest level should the next highest level be engaged. At each stage, parties with complaints should first seek to resolve their concerns in an informal fashion and then, if this fails, through a formal procedure.

In the event that a community member disagrees or has a conflict with URFC policy or decisions and cannot resolve it directly, they are encouraged to approach the RFFI President/CEO or a board member with their concern either by mail, email, telephone or face-to-face. This could include feedback received informally during meetings and field trips, concerns or issues raised in meetings or in one-on-one discussions. As outlined in the Monitoring and Assessment Section, the President/CEO or board member will complete a Stakeholder Input Form (Appendix D) and the President/CEO will be responsible for following up on the concern.

Informal Review

- Complete the Community Stakeholder Input Form (Appendix D)
- Submit the form to the RFFI President/CEO
- Meet with the President/CEO to seek resolution
- If appropriate, tour the Usal Forest
- If a large group, the President/CEO may conduct a public meeting
- Provide additional information, as appropriate

Formal Review

Review by the RFFI Board of Directors. Final review and disposition of all disputes is the responsibility of the RFFI Board of Directors.

8. ENVIRONMENTAL IMPACT

All RFFI forest lands will be managed to conform to FSC standards and guidelines.

8.1. HIGH CONSERVATION VALUE FORESTS AND REPRESENTATIVE SAMPLE AREAS

(see Appendix E for map)

Usal Redwood Forests High Conservation Values Areas (HCV) and Representative Sample Areas (RSA) comprise 5336 acres of Usal Redwood Forest, which is 11% of the total ownership.

Determining the HCV and RSA areas on Usal Redwood Forest began with a detailed look at what known sensitive and uncommon components and natural communities are in the geographic area of the ownership. Existing natural resource databases were reviewed and analyzed. Ownership managed GIS data reviewed in this process, included inventory data, aerial photography, harvest history, rare plant and sensitive natural community observations, archeological records, wildlife observations, and geological layers. Other natural resource databases were consulted to assess vegetative cover and sensitive biological resources on Usal Redwood Forest, including California Department of Fish & Wildlife's California Natural Diversity Database (CNDDB), USFS California Vegetation (CALVEG) Project and the Society of American Foresters (SAF) cover type classification system. Known local knowledge was also incorporated into the prioritization and compilation of areas assessed from databases to consider for HCV or RSA status. All potential areas were mapped and discussed at stakeholder meetings and open for comment and review. Input received during stakeholder meetings was considered in the designation of the final HCV and RSA areas.

Information from the USGS GAP Analysis Program's Protected Areas Database of the United

States (PADUS) version 1.2 was used to evaluate the protected status of nearby lands and identify potential areas that are underrepresented or inadequately protected and may warrant designation as a Representative Sample Area (RSA). Using the PADUS data and buffering the Property by 5 miles showed 35,005 acres in GAP status 1-3 land. An additional 7,451 acres are listed in PADUS as GAP status 4, but may in fact be managed in a way that would deserve a reclassification to 1-3. In total, almost 20% of the land surrounding the Usal Redwood Forest is protected.

Once all uncommon components and natural communities were identified from existing data, local knowledge and stakeholder input, areas were ground-truthed to fully assess and properly delineate community boundaries. The identification, ground-truthing, review and evaluation process culminated in the creation of a map depicting all potential HCVs and RSAs on Usal Redwood Forest. HCV and RSA features are tracked in two GIS layers, “HCV Classes” and “RSA” saved on the local GIS server in geodatabase (X:\GIS\URFCdata_20180717.gdb). Both layers are updated annually.

	Classification: HCVF or RSA	*Acres*	*Management Prescriptions*	*Monitoring Protocols*	*Other Known Reserves*
Type 1 Old Growth	**HCV**	**60**	**The roughly 60 acres are protected from harvesting, road construction and other timber management activities. The management objective is to prevent disturbance to the area.**	**Periodic monitoring will be performed using drone aerial imaging and photo points. Baseline photos will provide reference points for assessing changes in conditions.**	**Sinkyone Wilderness State Park Elkhorn Ridge Wilderness Area (BLM) Smithe Redwoods State Reserve Standish-Hickey State Recreation Area Reynolds Wayside Campgrounds Richardson Grove State Park Mattole River Ecological Reserve**
Type 2 Old Growth	**HCV***	**22**	**Harvests will only occur using single-tree selection with the goal of increasing mean stand diameter. All individual old growth trees will be retained in accordance with the Old Forest policy.**	**Periodic drone aerial imaging and photo points compared to baseline photos.**	**Sinkyone Wilderness State Park Elkhorn Ridge Wilderness Area (BLM) South Fork Eel River Wilderness Smithe Redwoods State Reserve Standish-Hickey State Recreation Area Reynolds Wayside Campgrounds Richardson Grove State Park Mattole River Ecological Reserve**
Grassland Openings	**RSA**	**90**	**Management activities in grasslands will be avoided to the extent feasible. Management activities to allow access to adjacent timber stands will occur only if no other routes are feasible. Consideration will be given to enhancement of the grasslands by controlling Douglas-fir encroachment.**	**Periodic drone aerial imaging and photo points compared to baseline photos.**	**South Fork Eel River Wilderness Elkhorn Ridge Wilderness Area Richardson Grove State Park**

	Classification: HCVF or RSA	*Acres*	*URFC Management Prescriptions*	*Monitoring Protocols*	*Other Known Reserves*
Humboldt milk-vetch	**HCV**	**0.25**	**The one known occurrence of Humboldt milk-vetch will be managed by protecting the seed bank from deleterious disturbance. Efforts will be made to limit disturbance to live plants until after seed set.** **Additional rare plant resources will also be protected from ground disturbing activity.**	**A survey will be conducted by a qualified biologist before any ground disturbing activity occurs.**	**Mendocino Redwood Company (Rockport Tract)** **Hawthorne Timber Company**
Class I and Class II Large Riparian Management Zone (L RMZs)	**HCV**	**3276**	**Management in these areas will be consistent with the California Forest Practice Rules.**	**The California Department of Fish and Wildlife monitors streams on a rotating five-year basis and provides reports. All of the streams have had baseline measurements that can be used comparatively after any disturbance to riparian areas. If monitoring of riparian zones shows declined conditions additional monitoring will be implemented to identify the issue and address the concern.**	**Sinkyone Wilderness State Park** **Elkhorn Ridge Wilderness Area (BLM)** **South Fork Eel River Wilderness** **Smithe Redwoods State Reserve** **Standish-Hickey State Recreation Area** **Reynolds Wayside Campgrounds** **Richardson Grove State Park** **Mattole River Ecological Reserve**
Mature Hardwood Stands	**RSA**	**50**	**Avoid conducting management activities in oak woodlands if feasible. Management activities to allow access to adjacent timber stands will occur only if no other routes are feasible. Seek opportunities to apply surrogates for natural disturbance agents (e.g. fire) within oak woodland areas. Decommission, close, and re-vegetate historic roads. Harvest encroaching Douglas-fir and avoid replanting the harvested area with conifers if feasible and cost- efficient.**	**Periodic drone aerial imaging and photo points compared to baseline photos.**	**BLM (inholding)** **South Fork Eel River Wilderness Elkhorn Ridge Wilderness Area**
Significant Archaeological Sites	**HCV**		**Avoid all potential site disturbing activities.**	**In the event of ground disturbing activities in the vicinity of known sites, monitoring will occur to ensure disturbance to sites does not occur.**	

	Classification: HCVF or RSA	*Acres*	*URFC Management Prescriptions*		*Other Known Reserves*
Northern Spotted Owl (NSO) Core Habitat	**HCV**	**1451**	**The goals of timber operations and activities conducted in the CHA are to: maintain or improve habitat through time and minimize negative impacts (i.e. noise and habitat impacts) associated with timber operations in order to prevent potential site abandonment.**	**A biologist will conduct annual landscape level monitoring and additional specific site monitoring when potential disturbance is planned in the area.**	
Red Alder Stands	**RSA**	**76**	**Management activities will be avoided to the extent feasible. Restoration activities that enhance the stands will not be limited. These restoration activities could include removal of nonnative species such as Eucalyptus.**	**Periodic drone aerial imaging and photo points compared to baseline photos.**	**Sinkyone Wilderness State Park**
Rocky Outcrops (Chimney Rock)	**RSA**	**12**	**Management activities will be avoided to the extent feasible. Management activities to allow access to adjacent timber stands will occur only if no other routes are feasible.**	**Periodic drone aerial imaging and photo points compared to baseline photos.**	**Elkhorn Ridge Wilderness Area**
****The two areas that are identified on the map do not meet the FSC definition of Type 2 OG. They are less than 20 acres.***					

9. FOREST COMPLEXITY AND DIVERSITY

9.1. OLD GROWTH STANDS AND INDIVIDUAL TREES

URFC recognizes its responsibility to protect and preserve components of its forest holdings that represent both the cultural or natural heritage of the region. We further recognize our responsibility to protect and preserve those aspects of the forest that are considered rare. The intent of this policy is to protect old growth stands and those components of an older forest that may be difficult to recruit in the near-term.

URFC acknowledges the work and energy that a number of individuals and organizations have given to establish a system of standards that have successfully facilitated the understanding and acceptance of old growth parameters and considerations. It is URFC's intent to use the *FSC-US Forest Management Standard (v1.0)* developed by the Forest Stewardship Council (FSC) as the foundation document for this policy.

9.1.1 Stands of Old Growth Trees

URFC has identified approximately 60 acres of FSC Type 1 old growth stands on the property. These acres will be permanently protected by URFC from harvesting. The Usal Forest also has approximately 22 acres of FSC Type 2 old growth stands where significant old forest characteristics are still present. The residual old growth trees and late successional characteristics of these stands will be protected and only those silvicultural treatments that will enhance or extend these stands will be considered.

9.1.2 Individual Legacy Trees

The remaining previously harvested URFC lands contain residual legacy trees that are scattered and in very low densities. In many cases, these trees are concentrated in or adjacent to riparian corridors and are protected by various elements of the California Forest Practice Rules. These trees, both near stream and upslope, will be preserved based on the following protection policy that is defined by size, function and structural characteristics specific to particular species or species grouping:

9.1.3 Retention Guidelines

Trees determined to have the following legacy tree characteristics shall be retained:

- Any redwood tree, 48" diameter at breast height (dbh) and larger, and with two or more age-related structural characteristics
- Any Douglas-fir tree, 42” dbh and larger, and with two or more age-related structural characteristics
- Any native hardwood tree, 36” dbh and larger
- Any tree (conifer or hardwood), 24” dbh and larger, with three or more age-related structural characteristics

In addition to the above, URFC may retain any tree (conifer or hardwood) exhibiting the presence of at least a single exceptional age-related structural characteristic.

The following criteria define age-related structural characteristics used to determine retention of legacy trees (each characteristic can be considered individually or in aggregate):

Redwood Age Related Characteristics

- Deep, plate-like bark patterns, with evidence of fire scarring
- Flattened, irregular or multiple broken crowns
- Complex lateral limb structure
- Highly reiterated crowns (multiple sprouting, replicated growth patterns)
- Large limbs, in excess of 6” in diameter
- Crown debris accumulation/canopy soil
- Platforms
- Deep cavities, living snag
- Presence of epiphytic ferns, bryophytes associations
- Basal hollows (cavities)

Douglas Fir Age Related Characteristics

- Bark deeply fissured
- Evidence of fire scarring (cavities, basal hollows, etc.)
- High presence of lichens and moss, with crown soils and ferns present
- Large lateral limbs in excess of 8" in diameter
- Fattened, irregular crowns with lower limbs with signs of decay and crown thinning
- Conks or other visible signs of internal decay
- Large multiple boles
- Crown debris accumulation
- Presence of epiphytic ferns, bryophytes associations

Hardwood Age Related Characteristics

(Tanoak, Quercus spp., Pacific madrone, California bay, Golden chinquapin, Big-leaf maple, etc.)

- Deep cracks or fissures in the bark
- Multiple branching crowns
- Presence of hard or soft mast (acorns, berries, etc)
- Platforms
- Large basal cavities
- Snags
- Cat-facing or basal burn cavities

9.1.4 Exceptions to Retention

Only in rare circumstances will the cutting and/or removal of trees with specified legacy tree or age-related structural characteristics be required (e.g., road/landing construction, rock pit development, cable corridors, or for other workplace safety considerations). Under the unusual circumstance when such trees would be cut, they will be retained in the forest to provide large wood on the forest floor or utilized in aquatic enhancement projects.

10. FOREST RESOURCE PROTECTION

10.1. MINIMIZING THE USE OF FOREST PESTICIDES

In July, 2013, the RFFI Board of Directors declared a three-year moratorium on the use of chemical herbicides as a vegetation management tool in the Usal Forest. RFFI used those three years to experiment with alternative methods of vegetation management. No feasible alternative was determined during that time and RFFI has extended the moratorium to allow other options to be explored. It is anticipated the moratorium will continue until the end of 2021, at which time it will be reevaluated.

It is the intent of this plan to establish a future forest structure that will not utilize silvicultural prescriptions that rely on repeated chemical application for their success. However, due to the extent of existing hardwood competition on the Usal Forest, URFC reserves the option of using herbicides where necessary to restore these stands to conifer dominance. The FPRs also require

the site occupancy provided by Group A species (conifers) shall not be reduced relative to Group B species (hardwoods). Regardless, the use of this vegetation treatment approach will not eliminate hardwoods from the landscape given the other conservation standards incorporated into the plan.

If chemicals are used, proper equipment and training shall be provided to minimize health and environmental risks. A licensed Pest Control Advisor (PCA) shall be utilized to prescribe vegetation treatment standards. An individual with a Qualified Applicators License (QAL) shall be utilized to conduct the vegetation treatment prescribed and as specified on the label of the product used.

10.2. PROTECTING THE USAL REDWOOD FOREST FROM FIRE, INSECTS AND DISEASE

10.2.1 Protection Measures to Minimize Impacts of Pests & Diseases

Management practices will maintain pests and pathogens at endemic levels. Where pests, pathogens, or diseases are significantly affecting the forest's condition, chemical measures will not be relied upon to control their spread unless they are the only alternative. Control methods may include: harvest, slash lopping and scattering; and control of movement of pathogens either into or away from the site; and predator introduction. Regular monitoring will indicate the success of the control strategy.

Fomes pini, a fungus disease also known as white pocket rot or conk, is an endemic disease occurring throughout coniferous forests; and in the West is considered to be the most damaging heart rot organism. Douglas-fir is the tree most commonly infected, particularly those which are suppressed or over-mature. To reduce or minimize this disease, infected, declining or suppressed Douglas-fir trees are removed during logging entries. If the disease is present, Douglas fir should be harvested at no later than 80 years of age. However, some larger, defective trees should be left for wildlife use.

Leptographium wageneri v. pseudotsugae, or black stain root disease of Douglas fir, is also an endemic fungus in the Western United States. This fungus does not cause rotting of wood, rather, this fungus attacks the roots and spreads throughout the sapwood of the roots and lower tree bole. The disease causes a decline in the tree crown, with subsequent reduction and size of needles, which leads to eventual tree death. Black stain attacks trees of all ages, and often causes small pockets of timber in the forest to die, since the disease can be spread through root grafts.

There is some evidence that black stain is aggravated by disturbance, such as pre-commercial thinning or logging; therefore, future timber marking and inter-planting decisions may depend, in part, on the potential effects of this disease. For instance, if black stain pockets develop, they should be regenerated with another species, if the site permits, in order to minimize the effects of this disease and maximize stocking.

Sudden Oak Death: Of current concern with tanoak, true oaks, and many other forest species, is the disease "Sudden Oak Death" caused by the fungus *Phytophthora ramorum.* The leaves of infected trees turn brown all at once, and the tree dies. Not much is known about the disease, but apparently the greatest known threat for spreading the disease is through movement of infected foliage (especially California laurel) and small diameter (less than 4") woody material. There is also a potential for fungal spread via wet soil encrusted onto mobile equipment.

Considerable research on this disease will provide new information. For the time being, RFFI will adhere the Department of Forestry directives to minimize this disease:

- Conduct a visual survey of the property and contact CAL FIRE if any symptoms are observed.
- If an infection is known on the property, all equipment and vehicles associated with the operation will be cleaned of all foliage and small diameter woody debris and soil prior to leaving the site.
- The small diameter material should be left on site. If the small diameter material is to be chipped, it should be left on site, with some non-host material run through the chipper to help clean out the host material. Alternatively, small diameter material may be transported in closed containers.
- No host firewood should be removed from the plan area if the plan is within 1/4 mile of a known infected site.
- If unprocessed wood is to be transported to an unregulated county (outside of the Zone of Infestation), the receiving county's Agricultural Commissioner will be contacted to approve of the shipment or method of shipment/transportation.

Pine Pitch Canker: Pine Pitch Canker has been detected in Mendocino County and is recognized through a declared Zone of Infestation. Pine tree removal and slash treatments will follow pre-scribed regulatory guidelines.

10.2.2 Protection Measures to Reduce Fire Risk

Management activities to be conducted on the Usal Redwood Forest have the potential to increase fuels and increase risk and intensity of wildfires. For this reason, projects are designed and carried out to: (1) reduce fuels and fire hazard adjacent to roads and near structures; (2) reduce hazards associated with human activities and project treatment; and (3) reduce potential impacts associated specifically related to harvesting activities.

Hazard Reduction Adjacent to Roads, Landings and Structures

Landing slash in tractor yarded areas will be spread and crushed on skid trails where feasible. Within cable units, landing slash may be piled and burned, but spreading and crushing is preferable, where possible.

In addition, slash generated within 100' of residences will be removed and slash between 100' and 200' of residences will be treated by one of several methods (burning, lopping, burying, chipping, or removal).

Creation and Maintenance of Strategic Shaded Fuel Breaks and Fire Breaks

Shaded Fuel breaks are strips of land where the vegetative fuel, primarily small shrubs, trees and downed logs, have been modified to reduce the ability of a fire spread. This is primarily achieved by removing the more flammable understory and leaving the more fire resilient over story. A fire break is a strip of land where all organic and vegetative material is removed down to mineral soil. This denies a fire any fuel, thereby cutting off the potential for a fire to spread. Typically, firebreaks tend to be smaller in width than a shaded fuel break. Both form of fire protection need regular maintenance to keep functioning.

Several major north-south and east-west trending ridges make ideal location for shaded fuel breaks and fire breaks. Priority for construction of shaded fuel breaks and fire breaks should be on the dividing the property by focusing activities on the WRP Ridge and the Yokahoma divide. Other high prioties would be along Highway 1 and near the Riest Ranch. Once the original breaks are in place, emphasis should shift to the smaller east-west trending ridges, to further divide the property into reasonable defensible areas.

Hazard Reduction Adjacent to Roads, Landings and Structures

Landing slash in tractor yarded areas will be spread and crushed on skid trails where feasible. Within cable units, landing slash may be piled and burned, but spreading and crushing is preferable, where possible.

In addition, slash generated within 100' of residences will be removed and slash between 100' and 200' of residences will be treated by one of several methods (burning, lopping, burying, chipping, or removal).

General Fire Protection Measures Applicable to Forest Management Activities

Fire hazard increases with increased levels of human activity and related ignition sources from smoking, equipment, warming fires, etc. As such, forest management activities to be conducted on the Usal Redwood Forest have the potential to generate activity related fuels, which can increase fire hazard and fire behavior. These impacts can be mitigated or reduced through the use of management practices, such as timber stand improvement projects which reduce ladder fuels and/or reduce total standing fuel by thinning of dense stands and retention of thrifty, larger more fire-resistant trees. Forest management operations will be planned and implemented to minimize the potential increased fire hazard associated with forest management activities. Projects will be planned and implemented to incorporate the appropriate protection measures based upon the project type:

- Avoidance of injury to trees by careful equipment use
- Disposal or lopping of slash to reduce fuel depth and insect breeding material
- Use of selective cutting to regulate composition and density of the stand (reducing moisture stress and competition, thereby improving growth rates and stand health)
- Pruning of trees adjacent to roads and lopping of branches to retard vertical fire spread and fuel buildup
- No smoking while traveling, working or moving about. Smoking shall not be combined with any other activity, but confined to a rest period in a safe place on roads, cleared landings or other areas of bare soil at least three feet in diameter. Burning material shall be extinguished in such areas before discarding.
- Vehicle drivers shall keep a serviceable shovel at least 46 inches in total length, an ax, and a fully charged fire extinguisher with at least a 1A:10B:C rating (2 ½ lb. capacity), in their vehicle and must be sure the vehicle muffler is in good working condition.
- Under no conditions will warm-up fires be permitted during the dry season when burning permits are required. Campfires are not permitted, except by written permit from RFFI.
- Chainsaws shall be equipped with approved spark-arrestor screens installed inside the muffler at the exhaust port. A serviceable fire extinguisher must be located within 25

feet of the point of operation.

Fire Protection Measures Specific to Logging Operations

Specific prevention and protection measures specific to logging operations include, where appropriate:

- Prior to beginning timber operations when burning permits are required, notices setting forth the procedures regarding smoking and matches, lunch and warming fires shall be posted in sufficient quantity and location throughout the logging area so that all employees and other persons employed by them are informed of such procedures.
- Timber operators shall provide for diligent supervision of such procedures throughout the conduct of their operations.
- A sealed firebox shall be located on a landing within the operating area in close proximity to the active portion of the operation. The firebox shall contain one operational five-gallon backpack pump-type fire extinguisher filled with water, two axes, two McLeod fire tools, and a sufficient number of shovels (at least 46 inch handle) so that each employee at the operation can be equipped to fight fire.
- At least one serviceable chainsaw of three and one-half horsepower with a cutting bar 20 inches in length or longer shall be immediately available within the operating area.
- During the period when burning permits are required, all tail and side blocks on a cable setting shall be located in the center of an area that is either cleared to bare mineral soil 15 feet in diameter or covered with a fireproof blanket that is at least 15 feet in diameter. A shovel and an operational full five-gallon back pump or fire extinguisher bearing a label showing at least a 4A:60:BC rating (10 lb. capacity) must be located within 25 feet of each such block before yarding.
- Cutting and welding during any time of year when burning permits are required shall only be conducted after doing both of the following:
  - First clearing away all flammable material, including snags, from the area around such operation for a distance of ten feet; and
  - Maintain one serviceable round point shovel with an overall length of not less than forty-six (46) inches and one operational backpack pump water-type fire extinguisher fully equipped and ready for use at the immediate area during the operation.
- During the dry season when burning permits are required, all logging roads shall be kept in a passable condition for fire truck travel.

10.2.3 Minimizing Impacts of Invasive Species

The purpose of RFFI's invasive species plan is to describe the actions taking place in the Usal Forest to control invasive species. It would not be feasible or cost-effective to control all non- native species occurring in the forest. URFC has compiled a list of targeted invasive species in order to prioritize species for control. These species will be managed in a variety of ways based on their threat level to the forest and its sensitive resources. Management objectives for URFC currently are to not use toxic chemicals for invasive plant species control.

The challenge of addressing and managing invasive species in California has been, and will be, a constant issue for resource managers. The mobile and transitory nature of our culture provides ideal opportunities for normally sedentary organisms to be moved across town, cities, continents and oceans. The need to address invasive species touches on all of the principle tenets of the RFFI forest model. Invasives can impact: the economics of forest management (cost of control or eradication); the environment (displacement of native species); and social concerns (increase use of chemicals to control or eradicate species). Prevention is always the best management option and some invasive species can be managed for preemptively through prescribed practices that minimize the risk of their movement, e.g., Sudden Oak Death. However, no prevention procedure is fool-proof, as many of these species are "invasive" based on their opportunistic nature to get established populations, e.g., feral hogs and bull frogs. Though this plan addresses plants extensively, RFFI is committed to limit the risk and spread of all taxa of invasive species: plants, vertebrates, invertebrates, insects, and pathogens.

Target Species for Management

This targeted species list was created from the larger list of all known non-native species in the Usal Forest. Timber Harvesting Plan (THP) botanical surveys have occurred on the Usal Forest since 2001. During these surveys, all floristic species encountered are recorded. Additional invasive plant specific surveys have taken place to assess and record the distribution of some of the more prominent invasive species like broom and pampas grass.

These efforts, along with consultation with regional experts and review of published material, led to the creation of a target invasive species list. Many of the non-native species found in the Usal Forest were rejected from the target species.

Target Species List

SCIENTIFIC NAME	COMMON NAME
Centaurea solstitialis	yellow starthistle
Cortaderia jubata	Jubata grass
Cotoneaster franchetii	orange cotoneaster
Cotoneaster lacteus	Parney's cotoneaster
Cotoneaster pannosus	silverleaf cotoneaster
Cytisus scoparius	Scotch broom
Delairea odorata	Cape-ivy, German-ivy
Eucalyptus globulus	Tasmanian blue gum
Genista monspessulana	French broom
Hedera helix, H. canariensis	English ivy, Algerian ivy
Ilex aquifolium	English holly
Spartium junceum	Spanish broom
Ulex europaeus	Gorse
Vinca major	big periwinkle

Species Considered but Rejected (scientific name and common name)

Agrostis stolonifera creeping bent-grass
Aira caryophyllea silver European hairgrass
Aira praecox little hairgrass
Anthoxanthum odoratum sweet vernal grass
Avena barbata slender wild oat
Avena fatua wild oat grass
Bellis perennis English daisy
Brassica nigra black mustard
Brassica rapa field mustard
Briza maxima large quaking or rattlesnake grass
Bromus diandrus ripgut grass
Bromus hordeaceus soft chess
Bromus japonicus brome grass
Bromus tectorum cheat grass
Cakile maritima sea rocket
Carduus pycnocephalus Italian thistle
Carpobrotus chlilensis sea fig
Cirsium arvense Canada thistle
Cirsium vulgare bull thistle
Conium maculatum poison hemlock
Convolvulus arvensis field bindweed
Cupressus macrocarpa Monterey cypress
Cynodon dactylon bermuda grass
Cynosurus echinatus hedgehog dogtail grass
Dactylis glomerata orchard grass
Daucus carota wild carrot or Queen Anne's lace
Digitalis purpurea foxglove
Dipsacus fullonum wild teasel
Dipsacus sativus Fuller's teasel
Erechtites glomerata cut-leaved coast fireweed
Erechtites minima toothed coast fireweed
Erodium botrys long-beaked storksbill
Erodium brachycarpum long-beaked filaree
Erodium cicutarium red-stemmed filaree
Erodium moschatum storksbill
Festuca arundinacea tall fescue
Foeniculum vulgare fennel
Geranium dissectum cut-leaved gēranium
Geranium molle dovefoot geranium
Holcus lanatus common velvet grass
Hordeum marinum ssp. *gussoneanum* Mediterranean barley
Hordeum murinum barley
Hordeum murinum ssp. *glaucum* wild barley
Hordeum murinum ssp. *leporinum* barley
Hypericum perforatum Klamath weed or common St. John's-wort
Hypochaeris glabra smooth cat's-ear
Hypochaeris radicata hairy cat's-ear
Leucanthemum vulgare ox-eye daisy
Lolium multiflorum Italian ryegrass
Lotus corniculatus birdfoot trefoil
Lupinus arboreus
Medicago polymorpha bur clover
Melilotus officinalis yellow sweetclover
Mentha pulegium pennyroyal
Myosotis latifolia forget-me-not
Oxalis corniculata sorrel
Parentucellia viscosa yellow parentucellia
Phalaris aquatica Harding grass
Picris echioides bristly ox-tongue
Pinus radiata Monterey pine
Plantago lanceolata English plantain
Poa pratensis Kentucky bluegrass
Polypogon monspeliensis rabbitfoot grass or annual beard grass
Ranunculus repens creeping buttercup
Raphanus sativus wild radish
Rubus armeniacus Himalayan blackberry
Rumex acetosella sheep sorrel
Rumex crispus curly dock
Senecio jacobaea tansy ragwort
Silybum marianum milk thistle
Sonchus asper ssp. *asper* prickly sow thistle
Taraxacum officinale dandelion
Torilis arvensis field hedge-parsley or rattlesnake weed
Trifolium hirtum rosy clover
Verbascum thapsus wolly mullein
Vulpia bromoides six week fescue
Vulpia myuros annual fescue

Mapping and Data Collection

High-quality maps of infestation areas are vital to monitoring and controlling invasive species. Efforts are underway to map the extent of the most dominant target species on the Usal Forest. While it will

take several years for the resolution to become clear, preliminary data is already informing management decisions. Geographic extent and population estimates are recorded by species in a GIS layer.

Management Options

There are a currently two methods used to combat invasive species, mechanical removal/cutting and manual removal.

INVASIVE SPECIES MANAGEMENT: NON-CHEMICAL TOOLS
Prevention: Preventing the introduction and spread of invasive species in the Usal Forest is the most desirable outcome. Many of the activities that occur in the forest, such as road opening, create conditions favorable for invasive species. Precautions will be taken when soil disrupting activities are conducted in areas that may have established seed banks of invasive species. When large areas of exposed soil are created, mulch or native seeds will be used to prevent new infestations of exotic species.
No Treatment: It may be more practical to choose not to treat target species in some areas of the forest. There could be a variety of reasons for not treating an area, including proximity to sensitive species, rugged terrain, and a low threat of spread.
Early Detection: Once a species has become established it becomes more difficult and expensive to manage that location. Early detection is key to efficient management of new outbreaks. Field staff and botanical contractors are trained and will continue to be trained in the identification and reporting of invasive species to aid in early detection. Detections will be forwarded to the forest management staff botanist for inclusion in the GIS layer.
Manual removal: Manual removal will be used in areas of the forest where sensitive resources are present and when a sizable crew is available to efficiently and manually control the spread of an invasive species.
Mechanical: Mechanical methods can be an effective tool in many locations. The mechanical system most often used is mowing, though a masticator is occasionally used to control invasive broom species. Although mowing or mastication does not always result in mortality of the invasive species, it does control invasive species populations by limiting growth and slowing the spread. We plan mechanical treatments during the spring prior to seed development on invasive species.
Fire: Targeted use of fire can be an effective tool for controlling some target species during certain life stages. The use of fire on the Usal Forest will be very limited due to the inherent danger.

Bio-control: Biological control may be successful in some applications. Grazing by livestock can play a valuable role in controlling some invasive species. Of course, any introduced species will change the dynamics of the system. Therefore, more investigation is required before introducing any biological agents into the Usal Forest.

INVASIVE SPECIES MANAGEMENT: CHEMICAL TOOLS

Chemical control can be effective and economical, and has been used in the past, but may also have undesirable side effects. It is the long-term desire of RFFI and URFC to establish a forest system that is not dependent on the use of herbicides. As mentioned above, in July, 2013, the RFFI Board of Directors declared an indefinite moratorium on the use of chemical herbicides as a vegetation management tool in the Usal Forest. RFFI has been using non-chemical methods of vegetation management since then.

10.3. SILVICULTURE AND REGENERATION

The management objectives in this section support RFFI's Forest Management Tenets *(see Section 2.2* RFFI's Basic Tenets Associated with All Forest Management Activities*)*

RFFI's objectives for implementation of forest management activities are to manage, conserve, and protect the URFC forests through development of larger and older stands that more closely reflect a historical mix of conifers, hardwoods and age classes. RFFI recognizes that forestland management is not only about trees: it also needs to consider the people living adjacent to the forestlands and, as discussed above, the plan encompasses issues such as: enhancing the social and economic well-being of forest workers and local communities; recognizing and respecting the rights of indigenous peoples' use and management of lands; and encouraging the efficient use of multiple forest products and services. A transition/return to historic conifer dominance helps address these issues.

Consistent with these forest management objectives, the following provide direction on use of silvicultural options compatible with the 2011 Usal Forest conservation easement, management philosophy, state and federal laws and restoration of natural landscapes. Silvicultural applications are applied to both insure adequate regeneration of future timber stocks and as an approach that mimics disturbance regimes that can facilitate habitat-forming processes. While the goal is to conduct economically viable harvests at each entry, it is recognized that initial investment (e.g., hardwood treatment or tree planting) may be necessary to place stands on a trajectory toward their desired future condition of increased conifer stocking over time.

10.4. OVERVIEW OF URFC FOREST SILVICULTURE

APPLYING FOREST MANAGEMENT TO ENHANCE, RESTORE, AND PROTECT THE USAL REDWOOD FOREST

- Provide forest management guidance for selection and other silvicultural systems to restore the forest to an uneven-aged stand structure, increase conifer site occupancy and average stand diameter and basal area in trees greater than 12" in diameter.
- Increase the acreage in late seral forest, improve wildlife habitat and retain important habitat structural elements.
- Retain a hardwood component in managed stands.
- Achieve a sustainable output of high-quality timber products with concomitant maintenance/production of wildlife trees, downed wood, and other structures for wildlife habitat.
- Invest in forest improvement practices.
- Eliminate the use of even-aged silvicultural prescriptions within 60 years.
- Control erosion related to current management activities to ensure protection of water quality, instream habitat and roads.
- Maintain an economically viable level of harvest to support management activities and meet financial obligations.
- Monitor forest inventory and growth and revise harvest and yield projections as necessary to reflect new scientific or technical information.

10.4.1 Provide Forest Management Guidance for Selection and Other Silvicultural Systems and Restore Forests to an Uneven-aged Stand Structure

Existing stands which regenerated after past harvesting activities are primarily even-age in structure with a high level of hardwood stocking. Transitioning from an even-age structure to an uneven-age structure will require both time and careful application of both even-age and uneven-age silviculture prescriptions to reset existing stands. RFFI is committed to, and required by the conservation easement, to eliminate the use of even-aged prescriptions within 60 years.

Overview of Silvicultural Systems to be Used for Management of the Usal Forest

A number of silvicultural systems will be applied to transition existing stands from the current largely homogenous structure to a heterogeneous structure.

The combination of silvicultural methods and harvesting systems will be selected based on their ability to maintain and facilitate regeneration of desired native species while maintaining the appropriate ecological services.

The key to uneven-aged management lies with the development or maintenance of multiple age classes with a range of diameter classes and species. Smaller diameter trees must be healthy, vigorous young timber and saplings in order to ensure recruitment into

larger merchantable diameter classes. These age classes provide a recruitment source for sawlog size timber, and are vital to the success of the silvicultural system. Pole timber will serve to bridge the gap between the harvest of older young-growth trees and the maturation of young saplings. Continuity of timber supply is assured across the Usal Forest because the young timber will be ready to be thinned at a time when the older timber will have grown into the larger diameter classes and are ready for havest.

General Silviculture Selection Logic

Selection of the appropriate silviculture will be guided by existing stand conditions with the key criteria being stocking expressed in terms of basal area of conifers and hardwoods. Specific silviculture methods will also be categorized consistent with California Forest Practice Regulations, which specify minimum retention standards and stocking requirements for areas harvested.

Silvicultural methods to be used are more generally described here:

Uneven-aged Management (Selection, Group Selection and Transition)

Initial stand structure, species composition and conifer stocking level will dictate which specific silvicultural method will be applied to each stand. The long term objective for the Usal Redwood Forest managed stands will be to create stand conditions in the future or maintain stand conditions where they currently exist that are reflective of UFRC objectives to achieve uneven-aged stands across the landscape, increase canopy closure, stand density and tree size.

Long term objectives for post-harvest stand density will be to retain a minimum of 125 ft^2 of conifer basal area, maintain a J-shaped diameter distribution and assure retention of sufficient larger diameter trees to support sustainable harvesting entries on a 10 to 20 year cutting cycle. Generally, individual tree selection will be conducted in areas with higher conifer stocking (i.e., > 125 ft^2 of conifer basal area). Group selection will be applied in areas where regeneration and younger age classes are absent and transition harvesting will be applied in areas with lower levels of conifer stocking (i.e., in stands with 85-125 ft^2 of conifer basal area).

Stand structure objectives include higher retention of small diameter classes to account for mortality over time. Thus, a graph of a desired uneven-aged stand would assume the shape of an "inverse- j" curve, with the highest part of the curve at the small diameters, which slopes lower toward the larger size classes.

A typical silvicultural prescription in the initial entry is to concentrate on reducing slightly the suppressed trees in the smaller size classes, while adjusting spacing of trees in the larger size classes. Classical uneven-aged management requires the choice of a “target” diameter class (D) in which trees will be harvested. For the Usal Forest, generally, the target diameter class of 36 inches dbh for redwood and 28 inches dbh for Douglas-fir has been chosen. While this target diameter class will be used as a general guide, it does not preclude the retention of individual larger diameter trees of excellent form and growth characteristics and those with structural characteristics for use by wildlife.

Intermediate Treatments (Commercial Thinning, Sanitation-salvage)

The commercial thinning method will generally be used in younger stands that are overstocked and in need of stocking control to prevent subsequent growth from being transferred to too many stems, as opposed to desired crop trees. One applicable stand condition would include Douglas-fir dominated stands in the medium to lower site classes. FPRs allow two different stocking standards to be utilized depending on tree diameters of dominant and co-dominant crown canopy.

The commercial thinning method is an intermediate treatment in overall stand development and can be followed by either even-aged or uneven-aged silvicultural methods.

In commercial thinning, spacing will be adjusted within aggregations of trees, retaining the most vigorous trees to promote timber growth and/or improve forest health. Increasing or maintaining average stand diameter of residual crop trees is a secondary objective.

The sanitation-salvage method will primarily be utilized where stand vigor has deteriorated due to drought and/or subsequent insect attack or disease. Severe wind and fire events may also lead to use of this method.

Even-aged Management (Variable Retention, Seed Tree and Shelterwood methods)

These methods result in forest stands in which the dominant trees have originated at about the same time following a period of establishment. Regeneration will be principally artificial (i.e., planted seedlings), although stump sprouting and seed fall also will contribute. Note: Variable Retention is a Special Prescription under the California FPRs.

Although a goal of URFC is to reduce use of these methods over time, the level of conifer stocking, species composition, and stand structure will dictate the applicability of these methods. Many existing stands are hardwood-dominated, especially in the northern and eastern portions of the property.

Where low conifer stocking (i.e., < 50% of total stand basal area or < 85 ft^2 of conifer basal area) or poor stand vigor exists, even-aged management may be utilized. Harvesting shall be designed to improve future growing conditions and shall maintain areas and/or elements of forest structure while placing the majority of the harvest unit on track to achieve full stocking.

Even-aged regeneration step harvests (exclusive of Class I and Class II watercourse and lake protection zones) shall retain a minimum of 15 percent conifer and hardwood aggregated by area or dispersed by basal area post-harvest.

In harvest units that will be using variable retention (VR), as defined by the Forest Practice Rules and THP guidelines, the retention will include both dispersed and aggregated retention to support biodiversity and forest resilience. A combined long-term retention of a minimum of 15% will be maintained for 20+ years or longer as required by the FPA/THP. The variable retention above 15% (non long-term) will be managed as needed for improving forest vigor and biodiversity.

Guidelines for dispersed long-term retention: Trees, principally conifer, will be vigorous, co-dominate (or better) found in the upper 1/3 size class. Trees providing protection, unique habitat or biodiversity (not suppressed) will also be incorporated

(example chinquapin or trees with large cavities).

Guidelines for aggregated long-term retention: Forest areas that reflect the species, size and age of the harvest unit will be identified, mapped and not commercially harvested. These areas may be located on unstable areas, special buffers, steep slopes or headwalls. Limited management activities within the aggregated retention will be only for improving forest resilience. A limited management example - reducing the number of small stems in a "dog hair" Douglas fir thicket.

Alternative Prescriptions

Alternative prescriptions will be used where one of the other standard methods or prescriptions do not fit the conditions of the stand. It is anticipated that the principal prescription will be one that overlays two existing methods across the stand (e.g., commercial thinning and seed tree removal).

General Timber Marking Guidelines

See Appendix H (Usal Redwood Forest Marking Guidelines) for specific timber marking guidelines for the above mentioned silvicultural methods.

10.4.2 Increase Acreage in Late Seral Forest, Improve Wildlife Habitat and Retain Important Habitat Structural Elements

Consistent with RFFI's intent for management of the Usal Redwood Forest, all silvicultural applications will retain or recruit a component of large, old trees relative to the existing distribution.

In order to speed the transition to late seral stage forest conditions, it will be important to retain exiting habitat elements during the conduct of timber harvesting operations or other forest management activities. To achieve this goal, the following marking guidelines are to be utilized:

Suppressed or defective trees will be individually evaluated, retaining those that have multiple structural wildlife habitat characteristics. Decadent and deformed trees of value to wildlife (14CCR 895.1 of FPRs) and snags may be utilized to meet stocking standards as permitted in the FPRs.

Late seral recruitment strategies will be concentrated adjacent to watercourses, within the riparian areas, and within appropriate sites within the management matrix. Decadent old growth residual trees with multiple structural characteristics of benefit to wildlife or trees exhibiting single exceptional attributes will be retained across the ownership. For example, late seral trees with basal hollows on a ridgetop are known key habitat roosts for both resident and migratory bats.

Snags are important wildlife habitat elements. For snag recruitment, live culls and existing snags are to be retained except where they pose a bona fide safety or fuel-loading hazard. At a minimum, for uneven-aged units, the snag retention/recruitment goal is at least 1 snag > 10" dbh of either hardwood or conifer species per acre. Snag retention/recruitment trees will not be marked for harvest or will be marked for retention.

It is not expected that these retention trees will be equally distributed across the landscape. For even-aged units, the snag retention/ recruitment goal is at least 2 snags>16" dbh of either hardwood or conifer species per acre. Retention may be achieved by aggregated retention.

Trees with existing nests or potential nesting structures such as large dead branches, dead tops, or platforms will be saved during harvest where feasible in association with adjacent screen trees that provide protection to this structural feature.

Retention or Recruitment of these structural groups will be considered at each entry and scattered throughout the leave stand where they exist.

10.4.3 Retain a Hardwood Component in Managed Stands

Normally, north-facing and east-facing slopes contain small amounts of hardwood in the under-story. On the south-facing slopes and ridges, hardwoods comprise a higher percentage of the mixed hardwood conifer stands characteristic of north coastal California.

Given market conditions, hardwood sawlogs exhibiting high-quality wood features will be retained where they do not compete with conifers. Some hardwoods may be harvested for biochar, pulp, fuelwood, and decorative products. Hardwood retention and recruitment will be based on the size and characteristics of the stand. Hardwood management guidelines include:

The harvest of hardwoods and/or their treatment, along with the conifers is to be used as a tool to improve conifer growth and maintain other forest qualities.

Hardwood competition not only reduces coniferous growth, but can also mechanically injure them during removal. Young conifers are to be released from overstory hardwoods by careful falling practices or by other treatment methods.

Falling of hardwoods will be conducted in such a manner to minimize physical damage to residual trees of all species. If the hardwoods are to be marketed, added care is be used when removing them.

Larger hardwoods with desirable habitat elements (snags, cavities, broken tops and limbs) will be retained in the stand for wildlife. Selected larger hardwoods will also be retained to facilitate conifer regeneration by utilizing their high, open canopies for shade, where such retention does not significantly retard the growth of conifers.

Where no conifer competition occurs, hardwoods will be retained for wildlife habitat and possibly carbon sequestration. While conifers are the focus of management, it is recognized that some areas are underlain by soils that primarily support hardwoods. These areas will remain as hardwood stands, and no attempt will be made to convert them to conifers.

10.4.4 Achieve a Sustainable Output of High-quality Timber Products with Concomitant Maintenance/Production of Wildlife Trees, Downed Wood, and Other Structures for Wildlife Habitat

The overall long-term objectives for management of the Usal Redwood Forest is to create a more diverse forest with a higher percentage of larger tree sizes than currently exist

that will allow for sustainable harvests over time using uneven-age silvicultural harvesting methods such as individual tree selection, group selection and other alternative methods that will maintain multi-aged stands across the landscape.

Given the past history of harvesting on the Usal Redwood Forest and emphasis by previous landowners on creating an even-aged forest condition, conversion to an uneven-aged forest management system will require a significant transition period. Also, while the plan emphasizes use of uneven-aged silvicultural prescriptions, not all stands are currently suitable for selection prescriptions, particularly in light of high levels of tanoak stocking. For those stands that are currently suitable for selection, group selection, or transition silviculture, harvest prescriptions will be designed to create or maintain uneven-aged stands that can be sustainably harvested utilizing a 10 to 20 year cutting cycle.

For existing stands with higher levels of tanoak stocking or overstocked stagnating conifers, even-aged or other special prescriptions may be necessary to secure younger conifer age classes and diameters. For the transition period where even-aged regeneration step harvests are used, the objective would generally be to apply even-aged silvicultural systems in a manner that achieves the long-term objectives of moving the stand structure to an uneven-aged management regime. It is the objective of UFRC to eliminate all even-aged management prescriptions within 60 years. However, actual date of harvest scheduling will need to remain flexible to take advantage of good markets and avoid poor ones.

Prolonged poor markets may dictate that no harvesting occurs for several years out of the harvest cycle. Conversely, favorable economic conditions may warrant a portion of the forest be logged each year of the cycle.

URFC intends to harvest yearly in portions of the property, while recognizing that market conditions may influence yearly harvest decisions. A yearly harvest is intended to provide continuous employment for community members, and a reliable source of forest products to local mills.

Long-range growth and yield models have been developed for the Usal Forest. The resulting Projected Harvest Schedule shows how inventory will increase and grow over time.

At the March 30, 2011 URFC meeting, the Usal Redwood Forest Company Management Committee directed the contracted forest manager, The Campbell Group, LLC (TCG, now known and referred to in this document as Campbell Global), to prepare a long-term plan for URFC. The primary objective for the modeling exercise was to develop a harvest schedule and forecasted cash flows associated with future operations conducted in a manner consistent with the then-draft Conservation Easement.

Easement Model Assumption Details

The assumptions related to stream protection measures in this modeling effort are consistent with the Anadromous Salmonid Protection rules that went into effect on January 1, 2010.

URFC timberlands also support an abundant and healthy population of Northern Spotted Owls (NSO). In the near-term, the property lacks sufficient quantities of NSO nesting and roosting habitat as defined by the current US Fish and Wildlife Service (USFWS) NSO habitat guidelines to permit material amounts of timber harvest activity in nesting and roosting habitat. In recognition that NSOs are persisting on the landscape, biologists at

Campbell Global, in conjunction with the USFWS, developed a draft property-specific Spotted Owl Management Plan (SOMP) that established NSO habitat protection areas (spatially explicit stand based polygons) where NSO habitat would be enhanced over time. The SOMP later evolved into an NSO Safe Harbor Agreement (SHA), which Campbell Global and URFC are currently working with the USFWS to develop. This SHA will guide long-term NSO management activities. The model used for harvest scheduling on URFC assumes the SOMP/SHA protection measures. The USFWS has issued a letter agreeing that URFC may implement the protection measures on an interim basis while all parties work on the permitting process.

As discussed previously, significant acreage of the URFC timberlands are largely dominated by hardwood tree species that limit the potential for maximum conifer stocking and growth. Consequently, the establishment and restoration of the conifer stands on URFC will require control of hardwoods and increased site occupancy in conifers. In addition, FPR require that THPs prescribe measures maintain conifer site occupancy or, if regeneration is proposed, to reduce the stocking of hardwoods to ensure adequate reforestation in conjunction with proposed timber harvest operations. The model used to predict growth and yield for URFC timberlands assumes effective hardwood brush control.

The harvest schedule model for URFC was also constrained to address Percent of Inventory (POI) limitations described in the Conservation Easement (CE).

The following charts were created from Campbell Global's 2011 conservation easement modeling: five-year average annual harvest volumes by species (Figure 1); harvest acres by harvest method (Figure 2); conservation easement total standing basal area inventory (Figure 3); and conservation easement silviculture summary (Figure 4).

All harvest volumes are estimated. They are provided to illustrate a possible scenario for yields and entry periods for URFC. Less volume may be harvested due to specific resource protection measures and timing of entry may depend on market or resource conditions.

Figure 1: Five-year average annual harvest volume by species

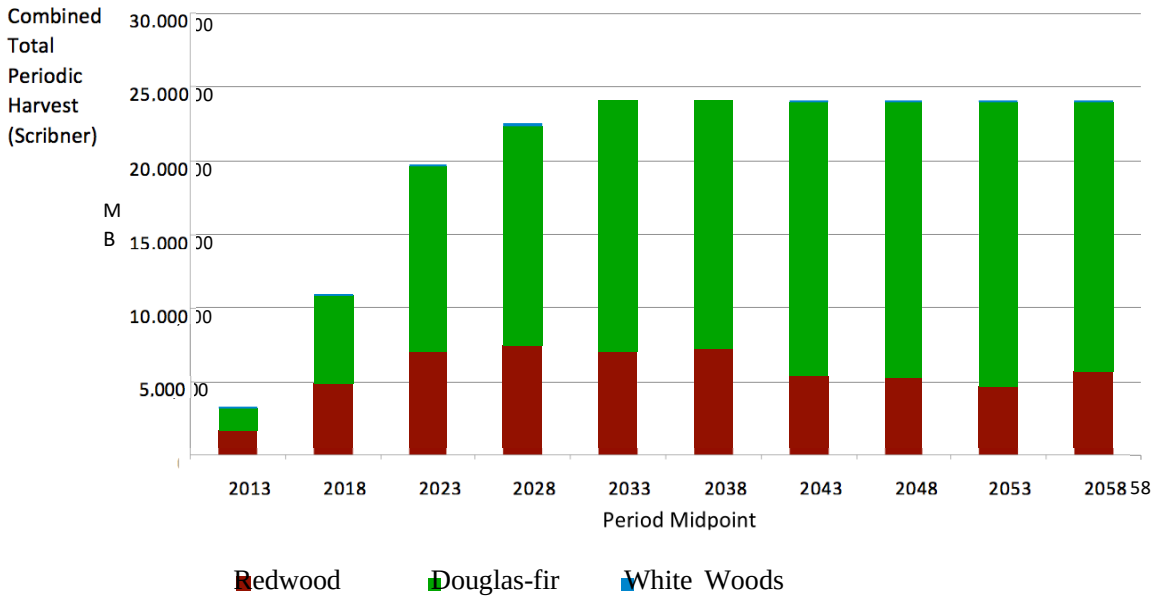


Figure 2: Harvest acres by harvest method

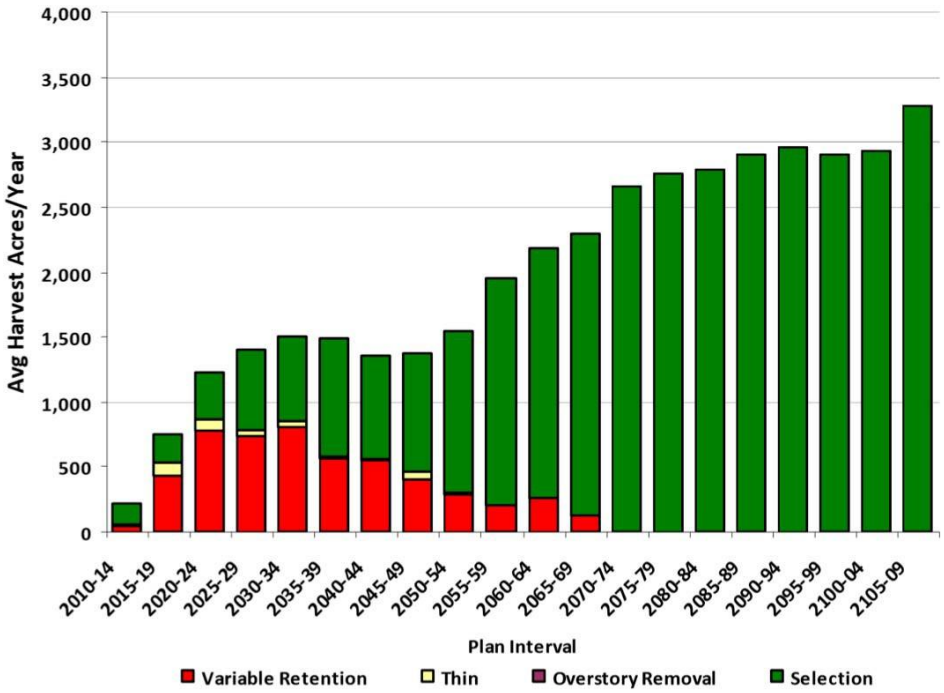


Figure 3: URFC conservation easement total standing basal area inventory

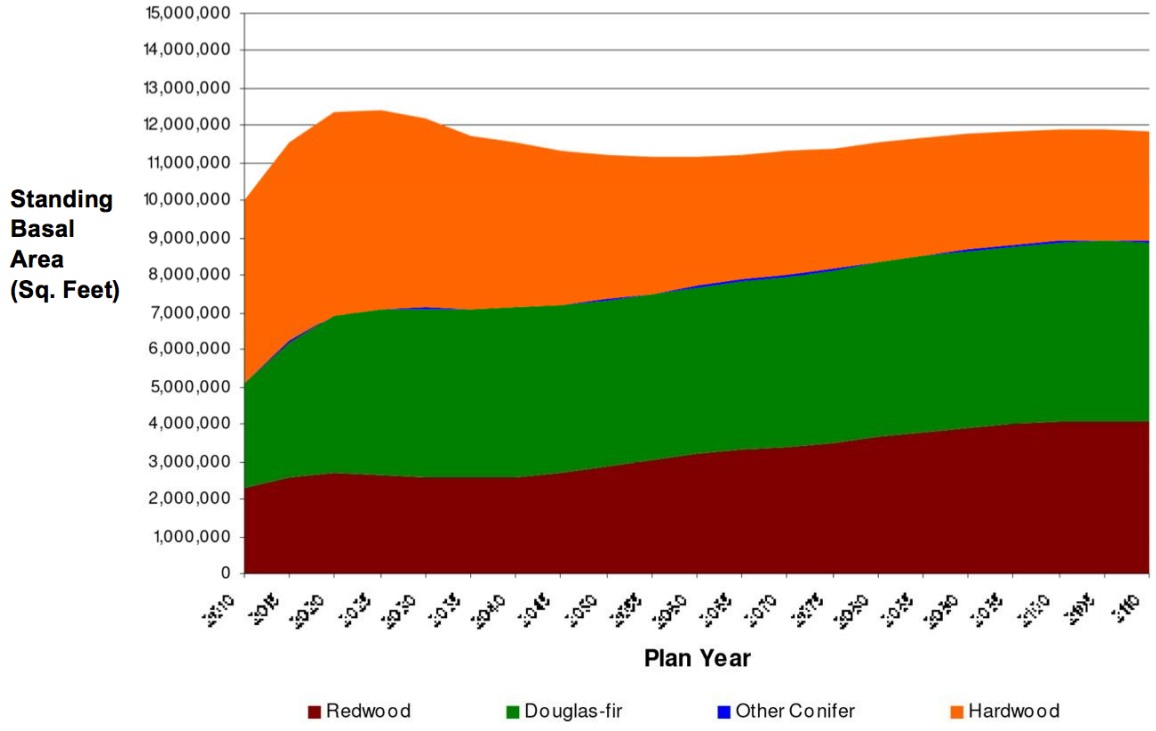
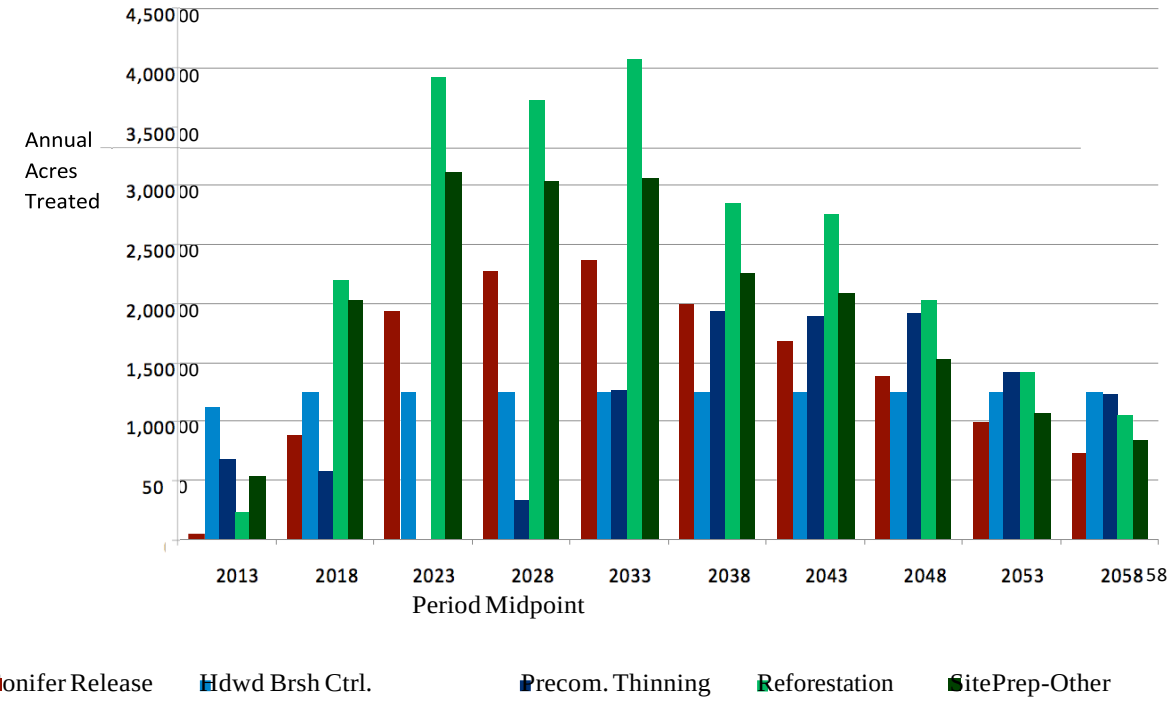


Figure 4: URFC conservation easement silviculture summary



Updates to Model and Harvest Projections

As described and illustrated above, the long-term analysis resulted in a harvest schedule and forecasted cash flows associated with future operations conducted in a manner consistent with the Conservation Easement. An updated analysis shall be prepared that centers around URFC's current long-term management goals. In this 100-yr analysis, growth and yield shall be modeled whereby balancing growth and harvest over time, while accounting for limits on productivity due to constraints imposed from other forest values (e.g. recreation, wildlife, economic vitality, etc…). In essence, ensure the projected harvest does not exceed growth whereby URFC's long-term management goals are met while accounting for California Forest Practice Rules (FPR) and Conservation Easement constraints. This analysis shall be GIS & data-driven, and therefore the results can be spatially tied back to the ground to help guide future management activities (e.g. where, when, and how much). One, maybe two options may be prepared and analyzed to compare and contrast different management goals and investment types. This secondary analysis is expected to start sometime 2020, with an estimated completion date near the end of 2021.

10.4.5 Invest in Forest Improvement Practices

Pre-commercial Thinning

Pre-commercial thinning reduces the number of stems per acre. This permits more recoverable growth to occur on fewer, but higher-quality, stems. Leave trees will have at least 1/3 their height in vigorous crown. Poor-quality conifer trees will be removed, and well-formed dominant trees retained. Spacing will vary between 5 and 16 feet. Since the selective prescription makes only limited light available to young regeneration, the cost effectiveness of pre-commercial thinning depends upon the species and size of the trees involved. Optimum economic return results when thinning conifers in the 3-6" dbh class or 15-20' in height. Trees larger than this are not cost-effective to thin, and trees smaller than this have usually not yet fully expressed dominance.

Generally, it is most cost-effective to prioritize retention on redwood, then Douglas fir, as they are the most economically valuable species. With reduced light to the understory, resulting regeneration is often hemlock and grand fir. In this instance, it may be beneficial to utilize pre-commercial thinning as a "weeding out" tool, thus favoring growth of Douglas fir and redwood. Of note is that pre-commercial thinning of conifers has been followed by black stain root disease in some North Coast timber stands.

Thus, the decision to pre-commercially thin existing or future developing young stands will be made on a site specific basis throughout the property. The objective is to undertake stocking control when necessary in order to achieve expected growth trajectories.

Planting/Interplanting of Conifers

Tree planting with conifers will be necessary in most stands where variable retention or the rehabilitation of understocked areas is utilized. Though partially harvested stands (e.g., selection, transition, commercial thinning) will meet or exceed the plan's specified square feet per acre of stocking, portions of each harvest unit may be interplanted with redwoods to increase stocking levels and improve the redwood to Douglas-fir ratio. Tree planting is utilized when it serves to establish or supplement natural regeneration by filling

in gaps. Either bare root or plug stock may be used. Since it is more important to plant in the best microsite available, a strict spacing criteria will not determine seedling placement. Planting offsets from redwood sprout clumps will also be utilized. Seedling survival may be improved by utilizing shade of deciduous or nitrogen-fixing shrubs or other retained vegetation (e.g., dispersed hardwood overstory canopy). Heavy sod areas will be avoided or scalped as needed to reduce seedling competition.

Site Preparation: The need for site preparation may be reduced by yarding un-merchantable tree tops (called YUM yarding) where feasible. However, following harvests, site preparation may be needed to establish or improve stocking. Ground disturbance from falling and skidding operations may not adequately prepare the site for planting or natural seeding in the tractor areas due to hardwood and brush competition. Mechanical site preparation may be utilized on gentle to moderate slopes.

Seedling Protection: Where necessary, appropriate non-lethal methods will be used to minimize feeding damage to replanted conifers from rodents, deer, elk, etc. to aid in seedling survivability.

Pruning: Pruning can be an effective tool to achieve specific objectives. Pruning may be used where appropriate to improve visibility and aesthetics, to address wildfire fuel issues by clearing lower limbs, or to accelerate tree growth to meet biological objectives.

Plantations: Plantations, though rare, are appropriate when the natural forest has experienced increased hardwood composition due to past harvesting or catastrophic events such as wildfire or a windstorm, where a significant amount of woody vegetation has been killed or severely damaged. While even-aged management units may approximate plantations in some initial respects, they differ when a longer-term perspective is utilized. The objective on this ownership is to transition away from the use of even-aged management over time. Also, conservation standards have been incorporated into the plan for the benefit of resource values other than timber production. Where large-scale catastrophic events have occurred, rapid restoration of the site is required to minimize soil erosion and prevent the takeover of undesirable, highly- competitive vegetation that would impede the opportunity for the natural forest to resume in a timely way.

10.4.6 Eliminate the use of Even-aged Silvicultural Prescriptions Within 60 Years

It is one of the conditions of the 2011 Usal Forest Conservation Easement (Schedule 6, section 2(b)) that the URFC transition to all uneven-aged management by the 61st year. This schedule was one of the assumptions of Campbell Global's 2011 modeling (see Appendix B) and is consistent with RFFI's long-term plan for management of the Usal Forest.

10.4.7 Control Erosion Related to Current Management Activities to Ensure Protection of Water Quality, Instream Habitat and Roads

Control Erosion from Roads

This section describes the specific management and maintenance recommendations related to all existing and proposed roads.

Road building is a constantly evolving discipline of forest engineering. RFFI recognizes the need to change and adapt its forest engineering strategies over time to reflect newly

emerging strategies and styles of management. That said, URFC's current approach to road building and maintenance includes:

New roads are laid out taking topographic features into account to minimize ground disturbance and the number of stream crossings. Whenever appropriate (e.g. gradients 7% or less), roads are to be out-sloped. Roadway planning, design, construction and maintenance is adequate to minimize surface erosion and reduce landslide potential.

Where feasible, measures will be taken to stabilize active erosion sites along roads.

Since roads are the major sediment contributors to streams, regular road maintenance is essential to protect the road surface and prevent erosion to downstream waters. In addition to these, operations on the URFC ownership will comply with the *Handbook for Forest, Ranch & Rural Roads: A Guide for Planning, Designing, Constructing, Reconstructing, Upgrading, Maintaining and Closing Wildland Roads,* available through the Mendocino County Resource Conservation District. The following recommended road maintenance measures are excerpts from this handbook:

- Road surface grading may be required after a period of intensive road use. However, grading will occur only when needed to maintain a smooth running surface, since over grading results in unnecessary erosion and increases road surface rock wear. Rock should be kept on hand to stabilize road surfaces that have been graded. Grading should only occur when the road surface is slightly damp (not wet). Road surfaces graded when they are too dry will not compact.
- Unplanned berms along the outside road edge that concentrate water on the road surface will be removed or breached prior to the winter period.
- Where inside ditches occur, clear blockages to flow. Ditches are to be "pulled" only when cutbank slumps have blocked ditch flow. Otherwise, grading of ditches causes undue erosion.
- Prior to the winter period, culverts are to be checked, with potential blockages to flow removed.
- Waterbars and/or rolling dips are to also be installed prior to the winter period at spacings to effectively disperse water off the road so that the formation of rills and gullies are minimized.
- Dust control (such as watering or application of magnesium chloride (MgCl)) of intensively used roads during the dry season is necessary to prevent loss of road surface material. Bare soil areas are to be seeded and/or mulched just prior to the winter period to prevent transport of sediment from erosion to downstream waters.

Control Erosion from Timber Harvesting Operations

Ground-Based Harvesting: The yarding systems utilized will be designed to minimize damage to the residual stand, minimize ground disturbance and to best protect water quality. Trees will be felled toward yarding corridors. Tractors and skidders will be utilized to yard timber on gentle to moderate slopes. Timber may be longlined from logging roads within cable areas or from skid trails (tractor roads) located within tractor areas. Areas designated for tractor yarding may be cable yarded at the discretion of the managing Registered Professional Forester (RPF). Within cable areas on ridge tops where deflection is low, tractors may be used to bunch logs for yarding. No tractors will occur on slopes greater than 55% unless explained and justified, and approved by the

State.

Cable Harvesting: Cable yarding is generally proposed on slopes greater than 55%. Where feasible, parallel yarding corridors will be utilized as opposed to a radiating pattern from a single landing. Pre-flagged cable corridors may be utilized to guide timber marking and reduce stand damage during yarding. Where YUM yarding is specified, landings may need to be oversized to safely accommodate additional YUM material for later disposal.

Helicopter Harvesting: Certain sensitive or remote areas may be harvested utilizing the helicopter yarding method. When helicopter yarding is proposed, a spill containment and countermeasure control plan will be prepared by the helicopter operator.

Minimize Management Effects and Erosion from Unstable Areas

Areas of potential instability are depicted on the Geomorphic Features Related to Landsliding Map. This California Geological Survey (CGS) mapping information will be supplemented, where needed, on individual THPs by an Engineering Geologic Review conducted by a Certified Engineering Geologist (CEG).

On each THP, the RPF will initially conduct an observational assessment of the harvest area for any geomorphic features identified on the CGS maps and the presence of unstable areas and slide area based on the characteristics specified in the FPRs. Following this field review, the need for a formal geologic review will be determined. The level of this review will vary with features observed and the timber operations proposed. Interaction between the RPF and CEG may result in plan modifications and specific geologic recommendations (e.g., harvest and road construction and yarding limitations) that will be incorporated into the THP.

Minimize Impacts of Management Activities During Wet Weather

The principal concern of wet weather operations is potential sediment delivery to watercourses. Another concern is undesirable compaction of soils in the yarding area. Soil compaction is desirable on road and landing surfaces, but can impact forest growth on the remainder of the harvest area.

Operations will be controlled through ongoing communication between the RPF and the Licensed Timber Operator (LTO) and numerous requirements in the FPRs, some of which are outlined below.

Although wet weather may occur at any time of year due to thunderstorms, most rainfall occurs during the period of November 1 to April 15. The FPRs define the winter period as November 15 to April 1. Other FPRs require that no timber operations may be conducted between October 15 and May 1 unless the THP incorporates a complete winter period operating plan.

Throughout the year, logging roads and landings shall not be used during any time of the year when operations may result in significant sediment discharge to watercourse or lakes, except in emergencies to protect the road, to reduce erosion, to protect water quality, or in response to public safety needs. During the extended wet weather period, log hauling or other heavy equipment uses shall be limited to logging roads and landings that exhibit a stable operating surface in conformance with above. Routine use of logging roads and landings shall not occur when equipment cannot operate under its own power.

Logging roads and landings used for log hauling or other heavy equipment uses during the winter period shall occur on a stable operating surface and, where necessary, be surfaced with rock to a depth and quantity sufficient to maintain such a surface. Use is prohibited on roads that are not hydrologically disconnected and exhibit saturated soil conditions. Exceptions may be proposed by the RPF when locations are disclosed and justified in the THP. Winter period yarding shall be limited to either cable or helicopter systems. During the winter period, hauling shall be curtailed for at least 24 hours following 0.25 inches of rainfall. It is probable that access for timber felling (generally by ATV) during the period October 15 to May 1 will be specified in THPs. This will facilitate limited winter employment opportunities.

To address the potential for rainfall events at various times of the year, pre-emptive installation of erosion control facilities is required. After October 15, waterbreaks must be installed on roads prior to the start of rain that generates overland flow. All waterbars shall be installed no later than the beginning of the winter period of the current year of timber operation. At any time of year, tractor roads must have drainage facilities (e.g. waterbreaks) installed as soon as practical following yarding and prior to either: (1) the start of rain that causes overland flow across or along the disturbed surface within a WLPZ, Equipment Exclusion Zone (EEZ) or Equipment Limitation Zone (ELZ); or (2) prior to any day with a National Weather Service forecast of a chance of rain of 30 percent or more. Similarly, installation of drainage facilities is required from October 15 to November 15 and April 1 to May 1 on all constructed skid trails and tractor roads prior to sunset if the National Weather Service forecast is a "chance" (30% or more) of rain within the next 24 hours.

10.4.8 Maintain an Economically Viable Level of Harvest to Support Management Activities and Meet Financial Obligations

On August 5, 2011, in anticipation of the Usal Forest Conservation Easement later the same year, The Campbell Group (Campbell Global) conducted a growth and yield model based on the assumptions of the easement, specifically:

- Maximum Net Present Value
- Usal Forest inventory as of January 1, 2010
- All California Forest Practice rules as of January 1, 2010
- Northern Spotted Owl (NSO) Habitat protection per draft Spotted Owl Management Plan (SOMP) submitted to USFWS December 2010
- 2.9 percent of total standing inventory harvest cap
- Silviculture regimes allow even-aged management
  - Even-aged harvest will include 15% tree retention
  - Even-aged harvesting unconstrained outside of stream zones, geological areas, spotted owl areas, etc.
  - Even-aged rotation age will be minimum 50 years
- Herbicide use will be modeled
- No even-aged harvest allowed after 60 years
- No rate of harvest limitation (other than the 2.9% of inventory cap)

This model outlined a sustainable harvest schedule that pays off URFC's debt within fifty years.

An update to the growth and yield model is schedule to begin in 2020, with an anticipated completion date sometime in the summer of 2012.

10.4.9 Monitor Forest Inventory and Growth Revise Harvest and Yield Projections as Necessary to Reflect new Scientific or Technical Information

See discussion of this in the Monitoring and Adaptive Management section below.

11. FOREST PRODUCTS

When planning or implementing forest management operations, an effort will be made to encourage the judicious use of the forest's multiple products and services to ensure economic viability and a wide range of environmental benefits. Forest management and marketing operations will encourage the optimal use and local processing of the forest's diversity of products. The Usal Forest Management Committee and RFFI Board of Directors will strive to strengthen and diversify the local economy, avoiding dependence upon a single forest product. Forest management operations will maintain and enhance all forest values and any extraction of alternative products will not deplete the resource.

Special forest products may include the production of biochar from excess hardwood biomass, floral greens, Christmas trees and boughs, mushrooms, burls, etc.

12. MONITORING AND ADAPTIVE MANAGEMENT

Monitoring is an integral part of RFFI's stewardship of the Usal Redwood Forest. It is the way that RFFI ensures that their procedures are being followed, its goals are being met, and community concerns are considered. The process of ongoing monitoring helps to understand the current conditions of the forest, compare it with desired future conditions and management objectives, and allow for ongoing adjustments to forestry management to better address social, economic and environmental effects.

The principal form of monitoring will be conducted through recording and review of various types of data and information gathered during the year, using the reports and forms categorized and summarized in Table 1, Monitoring Reports, Documents and Forms on p. 57. The timely completion of this information will be an ongoing and replicable requirement. A brief discussion of each category of data collection is shown below.

URFC seeks to continually improve its practices and policies through informed decision-making, which will make use of the internal monitoring and analysis. In addition, external information about environmental or forestry science and best practices, as well as information regarding social, economic, and regulatory issues will also be considered on an ongoing basis. The process of incorporating new information into the forestry management decision-making process is called Adaptive Management. Information will be discussed at monthly URFC management meetings to gauge how the company is meeting both short and long-term goals and objectives, and ensure it is conforming to FSC Standards. Changes in practices and policies will be modified as appropriate.

The summary of monitoring will be made available to the public via our website on an annual basis. The monitoring report will include, at the minimum, information regarding:

- The yield of all forest products harvested
- Growth rates, regeneration, and condition of the forest
- Composition and observed changes in flora and fauna
- Environmental and social impacts of harvesting and other operations
- Costs, productivity, and efficiency of forest management

12.1. CONSERVATION EASEMENT MONITORING

Since October 2014, URFC's conservation easement bas been held by the California Department of Forestry and Fire Protection's Forest Legacy Program (CalFire). From 2011 to 2014, the easement was held by The Conservation Fund (TCF), and during each of those years TCF performed an annual conservation easement monitoring report, including an on-site audit. URFC has complied with the conditions of our easement for each of those years. In 2014, CalFire accompanied TCF on their audit, and assumed monitoring responsibilities in 2015. CalFire has conducted annual monitoring visits every year since then. Monitoring reports can be located on the RFFI/URFC website: www.rffi.org/usal-redwood-forest-monitoring-reports

12.2. FORESTRY AND ENVIRONMENTAL MONITORING

URFC keeps records of its forestry inventory on a variety of systems. From these systems, it is possible to track changes in the land base, timber inventory, timber growth, timber harvests, encumbered timber, age classes and site classes of timber, etc. Data is extracted to produce an annual Timber Inventory Report. URCF also monitors harvesting under approved THPs to ensure they were completed as planned. An annual summary of completed THP operations will be provided to compare to planned operations.

Road maintenance and monitoring occurs in conjunction with THP, stream restoration, and vegetation management/fire protection activities. An annual summary of road maintenance activities will be provided. Post treatment monitoring of THP road sediment sites is conducted. Monthly reporting of water drafting is evaluated. Stream restoration/fishery habitat and other environmental enhancement programs (usually with partial grant funding) are monitored and reported. Class 1 stream channels and large woody debris are monitored as part of ongoing THP planning and preparation.

URFC monitors HCVF and RSA data to insure prescriptions for these sensitive areas are adhered to. An annual summary of HCVF and RSA data will be provided along with a commentary on changes to the previous year. We also monitor for inventory of flora and fauna on an ongoing basis and will identify and report significant changes in such populations. Part of this monitoring will be used to gauge the effectiveness of containment methods to stop the spread of invasive species. THP planning requires routine surveys for the presence of NSOs. The comprehensive NSO report prepared for the USFWS will be posted to our website. Any use of pesticides or chemicals on URFC (there is none anticipated) will be promptly tracked and reported.

12.3. SOCIAL MONITORING

URFC monitors the social impacts of its activities in several ways. We openly invite public input through annual and periodic meetings, advisory groups, committees, field trips, our web site, and one-on-one discussions. One way we monitor social and community impacts is through the use of a monitoring/reporting form that tracks Stakeholder Inputs (Appendix D). This form is completed by a URFC representative when they make a public presentation or have any meaningful interaction with a stakeholder or other members of the community. This could include feedback received informally during meetings and field trips, concerns or issues raised in meetings or in one-on-one discussions, and recording of conflicts should they occur. These forms are turned into the RFFI President/CEO for follow up, data collection and analysis. Issues, concerns, and emergent trends are reported and discussed periodically during monthly management meetings.

RFFI also invites public comment and participation through our website. This system allows the community to ask questions and seek information about RFFI and the Usal Forest. The questions are routed to the appropriate person for prompt follow up. The responses are recorded electronically and included in an annual review of public questions and concerns.

All stakeholder inputs are considered when making final decisions on any area of public concern, including all forest management activities. Public concerns can be addressed in a variety of ways. Open communication, information sharing, field trips and individual meetings with RFFI staff are encouraged to clarify and resolve issues and concerns. Written responses and other methods of dealing with public issues are not excluded and will be used as appropriate. Individual THPs can be modified when appropriate, and material changes to policies and procedures may result from stakeholder inputs.

Another way we monitor social impacts is by monitoring the economic benefit of URFC activities to the local economy. This includes monitoring our direct employment and indirect employment resulting from business we give to local vendors and contactors, so that we know how our spending contributes to the local economy. URFC will track and report our contributions to local organizations, associations, events and educational programs. Also, URFC will track and report income generated from non-forest products activities such as lease income, grants, and donations.

URFC's intent is to provide an annual summary of social monitoring on its website. This will include identifying the most common issues and concerns, how these were resolved or mitigated, and how URFC contributes to the local economy and the regional community.

12.4. BUSINESS MONITORING

The monitoring of business income and expenses is accomplished through a variety of detailed accounting systems. Information contained in these systems is used to generate quarterly and annual financial statements and to develop budgets for each fiscal year.

Revenues come largely from log volumes and carbon offset credits sold at market rates. Other revenues may come from activities such as the sale of non-commercial thinning and other wood waste for firewood, biofuels and biochar. Revenues from non-forest activities may include leases for hunting and telecommunications sites.

Expenses include forest manager costs, contracted logging costs, road improvements, forestry work, wages and overhead, wildlife and aquatic surveys and monitoring, forest restoration work, tree planting, vegetation management, property and yield taxes, interest and insurance.

12.5. TRAINING

Training helps ensure that URFC policies, procedures, and forest activities are all conducted as planned and within FSC criteria. Training also minimizes negative impacts of lost time accidents, environmental damage, and deviation from prescribed forestry operations. URFC recognizes three distinct groups in need of safety and environmental training in the Usal Forest: (a) URFC employees; (b) independent contractor employees; and (c) unpaid members of the public, including volunteers.

URFC addresses ongoing safety and environmental training to these groups in the following ways:

a. ***URFC employees*** – URFC ensures that it's employees review and understand all safety and environmental training policies before beginning work in the Usal Forest and on an annual basis or as needed based on identified issues. Training areas include, but are not limited to; log quality, fire response, hazardous spill containment and cleanup, FSC Principals, and chain of custody process.
b. ***Independent contractor employees*** – URFC provides all applicable safety and environmental training policies to independent contractors during annual contractor meetings or prior to commencement of contracted services. Copies of pertinent URFC policies must also be provided to any sub- contractors.
c. ***Unpaid members of the public, including volunteers*** – currently, members of the public enter the Usal Forest on a permit basis only. Prior to entering the property, URFC or RFFI staff will provide a safety and environmental policy/procedure review. Safety gear, when appropriate, will be required.

12.6. TABLE 1: MONITORING REPORTS, DOCUMENTS AND FORMS

FOREST AND ENVIRONMENTAL MONITORING

Forest Inventory Report

- Acreage Changes
- Land Acquisitions and Disposals
- Annual Timber Harvest Volume
- Annual Timber Inventory Volume Depletions
- Annual Timber Inventory Growth
- Forest Inventory Accomplishments
- Inventory Methodologies
- Land Base Ownership by Acreage
- Acres by Age Class and Species
- Volume by Age Class and Species
- Encumbered Leave Areas by Age Group and Cover Type
- Net Timber Producing Acres by Site Class
- Intensive Forest Management (IFM) Activity Summary (Planting, Spraying, Burning, Biomass)
- Historical Timber Inventory Cruising Activity
- Historical Intensive Forest Management (IFM) Treatments

Annual THP Monitoring

- Monitoring of completed harvest operations
- Annual Summary of timber harvesting, harvest volume, harvest acres and silvicultural systems used
- Annual Summary of THP related sediment source sites and treatments

Roads and Water Monitoring

- Summary of Road Maintenance Activities
- Annual inspections and maintenance of all mainline and appurtenant roads
- Post treatment monitoring of road related sediment source sites (General Waste Discharge Requirement, GWDR)
- Summary of monthly water drafting reports
- Environmental Enhancement: type, number of sites, volume of sediment savings and total costs of treating Sites
- Class I Channel Monitoring (Conducted during THP lay out. DFG level 2 protocol)
- Stream channel Large Woody Debris (LWD) Monitoring (part of Class I Channel monitoring)

Annual Summary of HCVF & RSA Monitoring

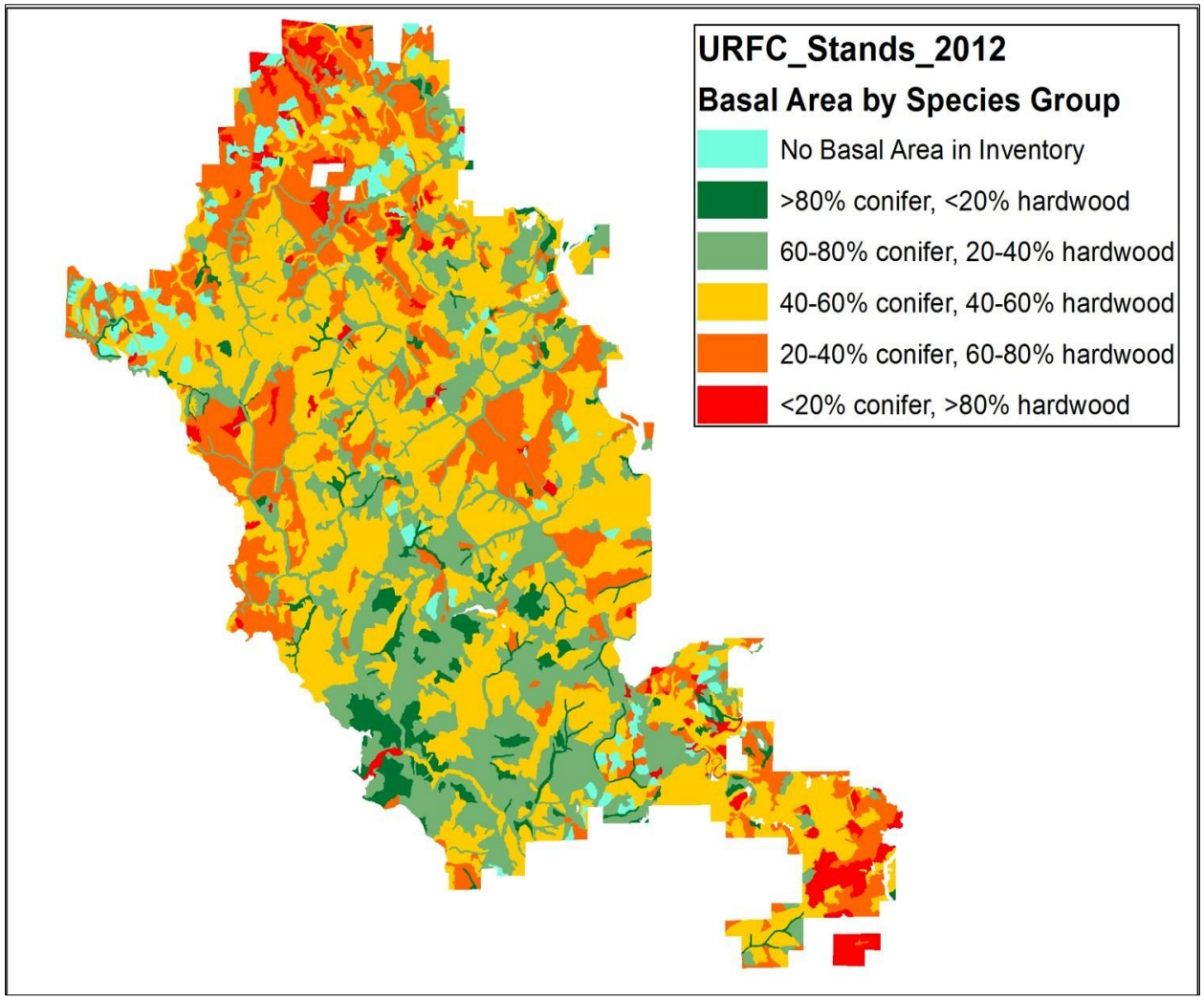
- Summary of previous years HCVF & RSA related monitoring.

Pesticide Monitoring

- Summary of pesticide and other chemical use.

BIOLOGICAL MONITORING	**NSO Annual Report to USFWS** • NSO THP surveys • NSO Population Monitoring • NSO Site occupancy/ status • NSO Banding • NSO Reproductive success • NSO Density **Fish/Salmonid Monitoring** • Summary of surveys **Annual Year-end Summary Report for the Botanical Season to the California Department of Fish & Wildlife** • Summary of botanical survey season • Sensitive species found • Invasive species • Annual Surveys Cumulative vascular plant species list for all surveys – 2007 to-date
SOCIAL IMPACTS MONITORING	• Employee and Contractor training programs • Number of direct employees and contract employees • Charitable giving, community donations, scholarships, matching grant funds • Money spent in the local community on goods and services. • Stakeholder Input Form – Appendix D • Other community inputs (media reports, political, etc.) • Native American activities, including harvest of acorns and other traditional materials
BUSINESS MONITORING	• Quarterly financials/Investment reports • Annual financial report • Annual budget

APPENDIX A: USAL FOREST BASAL AREA BY SPECIES GROUP



APPENDIX B: CONSERVATION EASEMENT MODELING ASSUMPTIONS – THE CAMPBELL GROUP

Easement Model Assumptions
for use by
Campbell Timberland Management
for
URFC cash flow modeling purposes

Assumptions for creation of Easement Model that will model forest growth and harvest by applying specific silvicultural regimes on Usal Redwood Forest

- ☐ Maximize Net Present Value
- ☐ Usal Inventory as of January 1, 2010
- ☐ All California Forest Practice rules as of January 1, 2010
- ☐ Spotted Owl Habitat protection per draft Spotted Owl Management Plan submitted to USFWS December 2010
- ☐ 2.9 percent of total standing inventory harvest cap
- ☐ Silvicultural regimes allow evenaged management
  - o Evenaged harvest will include 15% tree retention
  - o Evenaged harvesting unconstrained outside of stream zones, geological areas, spotted owl areas, etc.
  - o Evenaged rotation age will be minimum 50-years
- ☐ Herbicide use will be modeled
- ☐ No evenaged harvest allowed after 60-years
- ☐ No rate of harvest limitation (other than 2.9 POI)

Date: March 30, 2011

APPENDIX C: SAMPLE FOREST MANAGER/CONSULTANT DISPUTE RESOLUTION LANGUAGE

DISPUTE RESOLUTION.

1.1. The Company and Consultant (each, a "Party" and collectively, the "Parties"), will attempt in good faith to resolve any controversy or claim arising out of or relating to this Agreement promptly by negotiations between senior executives of the Parties who have authority to settle the controversy (and who do not have direct responsibility for administration of this Agreement). The disputing Party will give the other Party written notice of the dispute. Within five (5) days after receipt of said notice, the receiving Party will submit to the other a written response. The notice and response will include (a) a statement of each Party's position and a summary of the evidence and arguments supporting its position and (b) the name and title of the executive who will represent the Party. The executives will meet at a mutually acceptable time and place within ten (10) days of the date of the disputing Patty 's notice and, thereafter, as often as they reasonably deem necessary to exchange relevant information and to attempt to resolve the dispute.

1.2. If the matter has not been resolved within thirty (30) days of the disputing Party's notice or if the Party receiving said notice will not meet within the ten (10) days, the Parties acknowledge that this Agreement effects interstate commerce and agree to submit the dispute to private and confidential, binding arbitration with an arbitrator, who will be a lawyer knowledgeable in the field of timber management and mutually acceptable to the Parties, and in accordance with the follow ng provisions:

1.3. The Parties will each submit to the arbitrator a written summary of their respective position on the dispute. The arbitrator will endorse one of the two positions based upon which leads to an outcome that most closely resembles the Parties' intentions as provided in this Agreement. The arbitrator will not provide a compromise solution in the absence of both Parties' consent, which may be withheld in either Party's absolute discretion.

1.4. The arbitrator will follow such procedural rules as the Parties may agree upon and, in the absence of agreement, will follow the procedural rules of the American Arbitration Association.

1.5. If the Parties fail to agree upon an arbitrator under this Section xx within ten (10) days of demand by either Party, then either Party may request such appointment by a court of competent jurisdiction in **Ukiah** located in **Mendocino County**, or the federal district court having jurisdiction over that county. Both Parties will equally bear the cost and expense of the arbitrator and the appointment of the same unless that cost and expense (including attorneys· fees) is assessed differently by the arbitrator.

1.6. The arbitration will be completed within sixty (60) days after the date of the notice provided in Section xx.1 above or within sixty (60) days after the date of the appointment of the arbitrator as provided in Section xx.2 above.

1.7. Notwithstanding any provisions of this Section, Company will have the right to petition a court for injunctive relief to preserve the status quo pending arbitration and award under this Section.

1.8. All Parties freely and voluntarily enter into this Agreement including the arbitration provisions hereof and acknowledge that: (i) they are sophisticated business owners capable of understanding the consequences of their actions; (ii) they have received advice of counsel or had the opportunity to do so and have waived their right to seek advice of counsel; (iii) arbitration waives the right to trial by a judge and/or trial by a jury; and (iv) the procedures in arbitration are different from those afforded by litigation and lack the full protection of court rules and laws that are followed in judicial proceedings.

APPENDIX D: COMMUNITY STAKEHOLDER INPUTS AND SOCIAL MONITORING REPORTING FORM

URFC Representative: _____

Date of contact:_____

Setting/venue/location: _____

Stakeholder name(s) or group name:

General discussion topic:

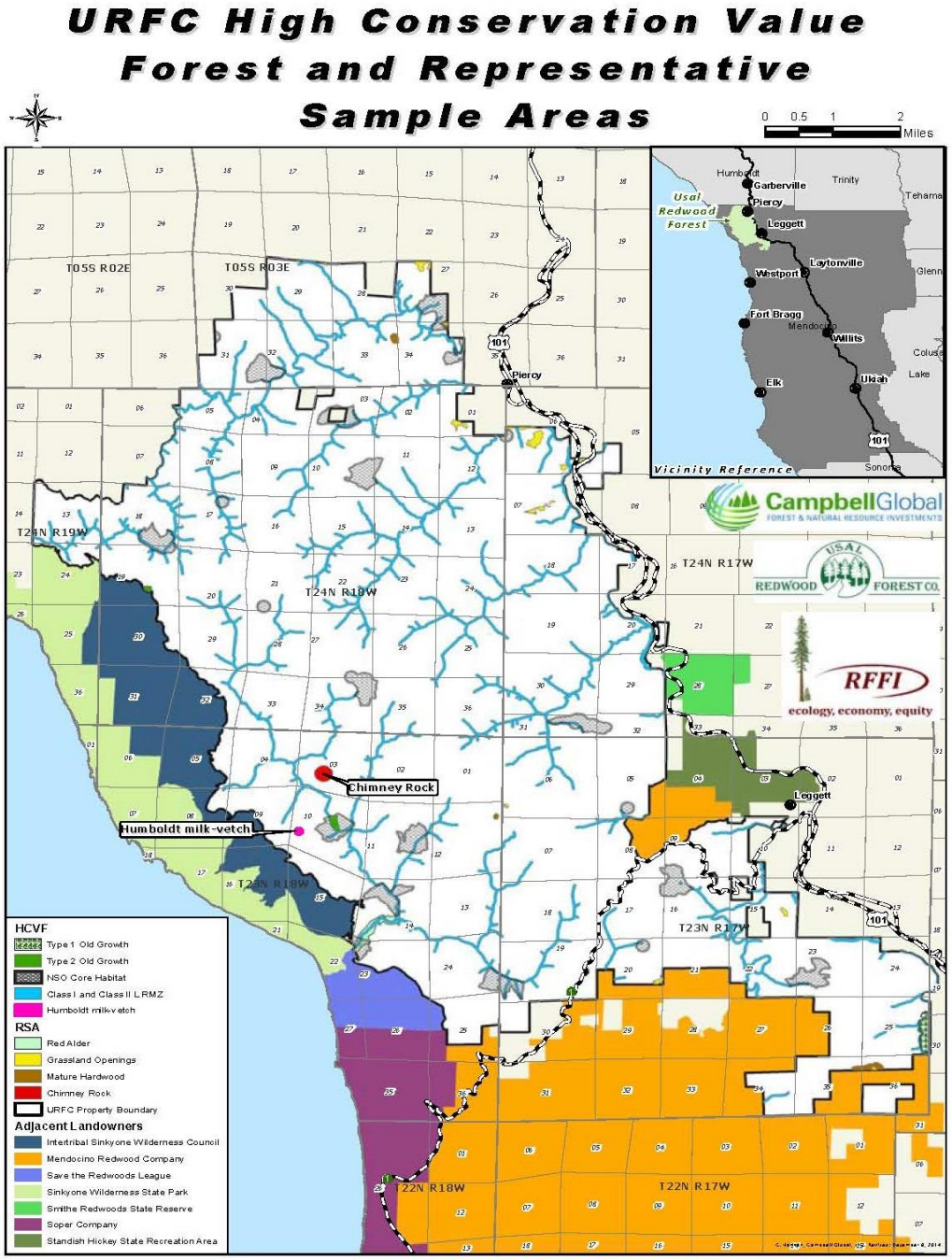
1) Describe the purpose of the meeting/event/tour where the stakeholder made contact. Include who initiated/planned it:

2) Nature of stakeholder interaction (written note, conversation, etc.):

3) Check the topic that appeared to you to be the stakeholder's primary concern (check all that apply):

   - o Clearcutting
   - o Old Growth
   - o Harvest levels
   - o Clean water Fish/fisheries/fishing
   - o Health of forest ecosystem
   - o Wildlife and rare plant protections
   - o A specific THP (name)_____
   - o Herbicide use
   - o Cumulative impacts
   - o Employment opportunities

APPENDIX E: USAL REDWOOD FOREST COMPANY HIGH CONSERVATION VALUE (HCVF) AND REPRESENTATIVE SAMPLE AREAS (RSA MAP)



APPENDIX F: REDWOOD FOREST FOUNDATION, INC. SOCIAL IMPACT ANALYSIS: COMMUNITY INPUT SUMMARY

Community/ Group	*Cultural/Historic/ Community Significance*	*Public Resources: air, water, and food*	*Aesthetics*	*Community Goals for Use and Protection*	*Community Economic Opportunities*
Local Native American Tribes- Wailaki, Cahto, Sinkyone Intertribal Council	Historic use as a main trail moving to the coast. Several significant archeological sites as well as significant historical utilization of materials (plant and animal)	Historic acorn gathering area as well as native grasses for weaving.	Voiced concerns about possible clear cutting. Consideration of neighboring Sinkyone Intertribal Wilderness area to the west.	Would like access to gather acorns as well as other plants and seeds for establishing a native plant supply. Neighboring Siskiyou Intertribal Wilderness Area. Habitat corridors between properties. Interested in protection of archeological and historical sites	Interested in partnerships including restoration projects to be implemented by tribal members. Engaged in early conversations about Kooscho, a Native and nature interpretive center proposed to be located at McCoy Creek.
Community of Fort Bragg Area and Mendocino Coast Communities	Town sites of Kenny, Moody and Usal all part of the history and lore of the area. Not too much still exists at the town sites, however, there are many historic photos that are posted on the RFFI website (rffi.org) Historic community access to Usal Road and Usal Beach for recreation.	Interest in hunting, fishing, mushroom collecting. Hunting has been restricted in the past to employees and/or a hunting club that was leasing the property. Desire to support the rebuilding of the salmon populations in Usal, Indian Creek and South Fork of the Eel. Desire to	Concerns about clearcutting. Land visible along Highway 1, northern access to the coast from highway 101. Prevention of motorcycle damage.	Interest in access for recreation including hiking, camping, and mountain biking. Concerns about herbicide use on the property. Desire to see a natural balance of tan oak and other species of lesser commercial value. Interested in seeing the forest reach late seral stages. Concern over illegal marijuana	Interest voiced about potential for the purchase of poles (pole building manufacturer), firewood cutting for resale and potential for supply of logs to small portable mill owners. Mendocino Woody Biomass Working Group-interested in utilization of biomass as a way to contribute to the economy and create jobs. Interest in the possibility of onsite

Community/ Group	*Cultural/Historic/ Community Significance*	*Public Resources: air, water, and food*	*Aesthetics*	*Community Goals for Use and Protection*	*Community Economic Opportunities*
		reestablish natural flows of streams. Protection of old growth trees.		grows and other illegal activity on forestlands. Maintenance of Usal Road. Road densities, questions about reduction. Interest in being part of the management planning processes. Protection and enhancement of biodiversity Method for distribution of future profits (grant making)	energy production Interested in the potential for an environmental camp at McCoy (incorporated into the plans for Kooscho-- proposed by RFFI and designed with community collaboration-- Native and nature interpretive center at McCoy Creek Interested in continuity of jobs in the woods including logging and related occupations. "Localization" is important in Mendocino County
Communities to the North incl. southern Humboldt County- *Mattole, Whale Gulch, Four Corners and to the East- Piercy*	Historic access to Indian Creek watershed--	Desire to support rebuilding of salmon populations. Interested in seeing educational opportunities for students and the public.	Possible sensitivity over logging of stands to the west of the South Fork of the Eel as it runs along Hwy 101.	Fire protection collaboration (Piercy and Whale Gulch volunteer fire depts.) Desire to be part of the decision making processes.	Interested in seeing tourism supported by the development of Kooscho (proposed and designed Native and nature interpretive center at McCoy Creek)
Humboldt County					Interested in supply of logs to independent mills.
Neighboring Landowners- *Sinkyone Intertribal*		Shared watersheds- Indian Creek, possible	Maintain historic access agreements- road maintenance	Looking for ways to collaborate, particularly around 101 to the coast	

Community/ Group	*Cultural/Historic/ Community Significance*	*Public Resources: air, water, and food*	*Aesthetics*	*Community Goals for Use and Protection*	*Community Economic Opportunities*
Council, Lost Coast Redwoods, Mendocino Redwoods Company, Soper-Wheeler, BLM,		collaborative planning on a watershed basis.	collaborations.	trail.	
Employees/ contractors		Voiced interest in hunting		Safe use of chemicals. Safety in the woods operations.	Interested in maintaining industrial level timber operations to insure ongoing employment. Local preference for hiring when at all possible.
Restoration & Preservation Groups *{Save the Redwoods League, Trout Unlimited, Pacific Watershed Associates,*	Collaborations around watersheds, restoration of lands, undoing damage done to landscape by past logging	Collaborative projects in Eel River watershed, trails. Restoration of historic fish populations. Protection of old growth trees		Biodiversity	Interested in collaborative writing of grants to continue to survey, plan restoration and implement projects on Usal land.
Government Entities	Property staying on the tax roles			Road safety and maintenance- increased trucks on Hwy 1. Collaboration in handling illegal activities including grows on the property.	

APPENDIX G: USAL REDWOOD FOREST COMPANY CONSERVATION EASEMENT

More information and a link to view or download the Usal Redwood Forest Company Conservation Easement, as well as monitoring reports, can be found here:
https://www.rffi.org/usal-redwood-forest-monitoring-reports/

The 75-page easement document can be viewed and downloaded directly here:

https://www.rffi.org/archive2018/Usal_Forest_Conservation_Easement.pdf

APPENDIX H: USAL REDWOOD FOREST COMPANY CONSERVATION EASEMENT

Usal Redwood Forest Marking Guidelines

One of the most important jobs in forest management is the timber marker. The decision of what trees to remove or take can have a longer lasting impact on the stand than how the logs are removed. To quote Henry Cary, one of the founding members of the Forest Stewards Guild: "A forester is remembered not by what he takes, but what he leaves behind." With this in mind, one of the first things to ask yourself before marking any tree is "What do I want the stand to look like in 20, 30, 50 and even 100 years".

Due to the diverse stand ages and conditions found on the Usal Redwood Forest (URFC), it is not practical to have a one size fits all approach to timber marking. Different silvicultural methods may be used throughout the property and may vary within individual timber harvest plans (THP's). As such, the following are general guidelines and individual timber markers should always use their own professional judgement based on the current site conditions and long-term goals for any area.

The desired long-term stand condition for most of the URFC property is a multi-aged stand (a minimum of 4-5 different age classes), dominated by conifers with a hardwood component not to exceed 30 percent of the basal area. Where they occur naturally, redwood should be the favored species. In Douglas-fir dominated stands, Douglas-fir should most likely remain the dominant species with a gradual, thoughtful approach to increasing the percentage of redwood.

Stands that are dominated by tanoak, greater than 50% of the basal area, should be evaluated on a site by site basis to determine the desired long-term condition. Where soil conditions are suitable for conifer productions, the tanoak component should be reduced to allow for re-establishment of Douglas-fir and, where appropriate, redwood. Heavily dominated tanoak stands located along major trending ridges may be best suited for the creation of shaded fuel breaks.

Silvicultural Systems

The three primary silvicultural methods that will require timber marking are selection, group selection and variable retention (VR). This does not rule out the potential use of other methods, such as transition or commercial thinning. However, the guidelines written for selection could easily be applied to those methods.

The long-term goal of URFC is to move to the use of selection and group selection as the primary silvicultural methods. The use of variable retention will primarily be used to help transition even aged stand with a significant hardwood component to uneven aged conifer dominated stands. Typical re-entry periods for selection and group selection will be 10-15 years and 15-20 years respectively. Re-entry periods for VR units will be greater than 20 years. Timber marking should take into account the re-entry period when determining the percentage of the pre-harvest volume to remove. Planned re-entries of 10 years should not remove more than 30% of the pre-harvest volume. Planned re-entries 20+ years should be looking to remove 50-60% of the pre-harvest volume.

General guidelines for all methods

1) Do not mark any Old-growth or Legacy trees. The URFC management plan defines Legacy trees as follows:

- Any redwood tree, 48" diameter at breast height (dbh) and larger, and with two or more age-related structural characteristics
- Any Douglas-fir tree, 42” dbh and larger, and with two or more age-related structural characteristics
- Any native hardwood tree, 36” dbh and larger
- Any tree (conifer or hardwood), 24” dbh and larger, with three or more age-related structural characteristics

The following criteria define age-related structural characteristics used to determine retention of legacy trees (each characteristic can be considered individually or in aggregate):

Redwood Age Related Characteristics

- Deep, plate-like bark patterns, evidence of fire scarring
- Flattened, irregular or broken crowns
- Complex lateral limb structure
- Highly reiterated crowns (multiple sprouting, replicated growth patterns)
- Large limbs, in excess of 6” in diameter
- Crown debris accumulation/canopy soil
- Platforms
- Deep cavities, living snag
- Presence of epiphytic ferns, bryophytes associations
- Basal hollows (cavities)

Douglas Fir Age Related Characteristics

- Bark deeply fissured
- Evidence of fire scarring (cavities, basal hollows, etc.)
- High presence of lichens and moss, with crown soils and ferns present
- Large lateral limbs in excess of 8” in diameter
- Fattened, irregular crowns with lower limbs with signs of decay and crown thinning
- Conks or other visible signs of internal decay
- Large multiple boles
- Broken crowns
- Crown debris accumulation
- Misshapen limbs often due to prevailing winds
- Presence of epiphytic ferns, bryophytes associations

Hardwood Age Related Characteristics

(Tanoak, Quercus spp., Pacific madrone, California bay, Golden chinquapin, Big-leaf maple, etc.)

- Deep cracks or fissures in the bark
- Multiple branching crowns
- Presence of hard or soft mast (acorns, berries, etc)
- Platforms
- Large basal cavities
- Snags
- Cat-facing or basal burn cavities

In addition to the above, URFC retains any tree (conifer or hardwood) exhibiting the presence of at least a single exceptional age-related structural characteristic.

2) Do not cut any snag or green cull. These trees have special value to wildlife and should be retained.

3) Be sure any marked tree is capable for being felled and will not get hung up on an adjacent tree or do significant damage to the other leave tree or conifer regeneration. In some instances, it may require the removal of an additional tree to get the one you want on the ground.

4) Trees that have grown together and are fused should be evaluated for longevity and potential for removal as a single tree. Typically, trees that are still fused together above 4.5’ above the ground, or at breast height, should be treated as one tree. Both trees should either be removed or retained, based on how they impact nearby trees, if they can be felled as one and the next scheduled re-entry. Trees that are not fused above 4.5’ above the ground should be evaluated as two trees with the idea of splitting the pair and allowing the retained tree to growth at least another cutting cycle.

5) Make sure the trees you are marking can be felled without substantial damage or breakage. Sites to avoid include falling across swales and over intermediate ridges, falling over old redwood stumps, falling over areas that have a substantial change in slope (i.e. concave or convex slopes).

6) Larger trees are more susceptible to breakage than smaller diameter trees. The larger trees will require more thought regarding where they will land and typically longer layouts to avoid breakage.

7) Where two or more conifer species are competing for light and/or moisture, Redwood should be favored over Douglas-fir for retention, and Douglas-fir favored over Grand fir. If other naturally formed conifers are located in the area, and typically make up less than 5% of the conifer composition, they should be considered for retention to provide species diversity.

8) Where there is an absence of naturally occurring large snags (>16” dbh), lower quality conifers may be girdled to create a snag, especially where it is in competition with a higher quality conifer but could possibly cause significant damage to the leave trees if felled.

Additional guidelines for Selection methods

1) Length of re-entry will determine percentage of standing inventory to remove. Re-entry periods of 10-15 years, harvest 25-35% of the pre-harvest volume. Re-entry periods of 20-25 years, harvest 35-40% of the pre-harvest volume. Planned re-entries greater than 30 years may want to consider other silvicultural methods.
2) Short re-entries should primarily focus on single tree selection. Longer re-entries can use a combination of group and single tree selection.
3) Group openings should be at least 1.5 times the average co-dominant tree height of the surrounding leave stand. For example, Where the average co-dominant tree height is 100', group selection openings should be 150' across at their narrowest point. Openings should be oriented to fit the contours and take advantage of the best solar exposure.
4) Larger openings, ideally greater than one acre, should have dispersed retention trees (5-15 trees per acre) to allow for natural Douglas-fir regeneration, recruitment of larger diameter wildlife trees and/or shelter for young conifers to get established. Trees slated for permanent retention for wildlife should ideally have one or more special features that would make them more suitable for wildlife habitat. Trees retained for seed production should be of the best and highest quality phenotype.

Additional guidelines for Variable Retention method

1) The use of Variable Retention should be reserved for stands that require more than 50% of the volume to be removed for the purpose of reducing the percentage of a group B species, primarily tanoak, in favor of establishing a new age class of group A species, primarily redwood and Douglas-fir.
2) Dispersed retention, with the intent of managing the retained trees as part of a selection method at some point in the future, is the preferred method of retention. Retention trees may be aggregated within the dispersed area, especially if retention trees have specific wildlife value or characteristics.
3) Tanoaks larger than 20" dbh, true oaks and madrones should be marked for retention.
4) In areas of pure tanoaks, or tanoaks make up over 75% of the canopy, selected codominant tanoaks, regardless of dbh, should be marked for retention to provide some shelter for conifer seedlings and to discourage excessive tanoak sprouting.
5) Where economically feasible, removal of conifers 14-20" dbh, with a live crown ratio greater than 35%, should be discouraged.

Additional guidelines for Reserve Areas

1) Harvest activity within reserve areas are for the sole purpose of restoring old growth or late seral characteristics. Depending on the age of the stand when first designated for a reserve, one to three entries are anticipated. The younger the stand, the more entries may be required to meet the objectives.
2) Emphasis will be on removal of the suppressed or intermediate trees in favor of dominant and codominant trees, regardless of species.
3) Trees with unique structural characteristics, such as broken tops, large lateral branches, forked tops,

etc., should be retained regardless of their position in the canopy.

4) Species which make up lower percentage of the stand composition, should be favored for retention to insure a level of stand diversity.

5) Larger (>24”) diameter hardwoods, especially true oaks, should be favored for retention.