Jackson Demonstration State Forest

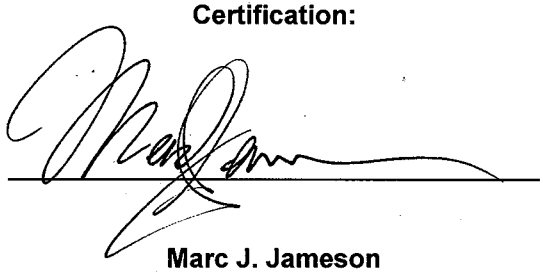
Plan for achievement of

Maximum Sustained Production
of
High Quality Timber Products

in accordance with

Title 14 CCR 913.11(a)

Certification:



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Chapter 1. Background

The Z'berg-Nejedly Forest Practices Act authorizes the California Board of Forestry and Fire Protection (Board) to adopt Forest Practice Rules (FPRs) that govern all timber-harvest-related activities on private and non-federal public forestlands in California. In 1994, the Board passed a series of regulations that require timberland owners to demonstrate maximum sustainable production (MSP) of high-quality timber products by either (1) submitting an "Option A" timber harvest plan, (2) preparing a sustained yield plan ("Option B"), or (3) following a set of prescriptive silvicultural requirements ("Option C"). The three options for meeting the MSP requirement are named after Forest Practice Rules sections 913.11 (a), (b), and (c), respectively.

An Option A plan identifies sustainable harvest levels given constraints on timber production from other public trust resources. Although there is no upper limit on the size of the assessment area for on Option A plan, Option A plans are tiered to individual THPs. Consequently an Option A plan, once approved, has no fixed life span. Every THP in the assessment area can conceivably trigger a new review of the Option A plan.

A sustained yield plan is usually a more detailed and formalized landscape-level plan. Documentation requirements are greater than in an Option A plan, and separate watershed and wildlife analyses are required. An SYP, once approved, is valid for 10 years.

Option C requirements consist of a fixed set of prescriptive silvicultural requirements that are deemed to satisfy the MSP requirement in lieu of a formal planning effort. Integral parts of the requirements are maintenance of at least 15 square feet per acre on site I through site III lands or 12 square feet per acre on site IV and site V lands in trees 18-inch (46-cm) diameter-at-breast-height (DBH), and rotation ages of at least 50 years on site I lands, 60 years on site II and III lands, and 80 years on site IV and V lands, in even-aged stands.

Because the California Department of Forestry and Fire Protection (CAL FIRE) manages a total of approximately 75,000 acres of state forestland in California on behalf of the public, the "ownership" exceeds 50,000 acres. CAL FIRE is therefore preparing long-term forest plans for all the State Forests that harvest timber. This document is an Option A plan for the largest State Forest in California, the 48,652-acre Jackson Demonstration State Forest (JDSF).

Purpose of Document

This document is a long-term strategic plan for Jackson Demonstration State Forest that serves two purposes. First, it fulfills the requirements of section 913.11(a) of the California Forest Practice Rules by disclosing sustainable management, a balance of harvest and growth over time, and protection of public trust resources. Second, it meets the Forest's demonstration mandate as an example of an Option A document for a medium- to small-size ownership that strikes a reasonable balance between the competing objectives of cost of preparation and scientific rigor.

Objectives

The objective of the Jackson Demonstration State Forest Option A plan is to project the effect of management on long term sustained yield, as provided by the Jackson Demonstration State Forest Management Plan, prepared by the Department and approved by the State Board of Forestry in January of 2008.

JDSF's management direction derives directly from statutes, regulations, and policies set by the State Board of Forestry and Fire Protection. Board policy describes Jackson and three of the other Demonstration State Forests as "commercial timberland areas managed by professional foresters who conduct programs in timber management, recreation, demonstration, and investigation in conformance with detailed management plans," (Board Policy 0351.1). More specifically, Board policy states that the primary purpose of JDSF is to conduct innovative demonstrations, experiments, and education in forest management; that timber production will be the primary land use on JDSF, and that recreation is recognized as a secondary but compatible land use on JDSF (Board Policy 0351.2).

There is great potential to create a living forest laboratory, available for research and demonstration, by developing and maintaining a broad range of conditions within the Forest. Under the management plan, designated parts of the State

Forest will be managed to produce a high level of forest growth and timber production while maintaining and restoring natural ecological processes, providing opportunities to conduct research and demonstration on the relationship of these goals. The scientific community recognizes that landscape-level patterns are extremely important. Thus, it is critical for the Forest to represent a broad spectrum of conditions, including older forest structure, healthy connected stream systems and associated riparian zones, and a range of habitat and structure conditions in order to meet research and demonstration needs and maintain ecosystem health.

The Department intends to manage JDSF, as well as the rest of the Demonstration State Forest system, as a demonstration of sustainable forest management, as directed by statute and Board policy, which includes production of forest products and protection of values related to recreation, watershed, wildlife, range and forage, fisheries, and aesthetic values. This approach will create and maintain a diverse forest laboratory available for research and demonstration on a vast array of subjects. Informational needs associated with forest management are very large and changing. Clients for research results and demonstration efforts are expanding beyond the traditional clientele group of small and industrial forestland owners to include nonprofit and governmental entities interested in restoration of a wide range of forest resources. Research on JDSF should include applied research on a variety of topics, as well as basic research in such areas ecological and biological forest processes.

The JDSF Management Plan establishes Desired Future Conditions or targets for management. The central goal is not a particular level of timber harvest or a preferred method of harvesting but a set of forest structures that represent the breadth of forest conditions appropriate to direction from statue, Board policy, and Management Plan goals and direction.

Given the current low level of older forest in the redwood region, a significant portion of the structural goals are oriented towards accelerating the development of older forest structures. The plan specifies healthy, functional ecosystems, emulation of natural processes, and broad diversity of forest structures and habitats, while recognizing that humans are an integral part of the ecosystem. Utilizing a diverse set of silvicultural systems is just one of the management tools that may be used to help achieve these Desired Future Conditions. The Plan emphasizes that restoration and maintenance of functioning systems is of high priority. A range of watershed management measures is required to reduce negative inputs to streams (such as fine sediment) and improve positive inputs (such as large woody debris). The Plan includes an aggressive road management plan and includes provisions to develop substantial areas of older forest structure and to recruit large woody debris, snags, and other characteristics of healthy, natural forest ecosystems.

The Management Plan presents a workable approach to create and maintain multiple seral stages, along with important structural habitat elements. It preserves all existing old-growth groves, augmenting most of them to provide large, contiguous areas of older forest habitat. It provides for recruitment of late seral habitat in the Mendocino Woodlands Special Treatment Area, upper Russian Gulch, and lower Big River, as well as along all Class I and II streams. It also provides for a broad corridor of forest with the structural characteristics of older forest that extends from the west to the east and the north to the south. The Plan protects individual large old-growth trees and smaller residual old-growth trees with unique habitat attributes. And it sets goals for increased retention of structural habitat elements such as snags, downed logs, and large green trees and their associated biodiversity values.

Planned harvest actions are set to achieve desired forest structural conditions, not simply to cut current growth or generate revenues. Careful application of silvicultural systems over space and time will achieve these conditions while also ensuring high growth rates and accumulation of high volumes of timber. Under the Plan, standing timber volumes (or "inventory") will continue to build over time, while providing a significant contribution to the local economy through the harvest and processing of timber. The average annual harvest levels during the next decade are estimated to be about 20-25 million board feet per year, and shall not exceed 35 MMBF per year.

Description of Jackson Demonstration State Forest

Location

Jackson Demonstration State Forest (JDSF) is located a little northward of the geographic center of the redwood region, which stretches 500 miles from Del Norte County through Monterey County. About half the total area of redwood forest is located to the north of JDSF and about half to the south. With 542,000 acres of redwood forest, Mendocino County encompasses more redwood forest area than any other county in California (Fire and Resource Assessment Program 2002).

JDSF includes portions of the Noyo and Big River watersheds, as well as several small watersheds that drain directly to the Pacific Ocean. JDSF covers approximately 48,652 acres in central Mendocino County. It varies from 2½ to 8 miles wide in a north-south direction, and is about 16½ miles long on the east-west axis. Its western boundary is within 1.5 miles of the coast, and the eastern boundary generally lies on the crest of the Mendocino Ridge separating the coastal slopes from the inland valleys, approximately 7 miles west of Willits.

The City of Fort Bragg, where the JDSF headquarters facility is located, is 2 miles north of the western property boundary. The town of Mendocino is located 2 miles west of the southwest corner of JDSF. The town of Willits and the Brooktrails development are located approximately 7 miles to the east. Ukiah, the county seat, is 35 miles southeast of JDSF.

Topography and Geology

JDSF and the surrounding area are located on the coastal side of the Mendocino Coast Range. The State Forest lands extend from gently sloping marine terrace surfaces along the Mendocino coastal plain in the west, to increasingly steep, rugged terrain in the eastern part of JDSF that is along the crest of the Mendocino Coast Range. The geomorphology of the coastal mountains of Mendocino County has been strongly influenced by two on-going processes: tectonic uplift and fluctuations in sea level. The landscape is especially affected during low sea level stands, when the coastline moves farther west. During these events, streams down-cut and form deeply incised valleys with steep-sided inner gorges. Once sea level rises (as at present) and the coastline advances, streams aggrade, the deep coastal valleys partially in-fill and estuaries form at the mouths of larger streams.

In general, the landscape is characterized by moderate to high relief. Slopes are less steep in the western watersheds within the Forest, and are steeper to the east in the watersheds nearer the crest of the Mendocino Coast Range. Elevations range from less than 100 feet within stream valleys along the western edge of JDSF, to a maximum of 2,092 feet in the southeast corner. The area drains directly to the Pacific Ocean. The local stream pattern is reminiscent of a "trellis", where short tributary streams flow into larger streams at roughly right angles. Stream pattern is controlled in part by structural patterns in the bedrock. As is true throughout the Coast Ranges, the predominant structural pattern trends northwesterly. Thus, many of the principal watercourses in the area are oriented in a northwest/southeast direction (South Fork Noyo River, Hare Creek, and Caspar Creek).

The California Geological Survey has mapped landslide features and relative landslide potential for the entire Noyo River watershed and for portions of the Big River watershed occupied by JDSF (Manson, Sowma-Bawcom, and Parker 2001; Short and Spittler 2002a; Short and Spittler 2002b). The areas inside and outside of JDSF are generally similar in the percentage of area covered by the various landslide and mass wasting features. Debris slide slopes, followed by rockslides, are the features covering the greatest amount of area. JDSF has a higher percentage of its area in potential inner gorge than does the area outside of the Forest. This situation is of concern because these potentially unstable areas tend to be directly connected to watercourses and have a high likelihood of delivering sediment to watercourses if they release material due to either natural causes or anthropogenic disturbance.

Hydrology

A USGS stream gauging station has been operated on the Noyo River since 1951. Large runoff events have occurred in 1955, 1964, 1974, 1993, and 2006. Streamflow has been measured in the Caspar Creek basin since water year 1963, with large runoff events documented in 1964, 1966, 1974, 1993, 1999, and 2006. The effects of harvesting and road building on changes in stream flows have been well documented through the work that has been conducted as part of the Caspar Creek watershed study (Ziemer 1998) (see also, http://www.fs.fed.us/psw/topics/water/caspar/). This project has been carried out jointly by the USFS and CAL FIRE since 1962.

Vegetation - General Forest Habitats

The forest type dominates the North Coast, Mendocino County, and JDSF. Beyond JDSF to the west there are coastal and aquatic communities. Within JDSF, key forest vegetation types include the Redwood Series, Red Alder Series, Pygmy Cypress Series, and the Bishop Pine Series (Sawyer and Keeler-Wolf 1995, Holland 1986). Other non-forest vegetation communities are limited in area at JDSF and include sphagnum bogs, marshes and grassland.

The Redwood Series is the principal vegetation type found within JDSF, comprising approximately 48,000 acres.

Redwood (*Sequoia sempervirens*) and Douglas-fir (*Pseudotsuga menziesii* var. *menziesii*) trees dominate the Forest. Other conifers present in the Forest include grand fir (*Abies grandis*), western hemlock (*Tsuga heterophylla*), and Bishop pine (*Pinus muricata*). Hardwoods comprise substantial secondary components in this type and are represented principally by tanoak (*Lithocarpus densiflorus* var. *densiflorus*) and madrone (*Arbutus menziesii*). The mixture of species shifts with distance from the coast, history of the area, exposure and soils. Redwood becomes less dominant moving inland with Douglas-fir and hardwood increasing. Some of the inland areas would be classified as Douglas-fir series by Sawyer and Keeler-Wolf (1995), and Holland (1986).

Most of the redwood stands found on JDSF are young (from five to 120 years old), but several small stands of un-entered and residual old-growth forest remain, totaling approximately 459 acres. The management history has influenced the species distribution in the eastern part of the forest as well. Though conifers dominate the forest overall, hardwoods play a role at JDSF. Young tanoak and madrone dominate young fir and redwood in some areas, and exist within most conifer stands at the mid and lower canopy levels. Hardwoods are more prevalent toward the central and eastern portions of the Forest.

The riparian Red Alder Series found in the western portion of the Forest can contain relatively pure stands of alder. Alder, Big leaf maple, and willow are generally restricted to riparian areas. Additional hardwoods found on JDSF are: California bay (*Umbellularia californica*), chinquapin (*Chrysolepis chrysophylla* var. *minor*), and canyon live oak (*Quercus chrysolepis*).

The Mendocino pygmy forest is a unique ecological community that occurs only in coastal Mendocino County. The California Natural Diversity Database (CNDDB) recognizes it as a community that is "rare and worthy of consideration." (2003). The Pygmy Cypress series covers approximately 613 acres of JDSF near the western extent of the Forest. CAL FIRE and California State Parks cooperate to manage some of this area.

Within the Pygmy forest areas there are two Sphagnum bogs. The Pygmy Cypress series often lies adjacent to Bishop Pine series. This type is typically found on soils that lack the fertility to support timber and often have pygmy cypress within them. The Northern Bishop Pine series is listed by CNDDB.

Eight special status plants (CNPS 1 and 2) and one lichen are known to occur on the Forest and 26 others that have been identified as having some habitat potential to occur on JDSF. Habitat potential has been identified by scoping and as well as discussion with DFG.

Fungi and lichen are examples of smaller, less well known organisms present at JDSF. Fungi function as beneficial mycorrhizae, decomposers aiding nutrient cycling, and as pathogens. Fruiting bodies may include mushrooms that benefit wildlife and human foragers. The area known as Mushroom Corners near the intersection of roads 408 and 409 is utilized by several universities, colleges and scientific societies for educational and scientific purposes.

History of Jackson Demonstration State Forest

Caspar Creek and the Caspar Lumber Company were named after Siegfried Caspar, a German immigrant who owned a cattle operation in this area. Initial logging on what is now JDSF began in 1862 when the Kelley and Rundle sawmill, supplied by a surrounding 5,000 acres of virgin redwood land, started operating near the mouth of Caspar Creek (Wurm 1986). In 1863 Jacob Green Jackson, a lumber dealer who owned lumber yards in Stockton and San Francisco, bought out the owners of the Kelley and Rundle operation and founded the Jackson Lumber Company. Lumber from the Caspar Lumber Company was transported to markets, mainly San Francisco, by schooners until the early 1930s.

In February 1946, C. J. Wood, the president of Caspar Lumber Company, offered to sell up to 51,000 acres of the company lands to the State at a reasonable price. A condition of sale was that the company could operate up to 15 years on some reserved old-growth timber. The State finally entered into a contract with the company to buy the lands on January 31, 1947 for one and a half million dollars. The purchased lands were named Jackson State Forest after the original owner of the land, Jacob Green Jackson. For tax reasons, C. J. Wood chose to transfer the properties to the state in five separate transactions, the last of which took place in 1951. Separately from the Caspar Lumber Company transactions, the Mendocino Woodlands Recreation Demonstration Area was added to JDSF at approximately the same time. This 5,425-acre property had been acquired from the Mendocino Lumber Company in 1935 by the U.S. Resettlement Administration, and was being administered by the National Park Service. The property was conveyed by deed to the Division of Forestry on September 11, 1947, and incorporated into JDSF. Map Figure 1 shows the current

area of the State Forest.

Prior to the first harvest entries in JDSF beginning in the 1860s, most of the Forest can be assumed to have been virgin old-growth. The coastal watersheds were largely clearcut until the 1930s when developing tractor technology and other factors allowed partial harvesting to extend further inland.

The earliest harvests in the original old-growth forest in the area which now constitutes JDSF were done with primitive technology, relying on rivers to float logs to the mill. This limited logging occurred within the Caspar Creek drainage immediately above the Caspar Mill, and along the lower slopes above the larger watercourses such as the South Fork of the Noyo River and the North Fork of Big River. The late 1800s witnessed the introduction of railroads and steam yarders. Most of the stands from the coast inland, up to the Chamberlain Creek drainage, were clear cut with this technology. Forest management was largely non-existent during this period. Emphasis was placed upon extraction of what seemed like a virtually inexhaustible resource of old-growth trees, and upon overcoming the challenges of logging and transporting very large trees with the primitive technology of that era. By 1947 when the State acquired Caspar Lumber Company's holdings, most of the coastal watersheds such as Caspar and Hare Creek, had regenerated to even-aged stands of 15 to 60 year old second-growth timber, though post-logging fires had burned through many of the regenerated stands.

Caspar Lumber Company started partial cutting toward the east end of the Forest in the late 1930s, in the Chamberlain Creek drainage. After acquiring the Forest, the State continued partial cutting in this drainage and the James Creek drainage during the 1950s and 60s. This first round of partial harvest was an individual marked tree cut that removed about 70 percent of the conifer volume. As a result, most of the large old-growth trees were removed. This initial cut was followed by a diameter limit harvest that removed most remaining conifer trees greater than 22 inches in diameter. This harvest pattern on the east end of the Forest resulted in an irregular uneven-aged stand structure, characterized by a relative abundance of hardwoods, poletimber and small sawtimber-sized young second-growth conifers, and individual scattered residual old-growth conifers.

This kind of irregular stand structure is typical of current stands on the east end of the Forest, and distinguishes this area from the western and central areas of the Forest. Although the more westerly portion of the Forest was subject to partial cutting of many second-growth stands, it has retained a more uniform stand structure due to the early history of large-scale clearcutting within the coastal watersheds.

In the late 1950s, after most of the old-growth areas within JDSF had been entered, managers began to investigate the feasibility of harvesting second-growth stands. Since the oldest second-growth stands were located within the Caspar Creek watershed, the first second-growth harvest on the Forest took place there. Harvest in second-growth stands subsequently occurred in the Caspar, Jughandle, Hare Creek, and South Fork Noyo River watersheds during the 1960s.

Management of JDSF has made use of both even-aged and uneven-aged systems. The first even-aged harvest in second-growth within the State Forest occurred in Caspar Creek in the early 1960s. It was not until the 1980s that a substantial proportion of harvesting in second-growth stands consisted of forms of even-aged management. A range of silvicultural methods has been in use on the Forest, for research and demonstration projects as well as operational forest management (Lindquist 1988). Harvest on JDSF has generally involved longer rotations and less frequent re-entries than on most industrial timberlands within the region.

Chapter 2. Existing Forest Conditions

Current Forest Management

The discussion in this section reflects management of JDSF under the 1983 and earlier forest management plans. In practice, management practices on JDSF continue to evolve gradually over time, reflecting changing societal, professional and research priorities.

The legal mandate for management of Jackson Demonstration State Forest is to research and demonstrate financially viable sustainable forestry practices in a broad range of forested habitats and forest structure conditions in the North Coast region of California. The North Coast region contains a large variety of forest stand types, and landowners practice a broad range of harvesting and forest management techniques. The owners of these working forests benefit from the research and demonstration that JDSF and other demonstration forests provide.

In order to be truly sustainable, forest management must maintain the ecological processes and biological diversity of the forest and its watersheds. To this end, JDSF management has maintained and developed a diverse range of forest habitats and stages of forest development. The diversity of forest conditions that have been cultivated on JDSF through 60 years of management offers unique opportunities for research and demonstration. The variety of forest structures found on JDSF, from recently regenerated stands to old-growth, make the Forest an enormously valuable resource as a working forest laboratory for research and demonstration. Forest structure, inventory, and growth are monitored on a regular basis, and the information is used to predict both future structure conditions (including wildlife habitat characteristics and values) and forest growth and yield.

JDSF is managed under sustainable forestry principles. Annual harvest has averaged well below annual growth. As a result, many second-growth stands on the Forest are growing older and becoming increasingly stocked with larger trees. An integral part of management is the regular harvest of a sufficient acreage to maintain an adequate representation of early to mid seral forest structures. These "maintenance" harvests may not have an immediate research function, but they serve the essential purpose of maintaining the range of forest structure conditions necessary to stay relevant as a managed research forest. Every timber sale on JDSF has not had a direct research purpose, but every timber sale has contributed in some way to cultivating the range of forest structure conditions necessary to remain relevant as a working research and demonstration forest.

Watershed protection levels at JDSF have been, and will remain high. This level of protection offers unique research opportunities, including the opportunity to test and monitor the effects of proposed new regulations. Forest restoration is an essential element of forest management, providing opportunities to test and monitor both active and passive approaches associated with management of riparian zones, the forest road system, older forest structures, and habitat development.

The development of high value forest products culminates in the sale of forest products to private entities, which contributes to the local economy. Timber sales, described in greater detail below, may be of varying sizes, with substantial variation in the harvest methods and the volume of timber that is made available. Minor forest products, including firewood, mushrooms, and greenery are also offered to small businesses and the general public.

Forest Structure

Forest structure refers to the unique combination of tree species, tree sizes, tree numbers, and tree spacing, along with other forms of vegetation (e.g., shrubs, forbs, grasses, and fungi) that can become established among and beneath the trees. The structure of a forest is reflective of conditions that promote regeneration and growth of the vegetation. Vegetation responds to opportunities to regenerate, and subsequent growth is influenced by available light, moisture, and nutrients. As a forest develops, the vegetation competes for light and moisture, creating abundant diversity of conditions. The removal of trees, as individuals or in groups, creates openings in the forest, and opportunities for regeneration and remaining vegetation to occupy these spaces.

Depending upon the amount of light that reaches the forest floor, various species of brush, forbs, and grasses may become established and persist. As forest stands change, due to natural development or stand management activity,

the spacing and size of the trees is variable, and the level of undergrowth will change. This dynamic is commonly referred to as vertical and horizontal diversity.

Historic management and natural forest development have combined to produce a mix of conditions within the Forest. Most of the original old forest was harvested by the Caspar Lumber Company between 1860 and 1955. Where this harvesting involved the cutting and burning of entire stands, which was common practice prior to the 1940s, the resulting young forest developed in an even-aged condition, where most of the trees are of nearly the same age and the forest canopy tended to become closed very early. This canopy condition tends to inhibit the growth of brush and forbs near the ground surface. After World War II, the cutting of old forests tended to be conducted in increments, where the larger trees were removed initially, followed by subsequent removal of smaller trees on one or two occasions. These conditions are prevalent in the North Fork of the Big River watershed and its tributaries (Chamberlain and James Creek watersheds). Each time that these areas were harvested, an opportunity was created for young trees to regenerate, so these areas tend to be occupied by stands with trees in two or more distinct age classes, along with scattered residual old trees that were not cut due to size, defect, or logistical circumstances.

Active management of young forest stands began during the 1960s. This management involved multiple forms of partial cutting as well as clearcutting. Clearcutting of young forest occurred primarily during the 1980s and early 1990s. Where this practice occurred, the resulting forest is very young and even-aged, rapidly approaching a closed canopy condition where the high level of shade will impede the development of brush and forbs. Where partial cutting methods have been employed in young stands, conditions are variable, and these stands are commonly characterized by having trees of two or more distinct ages, as well as having some brush and forbs growing under the canopy due to increased levels of light produced by the removal of trees.

The principal conifer species present within JDSF are coast redwood and Douglas-fir. These species commonly occur together within the Forest, with redwood typically more prevalent. Other minor conifers are present, including grand fir, hemlock, and bishop pine.

Most of the forest stands also include a hardwood component, with the predominant hardwood species being tanoak. Other hardwoods that occur include Pacific madrone, red alder, and live oak. Within conifer-dominated stands, the hardwoods are generally incapable of attaining the same height growth as the conifers, and eventually occupy a place below the crowns of the taller conifer trees.

There are a few remnant stands of virgin old-growth within the Forest, in addition to several hundred acres of partially harvested old forest. Structural components characteristic of older or late seral forest stands (e.g. snags, down logs, live trees with cavities and large limbs) exist throughout the forest at various levels.

The property has been conservatively harvested, resulting in a relatively high volume of standing timber. Because growth exceeds harvest, the forest continues to build inventory, and management has fostered the development of a broad range of structure conditions.

Resource Inventories

Estimates of timber volumes and other vegetation characteristics are derived primarily from a system of plots referred to as the JDSF Forest Resources Inventory (FRI). The inventory used as a basis for the Option A incorporates several thousand inventory plots. The system of inventory plots, currently numbering approximately 5,000, is replaced on a periodic basis.

Forest inventory has been monitored since 1959 through the implementation of a Continuous Forest Inventory (CFI) system. A 60 by 60 chain grid of 141 one-half acre permanently monumented rectangular monitoring study plots was installed throughout the Forest. The system was designed to track changing forest conditions and structures within reasonable tolerances for the Forest overall. Period measurements have been completed approximately every 5 years since 1959 using the original plot design. The most recent measurement of the CFI plots occurred in 2005. The JDSF CFI system constitutes one of the longest and most detailed time series of vegetation monitoring data in existence.

Historical harvests on the Forest have averaged 28 million board feet per year over the most recent 20 years of normal operation.

Timber Sale Program

The State Forest plans and schedules regular timber sales as directed by Board policy and existing management plans.

Forest product sale transactions are broken into two categories based on size, Class I sales and Class III sales(an intermediate Class II category was discontinued in 1976). Class I sales are limited to no more than 100 thousand board feet in volume, and cannot exceed $10,000 in value. These sales tend to consist of salvage operations, power line right-of-way clearance, and other small lots of timber. Class I sales of other forest products typically include firewood, split products, poles, greenery, and mushrooms. The Department of General Services exempts CAL FIRE from the requirements for competitive bidding for Class I sales, although these sales can be bid when it is appropriate. (For example, it may be desirable to use a bidding process to select a purchaser of a small sale when there are many people interested.)

Class III sales cover the major timber sale program, and are awarded through a competitive bidding process. Sale volumes have ranged from 100,000 board feet to more than 15 million board feet. Most sales have been between 5 and 12 million board feet. A Timber Harvesting Plan is prepared for each major timber sale.

Following consultation with the forest manager and forest staff, and after review of the Management Plan a timber harvesting plan and sale contract are prepared. The sale is appraised and advertised. A prospectus for each sale is sent to persons and organizations found on a mailing list that currently has about 100 names of potential purchasers, local logging contractors, and other interested parties. The sale is also listed on the California State Contracts Register website.

An advertising period of four to five weeks is typically provided to allow purchasers and contractors ample time to evaluate the sale and the contract provisions. Sales usually have bid dates in late winter or early spring, which allows the contract to be awarded and approved and operations to begin shortly after the end of the winter period.

Sale contracts are valid for one to two operating seasons, depending on the volume to be logged, the amount of new road to be constructed, the complexity of the operation, and how early in the year the sale is awarded. Normally, the contract for a sale of less than six or seven million board feet will be designed for completion in one season, and a larger sale will run for two seasons.

In most cases, the lead forester during sale preparation will serve as the contract administrator during the operational phase. This provides continuity of site-specific familiarity and ensures immediate feedback on the strengths and weaknesses of the harvest design. Administrative inspections are intended to ensure compliance with the timber sale contract. Inspections of the sale area are made at least weekly, and more often during critical or sensitive phases of operation. Additional administrative duties include monitoring harvesting progress and the request of stumpage payments on a timely basis.

State Forest sale administrators do not double as CAL FIRE Forest Practice inspectors on the sales which they administer. THP review and inspection for the purpose of compliance with the Forest Practice Rules is performed by CAL FIRE inspectors who are not State Forest staff. The contract administrator's responsibilities extend beyond the completion of timber harvesting, to include inspection and arrangement of maintenance of erosion control facilities during the maintenance period, and ensuring that harvest units meet stocking requirements.

Recreation

Recreational opportunities found on Jackson Demonstration State Forest are unique to the coastal region. They are informal, free of charge, unsupervised, and diverse. Primary recreational activities include camping, picnicking, hiking, biking, driving, horse-back riding, and hunting.

The objectives of the previous forest management plan developed in 1983 were to provide facility development sufficient to meet the projected average peak demand while remaining compatible with management of the timber resource, and to use recreation demand as an opportunity to inform the public about JDSF's timber and research activities. In the past 10 years, average peak demand has not been quantified other than by tracking the annual camping days per year. Although the past 10-year period has averaged 16,000 overnight-use days per year, the total number of visitor-use days exceeds this by an estimated factor of three when day-use visitors are included.

Although public use on the Forest has not diminished over time, priorities for implementing a recreation program have fluctuated with political goals and their resultant budgets. The goal of integrating recreation management, forestry education, resource protection and timber harvesting to demonstrate compatible use has been ongoing by default since the State Forest's inception as well as with directed attention.

With the exception of the two Conservation Camps and areas undergoing active timber operations, nearly all of the 48,652-acre forest is open for public access. There are 21 campgrounds within the boundaries of JDSF, and most of these offer opportunities for swimming or wading. The road system and easy access from Fort Bragg, Mendocino and Willits allows for extensive day use. It is estimated that day use comprises at least three times as many visitor-days as overnight camping. Unlike the surrounding smaller State Parks, JDSF has more roads available for use and allows a wider range of recreational uses (horse back riding, mountain biking, and hunting). JDSF does not collect any fees for recreational uses but does provide considerable public value to the visitors.

The majority of visitors live in Mendocino County, but an increasing number of visitors are from outside of the county. The rise in non-local visitors may be attributed to increased publicity from travel guides, a general increase in tourist travel to the north coast, and perhaps in the future from the Internet. Campgrounds are always full for the holiday weekends during the summer. The majority of the campsites are open seasonally.

Facilities

Maintenance of existing facilities has been the primary recreation management objective for the past several years. As staffing levels and budgets varied over the years, priorities fluctuated. The majority of recreational facility maintenance has been made possible by utilizing JDSF staff and crews from the two Conservation Camps located on the Forest.

Camp Host sites are located on the Forest at the two multiple-site campgrounds: Camp One (west end) and Dunlap Camp (east end). Information and camping permits can be obtained from the Camp Hosts. Currently, the only other locations where information can be obtained are from the JDSF headquarters (Fort Bragg) or the Mendocino Unit headquarters (Willits) during business hours on weekdays. Camp Hosts have been key in reducing the frequency of vandalism to campground and day-use facilities. Their physical presence acts as a deterrent, as does their routine maintenance of campground facilities.

The trail system on the Forest varies from designated self-guided interpretive trails and developed hiking trails to skid trails and logging roads (both old and new). There are four designated non-interpretive hiking trails that are located in JDSF: Camp One Loop, Trestle, Waterfall Grove, and Woods Trail. These trails are primarily limited to foot traffic travel although other non-motorized uses are not restricted. The Sherwood Trail is part of a regional trail designed for equestrian use that is not maintained by JDSF and continues into Fort Bragg across private property.

Road Management

The road system serves as the main point of public contact with the forest, and also serves as the conduit for management activities, including the transportation of staff, researchers, equipment, and forest products.

Forest roads on JDSF are used for timber harvesting, forest management activities, forest protection, public access, and recreation. The current road network reflects a history of various transportation technologies and forest practices. Beginning in the 1870s, railroads were used to transport logs in some watersheds and railroad grades were located along or adjacent to streambeds. Some JDSF roads use remnants of the old railroad grades in several places.

Most of the roads on JDSF, however, were constructed from the 1950s to the 1970s. Roads constructed during this period generally included an inboard ditch and cross drains. Concentrated runoff from this type of road has been shown to be a major source of fine sediment, because the inboard ditches are often connected directly to stream channels (Wemple et al 1996). Improvement of JDSF roads to reduce sediment yield is a priority for management.

Minor Forest Products

The Department currently offers the public and private commercial interests the opportunity to purchase minor forest products, subject to specific rules and constraints. At present, permits can be purchased for collection of products including salvage sawlogs, poles, split products, greenery (e.g., boughs, shrubs, and ferns), mushrooms, and firewood. Class I sale permits are issued for the collection of these minor forest products.

Salvage Sawlogs

Logs may be purchased from the State Forest, subject to permit constraints and applicable state regulations. Payments are generally made on the basis of log volume removed from the State Forest. The purchaser is responsible for paying all applicable yield and sales taxes. The removal of salvage sawlogs requires the purchaser to be in possession of a valid timber operator's license. Prices for logs to be removed are subject to negotiation between the purchaser and the State Forest manager. All timber operations are limited by the Forest Practice Rules and constraints established by the State Forest manager. Typical State Forest constraints include provisions for clearance from watercourses, slope limitations, wet weather restrictions, and pre-location of yarding and hauling facilities. All log locations are pre-specified. No logs and wood products originating from standing snags or old-growth trees may be collected.

Firewood

Firewood permits are available from the Forest. Firewood collection permits can be purchased for personal and commercial purposes after payment of a fee. Commercial producers are responsible for payment of all applicable taxes. Firewood collection is limited to dead and down material, and does not include either old-growth material or potential conifer sawlogs. Firewood collection is limited to pre-designated areas, and is generally subject to constraints such as watercourse clearance, slope limitation, weather conditions, retention of sufficient LWD for forest structure purposes and access road designation.

Greenery

Permits to collect greenery are available to the public. Very little of this activity occurs, but a few permits are issued every year. In recent years, permits have been issued for the collection of Douglas-fir boughs, ferns, salal, and huckleberry brush. Payment varies by product, being either on a volume basis or an item basis.

Mushrooms

Mushroom collection permits may be purchased for both personal use and commercial collection. Collection volume is limited, although areas of collection are not constrained.

Poles and Split Products

Permits may be purchased for collection and manufacture of poles and split products. Old-growth material may not be collected. Payment is made on an item or volume basis, and the purchaser is responsible for payment of all applicable taxes. Typically, poles are derived from thinning of young redwood/Douglas fir stands. Very little split product is manufactured, due primarily to the restriction against collection of old-growth material. Areas near watercourses are restricted in order to retain large woody debris with specific ecological value.

Periodically, the State Forest manager establishes permit prices, volume or numerical limits, and conditions of collection for the various minor forest products collected by the public. For personal use items, permit prices are nominal and are intended to cover the costs of administration of the permit process. Conditions of collection, collection location and collection limits (volumetric or numeric) are based upon an assessment of potential impacts that could result from the collection process and removal of the resource.

Research and Demonstration

This section discusses the general research and demonstration mandate for JDSF and how it affects the kind of forest

management that is practiced on the Forest.

Research and demonstration are primary elements of the mission for JDSF established by the State Board of Forestry and Fire Protection. The large number of research projects also contributes to the wide range of silvicultural prescriptions encountered on the Forest. It is important to distinguish between the general management prescriptions for the State Forest and silvicultural prescriptions that are part of specific research studies. For example, the collaborative Caspar Creek watershed study between CAL FIRE and the USDA Forest Service was designed in part to investigate the effect of clearcutting on soil erosion, sediment production and water flow. This study has provided valuable insights into the environmental effects of different patterns of road location and harvest, but it would be a mistake to interpret the large clearcuts and even-aged silvicultural prescriptions implemented under this study as indicative of the overall management goals for JDSF.

Future management in JDSF will continue the current pattern of a wide range of silvicultural prescriptions, with a mixed approach of uneven-aged and even-aged prescriptions covering the forested landscape. Habitat for the broadest range of species can be insured if diversity exists with regard to the size, shape, and continuity of created openings, and the resultant forest structure present during stand development. Future research and demonstration projects could include large-scale experiments to investigate effects of different management patterns. Such experiments necessitate retaining the flexibility to implement as wide a range of silvicultural prescriptions as possible on any given site. Past research, including the Caspar Creek watershed study, has been successfully implemented without jeopardizing the productive capacity of the Forest. Proven strategies for protecting public trust resources such as aquatic resources on managed forestland are not well developed, and the need for scientific information is great. JDSF is virtually the only managed forest ownership in the redwood region that can accommodate large-scale research to study how public trust resources can be protected on managed forest lands.

To forward the interests of research and demonstration, the planned management of Jackson Demonstration State Forest will produce a vast array of forest stand conditions available for observation and study. After accounting for areas requiring special protection, the remainder of the Forest was segregated into sizable management areas where a variety of even-aged and uneven-aged stand management techniques will be utilized (Map Figure 5). In addition, a substantial acreage was dedicated to the long-term development of late-seral forest conditions for the benefit of habitat, biodiversity, and ecological process.

The range of potential silvicultural systems available in any given area is constrained by the allocation plan mentioned above. Some sub-watersheds will be available for selection, while others will be available for group selection. Still other areas will be available for even-aged prescriptions of various types and with various rotation lengths. The concept is expected to produce a variety of forest stand structures that area available for research.

This plan will unfold incrementally over the course of the next 100 to 150 years as stands are grown, harvested, and continue to develop. There will be a unique opportunity to examine long-term growth and production, stand development, watershed process, and habitat development. One of the underlying principles of management will be a very high level of forest growth over time, in an effort to determine the productive potential of redwood timberland. Stand structure and habitat development will be quite variable, making it possible to examine the various habitat components and their combined contribution to the sustainability of species of concern. In addition, the dedication of relatively large sub-watersheds to a specific range of silvicultural practices will facilitate the monitoring and comparative study of watershed response.

This forest is quite unique in that it offers the State of California an opportunity to determine the potential of timberland to produce forest products while enhancing both habitat and water quality. There is an opportunity for JDSF to demonstrate the level of productivity and protection that can be achieved from the 2 million acres of private redwood timberland within the region, if provided with appropriate incentive and opportunity.

The largest, most ambitious, and longest-running research project on the Forest has been in the Caspar Creek watershed. The Caspar Creek paired watershed study assesses the effects of roads and logging on sediment production and delivery. This study was initiated in 1961 by the USDA Forest Service's Pacific Southwest Forest and Range Experiment Station (now Pacific Southwest Research Station), with the formal cooperation of the State of California's Division of Forestry (now Department of Forestry and Fire Protection) and Department of Water Resources.

Vegetation and Site Class

JDSF is dominated by second growth stands of redwood and Douglas-fir. Hardwood species, primarily tanoak, become more prevalent within the conifer stands toward the eastern portion of the Forest, and on south and west-facing slopes. Much of the difference in vegetation composition along an east-west gradient is due to historical logging patterns. The western and central portion of the Forest historically received generally even-aged harvests of the old forest, while partial cutting (primarly to a diameter limit) was predominant in the North Fork of Big River watershed toward the eastern part of the Forest. Additionally, climatic and soil conditions account for differences in stand conditions.

One of the key factors for the predictions of timber productivity is site index. Table 5 shows the amount of acres by site class for the Forest. Most of JDSF is site class II and III.

Stocking

For the purposes of this Option A plan, CAL FIRE will be reporting and tracking all timber volume estimates in board foot measure, Scribner scale. Minimum DBH is 10 inches and minimum top diameter inside bark is 6 inches. The board foot is the unit of measure chosen because it is the standard commercial unit used to determine the merchantable contents of trees, logs, and finished forest products, and it is the most common unit of valuation for taxation and market transactions. The board foot measure of volume described above was used for all forest inventory and growth and yield models used in the development of this Option A plan.

Table 4 shows a summary of beginning vegetation strate statistics, including volume and basal area. Based upon the Forest Resource Inventory, the total standing inventory volume on the Forest is estimated at 1.97 billion board feet conifer species, and 55 million cubic feet of hardwood, based upon an average of all inventory plots. Table 4 reflects a total calculated by aggregating inventory plots by vegetation type, producing a slightly different total inventory estimate.

Chapter 3. Planned Future Conditions

Desired Future Forest Structure Conditions

An integral part of the sustainable forestry program of management on JDSF is to achieve a deliberate balance of successional stages on the Forest, from very young to late seral stands and old-growth stands, at all times. The major purpose of the forest structure condition goals is to provide forest stand conditions and management histories in the Forest suitable to a accommodating a range of research investigations and demonstration opportunities, as well as a broad range of different habitats. A substantial portion of JDSF is dedicated to the development, maintenance and study of mature older forest. At the same time, the Forest needs to maintain sufficient cohorts of younger stand structures to stay relevant to its research and demonstration clientele of small and medium size private landowners, whose lands are typically dominated by early and mid-seral stands.

A broad range of management practices and forest management methods, from preservation to intensive forest management, will be utilized, including even-aged and uneven-aged methods. The general forest will be managed to develop and maintain maximum sustained yield of high quality products.

Forest structure conditions will be cultivated through a variety of silvicultural methods, both even-aged and uneven-aged. The stages of regeneration up through late seral can have significant cohorts of different ages and sizes of trees within the stand.

One goal of management on JDSF is to maintain the relative proportions of forest structure conditions or successional stages over time. The exception is old-growth stands which will not be harvested. Management may consist of either passive (i.e., foregoing harvest) or active management (typically thinnings) to allow young stands to mature into later successional classes in order to balance the distribution of successional classes. Management to balance the acreages of successional stages across the Forest may also consist of harvesting sufficiently many trees in a stand to reset it to an earlier successional stage. This approach can entail harvesting a sufficient number of trees in a mature stand to reset it to regeneration.

Structural Conditions Related to Late Seral, Watercourse and Lake Protection Zone Areas, and Older Forest Structure Zone Area

A significant component of stand management across the forest will be directed toward the creation and maintenance of interconnected older forest structure and older forest habitat. The principal areas within which this will occur are the existing old-growth groves, late seral development areas [including the watercourse and lake protection zones (WLPZs)], and the older forest structure zone (OFSZ) (see Map Figure 5). Each of these areas is organized around the geographic concept that larger units will be more effective than a collection of smaller units that are not connected. The late seral development areas and OFSZ are large contiguous areas designed in large part to provide core areas for wildlife species that prefer unfragmented areas with large trees in the overstory. These areas also have high research and recreation values.

Nearly all of the areas designated for late seral development currently are (1) immediately adjacent to core areas such as old-growth groves, State Parks, or Class I and II streams WLPZs, (2) dominated by stands with high California Wildlife Habitat Relationship (CWHR) ratings, and (3) will be managed to accelerate the development of larger trees or other older forest structures. The WLPZs are a hydrologically linked system that extends from low gradient reaches near the ocean all the way up to intermittent streams in the upper reaches of the watershed. The WLPZ goes through all stand types and management is primarily driven by evolving regulatory requirements as well as research and demonstration projects specifically designed to address riparian forest conditions. Older forests with larger trees and late seral structural characteristics will provide both high levels of canopy to maintain moister, cooler microclimates as well as provide the potential recruitment of large trees that could eventually enter the stream systems and provide some of the in-stream structure that is critical to salmonid species.

A contiguous 6,803-acre corridor will be managed as an Older Forest Structure Zone, extending across JDSF from west to east and north to south (Map Figure 5), composed primarily of reserved Old-growth Groves, Late Seral Development Areas, and older forest development areas. This area will produce structural characteristics of older forest, which include large trees, snags, down logs, multiple canopy layers, and a high level of structural diversity.

The portions of this zone available for timber management would be managed on an uneven-aged basis to recruit these structural conditions and wildlife habitat elements, to coincidentally grow and produce timber through careful thinnings and periodic replacement of large trees, and to provide recreational opportunities.

The Older Forest Structure Zone will have high value for research concerning topics such as restoration of older forests and the ecological processes associated with older forests. It also will improve the long-term conditions for wildlife, particularly species that prefer older forests. It provides a continuous corridor of forest that links most of the Forest's old-growth groves, and also provides habitat linking adjacent industrial timberland with the forests of JDSF.

The late seral development area is concentrated in two areas, including the Mendocino Woodlands and Upper Russian Gulch areas, and in three areas adjacent to designated old-growth groves. Within these areas, the objective of management will be to develop older forest through a variety of means, from relatively passive to active management. The more active forms of management will be conducted to accelerate the development of late seral structure. Late seral structure targets will include a significant component of large, old trees (greater than 150 years), as well as large snags, large down logs, deformed trees, multiple canopy layers, and a high degree of within-stand variability. A similar management strategy will be applied in the WLPZ, although management will also concentrate upon the unique values that these areas provide to watershed processes, the stream, and the near-stream environment. This management strategy recognizes that the stream zones provide a valuable forested link within watersheds and across the Forest and that large trees within these areas are an important source of large woody debris inputs to streams.

Forest Management

JDSF is first and foremost a research and demonstration forest. The management plan identifies planned management based on biological, scientific, and social criteria. It is based on the premise that JDSF Forest managers have the discretion to allocate forest management treatments, within the framework established by the management plan, based on the best available science. A set of initial implementation period measures will apply for the next one to three years (see Short Term Harvest Schedule, Table 2, below). The forest will be managed to develop the desired future conditions set forth in the previous section.

The primary focus of management is to lay out best management practices for sustainable forestry on JDSF. In some areas such as old-growth groves, areas immediately adjacent to larger streams, and parts of occupied habitats of threatened or rare species, the management will typically be "no management" except to protect the site from serious external threats or to improve specific habitat values.

The concept of sustainability requires a scientifically based long-term view with respect to the planned sequencing of forest treatments. A reasoned sequence of proposed treatments, based on sound silvicultural and ecological principles, is essential in meeting the defined land management objectives. The land management objectives and sequencing of treatments must be spatially allocated over the forest landscape in order to develop desired future conditions at the landscape level. JDSF continues to adhere to a policy of relatively open access for researchers, and therefore cannot completely predetermine the type of silviculture that will be used in research projects. In addition, given the amount of acres that have to be treated each year to achieve forest structure goals, research projects alone cannot be the only vehicle for timber harvest on JDSF. In any given year, a majority of the silvicultural treatments will probably not be directly associated with a specific research project, but rather will be aimed at creating the diversity of forest structure conditions replicated across the landscape, that is necessary for conducting future research projects that will meet the Forest's mandate.

The current structure and composition of the State Forest is reflective of past management and historic plans. Future management actions and natural growth processes will move the forest towards a more varied set of stand structures and habitat conditions, which are reflective of how management objectives on JDSF have evolved over the years.

The silvicultural allocation plan and short-term harvest schedule described here provide implementation guidelines for allocating harvest levels and silvicultural methods to different areas on the Forest. A key objective is to keep as many options available for future research and demonstration as possible within forest structure goals that primarily follow planning watershed boundaries. No single forest structure is favored over another. A key consideration is not to foreclose on future options, thus maintaining flexibility for future management and research installations.

This plan does not alter any of the protection measures associated with recognized areas of special concern. State Forest staff will continue to conduct site-specific assessments to determine the appropriateness of silvicultural

prescriptions for any given area. Forms of stand management are spatially allocated by forest area in a way that establishes an area allocation plan that limits management options near the OFSZ, adjacent rural residential neighborhoods, state parks, and the Mendocino Woodlands (see Map Figure 5). For any given timber harvest, the THP process provides the CEQA-compliant project-level environmental assessment process.

The allocation of silvicultural systems addresses potential conflicts with State Forest recreational use and local public interest values. Practices similar to even-aged silviculture that would encompass 2.5 or more acres were minimized in management compartments adjacent to areas where management is constrained. Uneven-aged management, which tends to maintain a continuous forest canopy, has been incorporated within the management compartments with identified sensitive public interest values.

Forest structure is created through natural growth and stand development processes in combination with the use of silvicultural systems. Silviculture is the art and science of stand manipulation to achieve desired conditions.

Older redwood forest tends to have an uneven-aged structure in nature. In addition to the existing old-growth groves, approximately one-third of the Forest will be dedicated to the development of an older or late seral forest condition. The form and amount of structural manipulation applied in these stands will vary according to the objectives for the given area. Active management may include light to moderate stand thinning, often of a variable nature, and other forms of stand management intended to achieve the desired conditions (the presence of large trees, snags, and large down logs within a stand that is both vertically and horizontally diverse).

Table 1 summarizes the planned acreage allocated to different silvicultural methods under this plan.

Table 1. Planned Distribution of Silvicultural Methods.

Silvicultural Method	**Acres**	**Percent of Forest Acres**
No harvest (old-growth groves, pygmy forest, cypress groups, Conservation Camps)	1,350	3
Late seral development and older forest structure prescriptions	15,801	33
Uneven-aged; single tree or cluster selection	8,933	18
Uneven-aged; group selection or single tree/cluster selection	7,325	15
Uneven-aged or even-aged; single tree/cluster selection, group selection, variable retention, two-aged or one-aged	12,788	26
Unclassified [research areas (variable silvicultural treatments) and power line right-of-way]	2,455	5
Total	**48,652**	**100**

Uneven-aged Management

Uneven-aged management is used to create and develop stands with trees of differing sizes and ages. Some common systems in uneven-aged management include single tree selection, cluster selection, and group selection. Openings within uneven-aged systems vary from an individual tree ($1/100^{th}$ of an acre) to clusters of trees (less than 1/4 acre) to openings designed to allow full sunlight (1/4 acre to 2.5 acres). Over time, uneven-aged systems develop trees from at least 3 age or size classes. Periodic timber harvest in these stands removes selected individual trees or small groups of trees in order to promote growth of the remaining trees and to create an opportunity for new trees to develop or regenerate.

A majority of the area devoted to timber production will be managed under an uneven-aged management system (at least 33,409 acres or 69% of the Forest area). This is the dominant system utilized by non-industrial forest landowners and others intent upon maintaining visual quality. In practice, size class differentiation often complements or substitutes for age class differentiation. The Forest will be managed to utilize two predominant uneven-aged silvicultural systems, single tree/cluster selection and group selection. The objective of this variability is to demonstrate a range of silvicultural

options under uneven-aged management, and to provide multiple future research opportunities.

Single Tree/Cluster Selection:

Single tree/cluster selection will be utilized to create small openings ranging in size between single trees and one-quarter acre. Single tree and cluster selection leads to stands with continuous forest cover, small gaps between trees, and a diversity of tree sizes and ages. The intent will be to enter each timber stand every 10 to 25 years to create a new age class. The residual growing stock level and the diameter distribution of trees in a stand will be adjusted on a site-specific basis.

Stand variability will be maintained in order to demonstrate a range of silvicultural options under uneven-aged management and to provide variable conditions available for future research.

The areas designated for this silvicultural method were intended to minimize potential conflict with recreation uses and with local public interest values. These management areas also share boundaries with private lands along the western edge of the State Forest and with developed recreation sites. They also form a viewshed from Highway 20. The basic management areas, or planned structure target conditions are depicted in Map Figure 5.

Many existing selection harvest units on the Forest have not yet had the kinds of repeated harvest entries that lead to multiple age classes and canopy layers, and only a very few have had more than two such entries. Many stands to be managed under the selection system are even-aged, single-canopy second-growth stands that have not been re-entered since their establishment, or have had only one partial cut that may or may not have resulted in successful creation of a new age class. Nowhere on JDSF is there a stand that displays the full range of trees of all sizes and ages that is the ultimate structure of the regulated[1] selection stand. Within the region, the practice of selective harvest of second-growth stands began only 40 to 50 years ago. A complete transition from even-aged to uneven-aged structure is largely theoretical, thus providing research and demonstration opportunities, and may take up to 80 years or more.

Each potential single tree/cluster selection harvest unit will be evaluated to determine the most appropriate treatment to move its condition towards a stand with a balance of age and size classes. Evaluation characteristics may include:

- Structural needs associated with creation of a range of conditions across the Forest for future research and demonstration.
- Condition of regeneration or opportunities to promote regeneration.
- Stand density. An open stand tends to receive light at the level of the regeneration, so a light harvest of the overstory may be appropriate. A closed stand may indicate the need to create canopy gaps.
- Competing vegetation. Stands with large components of brush or hardwood may benefit from a more aggressive regeneration effort.

Group Selection:

Stands managed under the group selection system will eventually consist of small forest patches at multiple stages of development, from recently regenerated to mature. The cutting cycle for an area designated for group selection will range from 10 to 25 years. The goal is to establish and maintain three to five separate age classes.

The sizes of group openings will typically range from 0.25 acre to 2.5 acres. Group openings 2.5 acres and larger are considered to represent even-aged management. Within stands, group sizes may remain fairly uniform to maintain the ability for comparison between stand management options. The intent under this plan is to demonstrate and assess a range of harvest opening sizes upon factors such as tree growth, regeneration of new trees, wildlife habitats, botanical diversity, operability, and financial considerations.

Criteria for selecting the sizes and configuration of group openings in a harvest unit may include:

- Forest-wide structure goals over time.

[1] In the context of managed uneven-aged stands, "regulated" stand conditions are reached once the stand approaches a relatively stable and sustainable state where harvest is roughly balanced with growth over the cutting cycle.

- Height of trees surrounding the opening. Smaller openings can be accommodated when surrounding trees are relatively short.
- Logging systems anticipated. The logistics of specific systems can be accommodated by the size, orientation, and arrangement of group openings.
- Shape. Long openings may require additional size to maintain sufficient levels of light for regeneration success.
- Orientation. Openings with the long axis aligned east-west will remain shaded along the south edge, while a north-south alignment may allow more sunlight to reach the opening. This effect may be accentuated on north-facing slopes.
- Site preparation and artificial regeneration. If these cultural practices are prescribed, their implementation can be more efficiently facilitated by larger opening sizes.
- Adjacency of neighbors, recreation areas, and other potential use conflicts.
- Species composition and stocking levels.
- Specific demonstration and/or research objective.

Even-aged Management

Even-aged management is intended to create and develop stands within which most of the trees are of similar age. This form of management works best when the desired species of trees grow well with a lot of sunlight. Some common systems to be demonstrated in even-aged management include variable retention, two-aged stands and one-aged stands (commonly called clearcutting). Harvest under this form of management tends to remove most of the trees from a given area to promote the regeneration of a new stand.

Even-aged management is generally used to create and maintain stands with trees of the same or similar age. This form of management works best when the desired species of trees grow well with a lot of sunlight. It is increasingly common to retain a significant number of larger trees growing above or among the more numerous younger trees. These larger trees are generally retained to increase habitat values, to shelter the younger trees, to provide a seed source, or to accumulate volume for later harvest.

Even-aged management will be used as necessary to achieve the forest structure conditions needed to accommodate an adequate range of research investigations. Within this context, even-age management also may be used to address forest health and problematic regeneration conditions, as well as immediate research and demonstration purposes.

A minority of the total Forest area devoted to timber production can be managed under an even-aged management system (12,788 acres or 26% of the Forest area is available to be managed under either even-aged or uneven-aged management systems). The total area receiving any form of even-aged silvicultural treatments shall not exceed 2,700 acres per decade (or 5.5% of Forest area). Clearcutting is to be conducted only where strictly necessary for purposes of research, demonstration, addressing forest health, or addressing problematic conditions for regeneration; clearcutting for these four purposes is limited to a cumulative maximum of 100 acres (or 0.2 % of Forest area) per decade. Up to an additional 400 acres (or 0.8 % of Forest area) may be clearcut per decade, but only for specific research purposes that cannot be reasonably met through any other method.

In addition, the extent of the use of even-aged management, at both the project and Forest-wide level, (a) will be tied to the Forest condition it is intended to produce and (b) will be necessary and appropriate to accommodate research investigations either immediately or at a later time. The foregoing constraints do not apply to even-aged management where necessary to address forest health or problematic regeneration conditions. All proposed even-aged management, with the exception of CAL FIRE-PSW Research Station's planned SF Caspar Creek research, will be presented to the appropriate advisory committee(s) for review and recommendation prior to implementation. The management plan reduces the potential extent of even-aged management to less than 26% of the Forest area, as well as restricting the rate at which even-aged management may be conducted. An increase in forms of uneven-aged management will tend to provide greater connectivity between forested habitats, and a general increase in aesthetic and recreational values.

In general, use of even-aged management is to be restricted to purposes of research, demonstration, addressing forest health, addressing problematic conditions for regeneration, or achieving long-term forest structure condition goals.

Some forms of even-aged management that are proposed for future demonstration include variable retention, two-aged stands, and one-aged stands including clearcutting. Variable retention is a form of management in which mature trees are retained in a variable configuration, and a new even-aged stand is grown beneath or between the retained trees.

Retained trees may occur as scattered individuals, in groups, or in combination. The purposes for retention of the mature trees are numerous, including habitat value, watershed, and aesthetic considerations. Two-aged stand conditions have not been widely applied within the region, but offer an important research and demonstration opportunity to meld the continuous canopy concept of uneven-aged management with the concept of creating significant space and sunlight for promotion of a second age class developing beneath and between the overstory. One-aged stands as the name implies designates stands where most of the trees are of the same age cohort.

An important consideration for the landowner when applying forms of even-aged management is the concept of rotation age. Rotation age is the age at which a stand of trees is harvested and a new even-aged stand of trees is regenerated on the site. Science has demonstrated that stands can produce maximum physical yields when the average annual growth of the stand is at or near its peak (Lindquist and Palley, 1963; Schumacher, 1930). Land managers also need to consider the economic costs and risks associated with retaining a stand to an advanced age. This continues to be a fertile area for research and demonstration. A broad range of rotation ages will be demonstrated. Most even-aged stands are capable of achieving culmination of mean annual increment at ages between 60 and 150 years, with the longest rotations applied to sites with the lowest growth potential. Economically optimal rotation ages are generally considered to be shorter, in the range of 40-70 years.

Timber Stand Improvement

Some silvicultural treatments are designed to improve the stand condition independent of whether an even-aged or uneven-aged stand structure is desired. The following treatments are applicable depending on specific site conditions. JDSF has a recent management history of applying mechanical timber stand improvement techniques to the majority of newly regenerated even-aged stands, and it is the intent of management to continue this practice in the future.

Precommercial Thinning and Release:

"Precommercial" means that merchantable sawtimber is not derived from the thinning operation. This stand treatment is undertaken to space the remaining trees and control species composition. It is designed to direct growth to the remaining trees, generally those with the best form or growth potential. Young stands are thinned to prescribed stocking levels, in an effort to produce a desired combination of species, tree size, and stand volume increment.

Release often accompanies precommercial thinning, and involves freeing individual trees, or groups of trees, from immediate competition by eliminating over-topping or closely surrounding vegetation. This practice, generally accomplished by mechanical means (e.g. chainsaw), produces increased growth on the remaining trees, a means of controlling invasive weed species, and assurance that planted seedlings will be free to grow. Release is normally a non-commercial practice.

Areas Not Covered by this Silvicultural Allocation Plan

There are portions of the State Forest not covered by this silvicultural spatial allocation plan. The largest area with no assigned silvicultural system is the Caspar watershed which is designated specifically for research.

The North Fork and South Fork Caspar management compartments make up the CAL FIRE-US Forest Service Caspar Creek Watershed study that has been in existence since 1962. Timber harvesting in these compartments will be planned and conducted to serve the needs of the research project. Timber harvesting is expected in the study area during the next ten years.

The Parlin Fork Management Area will continue to be managed using a group selection strategy as described in the 1992 Parlin Fork plan. State Forest staff will provide technical assistance and advice to the CAL FIRE Assistant Chief at Parlin Fork Conservation Camp in environmental assessment and protection, harvest planning, reforestation, stocking control, burning, and other management activities.

Other smaller areas not affected by the silvicultural allocation plan include the Railroad Gulch Study Area, Whiskey Springs Study Area, Stone Study Area, and the Caspar Cutting Trials. These smaller areas have established on-going demonstration or research projects that will set them aside from the overall silvicultural plan.

Initial Implementation Period and Short Term Harvest Schedule

Initial Implementation Period

The intent of the initial implementation period standards is to provide the Board and the Department with an opportunity to obtain detailed input on the management plan, and allow for consensus recommendations on potentially controversial management issues. The initial implementation period will sunset no more than 36 months after approval of the Forest Management Plan by the Board. A set of initial implementation period harvest limitations has been established, and is expected to remain in place for a one- to three-year period, while advisory bodies consider the JDSF management plan and make recommendations to the Department and the Board for possible modifications of the management plan. Decisions on stand structure for future unspecified research projects will be developed by JDSF staff in cooperation with researchers, the Demonstration State Forest Advisory Group (DSFAG), and, when functioning, the new Jackson Demonstration State Forest advisory body.

Short-Term Harvest Schedule

The short term harvest schedule is a companion piece to the silvicultural allocation plan. This schedule lists the approximate locations of proposed harvest units and the general silvicultural treatments to be applied. This information is shown in Table 2 below and displayed in Map Figure 6. The table reflects the establishment of a set of harvest restrictions that will apply for the initial implementation period, during the next one to three years of Plan implementation, and also provides for review of some of the timber harvest plans by advisory entities.

During the initial implementation period, harvest restrictions will be applied to the timber harvest plans in section 1 of the Short-Term Harvest Schedule in Table 2, below. Specific elements of the initial implementation period harvesting restrictions are:

1. Post-harvest conifer stocking (basal area) levels will be approximately 70 percent or greater of pre-harvest levels.
2. Average tree size as determined by quadratic mean stem diameter will be approximately equal to or greater than pre-harvest levels.

Efforts will be made to limit the extent of harvest in areas that have had little or no harvest entry since 1925 or that currently have more than 10 trees/acre greater than 30 inches in diameter, particularly where those areas have not already had work done to prepare timber harvesting plans.

Table 2. Short-Term Harvest Schedule.

Sale Area Name	Planned Silviculture	Harvest Acres[1] approx.	Planning Watershed
1. Potential Harvest Areas Intended for Operation during Initial Implementation Period (these harvests will meet initial implementation period harvest retention criteria, therefore are not subject to prior review by advisory entities)			
Northfork Spur	selection/cluster selection	452	Brandon Gulch
West Chamberlain	commercial thin/old forest structure development (commercial thin in 2005 DEIR)	515	Chamberlain Creek
14 Gulch North	selection/cluster selection (group selection in 2005 DEIR)	400	Berry Gulch
S Whiskey Springs	light and moderate commercial thin/selection/cluster selection/selection with road and trail corridor (commercial thin in 2005 DEIR)	300	Berry Gulch
Dunlap North	light and moderate commercial thin/selection with road and trail corridor/cluster selection (commercial thin in 2005 DEIR)	300	Chamberlain Creek
Dunlap South	selection/cluster selection (group selection in 2005 DEIR)	350	Chamberlain Creek/ Lower North Fork Big River/Two Log Creek
Hare Creek GHIJK	selection/cluster selection, clusters with matrix thinning, clusters with no matrix thinning/variable WLPZ demonstration	250	Hare Creek
2. Potential Harvest Areas during or following Initial Implementation Period (advisory entities will have the opportunity to review and comment if to be implemented during the initial implementation period)			
Berry Flat	commercial thinning/selection/cluster selection/with road and trail buffer (even-aged regeneration in 2005 DEIR)	50	Berry Gulch
Helms	selection/group selection/combined selection and group selection/with control stands	250	Mouth of Big River/Berry Gulch
Mitchell	selection/cluster selection (selection/group selection in 2005 DEIR)	635	Mitchell Creek
Orchard	selection/cluster selection/group selection with small groups, with and without matrix thinning (selection/groups selection in 2005 DEIR)	500	Caspar Creek
Park Gulch	group selection/silvicultural demonstration area with selection; cluster selection; group selection with small, medium, and large groups, with and without matrix thinning	300	Chamberlain Creek
Pleiades #4	selection/cluster selection (4th selective cut)	50	Kass Creek
Riley Ridge	old forest structure development using light and moderate thinning with variable density hardwood retention (group selection in 2005 DEIR)	600	Brandon Gulch

Table 2. Short-Term Harvest Schedule *(continued)*.

Sale Area Name	Planned Silviculture	Harvest Acres[1] approx.	Planning Watershed
South Fork Caspar Creek[2]	uneven-aged and/or even-aged management; prescription specifics to be determined; represents the "next phase" treatment of a research area, designed to study the effects of forest management upon watershed resources.	1,040	South Fork Caspar Creek
Thompson Gulch	late seral development using light and moderate variable density thinning and selection	250	Berry Gulch
Upper Hare Creek	selection/cluster selection/variable WLPZ treatment demonstration	100	Hare Creek
Volcano #2	group selection with small, medium, and large groups; with and without matrix thinning/selection with road and trail corridor	500	Brandon Gulch
Water Gulch #1	commercial thinning with light and moderate thinning	300	Chamberlain Creek
Water Gulch #2	light and moderate commercial thin/silvicultural demonstration area with selection; cluster selection; group selection with small, medium, and large groups, with and without matrix thinning/two-aged stand (even-aged regeneration in 2005 DEIR)	450	Chamberlain Creek
West Berry Gulch	light and moderate commercial thin/silvicultural demonstration area with selection; cluster selection; group selection with small, medium, and large groups, with and without matrix thinning/two-aged stand (commercial thin in 2005 DEIR)	400	Berry Gulch
3. Potential Even-aged Management Areas following Initial Implementation Period[3]			
Frolic #2	two-aged stand/variable retention/alternative prescription using combination of scattered and clumped retention/with control stands/variable WLPZ treatment demonstration (even-aged regeneration in 2005 DEIR)	200	Parlin Creek
Road 80	two-aged stand/alternative prescription similar to seed tree, with clustered structure retention/clearcut (max. 20 acres total clearcut area) (even-aged regeneration in 2005 DEIR)	200	Parlin Creek
Scissors #2	selection with road and trail corridor/cluster selection/variable retention/alternative prescription similar to seed tree with clumped structure retention (even-aged regeneration in 2005 DEIR)	100	Parlin Creek
Waldo	two-aged stand/variable retention/ alternative prescription similar to seed tree with clustered structure retention/clearcut (max. 20 acres total clearcut area)/variable WLPZ treatment demonstration (even-aged regeneration in 2005 DEIR)	150	Parlin Creek
Walton Gulch #2	two-aged stand/variable retention/alternative prescription similar to seed tree with scattered and clumped structure retention/variable WLPZ treatment demonstration (even-aged regeneration in 2005 DEIR)	100	Hare Creek

Table 2. Short-Term Harvest Schedule *(continued)*.

Sale Area Name	Planned Silviculture	Harvest Acres[1] approx.	Planning Watershed
Parlin	commercial thin/alternative prescription with scattered, grouped, and combination scattered and grouped structure retention	251	Parlin Creek
Tunnel	alternative prescription similar to seed tree, with structure retention/selection (even-aged regeneration/selection in 2005 DEIR)	54	Hare Creek
4. Enjoined Harvests Subject to Legal and Contract Resolution			
Brandon[4]	selection, cluster selection	540	Brandon Gulch
Camp 3[4]	selection, cluster selection	366	Brandon Gulch

1. For group selection units, the number in this column represents the total area of the unit. Typically, about 20 percent of the area is in group openings; the remaining area is sometimes thinned during the group selection harvest entry.

2. SF Caspar Creek research project timber harvest plan is not subject to the initial implementation period restrictions.

3. Even aged management will continue to be an integral part of the suite of management tools available for application on JDSF. Areas that include even-aged management will be deferred until the conclusion of the initial implementation period. These areas may be harvested during the initial implementation period if the silvicultural prescription is modified to eliminate even-aged management and group selection; such harvests are subject to prior review by advisory entities

4. The Camp 3 and Brandon THPs are currently enjoined from operation and subject to a stipulated agreement under First District Court of Appeal Case No. 102911 and Mendocino County Superior Court Action No. SCUK CVPT 0289022. It is anticipated that the manner in which these THPs are operated will be determined through negotiations among signatories to the stipulated agreement and the timber sale contract holders.

The potential harvests identified in this table represent the Department's current best expectations for short-term harvesting activity in the context of the programmatic nature of the Management Plan. The actual implementation of individual harvests identified here may not occur or may be modified in terms of scale, silvicultural prescriptions, timing, or other factors. Additionally, other harvests not identified herein may be developed and carried out, so long as they are within the scope of this Plan and are subjected to necessary reviews and permitting.

Limits on Productivity Imposed by Other Forest Values

This section describes the non-timber resource values affecting the level of timber production that can be achieved at JDSF. The two major limiting factors for timber production on JDSF are wildlife and watershed resources. Other non-timber resources listed in 14CCR 913.11(a)(1), recreation, regional economic vitality and employment, and aesthetic enjoyment, are also discussed in this section.

Special Concern Areas

In consideration of forest values other than timber productions, areas of special concern that constrain management were identified and provisions for their management were established. Special concern areas include unique habitats, habitat for species of concern, riparian areas, recreational areas, areas near residences and parks, research areas, water supplies, and sensitive slopes (Map Figure 5).

With the special concern areas identified (e.g., unique habitats, habitat for species of concern, riparian areas), a short-term harvest plan was formulated with the consideration of the following objectives: to maintain or restore habitat, to create diverse forest types and specific structural elements, to produce high levels of sustainable timber growth, and create opportunity for a viable research and demonstration program.

The term Special Concern Area is used to denote geographically distinct areas that are in some way unique, are designated for specific management, or that are subject to management restrictions to protect sensitive resources. Restricting management in this manner helps to create or retain forest conditions consistent with the goals of the Forest. Map Figure 5 shows the approximate locations of the Special Concern Areas. The acreage figures provided here are the best current estimates, but are subject to change with refinement of information or changes in conditions over time.

Many Special Concern Areas overlap. Examples include the power line right-of-way crossing through the watercourse and lake protection zone or the uneven-aged management area; the overlap of pygmy forest and the Jughandle Reserve; or road and trail corridors within the Woodlands Special Treatment Area. The acreages shown below are those that are assigned to each Special Concern Area independently; thus, the total of all acres is more than the total Forest acreage affected by Special Concern Areas. The most restrictive limitations will be applied during implementation of the management plan. The research and demonstration mandate coupled with public trust resource protection has resulted in 23 Special Concern Areas on the Forest.

Older Forest Structure Zone- 6,803 acres
Area designated for management to connect specific old-growth groves, late seral development areas, watercourse protection zones, and upland forest to form a contiguous area of habitat with structural characteristics of older forest, such as large trees, snags, down logs, and a high degree or vertical and horizontal diversity. Where timber harvest is proposed adjacent to the Old Forest Structure Zone, a buffer will be applied. No even-aged silvicultural systems may be used within 300 feet, and only single tree selection may be used within the first 100 feet adjacent to these areas.

Cypress groups - 253 acres
Stands dominated by pygmy cypress that occur on sites with generally unproductive soils (i.e., sites that are considered non-timberland), but not considered to be true pygmy forest. These areas will not be harvested. Note that conifer stands containing cypress that occur on more productive sites may be subject to harvesting and are not included in this Special Concern Area.

Pygmy forest - 613 acres
A unique type of dwarf vegetation found on old marine terraces dominated by pygmy cypress and other specially-adapted species. This Special Concern Area includes nearly all of the Jughandle Reserve Special Concern Area, along with other pygmy forest stands in JDSF that occur outside of the Jughandle Reserve boundaries. These areas will not be harvested.

Jughandle Reserve - 247 acres
An administrative area designated to protect a tract of pygmy forest within JDSF and to manage recreational access to these lands in a manner compatible with human use in the adjacent Jughandle State Reserve. This Special Concern Area lies almost entirely within the pygmy forest Special Concern Area. There will be no harvesting within the pygmy forest area.

Eucalyptus infestation area
This is an area in the Caspar Creek planning watershed that includes eucalyptus species mixed with the native species (Douglas-fir, redwood, and other species), along with some Monterey pine. This is an area of special management concern because of the need to control eucalyptus to allow regeneration of conifers in this stand and to prevent the spread of this exotic species on the Forest. JDSF intends to convert this area to native conifer species.

Inner gorges
Steep slopes adjacent to streams that are that are prone to mass wasting and have a high potential for sediment delivery to stream channels. These areas are subject to silvicultural limitations, such as no harvest or limited single tree selection, depending on the results of a site review during THP preparation.

Northern spotted owl nest areas
Buffers around known nest site locations that will be managed to minimize disturbance to these sites and enhance their value as nesting habitat for the northern spotted owl.

Osprey nest areas
Buffers around known nest site locations that will be managed to minimize disturbance to these sites and enhance their value as nesting habitat for osprey.

Watercourse and lake protection zones (WLPZ) - 7,440 acres
Areas designated for special management to protect aquatic and riparian resources, maintain terrestrial habitat connectivity for wildlife, and promote development of late-successional forest stand conditions. Silviculture is limited to no harvest or special uneven-aged regimes designed to promote development of late-successional forest stand conditions. WLPZ acres were estimated.

Woodlands Special Treatment Area - 2,511 acres
A special management area adjacent to the Mendocino Woodlands. Silvicultural activities, with limited exceptions, are focused on promoting late-successional forest conditions, maintaining aesthetic qualities, and limiting impacts on the operation of Mendocino Woodlands. (Note: the Railroad Gulch silvicultural study area is not included in this acreage).

Domestic water supplies - 195 acres
Designated areas for domestic water supply in JDSF that are sensitive to disturbance. Only a limited range of silviculture is allowed in these areas.

Buffers adjacent to non-timberland neighbors - 875 acres
Areas along the boundary of JDSF adjacent to non-industrial timberland owners where a buffer zone is designated to minimize impacts on neighbors. Only a limited range of silviculture is allowed in these areas.

Power line right-of-way - 89 acres
Operated by PG&E. The power line right-of-way runs through the Forest, generally parallel to Highway 20. The maintained clearing is not available for timber production.

State Park Special Treatment Areas - 415
Areas adjoining State Parks where the application of silvicultural systems must take the values of the parks into consideration.

Reserved old-growth groves - 459 acres
Includes the existing mapped old-growth grove reserves. These areas will not be harvested.

Late seral development areas – 2762 acres
Includes areas adjacent to three old-growth grove reserves, in addition to the upper Russian Gulch and lower Big River areas, which will be managed to develop late seral habitat conditions potentially suitable for the marbled murrelet. These areas will be managed to promote development of late seral stand conditions to help buffer the adjacent old-growth groves and to enhance the value of these areas for wildlife species that are associated with late seral forests. Where timber harvest is proposed near old-growth groves or late seral development areas, a buffer will be applied. No even-aged silvicultural systems may be used within 300 feet, and only single tree selection may be used within the first 100 feet adjacent to these areas.

Campground buffers - 133 acres
Areas immediately adjacent to campgrounds that are managed for public safety and aesthetic enjoyment. Even-aged silviculture is not allowed within the campground buffers.

Conservation camps - 43 acres
Areas occupied by the Parlin Fork and Chamberlain Creek conservation camps. These areas will not be managed for timber production.

Road and trail corridors – 4,790 acres
Buffer areas along trails and roads to maintain aesthetic qualities valued by the public. Only a limited range of silviculture is allowed in these areas.

Parlin Fork management area - 279 acres
An area adjacent to the Parlin Fork Conservation Camp that is used as a demonstration area for small woodland management.

Research areas - 1,680 acres
Areas set aside for various research studies.

Areas with a high relative landslide potential

Areas identified from CGS geology and geomorphology maps as having a high relative landslide potential using the best available data and assessment methodologies. These areas will be reviewed on the ground following the guidelines presented at the 1999 CLFA workshop. They are potentially subject to limitations on road construction, yarding methods, and silviculture and may need to be evaluated by a certified engineering geologist (CEG).

Mushroom Corners Management Area – 330 acres

The Mushroom Corners area partially overlaps the Caspar Experimental Watershed, Russian Gulch/Lower Big River a Late Seral Recruitment area, county roads with visual and recreation concerns, as well as proximity to State Parks and private land ownerships (see Figure 5). This area is particularly important to the mycological research community, in part due to its ease of access and presence and abundance of a diverse number of species.

Parts of the Forest not affected by these constraints are generally available for an allocation of management options that can be selected to best meet the array of management goals. To ensure that management activities do not conflict with these constraints, a comprehensive reference list has been compiled and the affected areas have been mapped.

During the course of planning regular timber harvesting operations, adjacent special concern areas where timber harvesting is allowed will be evaluated for their suitability for concurrent management treatments. For some special concern areas, notably research areas, a dedicated timber harvest or other project may be designed specifically to fulfill the objective of that area.

Watersheds

Riparian, Wetland, and Floodplain Management

The goal of the prescriptions developed for JDSF management related to watershed and fisheries values is to maintain or enhance important habitats for both anadromous and resident fishes found in JDSF and promote healthy and sustainable aquatic ecosystems. Specifically, properly functioning riparian and stream ecosystems will be protected or restored by managing forest stands in watercourse and lake protection zones (WLPZs) to promote their ecological succession to late seral forest conditions. Development of vertical structural diversity in these stands will be facilitated. A key overall management objective for in-channel areas is to increase the abundance and improve the distribution of key pieces of large woody debris (LWD). Streamside overstory and understory riparian trees in the WLPZ will provide sufficient canopy to avoid or minimize impacts to stream temperatures. Bank stability will be promoted by retaining vegetation, establishing equipment exclusion zones (EEZs) or equipment limitation zones (ELZs) along watercourses, and prohibiting ignition of prescribed fire near watercourses. Since JDSF is a publicly owned property available for

research purposes, protection measures assigned to riparian areas are to remain sufficiently flexible for conducting research on the adequacy of differing riparian protection measures.

Wetland habitats on JDSF will continue to be managed in a manner that maintains or restores productivity and contributes to fish and wildlife habitat, water quality, and ecological functions and processes. The wetlands of JDSF are small in extent, but of high interest and value. They include two known Sphagnum bogs and numerous springs and seeps with aquatic habitat values. Wetland habitat quality and hydrologic function will be protected.

Floodplain Management Measures

Where there is evidence of floodplain connectivity for storm events with return intervals of 20 years or less in areas that are proposed for timber management, Forest staff will utilize the guidelines stated in "Flood Prone Area Considerations in the Coast Redwood Zone" (November 2005). In addition, Forest staff will be guided by the evaluation procedures included in the Riparian Protection Committee's Final Report.

Hillslope Management to Provide for Slope Stability

Forest management activities with the potential to destabilize slopes and/or damage aquatic habitat will be mitigated to help maintain stability of hillslope areas and control sedimentation. Special attention will be given to areas where mass wasting tends to occur. Site specific measures will be developed and applied in THP design and implementation for potential high hazard areas. The goal is to limit management related input of sediment into stream channels that could significantly affect aquatic habitat and water quality.

Inner gorge and unstable areas will be identified during initial THP preparation with a map and field review. A Certified Engineering Geologist (CEG) will be consulted for appropriate measures needed to avoid or minimize impacts where timber harvesting is proposed within the inner gorge, and when appropriate for proposed timber harvesting and use of ground-based equipment within unstable areas. While potential inner gorge areas for JDSF have been mapped by the California Geologic Service (largely from aerial photographs), they will be field verified prior to logging. Road construction and ground-based yarding activities in inner gorges will not take place without CEG advice.

Where road building is proposed in potentially unstable areas, the Registered Professional Forester (RPF) will seek the advice of a CEG. Appropriate prescriptions will vary depending on the site-specific conditions present. Where timber harvesting is allowed in these areas, silvicultural restrictions may apply.

Specific slope stability assessment techniques to be used include:

a) Office Review of Existing Information. This information includes: 1) Maps of geologic and geomorphic features related to landsliding, 2) Relative landslide potential maps, and 3) prior THPs and their geologic reports.

b) Field Review. Once office review has been completed, an on-site evaluation will be conducted throughout the project area by a Registered Professional Forester (RPF). Areas highlighted during the office review of existing information will receive special attention. The RPF will follow the 1999 "California Licensed Foresters Association (CLFA) Guide to Determining the Need for Input From a Licensed Geologist During the THP Preparation." (Appendix VIII)

c) CEG Input. A CEG is to be consulted as appropriate during the design phase of timber sale preparation work to address slope instability and erosion issues identified during office and field reviews, insuring that harvest units and road designs are proposed that adequately protect unstable areas and inner gorges. The 1999 CLFA guide will be used to aid in determining when to call for the services of a CEG.

Water Quality

Water temperature and sediment issues are the major water quality concerns for the watersheds occupied by JDSF. Sediment issues are the main focus of this section.

At the broadest level of water quality protection, JDSF staff will protect the beneficial uses of water by compliance with water quality objectives in accordance with the Water Quality Control Plan for the North Coast Region (Basin Plan), and by implementing required Total Maximum Daily Load (TMDL) measures. JDSF staff also will comply with other relevant regulations of the North Coast Regional Water Quality Control Board, including the Anti-degradation Policy, TMDL, Implementation Policy statement, the Nonpoint Source Policy, and other relevant current regulations, as well as any additional relevant regulations that may be implemented over time.

Sediment and Turbidity in General

Reducing suspended sediment concentrations and lowering turbidity in waters flowing from JDSF are high priorities.

The primary techniques that will be used to reduce turbidity and suspended sediment concentrations in JDSF watercourses will relate to improved practices associated with road maintenance and timber operations. Road related surface erosion is estimated to account for half of the sediment generated within the 15 planning watersheds draining JDSF. Specific items that will reduce turbidity and suspended sediment concentrations include: hydrologically disconnecting inside ditchlines along road segments from watercourses and other road upgrading actions, reducing winter hauling on wet roads, properly abandoning roads located near watercourses, and use of annual inspections of roads to improve road maintenance. In addition to road management actions, improvements associated with hillslope operations will reduce sediment entry into watercourses. These practices include reduced tractor logging on steeper slopes, better recognition and mitigation measures for unstable slopes and inner gorge areas, and use of wider equipment exclusion zones—keeping ground disturbing activities further away from stream channels.

Wildlife, Fisheries and Plants

The overall objective for fish, wildlife and other non-timber resources is to manage habitat and special habitat elements. Discussed here are the principal areas of concern and proposed management direction. Jackson Demonstration State Forest, given its geographic location, vegetation types, and demonstration mandate, is in a unique position to develop habitats that contribute to improvement in the population viability of certain species of concern and to protect or restore other forest values. Opportunities exist for habitat restoration and management for species that may or may not presently occur on the forest. Similarly, efforts to control the establishment and spread of invasive weed species will contribute to the protection of biological diversity from both a local and regional perspective.

The measures that follow represent generally accepted habitat and species conservation practices that may be modified where appropriate for research and demonstration purposes where they are supported by experts in the field, undergo appropriate CEQA analysis, and include appropriate survey, study, and monitoring.

Protection and Enhancement of Aquatic Organisms and Associated Habitat

The intent of management is to achieve desired future conditions that will provide site- and species-specific protection measures that contribute to maintenance or improvement of the long-term conservation of population viability of aquatic and riparian dependent species of concern and enhance habitat values over existing conditions. Individual project stream and riparian protection and management measures will be determined on a site-specific basis and be designed to attain or maintain properly functioning condition while implementing the following protection measures.

The goal of the JDSF riparian and stream management program is to maintain "properly functioning" riparian and stream ecosystems, i.e., systems that provide essential ecological function. JDSF's management strategy will go beyond simply preventing significant detrimental effects to aquatic and riparian habitats. The goal is to ensure that the aquatic and terrestrial resources and the ecological functions of riparian areas are protected and improved or restored. JDSF will manage forested stands in water/lake protection zones (WLPZs) to promote their development to late-successional forest conditions. JDSF will retain and enhance the vertical structural diversity of these stands, and protect riparian zone special habitat elements such as snags and large woody debris (LWD) to improve habitat values.

Stream and riparian protection and management measures will be determined on a site-specific basis. A variety of conservation measures are available to avoid degradation and improve aquatic and riparian habitat. For example, large woody debris may be recruited to the stream through undisturbed buffer strips, retaining a predetermined number of

trees, rotation age adjustment, or silvicultural control of recruitment rate and the species mix of trees. In order to develop an integrated conservation approach it is necessary to identify stream and riparian conditions that may already be degraded and could be affected by planned operations. As these areas are identified, measures will be developed that are intended to improve conditions, especially in regard to LWD loading.

Wetlands

JDSF will manage wetland habitats in a manner that maintains or restores productivity and contributes to aquatic habitat, water quality, and ecological functions and processes. JDSF will protect wetland site integrity and hydrologic function.

Riparian Zones

Riparian areas along streams and rivers are among the most ecologically important elements of forest landscapes. Forests have a range of functional links to streams and rivers, including providing energy, nutrients, and coarse woody debris. Along smaller streams, forest conditions also strongly influence light and temperature conditions. The stability, or lack thereof, of the soil and rock underlying the forest also controls the level of fine sediments, gravel, and boulders that enter the stream system and create much of the streambed structure.

The goal of the JDSF riparian and stream management program is to maintain "properly functioning" riparian and stream ecosystems, i.e., systems that provide essential ecological function.

These habitat protection measures will be implemented within riparian zones to promote and protect riparian ecosystem function:

- Natural springs and seeps that may provide habitat for non-fish aquatic species are provided the same protections as Class II streams.
- LWD within the WLPZ will be retained and recruited to the stream system unless it presents an imminent risk to safety or drainage structures.
- The Road Management Plan will be implemented to minimize delivery of road-related sediment to aquatic habitats and facilitate fish passage at Class I and II road crossings.
- Selected roads within the WLPZ will be abandoned and decommissioned as described in the Road Management Plan. Construction and abandonment will be consistent with the standards described in the Road Management Plan.
- Road construction and harvesting proposed in inner gorge areas may be approved only after conferring with a Certified Engineering Geologist.
- Fish passage at Class I crossings will also be assessed and addressed as needed.

Large Woody Debris Survey, Recruitment, and Placement

The recruitment of LWD to the stream environment over time and consequent influence on the formation of pool habitats is also achieved through a variety of other habitat conservation strategies. In addition to the management measures listed above, the following strategies will be applied where they overlap with stream environments:

- Retain native hardwoods in the WLPZ except where species imbalance has occurred.
- Old-growth groves and residuals are protected per the JDSF old-growth conservation strategy.
- Salvage of dead or dying trees will not occur within the WLPZ, old-growth augmentation area, species-specific management area described in a habitat conservation strategy, or other area specifically identified. Exceptions may exist in response to large-scale occurrence of fire, insect attack, windthrow, or threat to infrastructure.

Protection and Enhancement of Wildlife Species, Habitat, and Forest Structure

The wildlife management objectives of the Forest are designed to protect or improve current populations and habitat by maintaining a diverse, dynamic matrix of forest habitats and seral stages suitable for a wide variety of native wildlife populations. Manage designated old-growth reserves for maintenance of late seral habitat values. Maintain and recruit

special habitat elements necessary for properly functioning habitats. Management goals and direction are intended to initiate a trajectory of management that will result in about one-third of the Forest area being in older forest structure, late seral forest, or old-growth.

Recruitment of Late Seral and Older Forest

Management areas have been designated adjacent to three existing old-growth groves or complexes to provide for the recruitment of additional late seral forest stands. These management areas will receive the same site-specific protection measures (i.e., special silvicultural management zones) as the old-growth grove reserves when THPs occur adjacent to these areas. These protection measures will increase the ecological values of these groves as habitat for marbled murrelet and other species, and help buffer the groves from various types of disturbance.

Late seral forest characteristics will also be cultivated in the Mendocino Woodlands Special Treatment. Management in this area may include thinning from below and individual tree selection designed to emphasize development and retention of large trees.

An additional area that encompasses part of the Russian Gulch and Lower Big River watershed has been designated for marbled murrelet habitat recruitment/late seral development. This area has important habitat potential due to its close proximity to the coast, State Park lands (Big River and Russian Gulch), and the Mendocino Woodlands Special Treatment Area (discussed above).

Where timber harvest is proposed near old-growth groves, late seral development areas, or the Older Forest Structure Zone, a buffer will be applied. No even-aged silvicultural systems may be used within 300 feet, and only single tree selection may be used within the first 100 feet adjacent to these areas.

The WLPZs on Class I and Class II streams will be managed for the development and maintenance of late seral forest characteristics.

Portions of other special concern zones may have designated areas where silvicultural activity will not occur. This management will allow for the recruitment of large trees that may develop the structural characteristics commonly associated with old-growth trees.

JDSF intends to recruit trees with late seral or old-growth characteristics in areas that enhance the ecological effects of forests with these structural characteristics.

Older Forest Structure Zone

To provide for an extensive corridor or older forest structure across the Forest, from west to east and north to south, a 6,803-acre Older Forest Structure Zone (OFSZ) has been designated. This corridor is indicated in Map Figure 5. The OFSZ corridor connects most of the old-growth groves and late seral development areas on the Forest. The OFSZ and its management has already been described earlier in this chapter in the section Structural Conditions Related to Late Seral, Watercourse and Lake Protection Zone Areas, and Older Forest Structure Zone Area.

Old-growth Forest

Existing old-growth groves will be retained, as will aggregations of old-growth trees. Individual old-growth trees found outside of stands or aggregations and exhibiting specified characteristics will be retained, with limited exceptions, such as where the tree presents a public safety issue or retention would result in the potential for greater long-term environmental damage. Old-growth retention and recruitment measures are presented below. In addition, refer to DEIR section VII.6.3 Timber Resources for a discussion of the old-growth protection measures.

Hardwoods

JDSF will maintain the naturally occurring hardwood component in riparian stands (WLPZs) and other special concern areas when consistent with the objectives of that area. Maintaining and recruiting hardwoods on JDSF, including larger size classes, will enhance not only wildlife species diversity but also forest structural diversity.

Protection of Unique Habitats

Pygmy Forest

JDSF will maintain the current distribution and species composition of this plant community and protect it from harmful human disturbance, while continuing to allow compatible recreational activities. Sphagnum Bogs will be protected due to their location within the Pygmy forest and their wetland status.

In addition, Cypress Groups, elements of bishop pine/pygmy cypress forest on unproductive soils (non-timberland) will not be subject to harvest. Some of this vegetation may also be considered Northern Bishop Pine Forest, a series or association considered rare and worthy of consideration by California Natural Diversity Database (dated 9/2003). Note that both Bishop pine and pygmy cypress can occur on disturbed more fertile redwood forest. In these areas (i.e. timberland) harvest may occur. As a special status plant species, effects to individual upland pygmy cypress will be evaluated on a project basis.

Recreation

Management Measures for Recreation

1. Timber harvesting within 300 feet of campgrounds and day-use areas will be planned and conducted with the designated site use in mind. Main access routes to high-use recreation areas will have slash abatement within 50 feet of the road.

2. Active timber operations within the vicinity (to be discussed at time of sales preparation) of occupied campgrounds and picnic areas will be limited to weekdays and non-holidays. Noise abatement mitigation will be included in any timber sale within 1000 feet of an open campground for timber operations occurring between July 1 and Labor Day. Camp Hosts will be kept informed of activities associated with timber operations affecting campgrounds under their jurisdiction.

3. Road surfacing for heavily used recreational roads will be upgraded in order to limit erosion, protect the beneficial uses of water, and provide safe driving conditions.

4. JDSF will seek joint efforts with the Department of Parks and Recreation and the Mendocino Woodlands Association to manage the area adjacent to the Mendocino Woodlands Outdoor Center for educational and recreational purposes.

5. Recreation facilities such as trails and roads used for recreation also are addressed by their inclusion in the Road and Trail Corridor Special Concern Area.

Mitigations to Avoid Potential Recreation and Visual Impacts

a. For even-aged timber harvest plans or harvest plans adjacent to buffer areas, conduct field evaluations by a RPF or his or her designee to determine the visibility of the THP area to the Forest visitor as seen from roads, trails, and recreation areas. Evaluations will include, but not be limited to: the degree and duration of vistas and general topography of the THP area in relation to the view aspect, and type and density of forest canopy and understory cover of forest areas surrounding the THP area. Where appropriate to visually soften and mitigate impacts created by even-aged management on the integrity of scenic views visible to the general forest visitor, develop the THP to include one or a combination of the following: modify the configuration of the harvest area to better reflect topography; modify the configuration of the harvest area to avoid spanning ridgelines in whole or in part; or leave selected standing trees along the harvest edge boundaries.

b. For public safety, post and maintain signs around all areas closed to public access for timber operations that include information defining the period of closure. In order to avoid conflicts between recreation uses and for public safety, post and maintain appropriate signs around all areas closed to hunting, trapping, and the use of firearms. Signs should be posted at all points where roads and trails enter such areas and, in the case of hunting restrictions, at legally required intervals along the perimeter of such areas.

c. Other recreation facilities such as trails and roads used for recreation are addressed by their inclusion in the Road and Trail Corridor Special Concern Area.

Regional Economic Vitality

JDSF is located in Mendocino County near the towns of Fort Bragg, Willits and Mendocino. Its western edge is near the Pacific Coast Highway and its eastern edge is near the town of Willits along State Highway 101. This area between the coast and the interior valleys is dominated by forests with residential development concentrated along the coast and the Highway 101 corridor.

In 2004, Mendocino County had a population of 89,190, of whom 60,865 lived in unincorporated areas. The county has a land area of 2.2 million acres.

The recently completed "Background Report for the County of Mendocino General Plan Update" (Pacific Municipal Consultants, January 2003) provides a thorough background on much of the economic setting relevant for JDSF in terms of the central Mendocino Coast as well as the broader target of private forests in the county.

Major Economic Sectors in Mendocino County

In describing the prospects for Mendocino County's ability to support and grow specialized and competitive industries, the Economic Development chapter of the Background Report provided useful insights into the nature and location of both the timber and tourism industries. It identified local concentration and relative employment growth as key metrics for identifying sectors that are projected to have the potential to be a large and growing part of the local economic base. Based on their analysis of 3-digit SIC (Standard Industrial Classification) codes for 1991 and 1999 they identified both the "lumber and wood products industry cluster" and the "tourism industry cluster" as vital pillars of the current and future Mendocino economy. Comparative economic advantages of these clusters are related to features such as specialized marketing organizations, credit and transport facilities, a trained labor force, and the existence of complementary industries.

Using a broader definition of workers than just those in the sawmill sector, the report calculated that the lumber and wood products industry cluster accounts for 2,520 or 9.2 percent of all the wage and salary jobs in the County in 1999. This reflects a loss of 354 jobs since 1991. During this period, the only segment of the cluster to show any employment growth was logging, which gained 149 jobs. In 1999, the lumber and wood products industry cluster average annual wage was $33,245—higher than the County's average at $21,507. Logging and wood products manufacturing have provided an excellent opportunity for high paying, blue collar jobs for decades. These have been valued by county residents, as they typically do not require extensive education or formal training. The downturn of timber production has spread to a broad range of wood products occupations including forestry, timber falling, choker setting, mechanic, truck driving, millwright, sawyer, planer operator, board handler, log and lumber grader, and electrician. Many of these workers have had to take cuts in hours worked, cuts in pay, or are forced to relocate, retire, or retrain in new occupations.

Mendocino's Tourism Industry

The Background Report provides a thorough overview of the tourism industry. It estimated that Mendocino County had a $303 million tourism industry in 1999, making it the third largest industry after agriculture and wood products. The analysis pointed out that the industry is dominated by coastal visitation as well as by activity in the inland communities along the State Route 101 corridor. A substantial amount of State Route 101 traffic utilizes commercial services in Hopland, Ukiah, and Willits. These communities have not historically been visitor destinations, and are challenged to attract the pass-through highway traffic. The expansion of Indian casinos along the corridor is adding to the activity.

For 1999 the study identified four major components of the tourism industry to which JDSF contributes either directly or indirectly.

- More than half (58 percent) of the $303 million visitor spending came from overnight guests at bed and breakfast inns, motels, and vacation rentals. The coastal area attracts the majority of overnight guests with most of the remainder utilizing lodging establishments along the State Route 101 corridor.
- Day travelers comprise 21 percent of visitor spending. This includes all Mendocino County spending by visitors traveling the State Route 101 corridor, as well as any day visitors traveling along the coastal highways.
- Eleven percent of Mendocino County's visitor spending comes from campers. This visitor segment is oriented to more outdoor recreation, spends less on lodging, and many prepare their own food. They spend more in local grocery stores, and less eating out.
- Ten percent of visitor spending in Mendocino County is from persons visiting friends and family who are permanent residents.

Source: Pacific Municipal Consultants 2003

Jobs and Revenue at Different Harvest Levels

For predicting employment changes related to changing levels of harvest output from Jackson Demonstration State Forest, or other timberlands in Mendocino County, a conservative ratio of 8 direct workers per million board feet of harvest was used rather than the much higher jobs/MMBF ratios experienced in Mendocino since 2000. The total of 8 direct jobs per million board feet of harvest is based on 7 workers per MMBF in sawmills and related wood remanufacturing plants and 1 worker per MMBF working in the logging, log transport, and reforestation sectors.

Table 3 presents a range of employment, regional income, and local tax estimates that would correspond to various levels of annual timber harvest. In addition to the benefits to local workers and local government revenue, increased economic output from the state forest supports other local business revenues. It also provides the funds necessary to continue to upgrade the road system to reduce sediment and peak water flow runoff, maintain research programs, fund the extension and outreach program, and improve recreational facilities. In simple terms, every change of 10 million board feet of annual harvest is related to 160 jobs, $4.3 million in local wages, and $184,000 in local taxes.

Current recreational opportunities on Jackson Demonstration State Forest do not appear to be directly tied in a positive or negative manner to harvest levels since the harvest units are scattered across the forest and are only closed for a limited period of time. In the short term, recreational use will move when seasonally limited to permit the safe use of harvesting and reforestation equipment. The ability of JDSF to maintain recreational infrastructure such as roads, trails, and trash removal is reduced when reductions in timber revenue force decreases in personnel working on the Forest. In the longer term, a combination of JDSF staff time, internally generated funds, potential state grants, and partnerships with local recreation use organizations will drive the design and development of new recreational opportunities on the forest.

Table 3.	Employment and Revenue Effects of Various Timber Harvest Levels.						
		Annual Timber Harvest MMBF (million board feet)					
Variable		**5**	**10**	**20**	**30**	**40**	**50**
$500/MBF	Stumpage value	$2,500,000	$5,000,000	$10,000,000	$15,000,000	$20,000,000	$25,000,000
2.60%	Local yield tax to Mendocino	$65,000	$130,000	$260,000	$390,000	$520,000	$650,000
Fixed by acreage	Property tax	$112,438	$112,438	$112,438	$112,438	$112,438	$112,438
Full-time equivalent positions	JDSF timber staff	5	10	15	20	20	25
8 jobs per MMBF	Direct Timber Employment (based on Mendo. and Humboldt ratios)	40	80	160	240	320	400
8 jobs per MMBF	Indirect Timber Employment (1:1 ratio)	40	80	160	240	320	400
$31,721 (same as direct estimate)	Estimated Wages JDSF	$158,605	$317,210	$475,815	$634,420	$634,420	$793,025
$31,721 (2003 salary survey)	Direct Wages non JDSF	$1,268,840	$2,537,680	$5,075,360	$7,613,040	$10,150,720	$12,688,400
$19,700 (2003 salary survey for service workers)	Indirect Wages	$788,000	$1,576,000	$3,152,000	$4,728,000	$6,304,000	$7,880,000
	Total Wages	$2,215,445	$4,430,890	$8,703,175	$12,975,460	$17,089,140	$21,361,425
1.25% of wages	County Sales Tax from wages (JDSF, Direct, Indirect)	$27,693	$55,386	$108,790	$162,193	$213,614	$267,018
	All Local Taxes (timber, property, sales on wages)	$205,131	$297,824	$481,228	$664,631	$846,052	$1,029,456
	Local Employment	85	170	335	500	660	825

Other Considerations

JDSF is a research and demonstration forest, used to conduct pure and applied research, and demonstrate techniques that are of possible use to other Northern California landowners. The Forest is managed to favor relatively rare vegetation and to favor wildlife to a degree greater than required of private forests. The protection of flora and fauna has economic values, though those values are difficult to quantify and are partially represented in the value for recreation. The Forest also produced mushrooms, forest greens, and firewood. In many respects, the Forest plays a valuable role for surrounding private forest landowners by allowing for the empirical testing on public land of how alternative land use patterns will affect non-timber values. Without such a public resource to test alternatives, regulatory guidelines are often proposed with limited understanding of their overall effectiveness and cost.

Aesthetic Enjoyment

Even-aged management will be concentrated in areas of the Forest that are not normally viewed closely by highway travelers, campers, or large numbers of nearby residential owners. Parks are buffered by special treatment areas, and identified rural residential ownerships are provided with a neighbor buffer, within which only a limited range of silviculture applies. A substantial forest area adjacent to the Mendocino Woodlands camp area, lower Big River, and Russian Gulch State Park is dedicated to development of late-seral forest conditions.

The Option A plan restricts forest management to partial harvest prescriptions in designated road and trail corridors throughout JDSF, and adjacent to campgrounds.

Long Term Sustained Yield

The long term sustained yield (LTSY) is defined in the California FPRs as the average annual growth sustainable by the inventory predicted at the end of a 100-year planning interval. Because trees take a long time to grow to maturity, it is often difficult to assess the long-term consequences of planned management. The LTSY statistic is intended to address the problem by capturing the harvest level that is sustainable in perpetuity under a particular management situation. The management situation reflected in the LTSY estimate describes the assumed type and intensity of future management that will occur for the duration of the 100-year planning interval, and it has a profound effect on the resulting estimate of the LTSY. A management situation that assumes a high level of successful intensive growth-enhancing treatments such as brush and hardwood control, and precommercial thinning, will result in high future growth projections and therefore a high LTSY estimate. Conversely, a management situation that embodies more extensive treatment assumptions with few growth-enhancing treatments, will have a correspondingly lower LTSY estimate. The LTSY estimate therefore is almost exclusively determined by the assumptions made about future management, and only to a very small extent by current stand conditions. The credibility of the estimated LTSY is greatly enhanced if it is based on assumptions about future management that bears some resemblance to past and current management on the property.

The estimated LTSY for JDSF is 46.6 million board feet (mbf) conifer[(2)] per year on the timberland base of 45,496 acres, or 1,024 board feet per acre per year. It is based on continuing past and current management practices on the Forest.

The long-term sustained yield was calculated as the growth on the inventory at the end of the 100-year planning period. The growth after the last harvest was used in the LTSY calculation; this was the 2090-2095 periodic annual increment (PAI) or the 2100-2105 PAI as appropriate for the unit.

Balance of Growth and Harvest

Planned future harvest is consistently at a lower level than projected growth, resulting in an increase in stocking levels over time.

Table 6 displays the projected inventory, harvest and growth over time. Inventories increase steadily over the planning period, reaching their maximum at approximately 74,000 board feet per acre at the end of the planning interval. Hardwood inventories remain a small proportion of total inventory over time, being at approximately current levels at the end of the planning period. Growth exceeds harvest in all planning periods.

Table 8 describes acres harvested by silvicultural method during the planning interval in the harvest schedule simulation. Table 6 describes the results of the computer model projections for calculating the long term sustained yield. Computer models by necessity are abstractions of reality that capture average trends but have limited ability to represent the variation around these averages that occurs on individual sites. The results in the table do not represent site-specific commitments to silvicultural treatments for implementation of this Option A plan. Rather, they are included here to allow reviewers to validate the reasonableness of the computer model projections.

Monitoring

The success of this Option A plan will ultimately be measured not upon approval of the planning document, but rather during its implementation, through a gradual adaptive management and learning process. The success of this plan is therefore inextricably linked to JDSF's State Forest research and demonstration program, and the objectives are crafted not as absolute standards but rather as goals to be achieved through adaptive management and learning over time.

The on-going JDSF continuous forest inventory (CFI) has been maintained since 1959 and constitutes one of the longest-running monitoring programs of forest growth in existence. The CFI inventory was last remeasured in 2005. While the CFI was originally intended to serve primarily as a guide for balancing harvest and growth at a forest wide level of detail, it provides a wealth of legacy information on forest structure over this time interval. The CFI system will continue to be maintained and updated into the future. With its extensive historical records of past trends combined with measurements in the future, the CFI system, together with regular periodic forest inventories, will be a cornerstone of the

2 : gross Scribner board feet, 10 inches minimum DBH to a six inches top diameter inside bark.

monitoring and adaptive management program under this Option A plan.

Annual harvest, decadal harvest, and 10-year rolling harvest volumes will be monitored and compared to LTSY projections.

Implementation of silvicultural methods will be guided by Table 8 (acres by silviculture over time).

The State Forest databank system, which is currently under development, will also be a fundamental part of the monitoring program. This is a two-pronged data base system that will track vital statistics of studies and monitoring on JDSF, as well as serve as a repository of inventory and research data. This data bank will enable JDSF to synthesize the large amount of research and monitoring data that exist on JDSF, and evaluate progress towards stated goals.

Implementation

All forest inventory data, models, and growth-and-harvest projections used in the development of the Option A plan are public information. The actual volume of timber harvested annually or in any other time period will be tracked to ensure compliance with the LTSY harvest restrictions and made available to the public on request.

All harvested timber products that are sold off the Forest and are subject to payment of yield tax will count towards the LTSY harvest quota. Examples of forest products that will not be tracked for reporting purposes are firewood cutting, cull trees or logs, and submerchantable wood products left after logging operations.

Chapter 4. Data and Methods

This chapter describes the data, analysis, and assumptions used in the analysis to develop the Option A plan. This chapter provides additional technical detail necessary for regulatory and peer review of the plan. It describes the resource inventories and models that were drawn upon to guide the development of the plan.

The analysis supporting this Option A plan consisted of two parallel tracks: 1) analysis of resource data by experienced forestry experts, and 2) harvest schedule computer models - simulating forest management 100 years into the future in order to evaluate the long term consequences of contemplated management over the next few years.

In the first analysis track, a diverse range of resource inventory data was studied and used to guide resource experts' professional opinion during the formulation of the Option A. Some inventory data, such as timber inventories, were incorporated into computer simulation models. Other resource inventories, such as archaeological surveys, were not analyzed quantitatively, due to their complex and site-specific nature.

In the second analysis track, 100-year projections of harvest, growth, and inventory over time were developed for a range of silvicultural prescriptions for each land type on the Forest. All these projections along with restrictions on management were integrated into a harvest schedule-a computer simulation model of the long-term effects of planned future management in the Option A plan. In the end, the harvest schedule model result was used as a decision support aide to help experienced resource professionals arrive at the final Option A plan. The remaining parts of this chapter discuss the resource data and analysis steps in more detail.

Land Types

Land types are the basic land units or strata to which alternative management activities are allocated and simulated over time. The first step in the planning process was to delineate on a map the parts of the Forest that might receive different management over time. For example, riparian areas are delineated as a separate land type since riparian areas are managed differently than most forest area, and this is expected to continue throughout the life span of the Option A plan.

At a minimum, a land type consists of timber management and special concern areas (Map Figure 5), short-term timber harvest (Map Figure 6), vegetation strata (Map Figure 9), and site quality strata (Map Figure 4).

Vegetation Coverage

The vegetation map used in this analysis is based upon field evaluation by trained staff in 2004 (Appendix 2). Tools avaiable to the staff included aerial photographs, stand harvest history, and forest inventory plots. Criteria utilized to segregate the vegetation were established by staff, and include species composition, stand density, and stand structure. The vegetation types were further aggregated for purposes of modeling for this plan (Map Figure 9).

Site

Soil survey maps for Mendocino County (NRCS, 1987) along with forest inventory plots formed the basis for estimates of site productivity on the Forest. The soil survey map units are soil series or a complex of several soil series. Site index estimates for redwood and Douglas-fir were calculated for each soil map unit polygon using 2005 FRI site trees. In cases where a soil mapping unit polygon didn't contain site trees, the site index estimate was derived from an average of all other soil polygons with the same soil complex. The site index values for each soil polygon were then assigned to a (Forest Practice Rule) FPR site class for DF and RW. The site trees from all plots that fell within one FPR DF/RW site class were then used to calculate a second averaged site index. This site index was used in the CRYPTOS stand tables. For growth modeling purposes, the redwood FPR site class was used to determine which rotation lengths should be modeled for each stand.

Resource Inventories

Forest Resource Inventory

The forest resource inventory (FRI) represents a system of temporary variable radius plots established in 2005. The plots were located on a grid, with the grid located randomly over the State Forest. The individual plots are spaced at five chain intervals along plot strips spaced twenty chains apart and oriented north-south. There are approximately 5,000 FRI plots. Within the plots, individual trees were tallied by species, and DBH was measured on each tree greater than 5 inches in diameter. Sample measurements of total tree height was made on each plot with suitable trees. A sub-plot was installed in order to tally small trees or regeneration.

Continuous Forest Inventory

The original continuous forest inventory (CFI) system consisted of 141 rectangular one-half acre permanent plots distributed on a square 3/4 mile systematic grid across the forest (sixty chains between plot centers). The plots were established and the first measurements obtained in 1959. Since then, the plots have been re-measured in 1964, 1969, 1974, 1979, 1984, 1989, 1999, and 2005. Due to periodic remeasurement, the CFI plot system provides an estimate of inventory and growth over time.

The original one-half acre CFI plots were fixed area rectangular plots, 2 chains by 2.5 chains. In addition to the main plot there were three subplots: a one-quarter acre subplot was put in at the time of the first measurement to measure tree heights in order to establish a height-diameter relationship. This subplot was only put in during the first measurement of the plots in 1959. Subsequent measurements did not measure heights, but rather relied on this relationship to estimate heights. A 1/25-acre subplot was used to measure trees 3.0 inches to 10.9 inches DBH. Finally, 40 one-thousandth acre subplots were used to record conifer reproduction less than 3.0 inches DBH.

General data measured at each CFI plot includes aspect, slope, age class (young growth/old growth), and whether the stand has been harvested in the past. Data measured on individual trees include species, DBH to the nearest 1/10 inch, merchantability class, crown class, vigor class, defect indicators, and sample regeneration status of the tree (re-measured, ingrowth, logged). Heights were measured on approximately half of the trees at the time of the first measurement in 1959. These data were used to estimate a height-diameter relationship which was used on subsequent measurements.

This original inventory design was used for five measurements of the plots: 1964, 1969, 1974, 1979, and 1984. Starting in 1989, permanent plots were circular one-fifth acre plots rather than rectangular one-half acre plots.

The 1989 permanent plots consisted of a one-fifth acre (52.7 feet radius) main plot on which all trees greater than 11.0 inches DBH were measured. All trees 7.0 inches DBH and larger were recorded on a one-twentieth acre subplot. Finally all trees greater than 7 inches tallied by 2-inch class on a one-hundredth acre subplot.

Timber Volume Calculations and Merchantability Limits

The board foot volumes presented in this document are in terms of net Scribner board feet in 16-foot logs with a minimum top diameter of 6 inches inside bark. Minimum diameter at breast height (DBH) for board foot measure is 10 inches. Net volume was calculated as 4 percent less than gross volume, based upon experience with defects on the Forest.

Volume equations for conifers are from Wensel and Krumland (1983), calibrated to local conditions. Volume equations for hardwoods are from Pillsbury & Kirkley, USDA Forest Service Research Note PNW-414 (1984).

Silvicultural Prescriptions

After land types had been defined and starting inventory characteristics had been developed for each land type, the next step in the analysis process was to identify the set of candidate silvicultural prescriptions to simulate for each land type on the Forest. Each silvicultural prescription represents one possible future management direction that can be applied to the piece of land represented by a land type. A silvicultural prescription includes the type and timing of harvest, regeneration, vegetation control, precommercial thinnings and intermediate thinnings. Model prescriptions were either selected individually for application to specific areas (e.g. SCAs) and specific percentages of management areas, or a range of prescriptions was modeled for each land type, in order to provide flexibility to choose prescriptions for each land type in the harvest schedule.

The forest was divided into timber management areas to facilitate analysis, and each of these was assigned a group of permissible silvicultural prescriptions (Map Figure 5). The timber management areas were spatially mixed to demonstrate a range of management practices across the landscape. Multiple forms of silviculture will be applied within these timber management areas, depending upon the nature of the demonstration and the specific stand characteristics.

Most of the modeled prescriptions were developed to simulate the current silvicultural prescriptions on the Forest, although not all possible applications and preharvest stand conditions could be simulated. Actual prescriptions utilized in practice will vary from the modeled prescriptions, based upon assessment of individual stands and a desire to produce varied stand conditions. The modeled prescriptions are intended to provide a range of results similar to potential practice in the forest.

Modeling of stand rotations was limited by available literature and stand projection models. Actual rotation lengths applied in the field will be longer in specified areas. The shortest projected even-aged rotations are 60 years. The longest modeled even-aged rotation used in this study was 120 years. Actual rotations applied in the field will vary between 60 and 150 years. The suite of uneven-aged selection prescriptions modeled includes varying post-harvest basal area levels, maximum diameters, and cutting cycle lengths. The cutting cycle represents the number of years between two successive harvest entries into the same stand. A long cutting cycle of 20 years and a short cutting cycle of 10 years were simulated, intended to maximize growth while reducing disturbance impacts from repeated harvest entries into the same stands. The maximum diameter parameter in the uneven-aged silvicultural prescriptions is a modeling construct necessary to mathematically represent the diameter distribution of the stands. While this is the most satisfactory mathematical abstraction of reality that can be achieved with current models, it only partially captures operational reality. In practice, trees larger than the modeled maximum diameter will often be left on site. For example, individual trees that meet structural criteria may be left on site.

The silvicultural prescriptions that were simulated and considered in the analysis are summarized below.

Variable Retention # 1

Harvest Precondition 150 ft^2/acre of CONIFER basal area.

Rotations Modeled

Site Class I/II	6, 8, 10, and 10+ periods.
Site Class III+	8, 10, 10+ periods

Rotation Steps

1.	Harvest	Retain 10% of conifer basal area and 10% of hardwood basal area Grow 2 periods
2.	Ingrowth	input regeneration
3.	Grow	2 periods
4.	Harvest	Commercial Thin. Using the r1 cutting routine, harvest 50% of the basal area in the 1"class and 30% of the basal area in the 30" class. The % of BA to harvest in intervening classes is extrapolated from the two endpoints.
5.	Grow	duration varies depending on the rotation being modeled. The rotation length equals the number of periods that have elapsed since the initial harvest in step 1 occurred. If the simulation reaches period 11 before the rotation length has been reached, the simulation stops.
6.	Repeat	steps 1 to 5 until period 11 is reached.

Variable Retention # 2

Identical to #1 except Retain 30% of basal area in step 1.

Clearcut

Harvest Precondition 150 ft^2/acre of CONIFER basal area.

Rotations Modeled

Site Class I/II	6, 8, 10, and 10+ periods.
Site Class III+	8, 10, 10+ periods

Rotation Steps

	1.	Harvest	Cut all trees (all sizes and all classes excluding residuals)Grow 2 periods
	2.	Ingrowth	input regeneration
	3.	Grow	2 periods
	4.	Harvest	Commercial Thin. Using the r1 cutting routine, harvest 50% of the basal area in the 1"class and 30% of the basal area in the 30" class. The % of BA to harvest in intervening classes is extrapolated from the two endpoints.
	5.	Grow	duration varies depending on the rotation being modeled. The rotation length equals the number of periods that have elapsed since the initial harvest in step 1 occurred. If the simulation reaches period 11 before the rotation length has been reached, the simulation stops.
	6.	Repeat	steps 1 to 5 until period 11 is reached.

Seed Tree

Harvest Precondition At least 5 conifers >= 24" Dbh. Residuals count towards the total. If less than 5 residuals, look for DF, followed by all other conifers.

Rotations Modeled

Site Class I/II	6, 8, 10, and 10+ periods.
Site Class III+	8, 10, 10+ periods

Rotation Steps

1.	Harvest	Retain 5 residuals & Douglas-fir trees > 24" Dbh. If not enough residuals & DF are present, then retain RW followed by OC. Cut all else.
2.	Grow	1 period
3.	Harvest	Seed tree removal step. Remove all remaining trees except residuals.
4.	Ingrowth	input regeneration
5.	Grow	1 period
6.	Harvest	Commercial Thin. Using the r1 cutting routine, harvest 50% of the basal area in the 1"class and 30% of the basal area in the 30" class. The % of BA to harvest in intervening classes is extrapolated from the two endpoints.
7.	Grow	duration varies depending on the rotation being modeled. The rotation length equals the number of periods that have elapsed since the initial harvest in step 1 occurred. If the simulation reaches period 11 before the rotation length has been reached, the simulation stops.
8.	Repeat	steps 1 to 7 until period 11 is reached.

Even-aged with Commercial thin start

Variable retention, Clearcut, and Seed Tree harvest rotations are also modeled with an initial commercial thin harvest.

Harvest Precondition 150 ft^2/acre of CONIFER basal area.

Rotations Modeled

Site Class I/II	6, 8, 10, and 10+ periods.
Site Class III+	8, 10, 10+ periods

Rotation Steps

1.	Harvest	Commercial Thin. Cut 50% of basal area for all species in the 1" class and 30% in the 48" class.
2.	Grow	2 periods
3.	Regeneration Cut	Begin with the Step 1 in the Variable Retention, Clearcut, or Seed Tree rotations. Note: This regeneration cut automatically happens 2 periods after the commercial thin. There is no pre-harvest stand condition that is enforced.

Two-age Stand

Harvest Precondition at least 20 conifer trees 18-36 inches.

Rotations Modeled

Site Class I/II	6, 8, 10, and 10+ periods.
Site Class III+	8, 10, 10+ periods

Rotation Steps

1.	Harvest	Retain 20 conifers 24-36" Dbh, and 5 largest hardwoodsIf 20 conifer trees do not exist in the 24-36" range, then the total is achieved by looking in lower classes down to 18"
2.	Grow	2 periods
3.	Ingrowth	input regeneration
4.	Grow	2 periods
5.	Harvest	Commercial Thin. Using the r1 cutting routine, harvest 50% of the basal area in the 1"class and 30% of the basal area in the 30" class. The % of BA to harvest in intervening classes is extrapolated from the two endpoints.
6.	Grow	duration varies depending on the rotation being modeled. The rotation length equals the number of periods that have elapsed since the initial harvest in step 1 occurred. If the simulation reaches period 11 before the rotation length has been reached, the simulation stops.
7.	Harvest	Cut all trees > 30" DBH, excluding residuals.
8.	Grow	2 periods
9.	Ingrowth	Input regeneration
10.	Grow	2 periods
11.	Repeat	steps 5 to 9 until period 11 is reached. Technically, with a 110 year simulation, even the shortest rotation will only reach step 6 the second time.

Selection Single-tree/Cluster #1:

Minimum Harvest 50 ft^2/acre of CONIFER basal area. = conifer BA precondition of 200 ft^2/acre

Cutting Cycles Modeled

All Sites	1 period cutting cycle and 2 period cutting cycle.

Cycle Steps

1.	Harvest	Retain 150 ft^2/acre conifer basal area with largest residual treeof 40" Dbh. Perform the harvest below 40" Dbh with a diminution quotient (q) of 1.25 and 2" diameter classes. Retain 10 ft^2/acre hardwood basal area with largest residual tree of 32" and a q of 1.25 and 2" diameter classes. Harvest a maximum of 40% of CONIFER pre-harvest basal area. Note: as always, no residuals are harvested.
2.	Grow	1 period
3.	Grow	1 period. This step will only be performed if modeling the 2 period rotation.
4.	Ingrowth	input regeneration if 20 years has elapsed since harvest
5.	Repeat	steps 1 to 4 until period 11 is reached.

Note: Twenty years after each harvest, a 20 year old ingrowth stand is added. In the case of a 1 period cutting cycle, harvest occurs at beginning of period 0, then again at beginning of period 1, and then the first ingrowth (associated with period 0 harvest) is added at the beginning of period 2. Then the period 2 harvest occurs. Therefore, between each harvest and associated ingrowth, 1 additional harvest will occur.

Note: If the post harvest retention is not met with the BDq (residual **B**a, maximum **D**bh, and **q**) curve with a B equal to the post harvest retention level and a D equal to the post harvest maximum tree Dbh, the B and D are elevated until the actual post harvest Ba is within about 10 ft^2 of the target.

Selection Single-tree/Cluster #2:

Identical to #1 except require a harvest precondition of 250 ft^2/acre of conifer basal area, retain 200 ft^2/acre conifer basal area with largest residual tree of 30", and retain 10 ft^2/acre hardwood basal area with largest residual tree of 24".

Group Selection #1 (thinning in matrix):

Note: This prescription requires a unique modeling technique in CRYPTOS. To simulate group openings, the stand is modeled 5 times with each stand being clearcut in succession. The CRYPTOS outputs are labeled as <ID>@.<file suffix> (such as 23A.rp), where @ is an alpha code A through E which identifies the 5 simulations. Then the average yield is taken from the 5 stands for each period. Stand #2 would be thinned in period 1, grown 2 periods, then clearcut in period 4, then proceed as stand 1. Stand 3 would be thinned in period 1, grown 4 periods, then clearcut in period 4, then proceed as stand 1. The prescription below is for stand #1.

Harvest Precondition 150 ft^2/acre of CONIFER basal area.

Cutting Cycles Modeled All Sites 2 period cutting cycle.

Cycle Steps

1.	Harvest	A: Clearcut stand #1, or B: Commercial Thin all other stands. Retain 200 ft^2 conifer basal area and 20 ft^2 hardwood basal area by cutting smallest trees first. Note: The commercial thin harvest is only performed if the CONIFER BA >= 250 ft^2
2.	Grow	stand #1 for 2 periods
3.	Ingrowth	input regeneration for stand #1 (no regen if stand was thinned).
4.	Grow	Grow stand #1 for 8 periods
5.	Repeat	steps 1A through 4. Note that stand 1 is never commercial thinned, and the commercial thin is never repeated on any other stands.

Group Selection #2 (NO thinning in matrix):

Identical to #1 except that step 1B is omitted.

Late Seral Development

Harvest Precondition 290 ft^2/acre of CONIFER basal area.

Cutting Cycles Modeled All Sites 2 period cutting cycle

Cycle Steps

1.	Harvest	Cut no trees > than 48" Dbh. Below 48", cut all species to a q of 1.1 based on 3" diameter classes, with a total BA target for the entire stand of 240 ft^2/acre. Cut no more than 30% of pre- harvest basal area (ALL SPECIES). No residuals are harvested.
2.	Grow	1 period
3.	Ingrowth	input regeneration
4.	Grow	1 period for 2 period rotation, and 3 periods for 4 period rotation.
5.	Repeat	steps 1 to 4 until period 11 is reached.

Older Forest Structure Development

Harvest Precondition 150 ft^2/acre of CONIFER basal area.

Cutting Cycles Modeled All Sites 2 period cutting cycle

Cycle Steps

1. Harvest — Retain 110 ft^2/acre Cut all species to a q of 1.1 based on 5" diameter classes with the maximum tree at 60" Dbh. Cut no more than 40% of pre-harvest basal area (ALL SPECIES).
2. Grow — 1 period
3. Ingrowth — input regeneration
4. Grow — 1 period for 2 period rotation, and 3 periods for 4 period rotation.
5. Repeat — steps 1 to 4 until period 11 is reached

No Harvest

Stand is grown for 110 periods.

Growth and Yield

Projecting forest growth consists of estimating the inventory, growth and harvest of trees that will develop on a piece of land over time for a particular silvicultural prescription, described in the previous section. The resulting growth projection represents the expected future conditions that will result from consistently applying one silvicultural prescription to a particular land type over time. The set of all possible growth projections that were developed for each land type becomes the pool of candidate prescriptions in the harvest schedule.

In order to analyze the effects of successive generations of stands on the same site, it is necessary to project forest development out for a sufficiently long time to capture conditions likely to result from a given management direction applied consistently over time. One-hundred-year projections with 10-year growth intervals were used in this Option A plan.

Harvest Schedule

Guided by a management objective and all the management constraints that exist on the Forest, computer models were used to assign silvicultural prescriptions to land types on the Forest. The resulting assignment of a unique silvicultural prescription to every acre on the Forest constitutes a harvest schedule. A harvest schedule projects growth and development of the Forest for 100 years or more into the future under a proposed management direction to allow us to evaluate the long term consequences of contemplated management. Specifically, the harvest schedule provides estimated future habitat conditions and harvest, growth and inventory levels. These projected future resource conditions allow analysts to evaluate the characteristics of candidate management scenarios.

In the JDSF Option A plan, harvest schedule development was accomplished using a locally produced custom-designed simulation software, a GIS database and a forest resources database. Every unique land type was assigned to one set of silvicultural prescriptions at the outset, and followed that set of silvicultural prescriptions for the duration of the planning interval.

Planning periods were 10 years. The objective was the utilization of silvicultural systems to create the desired set of forest structure conditions. Constraints, which varied by management alternative, described both desired future conditions and management policies. Limits on timber productivity imposed by other forest values, as discussed earlier in this document, describes constraints on future forest conditions used in the modeling of the selected alternative. The following set of policy constraints were used in the modeling process:

- Total harvest must be less than or equal to LTSY in each period throughout the planning interval.
- Harvest must be less than or equal to growth in all periods.
- The maximum harvest level is 350 million board feet of conifers in the first planning period.
- Application of the clearcut prescription was limited to no more than 200 acres per decade.
- Application of even-aged prescriptions was limited to no more than 2,700 acres per decade.

The JDSF Option A plan was not developed as a normative optimization harvest schedule. Rather, the harvest schedule

modeling was used primarily as a decision support tool. The development of the Option A plan was a collective process driven not by computer models, but by scientists, managers, field foresters, existing laws and policies, and the Forest management plan recently approved by the Board of Forestry.

Long Term Sustained Yield

The LTSY for all prescriptions was computed as the average growth of the inventory predicted in the last decade of the planning interval of the Option A plan. LTSY included growth on JDSF timberlands regardless of whether or not harvesting was scheduled within the planning interval, but it did not include growth from areas designated as no harvest. The estimated long term sustained yield for JDSF is 46.5 million board feet. This figure does not include growth from special concern areas designated as no harvest.

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Appendix 1. Tables and Charts

Table 4. Beginning Vegetation Strata statistics

Vegetation	*Acres*	*trees/ acre*	*BA/ acre*	*Total Conifer Volume bf*	*Conifer Volume bf/ac.*	*Hardwood Volume Cf/ac.*
A3D	156	119.4	261.5	6,606,778	42,478	786
BD4.5D	159	110.5	242.4	5,800,046	36,563	159
BD4M	262	100.6	180.7	6,540,405	24,973	105
BR4P	113	89.3	196.0	2,976,153	26,445	661
DR4.5C	262	142.5	440.7	28,218,821	107,822	28
DR4.5D	2,232	113.9	275.8	124,742,25	55,888	541
DR4.5DE	1,530	114.2	211.3	53,363,257	34,873	698
DR4.5M	1,163	88.2	211.8	43,817,001	37,670	306
DR4.5P/C	78	115.1	212.0	3,020,083	38,535	228
DR4.5P/H	927	93.5	155.8	16,037,073	17,294	1,129
DR4D	1,065	121.2	254.2	46,788,314	43,918	213
DR4DE	272	90.0	162.9	5,210,690	19,163	1,228
DR5D	603	95.7	233.2	25,513,317	42,340	299
DR5M/C	848	86.0	229.4	41,210,428	48,570	139
DRT4.5M	1,906	109.0	215.8	63,435,017	33,277	990
DRT4.5ME	1,630	113.1	193.7	40,005,660	24,541	1,081
DRT4P	1,835	63.3	111.8	17,869,782	9,736	1,198
DRT4S	1,006	80.0	134.2	12,903,739	12,831	1,269
GSEL	1,162	71.2	200.3	47,051,846	40,488	338
GSEL1	358	91.3	278.8	21,925,296	61,193	309
GSEL2	353	90.3	249.4	19,532,720	55,399	343
GSEL3	762	70.4	171.5	29,969,183	39,346	123
NT	229	45.2	117.8	5,037,065	22,026	134
P/C	669	23.3	31.9	2,331,366	3,484	8
R1	438	95.1	252.2	19,914,645	45,423	1,452
R2	367	107.5	291.4	21,233,672	57,864	1,097
RD2D	824	47.3	60.0	5,958,556	7,235	37
RD2M	650	38.3	69.1	6,755,137	10,391	253
RD3C	85	224.1	302.2	2,978,885	34,938	0
RD3D	283	81.2	124.5	4,811,783	16,990	32
RD3M	776	76.4	110.3	10,153,963	13,080	221
RD4.5C	990	119.7	320.9	65,126,047	65,815	442
RD4.5D	4,078	113.7	311.3	260,681,86	63,931	419
RD4.5M	1,278	102.9	270.4	69,474,679	54,377	325
RD4D	1,895	101.8	218.7	72,765,138	38,398	326
RD4M	754	113.4	248.4	34,528,483	45,773	184
RD4ME	1,561	84.6	135.7	22,084,381	14,148	892
RD4PE	1,244	82.3	149.9	21,918,975	17,615	936
RD5D	1,466	111.1	332.6	104,007,78	70,949	514
RD5M	1,297	97.9	249.3	60,426,170	46,592	576
RD5M/C	619	121.9	290.8	32,677,676	52,767	610
RD5M/H	1,029	98.7	246.4	44,662,752	43,416	1,069
RD5S	1,004	49.1	128.0	25,181,758	25,093	195
RDT4.5M	2,571	132.3	313.1	146,958,14	57,164	668
RDT4.5P	1,400	134.3	275.1	63,937,129	45,681	931
RDT5M	664	153.6	324.3	33,956,776	51,153	1,530
RT4.5M	404	128.3	253.3	13,407,112	33,178	1,668
RT4.5ME	3,298	65.8	112.1	33,622,648	10,196	1,067
TD3D	96	134.4	280.0	3,288,044	34,143	1,556
			Total Conifer Volume	1,850,418,502		

Note: Statistics reported in this table are based upon FRI plot data within vegetation strata. This produces a minor difference in total conifer volume from that produced by averaging all FRI plots.

Table 5. Acres by redwood site class.

Site Class	Acres
1	1965
2	15289
3	22246
4	9150
Total	48652

Table 6. Inventory, growth, and harvest over time, conifer.

Period	Inventory (mbf/ac.)	Growth (mmbf/year)	Harvest (mmbf/year)
1	40.4	51.5	26.3
2	45.6	53.5	27.1
3	51.0	52.0	33.1
4	54.9	50.1	33.4
5	58.3	48.6	38.7
6	60.3	48.1	37.3
7	62.6	48.1	39.0
8	64.4	49.1	33.5
9	69.8	49.1	38.6
10	72.8	50.1	35.1

Note: Statistics in this table based upon CRYPTOS yield streams, not FRI plot data.

Table 7. Allocation of acres by silvicultural method.

Silvicultural Prescription Group	Acres	Percent
Selection #1	7950	16.3
Selection #2	6767	13.9
Group Selection #1	2855	5.9
Group Selection #2	2860	5.9
Older Forest Structure Development	4637	9.5
Late Seral Development	9807	20.2
Two-aged Stand	2317	4.8
Clear-cut	1017	2.1
Seed Tree	753	1.5
Variable Retention #1	2974	6.1
Variable Retention #2	2954	6.1
No Harvest	3156	6.5

Table 8. Acres harvested each decade by silvicultural method.

SilviculturalPrescriptionGroup	1	2	3	4	5	6	7	8	9	10	11
Selection #1	3418	3475	3538	3612	3781	3690	3973	3663	4045	3794	4150
Selection #2	1436	2137	2876	2440	3053	2701	3231	2572	3428	2864	3427
Group Selection #1	864	1305	1225	1605	1246	1605	1246	1605	1246	1605	1251
Group Selection #2	866	1306	1229	1606	1249	1606	1249	1606	1249	1606	1254
Older Forest Structure Development	936	1357	1994	2507	1789	1492	2435	1453	1161	2589	1373
Late Seral Development	1091	3428	3448	3758	3083	2785	3651	3049	3574	2927	3623
Two-aged Stand[1]	559	360	399	365	871	672	478	403	511	455	391
Clear-cut[1]	335	285	439	411	530	488	489	411	329	311	321
Seed Tree[1]	70	222	238	318	392	399	286	312	224	185	164
Variable Retention #1[1]	1118	479	788	571	1212	760	960	584	604	452	724
Variable Retention #2[1]	2217	475	788	572	1193	757	958	584	599	452	716
No Harvest	0	0	0	0	0	0	0	0	0	0	0
	11793	14827	16961	17765	18399	16953	18954	16242	16970	17238	17394

[1]Note: Approximately half of the even-aged acres in each decade represent a commercial thinning, the remaining half represents the regeneration step.

Table 9. Conversion of Aggregated JDSF Vegetation to Modeled Vegetation at Time Zero

Aggregated Vegetation	Modeled Vegetation	Acres
A3D	RH4D	156
BD4.5D	HR4D	159
BD4M	HR4D	262
BR4P	RH4D	113
DR4.5C	RD4D	262
DR4.5D	RD4D	2,232
DR4.5DE	DR4D	1,530
DR4.5M	RH4D	1,163
DR4.5P/C	RD4D	78
DR4.5P/H	HR4D	927
DR4D	RD4D	243
DR4D	RH4D	823
DR4DE	HD4D	272
DR5D	RD4D	603
DR5M/C	RD4D	848
DRT4.5M	RH4D	1,906
DRT4.5ME	HR4D	1,630
DRT4P	HD4D	266
DRT4P	HR4D	1,570
DRT4S	HD4D	1,006
GSEL	RH4D	1,162
GSEL1	RD4D	358
GSEL2	RD4D	353
GSEL3	RD4D	762
NT	RH4M	229
P/C	HOC4P	669
R1	HR4D	438
R2	HR4D	367
RD2D	RD4P	824
RD2M	RH4P	650
RD3C	RH4D	85
RD3D	RD4M	283
RD3M	RH4D	413
RD3M	RH4M	363
RD4.5C	RD4D	990
RD4.5D	RD4D	4,077
RD4.5M	RH4D	1,278
RD4D	RH4D	1,895
RD4M	RD4D	754
RD4ME	HR4D	1,561
RD4PE	HR4D	1,244
RD5D	RH4D	1,466

RD5M	RH4D	1,297
RD5M/C	RH4D	619
RD5M/H	RH4D	1,029
RD5S	RD4M	174
RD5S	RH4M	829
RDT4.5M	RH4D	2,560
RDT4.5P	RH4D	1,400
RDT5M	RH4D	664
RT4.5M	HR4D	404
T4.5M	HR4D	3,298
TD3D	RH4D	96

Table 10. Modeled Vegetation by Decade

Modeled Veg	Decade										
	1	2	3	4	5	6	7	8	9	10	11
RD4D	11,560	11,848	15,049	15,505	15,209	15,523	18,013	19,586	21,134	20,769	21,106
RH4D	18,125	16,677	11,403	8,070	7,134	6,239	4,431	2,887	2,618	2,116	1,317
HR4D	11,860	10,450	6,041	5,949	3,748	3,673	3,142	2,632	1,852	1,685	1,174
DR4D	1,530	1,252	1,047	1,343	2,613	3,093	4,144	5,253	5,426	6,075	7,131
HD4D	1,543	3,961	7,633	6,012	5,721	4,328	3,272	2,571	2,342	1,992	944
RD5D		720	1,702	3,130	3,650	3,906	3,207	2,325	2,407	2,214	2,284
DR5D		68	143	820	859	1,344	2,529	3,563	3,949	4,638	4,437
RH5D		257	1,083	2,394	2,557	1,770	1,346	1,117	828	721	605
DH5D			23	89	655	1,248	1,359	1,553	1,685	1,531	1,797
RD4M	458	75	566	292	624	1,212	934	845	545	747	584
HOC4D			669	669	669	669	669	669	669	669	669
DH5M				115	443	689	652	784	737	825	905
RH4M	1,421	684	703	449	447	454	311	301	239	145	208
DH4D		274	1,033	587	390	380	434	220	423	363	356
DH5P				25	45	216	297	342	463	705	819
DR5M			0	190	454	294	440	503	224	370	327
DR5P		11	12	31	29	127	165	192	717	530	636
DR4M				4	10	244	95	212	244	648	620
RD5P		502	233	187	243	228	301	134	231	170	166
RD5M		46	103	163	353	379	244	252	153	241	282
RR4S		5	138	294	409	396	359	332	220	193	86
HD5M					43	121	47	169	210	153	1,091
RH5M		149	233	367	300	86	335	380	185	110	113
RH4P	650	47	141	227	479	217	159	144	130	71	
RH4S		417	178	203	144	136	98	138	56	86	39
RR5S		105	108	205	221	215	197	142	108	62	69
HD5D				3	200	183	414	408	21	83	101
HR5M				149	3	308	148	80	79	122	252
RD4P	824	26	3	11	41	68	65	98	121	101	
RH5P		29	66	46	61	105	94	74	141	146	200
RD4S		74	12	46	39	27	30	68	52	195	95
HD4M		12	21	51	112	79	57				
DR5S		27	67	80	130	107	112	64	68	10	17
HR4S		147	52	233	92	64	53	31	22		
HOC4P	669										
HOC4M		669									
HR5D				30	114	93	48	192	40	11	16
HD4S		7	23	171	82	128	100	70	30		
RD5S		24	18	20	48	52	57	54	58	8	20
HD4P		0		127	19	45	60	70	30		
HR4P			8	143	58	26	24	31	22		
HR4M		62	49	66	37	37	32	7	13	6	
DOC4D									0	37	63
HD5P			6	91	38	10	13	5	13	13	5

RH5S		0		5	46	38	52	16	16	0	7
R1S		13	9	12	34	24	25	16	16	5	6
ROC4D			4	4	7	10	21	36	9	22	14
DOC4M								10	7	8	5
DOC5P										5	44
HR5P			37	9	3	11	0	1	14	8	0
RR5P						11	12	11	11	12	11
RR4P			20	5	6	9	7	7	7	4	6
ROC4M				5	7	2	6	0	15	5	9
DH4S		1	3	2	4	4	8	10	2		
DH4P				1	2	2	2	9	7		
DR4S					0	1	4	4	13		
DR4P					0	0	4	5	8		1
RR4D				1	2	2	3	3	3	2	2
RR4M				0	2	1	3	3	3	2	1
ROC5M											
DH4M			3	2	2	2	2			1	
D5S		0	1	1	2	1	1	1	1	0	0
HR5S				0	1	1	1	0	0		
ROC4S				0		0	2	0	0	0	
ROC5P						0	0				
ROC5D											0

Appendix 2. Forest Cover Typing Procedures

Procedure For Determining Field Cover Type

The JDSF vegetation information is based upon field estimates performed by the forest management staff during 2003 and 2004. The tools utilized included aerial photographs, stand management records, and field reconaisance. A limited amount of field checking was conducted by supervisory staff. The initial step included an examination of aerial photographs and the identification of distinct vegetation polygons. This was followed by field verification and adjustment of the polygon boundaries and identification of the vegetation type.

Canopy Layers:
Each stand may include up to three distinct canopy layers (overstory, mid-story, and understory). A canopy layer must must have a minimum of 10% canopy cover by tree species. Total canopy cover shall be estimated for each canopy layer, and may exceed 100% in the aggregate of all layers.

Species Composition:
Up to two tree species will be allowed for each canopy layer. The species shall be indicated in order of site occupancy by canopy coverage.

Species List:

Species Code	Species
R	redwood
D	Douglas-fir
G	grand fir
H	hemlock
B	Bishop pine
T	tanoak
M	madrone
A	alder
L	live oak
OR	old redwood
OD	old D. fir
OH	other hardwoods
E	eucolyptus

Size Class:
Size class will be determined as the visually estimated diameter of the tree of average basal area (qmd) for each canopy layer.

Size Classes:

Size Class	DBH
1	<1"
2	1-6"
3	6-12"
4	12-18"
4.5	18-24"
5	24-30"
5.5	>30"

Density:
Density shall be estimated separately for each canopy layer, and shall be determined by visually estimating tree canopy closure of the canopy layer.

Density Classes:

Density Class	Canopy Cover
S	10-25%
P	25-40%
M	40-60%
D	60-80%
C	>80%

Harvest History:
Stand management history should be considered in the stand typing process, though the stand management history may not affect the cover type boundaries in all cases.

General typing characteristics shall conform roughly to the typing rules established for the California Wildlife Habitat Relationships System (CWHR).

Procedure for Aggregating JDSF Vegetation Types

A need was identified to reduce the LTSY modeling complexity by aggregating the JDSF vegetation types. This reduced the number of unique vegetation strata. The original vegetation types were aggregated according to the following general criteria, in combination with the application of professional judgement by management staff.

General Aggregation Rules

- Aggregate by first two overstory species if overstory is D or C
- Aggregate by mid-story if mid-story is D or C
- If overstory is M, aggregate by overstory if mid-story is two or more sizes smaller or more
- If second overstory species is a hardwood, aggregate separately by first overstory species
- If mid-story is hardwood and D or C, aggregate separately by overstory species
- Aggregate by first species if overstory is M, D, or C and OR alone or OR/OD combination
- Aggregate by first species and overstory denisty if pine, cypress, or alder

- If overstory is S and mid-story is M, D, or C, aggregate by mid-story
- If overstory is P and mid-story size is one size or 1.5 size smaller, aggregate by overstory
- Aggregate prior Gsel separately for matrix thin/no thin

Procedure for Determining Future Vegetation Types

Future vegetation types with potential relationship to habitat value have been derived from stand tables, through application of a modeling process that considers species, size class, and canopy closure. For each stand table, from beginning conditions to the end of the analysis period, a conversion was performed to obtain a modeled vegetation type (Table 10). The model estimates canopy of each tree and the stand as a whole, as well as the arithmetic average DBH for the stand. The resultant vegetation type call includes the two species with the greatest canopy cover regardless of canopy position, followed by the arithmetic average diameter for the stand, and lastly a stand density that reflects the total calculated canopy cover. A conversion of the JDSF aggregated vegetation types is also included as Table 9, to enable the reader to see the relationship between vegetatation types based upon the stand tables produced by the model and the aggregated vegetation types produced by JDSF staff. Note also that the modeled vegetation types do not include trees less than 11 inches DBH, since these smaller trees tend to over-influence average stand diameter when regeneration is input into the simulations.

Appendix 3: Sample Yield Streams

Prescription: Selection #2, Begin Harvest Decade 2, Veg Strata: RD4.5D

CRYPTOS version 7.8

YIELD SUMMARY: 1.yd

stand label = P1.SD file = 1.sd

- CURRENT CONFIGURATION STATUS -

bm: 8.0" cm: .0" ma: 1.00 sp: 2
bt: 6.0" ct: 6.0" iq: OFF ro: fixed

species	site	init. age
Redwood	106.	0.
DouglasFir	125.	0.
Other con.	125.	0.
Tan Oak	75.	0.
Alder	100.	0.
Other Hwd.	75.	0.
Res. Redwd	125.	0.
Res. conif	125.	0.

YR YIELD RECORD

species	et	dbar	tpa	basar	cvol	bdvol	bagro	cvgro	bdgro	
Conifers	.00	19.54	148.8	309.9	11.21	68.90	.0	.00	.00	
Hardwoods	.00	10.68	51.9	32.3	.56	2.32	.0	.00	.00	
Totals	.00	17.68	200.7	342.2	11.77	71.22	.0	.00	.00	
Conifers	3.00	20.05	146.8	321.9	11.93	73.94	12.0	.71	5.04	
Hardwoods	3.00	10.92	50.9	33.1	.62	2.74	.8	.06	.42	
Totals	3.00	18.14	197.8	355.0	12.55	76.67	12.8	.78	5.46	M
Conifers	8.00	20.81	145.0	342.6	13.19	82.89	20.7	1.27	8.95	
Hardwoods	8.00	11.28	50.0	34.7	.73	3.56	1.6	.11	.82	
Totals	8.00	18.84	195.0	377.3	13.93	86.45	22.2	1.38	9.77	M
Conifers	13.00	21.56	143.4	363.6	14.57	92.50	21.0	1.38	9.62	
Hardwoods	13.00	11.67	48.9	36.3	.84	4.47	1.6	.11	.90	
Totals	13.00	19.52	192.4	399.9	15.41	96.97	22.6	1.49	10.52	M
HR	HARVESTS: Cut_period_1_Hardwood						growth	harvested		
Hardwoods	13.00	11.29	38.3	26.6	.60	3.18	1.2	.08	.64	
Totals	13.00	11.29	38.3	26.6	.60	3.18	1.2	.08	.64	
AH	STAND AFTER HARVEST						growth	remaining		
Conifers	13.00	21.56	143.4	363.6	14.57	92.50	21.0	1.38	9.62	
Hardwoods	13.00	12.94	10.6	9.7	.24	1.29	.4	.03	.26	
Totals	13.00	21.08	154.1	373.3	14.81	93.79	21.4	1.41	9.88	
HR	HARVESTS: Cut_period_1_Con_no_Resid						growth	harvested		
Conifers	13.00	36.51	20.0	145.5	6.73	46.77	6.3	.46	3.72	
Totals	13.00	36.51	20.0	145.5	6.73	46.77	6.3	.46	3.72	
AH	STAND AFTER HARVEST						growth	remaining		
Conifers	13.00	18.00	123.4	218.1	7.85	45.73	14.7	.92	5.90	
Hardwoods	13.00	12.94	10.6	9.7	.24	1.29	.4	.03	.26	
Totals	13.00	17.65	134.1	227.8	8.09	47.02	15.1	.95	6.16	
Conifers	18.00	18.83	122.0	236.0	8.86	52.51	18.0	1.02	6.78	
Hardwoods	18.00	13.45	10.4	10.3	.28	1.62	.6	.04	.33	
Totals	18.00	18.46	132.5	246.3	9.14	54.14	18.5	1.06	7.12	M
Conifers	23.00	19.64	120.9	254.3	9.93	59.73	18.3	1.06	7.22	

Hardwoods	23.00	13.93	10.2	10.8	.34	2.09	.5	.06	.47	
Totals	23.00	19.26	131.0	265.1	10.26	61.82	18.8	1.12	7.68	M
Conifers	28.00	20.42	119.9	272.6	11.02	67.31	18.3	1.09	7.58	
Hardwoods	28.00	14.34	9.9	11.2	.37	2.50	.4	.04	.41	
Totals	28.00	20.02	129.8	283.8	11.39	69.80	18.7	1.13	7.98	M
Conifers	33.00	21.17	119.0	290.8	12.14	75.17	18.1	1.12	7.86	
Hardwoods	33.00	14.69	9.7	11.4	.41	2.91	.3	.04	.41	
Totals	33.00	20.75	128.7	302.2	12.55	78.08	18.4	1.15	8.28	M
IG			INGROWTH							
Conifers	33.00	2.62	254.1	9.5	.00	.00				
Hardwoods	33.00	3.12	67.1	3.6	.00	.00				
Totals	33.00	2.73	321.3	13.1	.00	.00				
AI			STAND AFTER INGROWTH				includes ingrowth			
Conifers	33.00	12.15	373.1	300.3	12.14	75.17	27.7	1.12	7.86	
Hardwoods	33.00	5.98	76.9	15.0	.41	2.91	3.8	.04	.41	
Totals	33.00	11.33	450.0	315.3	12.55	78.08	31.5	1.15	8.28	
HR	HARVESTS: Cut_period_3_Hardwood						growth harvested			
Hardwoods	33.00	4.23	60.7	5.9	.11	.81	2.8	.01	.11	
Totals	33.00	4.23	60.7	5.9	.11	.81	2.8	.01	.11	
AH			STAND AFTER HARVEST				growth remaining			
Conifers	33.00	12.15	373.1	300.3	12.14	75.17	27.7	1.12	7.86	
Hardwoods	33.00	10.14	16.2	9.1	.30	2.10	1.0	.03	.30	
Totals	33.00	12.07	389.3	309.4	12.43	77.27	28.7	1.14	8.16	
HR	HARVESTS: Cut_period_3_Con_no_Resid						growth harvested			
Conifers	33.00	10.34	180.2	105.1	4.35	28.04	8.3	.32	2.39	
Totals	33.00	10.34	180.2	105.1	4.35	28.04	8.3	.32	2.39	
AH			STAND AFTER HARVEST				growth remaining			
Conifers	33.00	13.62	193.0	195.2	7.78	47.13	19.3	.80	5.48	
Hardwoods	33.00	10.14	16.2	9.1	.30	2.10	1.0	.03	.30	
Totals	33.00	13.38	209.1	204.3	8.08	49.23	20.3	.82	5.77	
Conifers	38.00	14.69	183.8	216.4	8.69	53.39	21.1	.90	6.27	
Hardwoods	38.00	10.49	15.8	9.5	.32	2.44	.4	.03	.34	
Totals	38.00	14.40	199.6	225.8	9.01	55.83	21.5	.93	6.60	M
Conifers	43.00	15.64	178.2	237.7	9.68	60.18	21.4	.99	6.79	
Hardwoods	43.00	10.85	15.4	9.9	.35	2.76	.4	.02	.32	
Totals	43.00	15.31	193.6	247.6	10.03	62.95	21.8	1.02	7.11	M
Conifers	48.00	16.52	174.0	258.9	10.78	67.55	21.2	1.10	7.37	
Hardwoods	48.00	11.20	15.0	10.3	.37	3.09	.4	.02	.32	
Totals	48.00	16.16	189.0	269.2	11.15	70.63	21.6	1.12	7.69	M
Conifers	53.00	17.34	170.5	279.8	11.84	74.99	20.9	1.06	7.44	
Hardwoods	53.00	11.52	14.6	10.6	.40	3.41	.3	.02	.32	
Totals	53.00	16.96	185.2	290.4	12.24	78.40	21.2	1.09	7.76	M
IG			INGROWTH							
Conifers	53.00	2.62	209.5	7.9	.00	.00				
Hardwoods	53.00	3.12	55.4	2.9	.00	.00				
Totals	53.00	2.73	264.8	10.8	.00	.00				
AI			STAND AFTER INGROWTH				includes ingrowth			
Conifers	53.00	11.78	380.0	287.7	11.84	74.99	28.7	1.06	7.44	
Hardwoods	53.00	5.95	70.0	13.5	.40	3.41	3.3	.02	.32	

Totals	53.00	11.08	450.0	301.2	12.24	78.40	32.0	1.09	7.76	
HR	HARVESTS: Cut_period_5_Hardwood							growth	harvested	
Hardwoods	53.00	4.11	54.1	5.0	.08	.68	2.6	.00	.07	
Totals	53.00	4.11	54.1	5.0	.08	.68	2.6	.00	.07	
AH	STAND AFTER HARVEST							growth	remaining	
Conifers	53.00	11.78	380.0	287.7	11.84	74.99	28.7	1.06	7.44	
Hardwoods	53.00	9.92	15.9	8.5	.32	2.72	.7	.02	.25	
Totals	53.00	11.71	395.9	296.2	12.16	77.72	29.4	1.08	7.70	
HR	HARVESTS: Cut_period_5_Con_no_Resid							growth	harvested	
Conifers	53.00	9.77	172.1	89.5	3.27	19.86	8.5	.26	1.81	
Totals	53.00	9.77	172.1	89.5	3.27	19.86	8.5	.26	1.81	
AH	STAND AFTER HARVEST							growth	remaining	
Conifers	53.00	13.22	207.9	198.1	8.57	55.14	20.2	.80	5.63	
Hardwoods	53.00	9.92	15.9	8.5	.32	2.72	.7	.02	.25	
Totals	53.00	13.01	223.8	206.7	8.88	57.86	20.9	.82	5.88	
Conifers	58.00	14.24	199.0	220.2	9.68	62.28	22.0	1.12	7.14	
Hardwoods	58.00	10.25	15.5	8.9	.33	2.97	.3	.02	.24	
Totals	58.00	13.99	214.5	229.1	10.02	65.25	22.4	1.13	7.39	M
Conifers	63.00	15.16	193.1	242.1	10.69	69.22	21.9	1.00	6.94	
Hardwoods	63.00	10.59	15.1	9.2	.35	3.20	.4	.01	.24	
Totals	63.00	14.88	208.2	251.4	11.03	72.43	22.3	1.02	7.18	M
Conifers	68.00	16.01	188.5	263.7	11.76	76.62	21.6	1.07	7.40	
Hardwoods	68.00	10.93	14.7	9.6	.38	3.54	.3	.04	.34	
Totals	68.00	15.70	203.2	273.3	12.14	80.16	21.9	1.11	7.74	M
Conifers	73.00	16.81	184.7	284.8	12.88	84.38	21.1	1.12	7.76	
Hardwoods	73.00	11.27	14.3	9.9	.40	3.81	.3	.02	.26	
Totals	73.00	16.48	199.0	294.8	13.29	88.19	21.5	1.14	8.03	M
IG	INGROWTH									
Conifers	73.00	2.62	198.5	7.4	.00	.00				
Hardwoods	73.00	3.12	52.4	2.8	.00	.00				
Totals	73.00	2.73	251.0	10.2	.00	.00				
AI	STAND AFTER INGROWTH							includes	ingrowth	
Conifers	73.00	11.83	383.2	292.3	12.88	84.38	28.6	1.12	7.76	
Hardwoods	73.00	5.90	66.8	12.7	.40	3.81	3.1	.02	.26	
Totals	73.00	11.15	450.0	305.0	13.29	88.19	31.7	1.14	8.03	
HR	HARVESTS: Cut_period_7_Hardwood							growth	harvested	
Hardwoods	73.00	4.05	51.0	4.5	.06	.42	2.4	.01	.07	
Totals	73.00	4.05	51.0	4.5	.06	.42	2.4	.01	.07	
AH	STAND AFTER HARVEST							growth	remaining	
Conifers	73.00	11.83	383.2	292.3	12.88	84.38	28.6	1.12	7.76	
Hardwoods	73.00	9.72	15.8	8.1	.34	3.38	.7	.01	.19	
Totals	73.00	11.75	399.0	300.4	13.23	87.77	29.3	1.13	7.96	
HR	HARVESTS: Cut_period_7_Con_no_Resid							growth	harvested	
Conifers	73.00	10.41	161.2	95.4	4.24	28.23	8.3	.30	2.17	
Totals	73.00	10.41	161.2	95.4	4.24	28.23	8.3	.30	2.17	
AH	STAND AFTER HARVEST							growth	remaining	
Conifers	73.00	12.75	222.0	196.9	8.64	56.16	20.3	.82	5.60	

Hardwoods	73.00	9.72	15.8	8.1	.34	3.38	.7	.01	.19	
Totals	73.00	12.57	237.8	205.1	8.98	59.54	21.0	.83	5.79	
Conifers	78.00	13.78	212.2	219.6	9.69	62.95	22.7	1.05	6.80	
Hardwoods	78.00	10.04	15.4	8.5	.35	3.60	.3	.01	.21	
Totals	78.00	13.56	227.6	228.1	10.04	66.55	23.0	1.06	7.01	M
Conifers	83.00	14.69	205.8	242.2	10.72	69.92	22.6	1.03	6.97	
Hardwoods	83.00	10.39	15.0	8.8	.36	3.79	.4	.01	.20	
Totals	83.00	14.44	220.8	251.0	11.08	73.71	22.9	1.04	7.16	M
Conifers	88.00	15.54	200.8	264.4	11.77	77.18	22.2	1.06	7.26	
Hardwoods	88.00	10.73	14.6	9.2	.39	4.06	.3	.03	.27	
Totals	88.00	15.26	215.4	273.5	12.16	81.24	22.5	1.08	7.53	M
Conifers	93.00	16.33	196.7	286.0	12.89	84.87	21.6	1.12	7.69	
Hardwoods	93.00	11.05	14.2	9.4	.41	4.27	.3	.02	.21	
Totals	93.00	16.03	210.8	295.4	13.30	89.14	21.9	1.14	7.90	M
IG			INGROWTH							
Conifers	93.00	2.62	189.2	7.1	.00	.00				
Hardwoods	93.00	3.12	50.0	2.7	.00	.00				
Totals	93.00	2.73	239.2	9.7	.00	.00				
AI			STAND AFTER INGROWTH				includes ingrowth			
Conifers	93.00	11.80	385.9	293.1	12.89	84.87	28.7	1.12	7.69	
Hardwoods	93.00	5.88	64.1	12.1	.41	4.27	2.9	.02	.21	
Totals	93.00	11.15	450.0	305.2	13.30	89.14	31.6	1.14	7.90	
HR	HARVESTS: Cut_period_9_Hardwood						growth harvested			
Hardwoods	93.00	3.87	45.2	3.7	.04	.26	2.0	.01	.05	
Totals	93.00	3.87	45.2	3.7	.04	.26	2.0	.01	.05	
AH			STAND AFTER HARVEST				growth remaining			
Conifers	93.00	11.80	385.9	293.1	12.89	84.87	28.7	1.12	7.69	
Hardwoods	93.00	9.00	19.0	8.4	.37	4.02	.9	.01	.16	
Totals	93.00	11.68	404.8	301.5	13.26	88.89	29.6	1.13	7.85	
HR	HARVESTS: Cut_period_9_Con_no_Resid						growth harvested			
Conifers	93.00	11.15	141.1	95.6	4.78	33.95	7.2	.28	2.17	
Totals	93.00	11.15	141.1	95.6	4.78	33.95	7.2	.28	2.17	
AH			STAND AFTER HARVEST				growth remaining			
Conifers	93.00	12.16	244.8	197.5	8.11	50.92	21.5	.85	5.52	
Hardwoods	93.00	9.00	19.0	8.4	.37	4.02	.9	.01	.16	
Totals	93.00	11.96	263.7	205.9	8.48	54.94	22.4	.86	5.68	
Conifers	98.00	13.12	234.6	220.4	9.27	58.08	22.9	1.16	7.15	
Hardwoods	98.00	9.23	18.5	8.6	.38	4.21	.2	.01	.19	
Totals	98.00	12.88	253.1	229.0	9.66	62.29	23.1	1.17	7.35	M
Conifers	103.00	13.98	227.6	242.8	10.32	65.06	22.4	1.05	6.98	
Hardwoods	103.00	9.48	18.0	8.8	.39	4.37	.2	.01	.16	
Totals	103.00	13.70	245.7	251.6	10.71	69.43	22.6	1.06	7.14	M
Conifers	108.00	14.78	222.0	264.5	11.39	72.36	21.7	1.07	7.30	
Hardwoods	108.00	9.73	17.5	9.1	.40	4.51	.2	.01	.14	
Totals	108.00	14.47	239.6	273.6	11.79	76.87	22.0	1.08	7.44	M
Conifers	113.00	15.52	217.3	285.5	12.57	80.25	21.0	1.18	7.89	
Hardwoods	113.00	9.98	17.0	9.3	.41	4.65	.2	.01	.14	
Totals	113.00	15.19	234.3	294.8	12.98	84.90	21.2	1.19	8.03	M
IG			INGROWTH							

Conifers	113.00	2.62	170.6	6.4	.00	.00
Hardwoods	113.00	3.12	45.1	2.4	.00	.00
Totals	113.00	2.73	215.7	8.8	.00	.00

AI	STAND AFTER INGROWTH						includes ingrowth		
Conifers	113.00	11.75	387.9	291.9	12.57	80.25	27.4	1.18	7.89
Hardwoods	113.00	5.86	62.1	11.6	.41	4.65	2.6	.01	.14
Totals	113.00	11.12	450.0	303.6	12.98	84.90	30.0	1.19	8.03

TH	TOTAL HARVEST DURING SIMULATION PERIOD					
Conifers	113.00	11.16	674.6	531.1	23.38	156.84
Hardwoods	113.00	5.19	249.2	45.7	.89	5.34
Totals	113.00	9.55	923.8	576.9	24.27	162.19

Prescription: Older Forest Structure Development, Begin Harvest Decade 2, Veg Strata: RD4.5D

CRYPTOS version 7.8

YIELD SUMMARY: 1.yd

stand label = P1.SD file = 1.sd

- CURRENT CONFIGURATION STATUS -

bm: 8.0" cm: .0" ma: 1.00 sp: 2
bt: 6.0" ct: 6.0" iq: OFF ro: fixed

species	site	init.	age
Redwood	106.	0.	
DouglasFir	125.	0.	
Other con.	125.	0.	
Tan Oak	75.	0.	
Alder	100.	0.	
Other Hwd.	75.	0.	
Res. Redwd	125.	0.	
Res. conif	125.	0.	

YR YIELD RECORD

species	et	dbar	tpa	basar	cvol	bdvol	bagro	cvgro	bdgro	
Conifers	.00	19.54	148.8	309.9	11.21	68.90	.0	.00	.00	
Hardwoods	.00	10.68	51.9	32.3	.56	2.32	.0	.00	.00	
Totals	.00	17.68	200.7	342.2	11.77	71.22	.0	.00	.00	
Conifers	3.00	20.05	146.8	321.9	11.93	73.94	12.0	.71	5.04	
Hardwoods	3.00	10.92	50.9	33.1	.62	2.74	.8	.06	.42	
Totals	3.00	18.14	197.8	355.0	12.55	76.67	12.8	.78	5.46	M
Conifers	8.00	20.81	145.0	342.6	13.19	82.89	20.7	1.27	8.95	
Hardwoods	8.00	11.28	50.0	34.7	.73	3.56	1.6	.11	.82	
Totals	8.00	18.84	195.0	377.3	13.93	86.45	22.2	1.38	9.77	M
Conifers	13.00	21.56	143.4	363.6	14.57	92.50	21.0	1.38	9.62	
Hardwoods	13.00	11.67	48.9	36.3	.84	4.47	1.6	.11	.90	
Totals	13.00	19.52	192.4	399.9	15.41	96.97	22.6	1.49	10.52	M
HR HARVESTS: Cut_period_1_All_no_Resid								growth harvested		
Conifers	13.00	17.10	79.6	126.9	4.12	23.28	8.3	.47	2.89	
Hardwoods	13.00	10.62	40.9	25.2	.52	2.66	1.3	.07	.58	
Totals	13.00	15.21	120.5	152.0	4.64	25.94	9.6	.54	3.47	
AH STAND AFTER HARVEST								growth remaining		
Conifers	13.00	26.07	63.9	236.7	10.45	69.22	12.7	.91	6.73	
Hardwoods	13.00	16.00	8.0	11.2	.32	1.81	.3	.04	.32	
Totals	13.00	25.15	71.9	247.9	10.77	71.03	13.1	.95	7.05	
Conifers	18.00	26.97	63.3	251.2	11.41	76.43	14.5	.95	7.21	
Hardwoods	18.00	16.49	7.8	11.6	.37	2.23	.5	.05	.42	
Totals	18.00	26.02	71.2	262.8	11.78	78.66	14.9	1.00	7.63	M
Conifers	23.00	27.85	62.9	266.1	12.40	83.95	14.9	.99	7.52	
Hardwoods	23.00	16.95	7.7	12.0	.41	2.68	.4	.04	.45	
Totals	23.00	26.88	70.6	278.1	12.81	86.63	15.3	1.03	7.97	M
Conifers	28.00	28.71	62.5	281.2	13.41	91.73	15.1	1.01	7.78	
Hardwoods	28.00	17.35	7.5	12.3	.45	3.14	.3	.04	.46	
Totals	28.00	27.71	70.1	293.5	13.86	94.87	15.4	1.05	8.24	M
Conifers	33.00	29.54	62.3	296.4	14.44	99.73	15.2	1.03	7.99	
Hardwoods	33.00	17.67	7.4	12.5	.49	3.60	.2	.04	.46	
Totals	33.00	28.52	69.6	308.9	14.92	103.33	15.4	1.07	8.45	M

IG INGROWTH

Conifers	33.00	2.62	300.9	11.3	.00	.00				
Hardwoods	33.00	3.12	79.5	4.2	.00	.00				
Totals	33.00	2.73	380.4	15.5	.00	.00				
AI			STAND AFTER INGROWTH				includes ingrowth			
Conifers	33.00	12.46	363.2	307.6	14.44	99.73	26.5	1.03	7.99	
Hardwoods	33.00	5.94	86.9	16.7	.49	3.60	4.4	.04	.46	
Totals	33.00	11.50	450.0	324.4	14.92	103.33	30.9	1.07	8.45	
HR	HARVESTS: Cut_period_3_All_no_Resid						growth harvested			
Conifers	33.00	8.52	319.1	126.5	5.02	32.69	15.7	.39	2.84	
Hardwoods	33.00	3.46	77.6	5.1	.05	.33	3.6	.01	.06	
Totals	33.00	7.80	396.8	131.5	5.07	33.02	19.4	.39	2.90	
AH			STAND AFTER HARVEST				growth remaining			
Conifers	33.00	27.47	44.0	181.2	9.42	67.04	10.7	.64	5.15	
Hardwoods	33.00	15.22	9.2	11.7	.44	3.27	.8	.03	.41	
Totals	33.00	25.77	53.2	192.8	9.86	70.31	11.5	.67	5.55	
Conifers	38.00	28.58	43.1	192.0	10.12	72.63	10.8	.70	5.59	
Hardwoods	38.00	15.56	9.0	11.9	.47	3.70	.2	.03	.43	
Totals	38.00	26.79	52.1	203.9	10.59	76.33	11.0	.73	6.02	M
Conifers	43.00	29.59	42.5	202.9	10.84	78.39	11.0	.72	5.76	
Hardwoods	43.00	15.85	8.8	12.0	.50	4.11	.1	.03	.41	
Totals	43.00	27.73	51.2	215.0	11.34	82.50	11.1	.75	6.17	M
Conifers	48.00	30.56	42.0	214.0	11.57	84.25	11.0	.72	5.86	
Hardwoods	48.00	16.13	8.5	12.1	.52	4.48	.1	.02	.37	
Totals	48.00	28.64	50.5	226.1	12.09	88.73	11.1	.75	6.23	M
Conifers	53.00	31.48	41.6	225.1	12.34	90.37	11.1	.77	6.12	
Hardwoods	53.00	16.39	8.3	12.2	.55	4.88	.1	.03	.40	
Totals	53.00	29.51	49.9	237.2	12.89	95.25	11.1	.80	6.52	M
IG			INGROWTH							
Conifers	53.00	2.63	303.0	11.4	.00	.00				
Hardwoods	53.00	3.12	80.0	4.3	.00	.00				
Totals	53.00	2.74	383.0	15.6	.00	.00				
AI			STAND AFTER INGROWTH				includes ingrowth			
Conifers	53.00	11.22	344.6	236.5	12.34	90.37	22.5	.77	6.12	
Hardwoods	53.00	5.84	88.3	16.4	.55	4.88	4.3	.03	.40	
Totals	53.00	10.35	432.9	252.9	12.89	95.25	26.8	.80	6.52	
HR	HARVESTS: Cut_period_5_All_no_Resid						growth harvested			
Conifers	53.00	7.33	313.9	91.9	4.20	29.85	15.1	.28	2.21	
Hardwoods	53.00	4.51	83.9	9.3	.22	1.98	4.3	.02	.19	
Totals	53.00	6.83	397.7	101.2	4.42	31.83	19.4	.30	2.41	
AH			STAND AFTER HARVEST				growth remaining			
Conifers	53.00	29.35	30.8	144.6	8.14	60.52	7.4	.49	3.91	
Hardwoods	53.00	17.16	4.4	7.1	.33	2.90	.0	.01	.21	
Totals	53.00	28.11	35.2	151.7	8.47	63.42	7.4	.50	4.11	
Conifers	58.00	30.45	30.2	152.6	8.64	64.61	8.0	.50	4.08	
Hardwoods	58.00	17.46	4.3	7.2	.34	3.11	.0	.01	.21	
Totals	58.00	29.15	34.5	159.7	8.98	67.71	8.0	.51	4.30	M
Conifers	63.00	31.43	29.8	160.7	9.15	68.76	8.1	.50	4.16	
Hardwoods	63.00	17.76	4.2	7.2	.35	3.31	.0	.01	.21	
Totals	63.00	30.09	34.0	167.8	9.50	72.08	8.1	.52	4.36	M

Conifers	68.00	32.36	29.6	168.8	9.68	73.06	8.2	.53	4.30	
Hardwoods	68.00	18.07	4.0	7.2	.36	3.51	.0	.01	.20	
Totals	68.00	30.99	33.6	176.0	10.04	76.57	8.2	.54	4.50	M
Conifers	73.00	33.25	29.4	177.1	10.20	77.38	8.2	.52	4.31	
Hardwoods	73.00	18.36	3.9	7.2	.37	3.70	.0	.01	.19	
Totals	73.00	31.87	33.3	184.2	10.57	81.08	8.2	.53	4.50	M
IG				INGROWTH						
Conifers	73.00	2.63	303.0	11.4	.00	.00				
Hardwoods	73.00	3.12	80.0	4.3	.00	.00				
Totals	73.00	2.74	383.0	15.6	.00	.00				
AI			STAND AFTER INGROWTH				includes ingrowth			
Conifers	73.00	10.20	332.4	188.5	10.20	77.38	19.6	.52	4.31	
Hardwoods	73.00	4.99	83.9	11.4	.37	3.70	4.2	.01	.19	
Totals	73.00	9.38	416.3	199.9	10.57	81.08	23.9	.53	4.50	
HR	HARVESTS: Cut_period_7_All_no_Resid						growth harvested			
Conifers	73.00	6.70	316.0	77.4	3.68	27.62	14.4	.19	1.54	
Hardwoods	73.00	4.17	76.7	7.3	.21	2.28	3.3	.00	.07	
Totals	73.00	6.29	392.7	84.6	3.89	29.90	17.7	.19	1.61	
AH			STAND AFTER HARVEST				growth remaining			
Conifers	73.00	35.26	16.4	111.1	6.52	49.75	5.3	.33	2.78	
Hardwoods	73.00	10.29	7.2	4.1	.16	1.43	.9	.01	.12	
Totals	73.00	29.94	23.6	115.3	6.68	51.18	6.2	.35	2.89	
Conifers	78.00	36.26	16.3	116.7	6.88	52.72	5.6	.36	2.97	
Hardwoods	78.00	11.02	7.0	4.6	.17	1.56	.5	.01	.13	
Totals	78.00	30.94	23.2	121.3	7.05	54.28	6.0	.37	3.10	M
Conifers	83.00	37.22	16.2	122.3	7.25	55.74	5.6	.36	3.02	
Hardwoods	83.00	11.99	6.7	5.3	.19	1.71	.7	.02	.15	
Totals	83.00	31.94	22.9	127.6	7.43	57.45	6.3	.38	3.17	M
Conifers	88.00	38.14	16.1	128.0	7.61	58.81	5.7	.37	3.07	
Hardwoods	88.00	13.09	6.5	6.1	.23	1.95	.8	.04	.24	
Totals	88.00	32.94	22.7	134.1	7.84	60.76	6.5	.41	3.31	M
Conifers	93.00	39.05	16.1	133.7	7.98	61.91	5.7	.37	3.11	
Hardwoods	93.00	14.20	6.3	7.0	.26	2.19	.9	.03	.24	
Totals	93.00	33.91	22.4	140.6	8.24	64.11	6.6	.40	3.35	M
IG				INGROWTH						
Conifers	93.00	2.63	303.0	11.4	.00	.00				
Hardwoods	93.00	3.12	80.0	4.3	.00	.00				
Totals	93.00	2.74	383.0	15.6	.00	.00				
AI			STAND AFTER INGROWTH				includes ingrowth			
Conifers	93.00	9.13	319.1	145.0	7.98	61.91	17.1	.37	3.11	
Hardwoods	93.00	4.88	86.3	11.2	.26	2.19	5.1	.03	.24	
Totals	93.00	8.41	405.4	156.3	8.24	64.11	22.2	.40	3.35	
Conifers	98.00	10.38	295.2	173.5	8.39	65.17	28.5	.41	3.26	
Hardwoods	98.00	5.42	84.9	13.6	.30	2.51	2.3	.04	.31	
Totals	98.00	9.50	380.1	187.1	8.69	67.68	30.8	.44	3.58	M
Conifers	103.00	11.51	281.2	203.0	8.93	68.97	29.5	.54	3.79	
Hardwoods	103.00	6.06	83.2	16.7	.35	2.89	3.1	.05	.38	
Totals	103.00	10.51	364.4	219.7	9.27	71.86	32.6	.59	4.17	M
HR	HARVESTS: Cut_period_10_All_no_Resid						growth harvested			
Conifers	103.00	7.56	246.1	76.7	1.70	13.61	21.4	.07	.56	

Hardwoods	103.00	4.73	78.6	9.6	.05	.26	2.5	.02	.09	
Totals	103.00	6.98	324.7	86.3	1.75	13.87	23.9	.09	.65	
AH	STAND AFTER HARVEST						growth remaining			
Conifers	103.00	25.68	35.1	126.3	7.23	55.35	8.1	.46	3.23	
Hardwoods	103.00	16.68	4.7	7.1	.30	2.63	.6	.03	.29	
Totals	103.00	24.80	39.8	133.4	7.53	57.98	8.7	.50	3.52	
Conifers	108.00	26.78	34.4	134.6	7.65	58.55	8.4	.42	3.19	
Hardwoods	108.00	17.49	4.6	7.6	.33	2.93	.5	.03	.30	
Totals	108.00	25.87	39.0	142.2	7.98	61.48	8.9	.45	3.50	M
Conifers	113.00	27.83	33.9	143.2	8.09	61.91	8.5	.44	3.36	
Hardwoods	113.00	18.17	4.5	8.0	.36	3.26	.4	.03	.32	
Totals	113.00	26.89	38.3	151.2	8.45	65.16	9.0	.47	3.68	M
TH	TOTAL HARVEST DURING SIMULATION PERIOD									
Conifers	113.00	8.13	1274.7	499.4	18.71	127.05				
Hardwoods	113.00	4.96	357.7	56.4	1.06	7.51				
Totals	113.00	7.58	1632.4	555.7	19.77	134.56				

Prescription: Late Seral Development, Begin Harvest Period 2, Vegetation Strate: RD4.5D

CRYPTOS version 7.8

YIELD SUMMARY: 1.yd

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stand label = P1.SD file = 1.sd

- CURRENT CONFIGURATION STATUS -

bm: 8.0" cm: .0" ma: 1.00 sp: 2
bt: 6.0" ct: 6.0" iq: OFF ro: fixed

species	site	init. age
Redwood	106.	0.
DouglasFir	125.	0.
Other con.	125.	0.
Tan Oak	75.	0.
Alder	100.	0.
Other Hwd.	75.	0.
Res. Redwd	125.	0.
Res. conif	125.	0.

YR YIELD RECORD

species	et	dbar	tpa	basar	cvol	bdvol	bagro	cvgro	bdgro	
Conifers	.00	19.54	148.8	309.9	11.21	68.90	.0	.00	.00	
Hardwoods	.00	10.68	51.9	32.3	.56	2.32	.0	.00	.00	
Totals	.00	17.68	200.7	342.2	11.77	71.22	.0	.00	.00	
Conifers	3.00	20.05	146.8	321.9	11.93	73.94	12.0	.71	5.04	
Hardwoods	3.00	10.92	50.9	33.1	.62	2.74	.8	.06	.42	
Totals	3.00	18.14	197.8	355.0	12.55	76.67	12.8	.78	5.46	M
Conifers	8.00	20.81	145.0	342.6	13.19	82.89	20.7	1.27	8.95	
Hardwoods	8.00	11.28	50.0	34.7	.73	3.56	1.6	.11	.82	
Totals	8.00	18.84	195.0	377.3	13.93	86.45	22.2	1.38	9.77	M
Conifers	13.00	21.56	143.4	363.6	14.57	92.50	21.0	1.38	9.62	
Hardwoods	13.00	11.67	48.9	36.3	.84	4.47	1.6	.11	.90	
Totals	13.00	19.52	192.4	399.9	15.41	96.97	22.6	1.49	10.52	M
Conifers	18.00	22.27	142.1	384.5	15.92	102.23	20.9	1.34	9.73	
Hardwoods	18.00	12.02	47.9	37.8	.95	5.43	1.4	.11	.96	
Totals	18.00	20.19	190.0	422.2	16.86	107.66	22.3	1.45	10.69	M
Conifers	23.00	22.96	140.9	405.0	17.27	112.16	20.5	1.35	9.93	
Hardwoods	23.00	12.35	46.8	38.9	1.14	6.89	1.2	.19	1.46	
Totals	23.00	20.82	187.7	443.9	18.40	119.05	21.7	1.54	11.39	M
HR	HARVESTS: Cut_period_2_All_no_Resid							growth harvested		
Conifers	23.00	17.07	76.7	121.8	3.89	21.41	7.2	.37	2.28	
Hardwoods	23.00	10.69	15.2	9.5	.25	1.44	.4	.03	.26	
Totals	23.00	16.19	91.8	131.3	4.14	22.85	7.5	.40	2.54	
AH	STAND AFTER HARVEST							growth remaining		
Conifers	23.00	28.44	64.2	283.1	13.38	90.75	13.3	.99	7.65	
Hardwoods	23.00	13.07	31.7	29.5	.89	5.45	.8	.16	1.20	
Totals	23.00	24.45	95.9	312.6	14.27	96.19	14.2	1.15	8.85	
Conifers	28.00	29.23	63.8	297.3	14.41	98.82	14.1	1.03	8.07	
Hardwoods	28.00	13.46	30.8	30.4	.99	6.52	.9	.11	1.08	
Totals	28.00	25.20	94.6	327.7	15.41	105.34	15.1	1.14	9.15	M
Conifers	33.00	29.99	63.5	311.3	15.45	107.01	14.1	1.04	8.19	
Hardwoods	33.00	13.81	30.0	31.1	1.09	7.60	.7	.09	1.08	
Totals	33.00	25.93	93.4	342.5	16.54	114.61	14.8	1.13	9.27	M
Conifers	38.00	30.72	63.2	325.2	16.48	115.25	13.9	1.03	8.24	

Hardwoods	38.00	14.10	29.1	31.5	1.17	8.66	.4	.08	1.06	
Totals	38.00	26.63	92.3	356.7	17.66	123.92	14.2	1.12	9.31	M
Conifers	43.00	31.43	62.9	338.8	17.51	123.50	13.6	1.02	8.24	
Hardwoods	43.00	14.32	28.2	31.6	1.24	9.68	.1	.07	1.01	
Totals	43.00	27.30	91.1	370.4	18.75	133.17	13.6	1.09	9.25	M
IG				INGROWTH						
Conifers	43.00	2.62	283.9	10.6	.00	.00				
Hardwoods	43.00	3.12	75.0	4.0	.00	.00				
Totals	43.00	2.73	358.9	14.6	.00	.00				
AI			STAND AFTER INGROWTH				includes ingrowth			
Conifers	43.00	13.59	346.8	349.4	17.51	123.50	24.2	1.02	8.24	
Hardwoods	43.00	7.95	103.2	35.6	1.24	9.68	4.0	.07	1.01	
Totals	43.00	12.52	450.0	385.0	18.75	133.17	28.3	1.09	9.25	
HR	HARVESTS: Cut_period_4_All_no_Resid						growth harvested			
Conifers	43.00	8.07	296.9	105.3	4.32	28.61	13.0	.26	1.99	
Hardwoods	43.00	5.63	64.9	11.2	.32	2.41	2.6	.02	.28	
Totals	43.00	7.68	361.8	116.5	4.64	31.02	15.6	.28	2.27	
AH			STAND AFTER HARVEST				growth remaining			
Conifers	43.00	29.95	49.9	244.1	13.18	94.89	11.3	.76	6.25	
Hardwoods	43.00	10.79	38.3	24.4	.92	7.26	1.4	.05	.74	
Totals	43.00	23.62	88.2	268.5	14.11	102.15	12.7	.81	6.99	
Conifers	48.00	30.85	49.2	255.4	13.98	101.47	11.3	.80	6.59	
Hardwoods	48.00	11.05	37.0	24.6	.97	8.03	.3	.05	.77	
Totals	48.00	24.40	86.2	280.0	14.95	109.51	11.6	.85	7.36	M
Conifers	53.00	31.68	48.7	266.6	14.81	108.19	11.2	.83	6.71	
Hardwoods	53.00	11.35	35.7	25.1	1.01	8.73	.5	.04	.70	
Totals	53.00	25.17	84.5	291.7	15.82	116.92	11.7	.86	7.41	M
Conifers	58.00	32.46	48.3	277.7	15.63	114.90	11.1	.82	6.71	
Hardwoods	58.00	11.69	34.5	25.7	1.05	9.42	.6	.04	.68	
Totals	58.00	25.91	82.8	303.4	16.68	124.32	11.7	.86	7.39	M
Conifers	63.00	33.20	48.0	288.6	16.43	121.54	10.9	.80	6.64	
Hardwoods	63.00	12.05	33.3	26.4	1.07	10.01	.7	.02	.59	
Totals	63.00	26.65	81.3	315.0	17.50	131.55	11.6	.82	7.23	M
IG				INGROWTH						
Conifers	63.00	2.62	291.6	10.9	.00	.00				
Hardwoods	63.00	3.12	77.1	4.1	.00	.00				
Totals	63.00	2.73	368.7	15.0	.00	.00				
AI			STAND AFTER INGROWTH				includes ingrowth			
Conifers	63.00	12.72	339.6	299.6	16.43	121.54	21.9	.80	6.64	
Hardwoods	63.00	7.11	110.4	30.5	1.07	10.01	4.7	.02	.59	
Totals	63.00	11.60	450.0	330.0	17.50	131.55	26.6	.82	7.23	
HR	HARVESTS: Cut_period_6_All_no_Resid						growth harvested			
Conifers	63.00	7.19	291.7	82.3	3.61	25.36	13.2	.20	1.62	
Hardwoods	63.00	4.68	93.4	11.2	.19	1.65	4.6	.01	.14	
Totals	63.00	6.67	385.1	93.5	3.81	27.01	17.7	.21	1.76	
AH			STAND AFTER HARVEST				growth remaining			
Conifers	63.00	28.83	47.9	217.3	12.82	96.18	8.7	.60	5.02	
Hardwoods	63.00	14.44	16.9	19.3	.88	8.36	.2	.02	.45	
Totals	63.00	25.86	64.9	236.5	13.70	104.53	8.9	.61	5.47	

Conifers	68.00	31.26	42.5	226.5	13.44	101.38	9.2	.62	5.20	
Hardwoods	68.00	14.82	16.4	19.6	.93	8.96	.3	.05	.60	
Totals	68.00	27.68	58.9	246.1	14.37	110.34	9.6	.67	5.81	M
Conifers	73.00	32.17	41.8	235.8	14.08	106.68	9.3	.64	5.30	
Hardwoods	73.00	15.21	15.8	20.0	.96	9.47	.4	.03	.51	
Totals	73.00	28.53	57.6	255.8	15.04	116.15	9.7	.67	5.80	M
Conifers	78.00	32.98	41.3	245.1	14.72	111.95	9.3	.63	5.27	
Hardwoods	78.00	15.60	15.3	20.3	1.00	9.97	.3	.03	.50	
Totals	78.00	29.32	56.6	265.4	15.71	121.92	9.6	.67	5.77	M
Conifers	83.00	33.75	41.0	254.4	15.34	117.19	9.3	.63	5.24	
Hardwoods	83.00	15.98	14.7	20.5	1.03	10.46	.2	.03	.49	
Totals	83.00	30.09	55.7	275.0	16.37	127.65	9.5	.66	5.73	M
IG				INGROWTH						
Conifers	83.00	2.63	303.0	11.4	.00	.00				
Hardwoods	83.00	3.12	80.0	4.3	.00	.00				
Totals	83.00	2.74	383.0	15.6	.00	.00				
AI			STAND AFTER INGROWTH				includes ingrowth			
Conifers	83.00	11.90	344.0	265.8	15.34	117.19	20.7	.63	5.24	
Hardwoods	83.00	6.93	94.7	24.8	1.03	10.46	4.5	.03	.49	
Totals	83.00	11.02	438.7	290.6	16.37	127.65	25.2	.66	5.73	
Conifers	88.00	12.98	317.9	292.1	15.98	122.47	26.3	.64	5.28	
Hardwoods	88.00	7.20	93.1	26.3	1.08	11.17	1.5	.05	.71	
Totals	88.00	11.92	411.0	318.4	17.05	133.64	27.8	.69	5.99	M
Conifers	93.00	13.90	302.3	318.5	16.69	128.03	26.5	.71	5.56	
Hardwoods	93.00	7.53	91.4	28.3	1.12	11.86	1.9	.05	.69	
Totals	93.00	12.71	393.7	346.8	17.81	139.89	28.4	.76	6.25	M
HR	HARVESTS: Cut_period_9_All_no_Resid						growth harvested			
Conifers	93.00	7.92	258.8	88.4	2.66	19.28	17.8	.15	1.09	
Hardwoods	93.00	6.31	79.7	17.3	.52	5.38	1.7	.03	.35	
Totals	93.00	7.57	338.5	105.7	3.19	24.66	19.5	.18	1.44	
AH			STAND AFTER HARVEST				growth remaining			
Conifers	93.00	31.14	43.5	230.1	14.03	108.75	8.7	.56	4.46	
Hardwoods	93.00	13.08	11.8	11.0	.60	6.49	.2	.02	.34	
Totals	93.00	28.28	55.3	241.0	14.62	115.24	8.9	.58	4.81	
Conifers	98.00	32.10	42.7	239.8	14.59	113.40	9.7	.56	4.65	
Hardwoods	98.00	13.45	11.3	11.1	.61	6.73	.2	.01	.24	
Totals	98.00	29.20	54.0	251.0	15.20	120.13	9.9	.57	4.89	M
Conifers	103.00	32.97	42.1	249.7	15.23	118.41	9.9	.64	5.01	
Hardwoods	103.00	13.84	10.9	11.3	.62	6.94	.2	.01	.21	
Totals	103.00	30.06	53.0	261.0	15.85	125.34	10.1	.65	5.22	M
Conifers	108.00	33.80	41.7	259.7	15.85	123.38	10.0	.62	4.97	
Hardwoods	108.00	14.21	10.5	11.5	.62	7.10	.2	.00	.16	
Totals	108.00	30.89	52.1	271.2	16.46	130.48	10.1	.62	5.13	M
Conifers	113.00	34.60	41.3	269.7	16.47	128.45	10.0	.63	5.07	
Hardwoods	113.00	14.56	10.1	11.6	.62	7.22	.1	.00	.11	
Totals	113.00	31.68	51.4	281.3	17.09	135.66	10.1	.62	5.19	M
IG				INGROWTH						
Conifers	113.00	2.63	303.0	11.4	.00	.00				
Hardwoods	113.00	3.12	80.0	4.3	.00	.00				
Totals	113.00	2.74	383.0	15.6	.00	.00				
AI			STAND AFTER INGROWTH				includes ingrowth			

Conifers	113.00	12.23	344.3	281.0	16.47	128.45	21.4	.63	5.07
Hardwoods	113.00	5.69	90.1	15.9	.62	7.22	4.4	.00	.11
Totals	113.00	11.20	434.4	296.9	17.09	135.66	25.8	.62	5.19

TH	TOTAL HARVEST DURING SIMULATION PERIOD					
Conifers	113.00	8.49	924.0	397.9	14.48	94.66
Hardwoods	113.00	5.80	253.2	49.1	1.29	10.88
Totals	113.00	7.98	1177.2	447.0	15.77	105.54

Prescription: Variable Retention #2, Site II, Rotation Age: 80, Begin Harvest Period 2, Vegetation Strate: RD4.5D

CRYPTOS version 7.8

YIELD SUMMARY: 1.yd

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stand label = P1.SD file = 1.sd

- CURRENT CONFIGURATION STATUS -

bm: 8.0" cm: .0" ma: 1.00 sp: 2
bt: 6.0" ct: 6.0" iq: ON ro: fixed

species	site	init. age
Redwood	106.	0.
DouglasFir	125.	0.
Other con.	125.	0.
Tan Oak	75.	0.
Alder	100.	0.
Other Hwd.	75.	0.
Res. Redwd	125.	0.
Res. conif	125.	0.

YR YIELD RECORD

species	et	dbar	tpa	basar	cvol	bdvol	bagro	cvgro	bdgro	
Conifers	.00	19.54	148.8	309.9	11.21	68.90	.0	.00	.00	
Hardwoods	.00	10.68	51.9	32.3	.56	2.32	.0	.00	.00	
Totals	.00	17.68	200.7	342.2	11.77	71.22	.0	.00	.00	
Conifers	3.00	20.03	146.8	321.3	11.88	73.50	11.4	.67	4.60	
Hardwoods	3.00	10.92	50.9	33.1	.62	2.72	.8	.06	.40	
Totals	3.00	18.13	197.8	354.4	12.50	76.22	12.2	.73	5.00	M
Conifers	8.00	20.76	145.0	340.9	13.07	81.67	19.6	1.18	8.17	
Hardwoods	8.00	11.29	50.0	34.7	.72	3.50	1.6	.11	.79	
Totals	8.00	18.79	195.0	375.6	13.79	85.17	21.2	1.29	8.96	M
Conifers	13.00	21.47	143.4	360.8	14.35	90.44	19.8	1.28	8.77	
Hardwoods	13.00	11.67	48.9	36.3	.83	4.36	1.6	.10	.86	
Totals	13.00	19.45	192.4	397.1	15.18	94.80	21.5	1.39	9.63	M
HR HARVESTS: VR_Period_1								growth harvested		
Conifers	13.00	21.44	100.2	251.0	9.98	62.80	13.9	.90	6.14	
Hardwoods	13.00	11.67	34.3	25.4	.58	3.05	1.1	.07	.60	
Totals	13.00	19.42	134.4	276.4	10.56	65.85	15.0	.97	6.74	
AH STAND AFTER HARVEST								growth remaining		
Conifers	13.00	21.56	43.3	109.8	4.37	27.64	6.0	.39	2.63	
Hardwoods	13.00	11.67	14.7	10.9	.25	1.31	.5	.03	.26	
Totals	13.00	19.54	58.0	120.7	4.62	28.95	6.4	.42	2.89	
Conifers	18.00	22.49	42.8	118.2	4.84	30.88	8.5	.47	3.25	
Hardwoods	18.00	12.49	14.3	12.1	.33	1.85	1.2	.08	.55	
Totals	18.00	20.46	57.1	130.4	5.17	32.74	9.7	.55	3.79	M
Conifers	23.00	23.43	42.5	127.3	5.35	34.42	9.0	.51	3.54	
Hardwoods	23.00	13.34	13.9	13.5	.40	2.43	1.3	.07	.57	
Totals	23.00	21.40	56.4	140.7	5.75	36.85	10.4	.58	4.11	M
Conifers	28.00	24.36	42.2	136.7	5.89	38.23	9.4	.54	3.81	
Hardwoods	28.00	14.13	13.5	14.7	.47	3.07	1.2	.07	.65	
Totals	28.00	22.32	55.7	151.4	6.36	41.30	10.6	.61	4.45	M
Conifers	33.00	25.27	42.0	146.3	6.45	42.28	9.6	.56	4.05	
Hardwoods	33.00	14.80	13.1	15.7	.54	3.76	1.0	.07	.69	
Totals	33.00	23.21	55.1	162.0	7.00	46.03	10.6	.64	4.73	M

IG INGROWTH

Conifers	33.00	7.02	358.0	96.1	.68	2.43				
Hardwoods	33.00	3.94	91.0	7.7	.01	.01				
Totals	33.00	6.51	449.0	103.9	.69	2.43				
AI		STAND AFTER INGROWTH					includes ingrowth			
Conifers	33.00	10.54	400.0	242.4	7.13	44.70	105.8	1.24	6.47	
Hardwoods	33.00	6.42	104.1	23.4	.55	3.77	8.7	.08	.70	
Totals	33.00	9.83	504.1	265.8	7.69	48.47	114.5	1.32	7.17	
Conifers	38.00	11.60	384.1	281.7	8.26	51.11	39.3	1.12	6.40	
Hardwoods	38.00	6.68	102.7	25.0	.64	4.55	1.6	.09	.78	
Totals	38.00	10.75	486.9	306.7	8.89	55.66	40.9	1.21	7.19	M
Conifers	43.00	12.53	372.9	319.3	9.59	58.59	37.5	1.33	7.49	
Hardwoods	43.00	6.92	101.3	26.5	.71	5.31	1.5	.07	.76	
Totals	43.00	11.56	474.3	345.7	10.30	63.91	39.0	1.40	8.25	M
Conifers	48.00	13.37	364.0	354.7	10.92	66.49	35.4	1.33	7.89	
Hardwoods	48.00	7.13	99.8	27.7	.76	6.03	1.2	.06	.72	
Totals	48.00	12.29	463.9	382.4	11.69	72.52	36.6	1.39	8.61	M
Conifers	53.00	14.13	356.6	388.0	12.24	74.64	33.4	1.32	8.15	
Hardwoods	53.00	7.31	98.3	28.7	.81	6.69	1.0	.04	.66	
Totals	53.00	12.96	454.9	416.7	13.05	81.33	34.4	1.36	8.81	M
HR	HARVESTS: Thin_Period_5						growth harvested			
Conifers	53.00	11.82	147.1	112.2	2.52	12.80	12.1	.41	2.25	
Hardwoods	53.00	6.92	45.8	12.0	.31	2.59	.5	.02	.26	
Totals	53.00	10.86	193.0	124.2	2.84	15.39	12.6	.43	2.51	
AH		STAND AFTER HARVEST					growth remaining			
Conifers	53.00	15.54	209.4	275.8	9.72	61.84	21.3	.91	5.90	
Hardwoods	53.00	7.64	52.5	16.7	.49	4.11	.5	.03	.40	
Totals	53.00	14.31	262.0	292.5	10.22	65.94	21.8	.94	6.30	
Conifers	58.00	16.38	205.7	301.2	10.98	69.43	25.3	1.26	7.59	
Hardwoods	58.00	7.87	51.3	17.3	.52	4.47	.6	.02	.37	
Totals	58.00	15.07	257.0	318.5	11.50	73.90	25.9	1.28	7.96	M
Conifers	63.00	17.18	202.5	326.0	12.15	77.01	24.9	1.17	7.58	
Hardwoods	63.00	8.12	50.1	18.0	.53	4.81	.7	.02	.34	
Totals	63.00	15.80	252.6	344.0	12.68	81.82	25.5	1.18	7.92	M
Conifers	68.00	17.93	199.7	350.2	13.35	84.95	24.1	1.20	7.94	
Hardwoods	68.00	8.39	48.8	18.7	.55	5.13	.7	.01	.32	
Totals	68.00	16.50	248.6	368.9	13.89	90.08	24.9	1.21	8.26	M
Conifers	73.00	18.63	197.3	373.6	14.76	93.90	23.4	1.41	8.95	
Hardwoods	73.00	8.65	47.6	19.4	.59	5.56	.7	.04	.43	
Totals	73.00	17.15	244.9	393.0	15.35	99.47	24.1	1.46	9.38	M
Conifers	78.00	19.29	195.2	396.2	16.04	102.60	22.7	1.28	8.70	
Hardwoods	78.00	8.91	46.3	20.1	.61	5.88	.6	.02	.31	
Totals	78.00	17.78	241.5	416.3	16.65	108.48	23.3	1.30	9.01	M
Conifers	83.00	19.92	193.3	418.2	17.33	111.51	21.9	1.29	8.91	
Hardwoods	83.00	9.15	45.1	20.6	.62	6.17	.5	.01	.29	
Totals	83.00	18.37	238.3	438.8	17.95	117.68	22.5	1.30	9.21	M
Conifers	88.00	20.51	191.5	439.4	18.62	120.59	21.2	1.30	9.08	
Hardwoods	88.00	9.38	43.8	21.0	.63	6.44	.4	.01	.27	
Totals	88.00	18.94	235.3	460.4	19.26	127.03	21.7	1.31	9.35	M
Conifers	93.00	21.07	190.0	459.9	19.92	129.80	20.6	1.29	9.21	
Hardwoods	93.00	9.59	42.6	21.4	.64	6.68	.3	.01	.24	
Totals	93.00	19.48	232.5	481.3	20.56	136.48	20.9	1.30	9.45	M

HR	HARVESTS: VR_Period_9						growth harvested			
Conifers	93.00	21.04	132.7	320.4	13.88	90.35	14.4	.91	6.44	
Hardwoods	93.00	9.59	29.8	14.9	.45	4.67	.2	.01	.17	
Totals	93.00	19.45	162.5	335.4	14.32	95.03	14.6	.91	6.61	
AH			STAND AFTER HARVEST				growth remaining			
Conifers	93.00	21.14	57.2	139.5	6.04	39.45	6.2	.39	2.76	
Hardwoods	93.00	9.59	12.8	6.4	.19	2.00	.1	.00	.07	
Totals	93.00	19.55	70.0	145.9	6.24	41.45	6.3	.39	2.83	
Conifers	98.00	21.96	56.8	149.3	6.60	43.31	9.8	.56	3.87	
Hardwoods	98.00	10.10	12.2	6.8	.23	2.26	.4	.03	.26	
Totals	98.00	20.36	69.0	156.1	6.83	45.57	10.2	.59	4.13	M
Conifers	103.00	22.77	56.4	159.6	7.20	47.50	10.3	.60	4.19	
Hardwoods	103.00	10.66	11.7	7.3	.29	2.74	.5	.07	.48	
Totals	103.00	21.19	68.1	166.8	7.49	50.24	10.7	.66	4.67	M
Conifers	108.00	23.59	56.1	170.2	7.83	51.97	10.6	.63	4.47	
Hardwoods	108.00	11.19	11.2	7.7	.32	3.00	.4	.03	.26	
Totals	108.00	22.01	67.3	177.9	8.14	54.97	11.0	.65	4.72	M
Conifers	113.00	24.39	55.8	181.1	8.48	56.68	10.9	.65	4.71	
Hardwoods	113.00	11.65	10.7	7.9	.34	3.26	.3	.02	.26	
Totals	113.00	22.82	66.5	189.0	8.82	59.94	11.2	.68	4.97	M
IG			INGROWTH							
Conifers	113.00	7.02	358.0	96.1	.68	2.43				
Hardwoods	113.00	3.94	91.0	7.7	.01	.01				
Totals	113.00	6.51	449.0	103.9	.69	2.43				
AI			STAND AFTER INGROWTH				includes ingrowth			
Conifers	113.00	11.08	413.8	277.2	9.16	59.10	107.0	1.34	7.14	
Hardwoods	113.00	5.31	101.7	15.7	.35	3.27	8.0	.03	.27	
Totals	113.00	10.21	515.5	292.9	9.51	62.37	115.0	1.36	7.40	
TH			TOTAL HARVEST DURING SIMULATION PERIOD							
Conifers	113.00	17.58	380.0	683.6	26.37	165.96				
Hardwoods	113.00	9.13	109.9	52.4	1.34	10.32				
Totals	113.00	16.06	489.9	736.0	27.72	176.27				

Prescription: Two-aged Stand, Site II, Rotation Age: 80, Begin Harvest Period 2, Vegetation Strate: RD4.5D

CRYPTOS version 7.8

YIELD SUMMARY: 1.yd

stand label = P1.SD file = 1.sd

- CURRENT CONFIGURATION STATUS -

bm: 8.0" cm: .0" ma: 1.00 sp: 2
bt: 6.0" ct: 6.0" iq: OFF ro: fixed

species	site	init. age
Redwood	106.	0.
DouglasFir	125.	0.
Other con.	125.	0.
Tan Oak	75.	0.
Alder	100.	0.
Other Hwd.	75.	0.
Res. Redwd	125.	0.
Res. conif	125.	0.

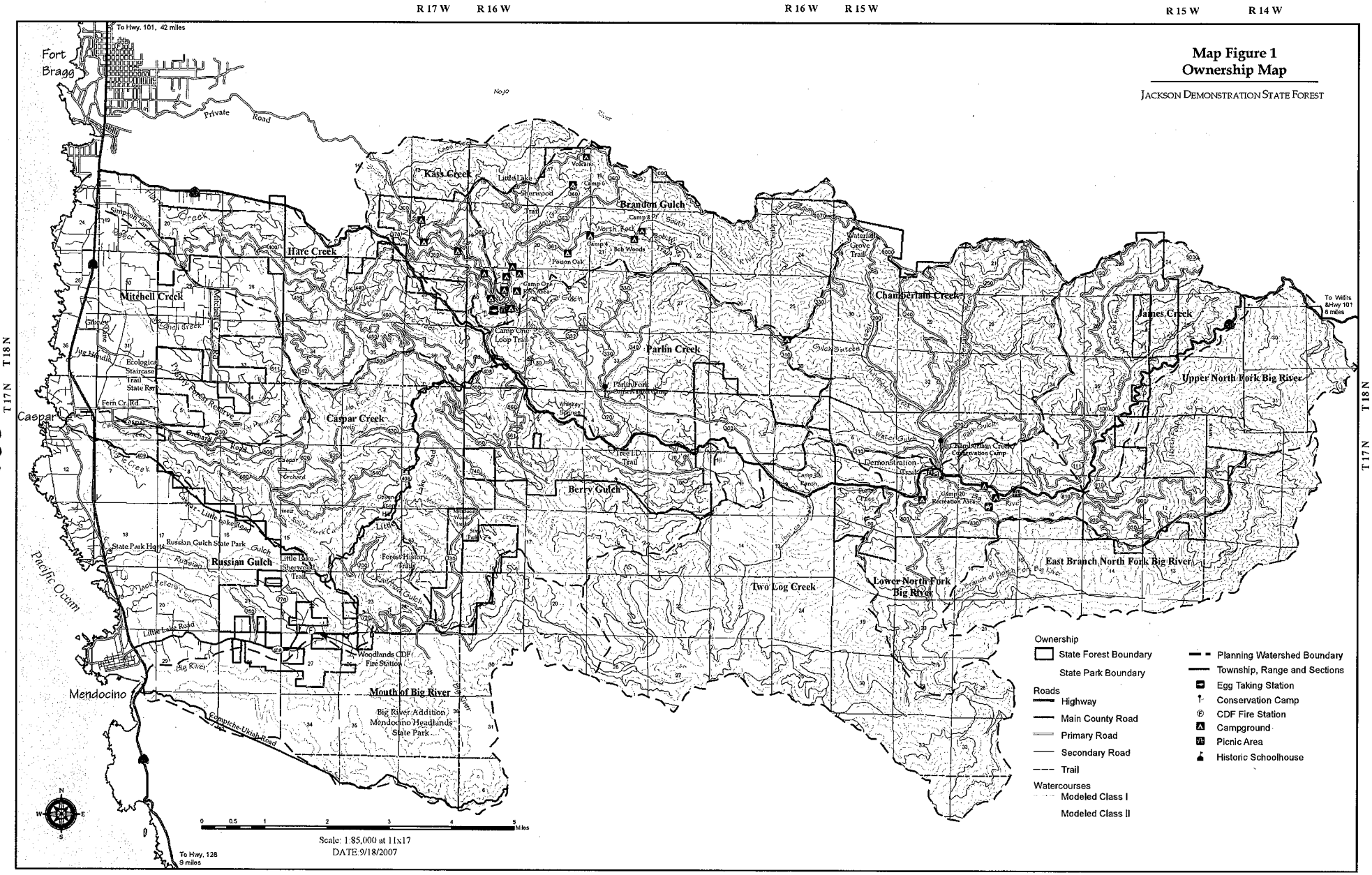
YR YIELD RECORD

species	et	dbar	tpa	basar	cvol	bdvol	bagro	cvgro	bdgro	
Conifers	.00	19.54	148.8	309.9	11.21	68.90	.0	.00	.00	
Hardwoods	.00	10.68	51.9	32.3	.56	2.32	.0	.00	.00	
Totals	.00	17.68	200.7	342.2	11.77	71.22	.0	.00	.00	
Conifers	3.00	20.05	146.8	321.9	11.93	73.94	12.0	.71	5.04	
Hardwoods	3.00	10.92	50.9	33.1	.62	2.74	.8	.06	.42	
Totals	3.00	18.14	197.8	355.0	12.55	76.67	12.8	.78	5.46	M
Conifers	8.00	20.81	145.0	342.6	13.19	82.89	20.7	1.27	8.95	
Hardwoods	8.00	11.28	50.0	34.7	.73	3.56	1.6	.11	.82	
Totals	8.00	18.84	195.0	377.3	13.93	86.45	22.2	1.38	9.77	M
Conifers	13.00	21.56	143.4	363.6	14.57	92.50	21.0	1.38	9.62	
Hardwoods	13.00	11.67	48.9	36.3	.84	4.47	1.6	.11	.90	
Totals	13.00	19.52	192.4	399.9	15.41	96.97	22.6	1.49	10.52	M
HR HARVESTS: Period_1_Initial_Harvest								growth	harvested	
Conifers	13.00	20.00	123.5	269.4	10.43	65.69	16.2	1.04	7.00	
Hardwoods	13.00	11.44	48.5	34.6	.78	4.06	1.6	.11	.86	
Totals	13.00	18.00	172.0	304.0	11.21	69.75	17.9	1.14	7.85	
AH STAND AFTER HARVEST								growth	remaining	
Conifers	13.00	29.39	20.0	94.2	4.14	26.82	4.7	.34	2.62	
Hardwoods	13.00	27.23	.4	1.7	.06	.40	.0	.00	.05	
Totals	13.00	29.35	20.4	95.9	4.20	27.22	4.8	.35	2.67	
Conifers	18.00	30.31	20.0	100.0	4.54	29.86	5.8	.40	3.05	
Hardwoods	18.00	27.60	.4	1.7	.07	.46	.0	.00	.06	
Totals	18.00	30.26	20.4	101.7	4.61	30.32	5.8	.40	3.10	M
Conifers	23.00	31.23	19.9	106.0	4.95	33.05	6.0	.41	3.19	
Hardwoods	23.00	27.92	.4	1.7	.07	.52	.0	.00	.06	
Totals	23.00	31.16	20.3	107.7	5.02	33.57	6.0	.42	3.25	M
Conifers	28.00	32.14	19.9	112.1	5.37	36.38	6.1	.42	3.32	
Hardwoods	28.00	28.18	.4	1.7	.08	.58	.0	.00	.06	
Totals	28.00	32.06	20.3	113.8	5.45	36.95	6.1	.43	3.38	M
Conifers	33.00	33.04	19.9	118.4	5.81	39.81	6.3	.43	3.44	
Hardwoods	33.00	28.38	.4	1.7	.08	.63	.0	.00	.06	
Totals	33.00	32.96	20.3	120.1	5.89	40.45	6.3	.44	3.50	M

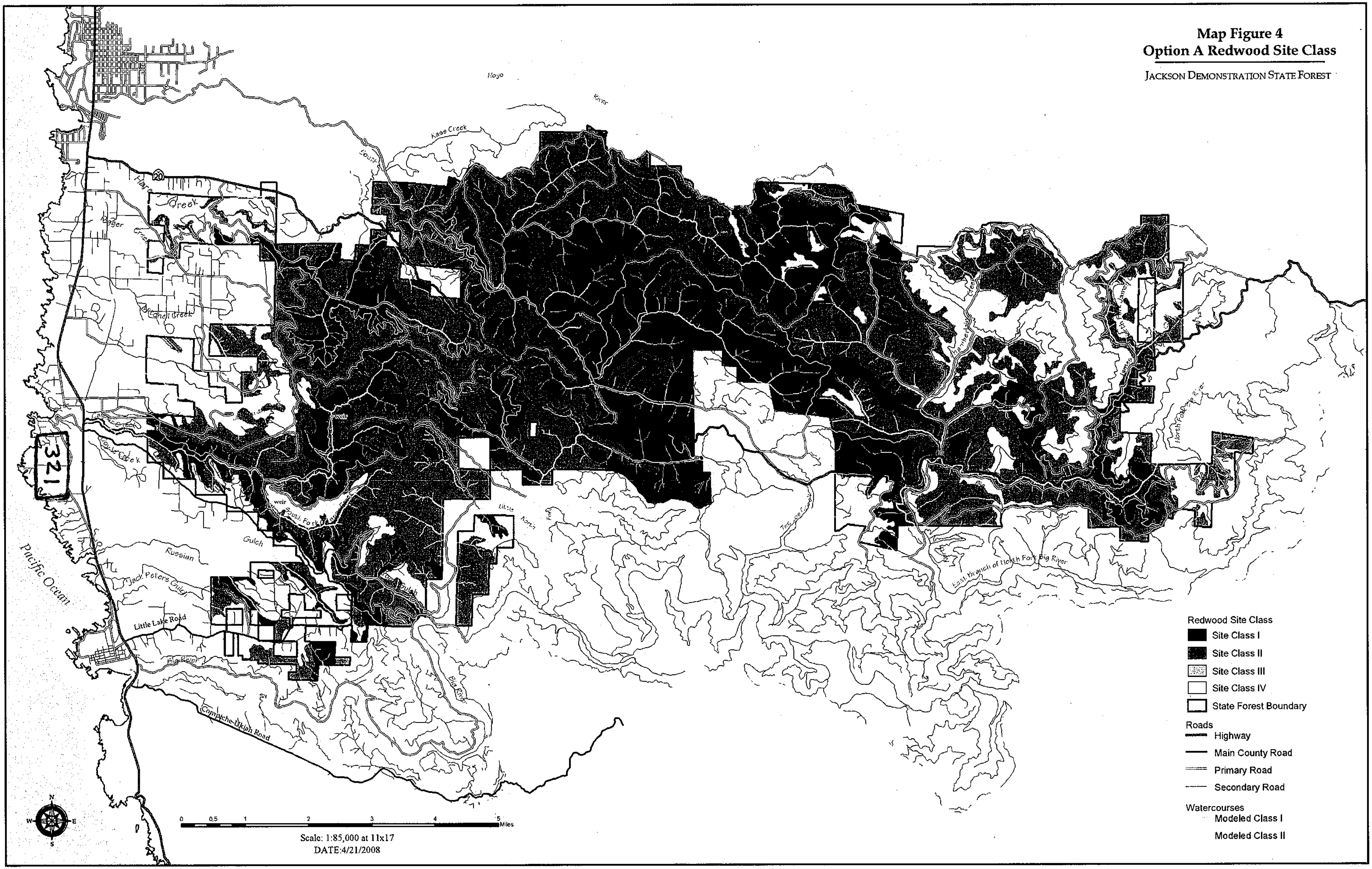
IG INGROWTH

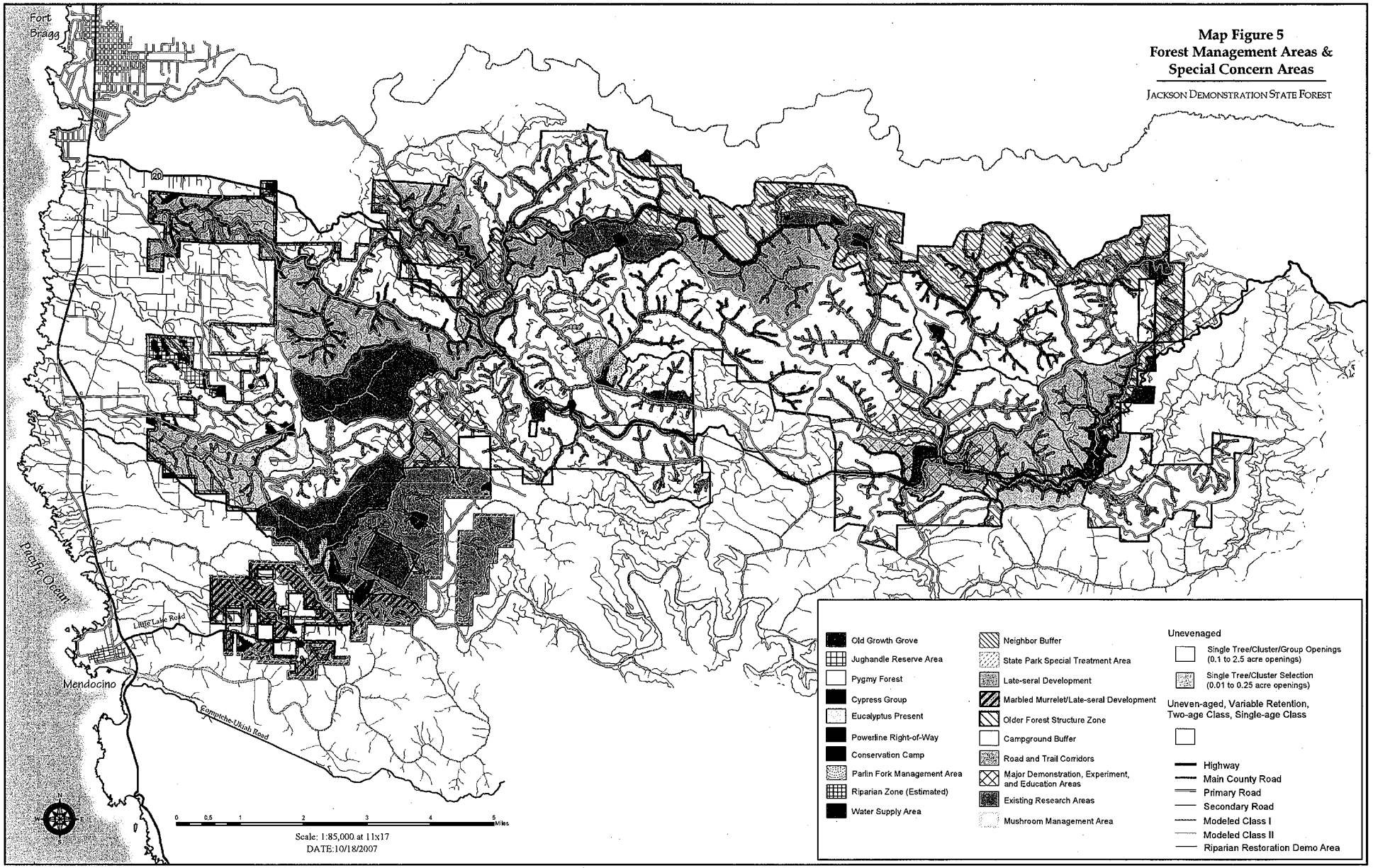
Conifers	33.00	7.02	358.0	96.1	.68	2.43				
Hardwoods	33.00	3.94	91.0	7.7	.01	.01				
Totals	33.00	6.51	449.0	103.9	.69	2.43				
AI			STAND AFTER INGROWTH						includes ingrowth	
Conifers	33.00	10.20	377.9	214.5	6.49	42.24	102.4	1.11	5.86	
Hardwoods	33.00	4.35	91.4	9.4	.09	.64	7.7	.01	.06	
Totals	33.00	9.35	469.3	224.0	6.57	42.88	110.1	1.12	5.93	
Conifers	38.00	11.44	362.1	258.5	7.64	48.69	44.0	1.15	6.45	
Hardwoods	38.00	4.56	90.1	10.2	.10	.73	.8	.02	.09	
Totals	38.00	10.44	452.2	268.7	7.75	49.42	44.8	1.17	6.54	M
Conifers	43.00	12.54	350.6	300.9	9.07	56.62	42.3	1.43	7.93	
Hardwoods	43.00	4.85	88.6	11.4	.11	.81	1.2	.01	.08	
Totals	43.00	11.42	439.2	312.3	9.19	57.43	43.5	1.44	8.01	M
Conifers	48.00	13.54	341.1	340.9	10.57	65.36	40.1	1.49	8.75	
Hardwoods	48.00	5.17	87.2	12.7	.12	.90	1.4	.01	.09	
Totals	48.00	12.30	428.3	353.7	10.69	66.26	41.4	1.50	8.84	M
Conifers	53.00	14.44	333.2	378.7	12.11	74.80	37.8	1.54	9.43	
Hardwoods	53.00	5.50	85.7	14.1	.13	.99	1.4	.01	.09	
Totals	53.00	13.11	418.9	392.9	12.24	75.79	39.2	1.55	9.52	M
HR	HARVESTS: Thin_Period_5								growth harvested	
Conifers	53.00	11.33	135.8	95.1	1.79	8.04	12.7	.43	2.25	
Hardwoods	53.00	5.29	40.5	6.2	.04	.28	.7	.00	.03	
Totals	53.00	10.26	176.3	101.3	1.83	8.33	13.4	.44	2.28	
AH			STAND AFTER HARVEST						growth remaining	
Conifers	53.00	16.23	197.4	283.6	10.32	66.75	25.1	1.11	7.18	
Hardwoods	53.00	5.68	45.2	8.0	.09	.71	.7	.01	.06	
Totals	53.00	14.85	242.5	291.6	10.41	67.46	25.8	1.11	7.24	
Conifers	58.00	17.19	193.3	311.5	11.60	75.01	27.8	1.28	8.26	
Hardwoods	58.00	6.14	44.1	9.1	.11	.81	1.1	.01	.09	
Totals	58.00	15.73	237.4	320.5	11.71	75.82	28.9	1.29	8.36	M
Conifers	63.00	18.09	189.9	338.7	13.02	84.15	27.2	1.42	9.14	
Hardwoods	63.00	6.63	42.9	10.3	.13	.93	1.2	.02	.13	
Totals	63.00	16.58	232.8	349.0	13.14	85.09	28.4	1.44	9.27	M
Conifers	68.00	18.93	186.8	365.2	14.39	93.46	26.5	1.37	9.30	
Hardwoods	68.00	7.11	41.8	11.5	.15	1.07	1.2	.02	.14	
Totals	68.00	17.38	228.6	376.7	14.53	94.53	27.7	1.39	9.44	M
Conifers	73.00	19.73	184.1	390.8	15.79	103.20	25.7	1.41	9.74	
Hardwoods	73.00	7.56	40.6	12.7	.18	1.29	1.2	.03	.22	
Totals	73.00	18.14	224.7	403.5	15.97	104.49	26.8	1.44	9.96	M
Conifers	78.00	20.48	181.6	415.7	17.21	113.21	24.8	1.42	10.01	
Hardwoods	78.00	7.97	39.5	13.7	.22	1.60	1.0	.04	.31	
Totals	78.00	18.87	221.1	429.4	17.43	114.81	25.9	1.46	10.32	M
Conifers	83.00	21.20	179.4	439.7	18.65	123.54	24.0	1.44	10.33	
Hardwoods	83.00	8.36	38.4	14.6	.29	2.06	.9	.07	.47	
Totals	83.00	19.56	217.8	454.3	18.95	125.60	24.9	1.51	10.79	M
Conifers	88.00	21.87	177.4	462.9	20.13	134.16	23.2	1.48	10.62	
Hardwoods	88.00	8.70	37.2	15.4	.32	2.35	.8	.03	.29	
Totals	88.00	20.21	214.6	478.2	20.45	136.51	24.0	1.51	10.91	M
Conifers	93.00	22.52	175.5	485.3	21.59	144.86	22.4	1.47	10.70	
Hardwoods	93.00	9.00	36.1	16.0	.42	3.09	.6	.10	.74	
Totals	93.00	20.84	211.6	501.3	22.02	147.95	23.0	1.56	11.45	M

HR	HARVESTS: Cut_all_>30_Period_9						growth harvested		
Conifers	93.00	41.60	22.6	213.4	11.98	90.10	7.5	.53	4.48	
Hardwoods	93.00	34.83	.1	.3	.02	.18	.0	.00	.00	
Totals	93.00	41.59	22.7	213.8	12.00	90.28	7.5	.53	4.48	
AH			STAND AFTER HARVEST				growth remaining			
Conifers	93.00	18.06	152.9	271.9	9.62	54.76	14.9	.94	6.23	
Hardwoods	93.00	8.91	36.1	15.6	.40	2.91	.6	.10	.74	
Totals	93.00	16.70	189.0	287.5	10.02	57.67	15.5	1.04	6.97	
Conifers	98.00	18.75	151.2	290.0	10.76	62.41	18.1	1.14	7.65	
Hardwoods	98.00	9.27	34.9	16.3	.45	3.40	.7	.05	.49	
Totals	98.00	17.37	186.1	306.3	11.21	65.81	18.8	1.19	8.14	M
Conifers	103.00	19.42	149.6	307.7	11.88	70.20	17.7	1.12	7.79	
Hardwoods	103.00	9.58	33.7	16.9	.49	3.89	.5	.04	.49	
Totals	103.00	18.02	183.3	324.6	12.37	74.09	18.2	1.16	8.28	M
Conifers	108.00	20.05	148.2	325.0	13.02	78.17	17.3	1.14	7.97	
Hardwoods	108.00	9.84	32.5	17.2	.57	4.60	.3	.08	.71	
Totals	108.00	18.64	180.6	342.1	13.59	82.77	17.5	1.22	8.68	M
Conifers	113.00	20.66	146.8	341.8	14.13	86.13	16.8	1.11	7.96	
Hardwoods	113.00	10.05	31.2	17.2	.60	5.07	.1	.03	.46	
Totals	113.00	19.23	178.1	359.0	14.73	91.20	16.8	1.14	8.42	M
IG			INGROWTH							
Conifers	113.00	7.02	358.0	96.1	.68	2.43				
Hardwoods	113.00	3.94	91.0	7.7	.01	.01				
Totals	113.00	6.51	449.0	103.9	.69	2.43				
AI			STAND AFTER INGROWTH				includes ingrowth			
Conifers	113.00	12.61	504.8	437.9	14.81	88.56	112.9	1.79	10.39	
Hardwoods	113.00	6.12	122.2	24.9	.60	5.07	7.8	.04	.47	
Totals	113.00	11.63	627.1	462.8	15.41	93.63	120.7	1.83	10.86	
TH			TOTAL HARVEST DURING SIMULATION PERIOD							
Conifers	113.00	17.56	281.9	577.9	24.20	163.83				
Hardwoods	113.00	8.66	89.1	41.2	.84	4.52				
Totals	113.00	15.76	371.0	619.1	25.04	168.35				


Map Figure 1
Ownership Map
JACKSON DEMONSTRATION STATE FOREST
R 17 W
R 16 W
R 15 W
R 14 W
T 18 N
T 17 N
To Hwy. 101, 42 miles
Fort Bragg
Private Road
Kass Creek
Beaudon Gulch
Hare Creek
Mitchell Creek
Chamberlain Creek
James Creek
To Willits & Hwy 101 6 miles
Parlin Creek
Upper North Fork Big River
Caspar
Caspar Creek
Berry Gulch
Two Log Creek
Lower North Fork Big River
East Branch North Fork Big River
Russian Gulch
Pacific Ocean
Mendocino
Mouth of Big River
Big River Addition Mendocino Headlands State Park
To Hwy. 128 9 miles
Scale: 1:85,000 at 11x17
DATE 9/18/2007
Ownership
State Forest Boundary
State Park Boundary
Roads
Highway
Main County Road
Primary Road
Secondary Road
Trail
Watercourses
Modeled Class I
Modeled Class II
Planning Watershed Boundary
Township, Range and Sections
Egg Taking Station
Conservation Camp
CDF Fire Station
Campground
Picnic Area
Historic Schoolhouse

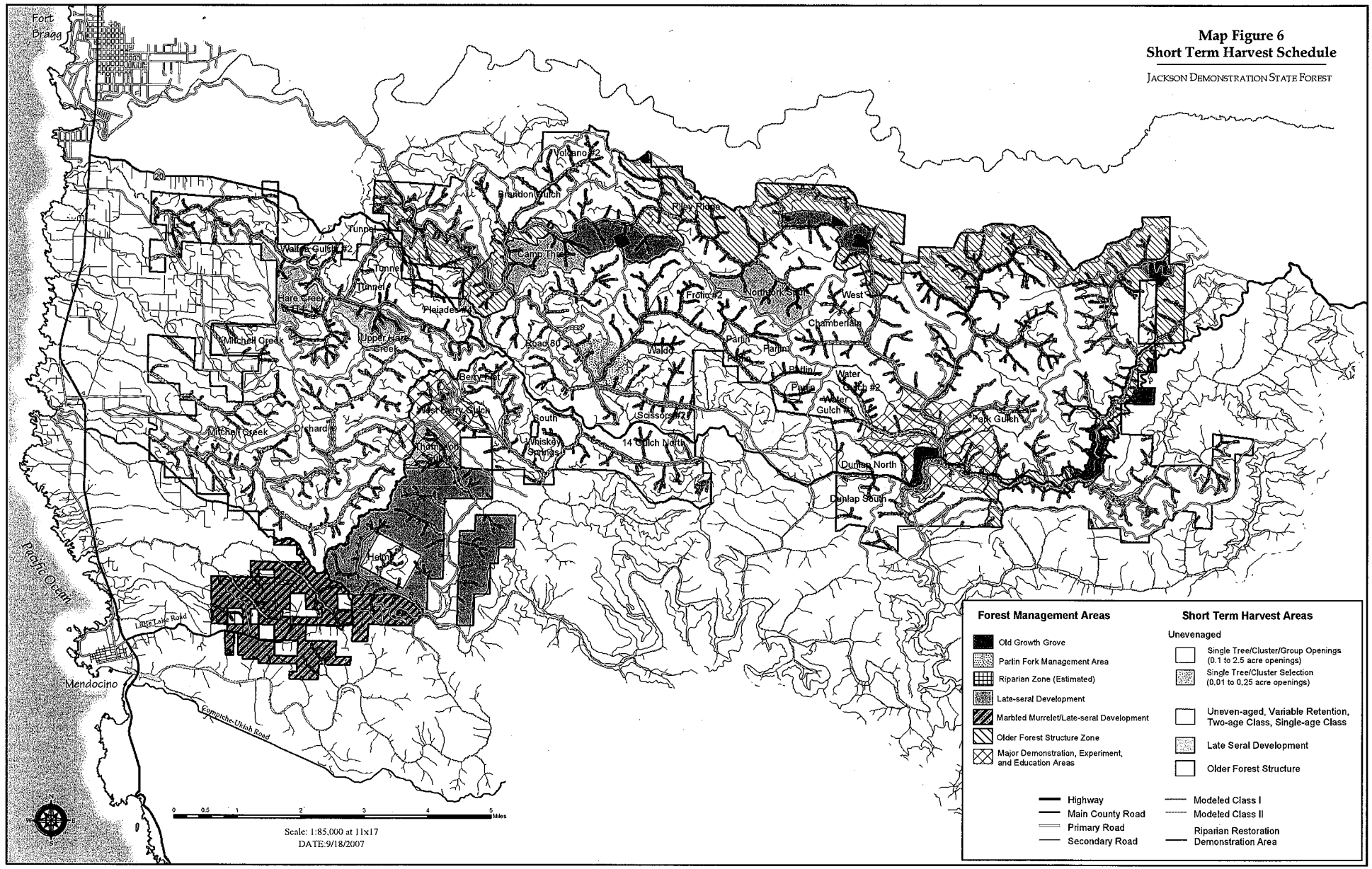
320

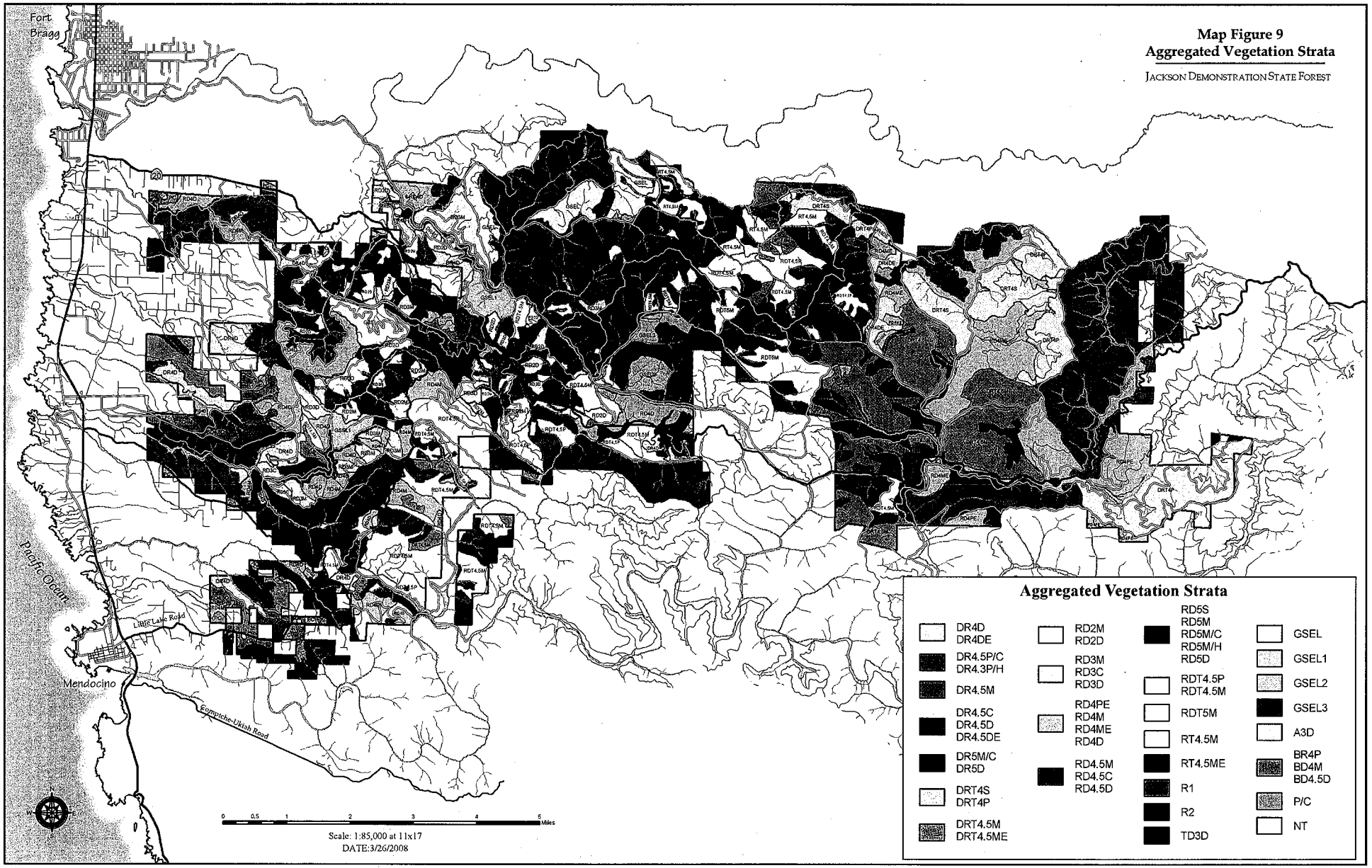

Map Figure 4
Option A Redwood Site Class
JACKSON DEMONSTRATION STATE FOREST
Pacific Ocean
Little Lake Road
Comptche-Ukiah Road
East Branch of North Fork Big River
Redwood Site Class
Site Class I
Site Class II
Site Class III
Site Class IV
State Forest Boundary
Roads
Highway
Main County Road
Primary Road
Secondary Road
Watercourses
Modeled Class I
Modeled Class II
0 0.5 1 2 3 4 5 Miles
Scale: 1:85,000 at 11x17
DATE:4/21/2008
321



Map Figure 5
Forest Management Areas & Special Concern Areas

JACKSON DEMONSTRATION STATE FOREST


Map Figure 6
Short Term Harvest Schedule
JACKSON DEMONSTRATION STATE FOREST
Fort Bragg
Mendocino
Pacific Ocean
Little Lake Road
Comptche-Ukiah Road
Volcano #2
Brandon Gulch
Riley Ridge
Tunnel
Walker Gulch #2
Camp Three
Hare Creek
Pleiades #1
Frolic #2
North Fork Spark
West Chamberlain
Mitchell Creek
Upper Hare Creek
Road 80
Waldo
Parlin
Parlin
Parlin
Water Gulch #2
Water Gulch #1
Berry Gulch
West Berry Gulch
Scissors #2
Park Gulch
Mitchell Creek
Orchard
North Whiskey Springs
South Whiskey Springs
14 Gulch North
Dunlap North
Dunlap South
Forest Management Areas
Old Growth Grove
Parlin Fork Management Area
Riparian Zone (Estimated)
Late-seral Development
Marbled Murrelet/Late-seral Development
Older Forest Structure Zone
Major Demonstration, Experiment, and Education Areas
Short Term Harvest Areas
Unevenaged
Single Tree/Cluster/Group Openings (0.1 to 2.5 acre openings)
Single Tree/Cluster Selection (0.01 to 0.25 acre openings)
Uneven-aged, Variable Retention, Two-age Class, Single-age Class
Late Seral Development
Older Forest Structure
Highway
Main County Road
Primary Road
Secondary Road
Modeled Class I
Modeled Class II
Riparian Restoration Demonstration Area
0 0.5 1 2 3 4 5 Miles
Scale: 1:85,000 at 11x17
DATE:9/18/2007


Map Figure 9
Aggregated Vegetation Strata
Jackson Demonstration State Forest
Fort Bragg
Mendocino
Pacific Ocean
Little Lake Road
Compiche-Ukiah Road
Aggregated Vegetation Strata
DR4D
DR4DE
DR4.5P/C
DR4.3P/H
DR4.5M
DR4.5C
DR4.5D
DR4.5DE
DR5M/C
DR5D
DRT4S
DRT4P
DRT4.5M
DRT4.5ME
RD2M
RD2D
RD3M
RD3C
RD3D
RD4PE
RD4M
RD4ME
RD4D
RD4.5M
RD4.5C
RD4.5D
RD5S
RD5M
RD5M/C
RD5M/H
RD5D
RDT4.5P
RDT4.5M
RDT5M
RT4.5M
RT4.5ME
R1
R2
TD3D
GSEL
GSEL1
GSEL2
GSEL3
A3D
BR4P
BD4M
BD4.5D
P/C
NT
Scale: 1:85,000 at 11x17
DATE:3/26/2008

A CD and enlarged maps were submitted with **THP 1-08-074 MEN** which contains the Option A figures 1, 4, 5, 6, & 9 (pages 320-324. respectively). The CD and maps are located in the Official Record and available for purchase through our Santa Rosa office located at:

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