

## Chapter 21

# Jackson Demonstration State Forest, California, United States of America

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## ABBREVIATIONS

<b>Board</b>	California Board of Forestry and Fire Protection
<b>Department</b>	California Department of Forestry and Fire Protection
<b>EIR</b>	Environmental Impact Report
<b>JAG</b>	Jackson Advisory Group
<b>JDSF</b>	Jackson Demonstration State Forest
<b>SCA</b>	Special Concern Area

## MANAGEMENT SETTING AND BACKGROUND

The California Department of Forestry and Fire Protection (the Department) manages approximately 71,000 acres (ac) (28,733 hectares (ha)) of Demonstration State Forests on behalf of the people of California. The Jackson Demonstration State Forest (JDSF), a 48,652 ac (19,689 ha) second-growth redwood (*Sequoia sempervirens*) forest located in Mendocino County, between Fort Bragg and Willits, is the largest forest in the Department's Demonstration State Forests system.

The JDSF was purchased from the Caspar Lumber Company in 1947 after nearly 90 years of management for timber production. The establishment of the JDSF was predicated upon declining volumes of old-growth timber and the fact that large areas of potentially productive timberland in California were not producing a satisfactory growth of young timber. 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 15–60-year-old second-growth forests, though post-logging fires had burned through many of the regenerated stands. Caspar Lumber Company started partial cutting on the east end of the forest in the 1930s. After acquiring the forest, the state continued partial cutting on the east end during the 1950s and 1960s. This first round of partial harvest was an individual marked tree cut that removed about 70% of the coniferous 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 coniferous trees greater than 22 inches (in) (56 centimeters (cm)) 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, pole timber, small young second-growth conifers, and individual scattered residual old-growth conifers. This kind of irregular stand structure is typical of current stands on the eastern portion of the forest, and distinguishes it from the western portion. Although the western portion of the forest was subject to partial cutting of the second-growth stands, it has retained a more uniform stand structure due to the early history of large-scale clear-cutting within the coastal watersheds.

For the purposes of growing trees, the JDSF is primarily composed of site class II and III lands. Redwood and Douglas-fir (*Pseudotsuga menziesii*) trees dominate the forests. Other conifers 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*) and madrone (*Arbutus menziesii*). The majority of trees are less than 120 years old. Approximately 459 ac (186 ha) of old-growth redwood groves remain on the JDSF and are protected from harvesting. Old-growth residual trees, which were left standing when the forest was first harvested and

during subsequent harvests, can be found as isolated individuals or in small aggregations. Redwood becomes less dominant as one moves inland, as Douglas-fir and hardwood increase in composition. Some of the inland areas would be classified as a Douglas-fir forest series by [Sawyer and Keeler-Wolf \(1995\)](#) and [Holland \(1986\)](#). Tanoak and madrone dominate young Douglas-fir and redwood stands 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 western portion of the forest can contain relatively pure stands of red alder (*Alnus rubra*). Alder, bigleaf maple (*Acer macrophyllum*), and willow (*Salix* spp.) are generally restricted to riparian areas. Additional hardwoods found on the JDSF include California bay (*Umbellularia californica*), chinquapin (*Chrysolepis chrysophylla*), 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 ([California Department of Fish and Wildlife, 2007](#)) recognizes it as a community that is “rare and worthy of consideration.” The Pygmy Cypress community covers approximately 613 ac (248 ha) of the JDSF near the western end of the forest. The California Department and Parks and Recreation cooperate to manage some of this area.

The JDSF contains 142 continuous forest inventory plots that have been measured at 5-year intervals since 1959. Forest growth is in the range of 900–1,300 board feet per ac (5.2–7.4 cubic meters (m<sup>3</sup>) per ha) per year in most areas. Harvest levels average 15–25 million board feet (MMBF) (35,400–59,000 m<sup>3</sup>) per year. The standing inventory of the JDSF averages approximately 43,000 board feet per ac (251 m<sup>3</sup> per ha). The average density of snags on the JDSF is 1.9 per ac (4.7 per ha). Slightly more than half of the snags (57%) are from conifers. However, the most common species of snag is tanoak (23%), followed by young growth Douglas-fir and Bishop pine (20% each), madrone (15%), and young-growth redwood (8%). The diameter at breast height (DBH) of the snags averages 17.6 in (44.7 cm) with a maximum of 44 in (111.8 cm) and does not differ appreciably between conifers and hardwoods.

The Pacific Ocean is a moderating influence on the climate of the region. The JDSF has a Mediterranean climate, characterized by a pattern of low-intensity rainfall in the winter and cool, dry summers. Fog is a dominant climatic feature, generally occurring frequently during the summer months and less frequently during the rest of the year. About 90% of the precipitation in this area falls between October and April. Mean annual precipitation is 39 in (991 millimeters (mm)) at Fort Bragg ([California Department of Water Resources, 2013](#)), but ranges from 39 to 55 in (991–1,397 mm) across the forest. The rainfall, runoff, and stream discharges in this region are all considerably lower than the wetter redwood forest areas in Humboldt and Del Norte counties to the north.

In general, the landscape is characterized by moderate to high relief. Elevations range from less than 100 feet (ft) (30.5 meters (m)) within stream valleys along the western edge of the JDSF, to a maximum of 2,092 ft (638 m) in the southeast corner. The area drains directly into the Pacific Ocean. The local stream pattern is reminiscent of a “trellis,” where short tributary streams flow into larger streams at roughly right angles. The stream pattern is controlled in part by structural patterns in the bedrock. As is true throughout Coast Range, the predominant structural pattern of streams trends northwesterly. Thus, many of the principal watercourses in the area are oriented from northwest to southeast.

Debris slide slopes, followed by rockslides, are the features covering the greatest amount of area. Mass wasting on the JDSF is dominated by shallow debris slides associated with roads and landings and slides in inner gorges and steep colluvial filled hollows. Surface erosion for the JDSF planning watersheds has been estimated from field surveys, results from the Caspar Creek watershed study, and erosion hazard ratings. The eastern planning watersheds have the highest percentage of land in the high or extreme categories. Sediment delivery to stream channels has been estimated to come from heavily used gravel-surfaced roads within 200 ft (61 m) of streams. Overall, average sediment delivery from surface erosion associated with the JDSF riparian roads is 50% of the total estimated from all sources. The legacy effects of old streamside roads were found to be substantial and continue to be a focus of the JDSFs road management efforts.

The most significant impact to stream channels located within the JDSF has been the widespread removal of large woody debris from low-gradient stream channels from the 1950s to the early 1990s. This large woody debris removal has reduced pool frequency and depths and overall habitat complexity, which has in turn reduced the quality of over-summering and over-wintering habitat for anadromous fishes. Where wood has been removed, stored sediments have been flushed, resulting in channel lowering and entrenchment disconnecting channels from floodplains and reducing backwater habitats thought to be important refuges for fish during strong winter storms. Additionally, older logging practices that occurred until the mid-1970s resulted in large inputs of sediment into stream channels. Some channels have shown slight recovery from aggradation but, overall, most continue to show evidence of high sediment input, increased entrenchment, and reduced large woody debris levels. Restoring large woody debris to streams continues to be a management and research focus at the JDSF.

The JDSF and the surrounding forested area provide habitat for a number of listed and sensitive fish and wildlife species, including the northern spotted owl (*Strix occidentalis caurina*), coho salmon (*Oncorhynchus kisutch*), and steelhead trout (*Oncorhynchus mykiss*). In addition, the JDSF has the potential to provide habitat for several listed or sensitive species

that are not currently known to occur on the forest. These species include the marbled murrelet (*Brachyramphus marmoratus*), Pacific fisher (*Martes pennanti*), and Humboldt marten (*Martes americana humboldtensis*). As such, the JDSF, in conjunction with other parcels of public land in central Mendocino County, represents a valuable resource of potential re-occupancy and sustainability for at-risk wildlife species. In 2011, the JDSF was designated as critical habitat for the marbled murrelet.

Historically, coho salmon and steelhead trout occurred in all of the planning watersheds within the forest. On the JDSF, there are about 90 miles (mi) (145 kilometers (km)) of streams with fish habitat, and within the planning watersheds draining the JDSF there are about 192 mi (309 km) of this habitat. Steelhead trout are found in all 15 planning watersheds reviewed, and coho salmon are found in 12 of the 15 planning watersheds. Coho generally use stream channels with less than 4% gradient and were found in 92 mi (148 km) of the Class I watercourses found in the 15 planning watersheds (i.e., about 48% of the total Class I stream system present).

The JDSF receives an estimated 61,000 recreational visitors per year. There are more than 60 individual campsites, many miles of riding and hiking trails, and more than 200 mi (322 km) of forest road utilized by the public. Other common recreational activities conducted on the forest include picnicking, hunting, swimming, wildlife viewing, and target shooting. The forest also is a local source of firewood and other minor forest products such as mushrooms and greenery for both personal and commercial use.

## PLANNING ENVIRONMENT AND METHODOLOGY

The eight Demonstration State Forests in California are self-funded. The Board of Forestry and Fire Protection (the Board) specifies that the purposes of all the state forests are research and demonstration, timber production, and recreation. Given the overarching mandate of research and demonstration, timber production is the primary land use on the JDSF, while recreation is recognized as a secondary but compatible land use. Funding to support all activities on the forests, including salaries and overhead expenses, comes from revenues generated on the forests, primarily timber sales, but also recreation fees and fees from the sale of minor forest products. Revenues from all the Demonstration State Forests are pooled in a joint fund and distributed to individual forests annually. The JDSF, by virtue of being the largest forest in the Demonstration State Forests system, is the major contributor of revenue to the fund.

Management plans are developed for each Demonstration State Forest through a public process and are subject to mandates of the California Environmental Quality Act. Similar to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.), the California Environmental Quality Act requires that environmental values be integrated into the decision-making processes by considering the environmental impacts of proposed actions and reasonable alternatives to those actions. This requirement is met by preparing an environmental impact report (EIR) or other similar documents. The approval process for an EIR allows for public input. All forest management activities on the Forest must also comply with the California Forest Practices Act and regulations promulgated by the Board.

Additionally, management plans are reviewed every 5 years by the Board, and policy requires the Demonstration State Forests to operate under a current management plan. In an open public process, the Department presents to the Board a thorough review of each existing plan at least every 5 years. After each review, the Board may direct the Department either to continue management under the existing plan, to prepare amendments to the plan, or to prepare a new plan for public review and Board approval. During the management plan review and update process, Board policy permits the Department to continue to manage state forests under existing management plans with appropriate consideration for changes in law or regulation until amendments or new plans are approved by the Board.

## Management Objectives

The Department formulated several guidelines and objectives for the management plan. These objectives were derived from a number of sources. Existing laws and regulations, Board policy, science, professional experience, advisory groups, and public input all played a role in formulating the guidelines and objectives. The JDSF will be managed as a working forest with regular timber harvesting operations consistent with environmental constraints related to public trust resources such as watershed, wildlife, fisheries, aesthetics, and recreational enjoyment. The annual allowable harvest level will be determined by a spatially explicit long-term harvest schedule.

The JDSF will maintain as wide a range of forest structures as possible to maintain diversity and maximize options for future research and management. This will be achieved by creating and maintaining a dynamic matrix of habitats and seral stages that moves across the landscape over time. A late-seral stand can be harvested and reset to a younger stand and be replaced by a candidate late-seral stand somewhere else in the forest, reflecting the paradigm that disturbance is the rule

rather than the exception in most ecosystems (Botkin, 2006). The JDSF will be made available to educational institutions and other agencies for conducting research and demonstration projects. Demonstration areas will be developed. These will incorporate a wide range of forest management approaches within a compact, easily accessible area. Finally, the management plan specifies that a Forest Learning Center will be established at the JDSF to support and facilitate forest management research and learning activities.

Forest management will focus on increasing the amount of older forest structure and late-seral forest available for terrestrial wildlife, including areas adjacent to aquatic habitats. Maintaining corridors of contiguous habitat will improve habitat connectivity and reduce forest fragmentation. Activities will use a range of management techniques to compare natural and accelerated forest restoration approaches in areas designated for development of late-seral forest characteristics. Designated old-growth reserves will be managed for maintenance of late-seral habitat values.

Riparian areas will be managed for late-seral habitats, while allowing for flexibility to conduct research on riparian protection zones. Recovery habitat for listed species will be created or naturally developed. Forestry practices that maintain stability of hill slopes will be used. A control program will be developed to limit sources of mass wasting and surface erosion. Finally, a comprehensive road management plan will be developed to reduce sediment production, including upgrading roads remaining in the permanent transportation network and properly abandoning high-risk riparian roads where possible.

### Constraints and Opportunities for the Planning Area

Special concern areas (SCA) at the JDSF are areas where management is restricted in order to protect certain resources. They include unique habitats, habitat for species of concern, riparian areas, recreational areas, areas near residences and parks, research areas, water supplies, and sensitive slopes. Figure 21.1 illustrates several of the SCAs located on the JDSF.

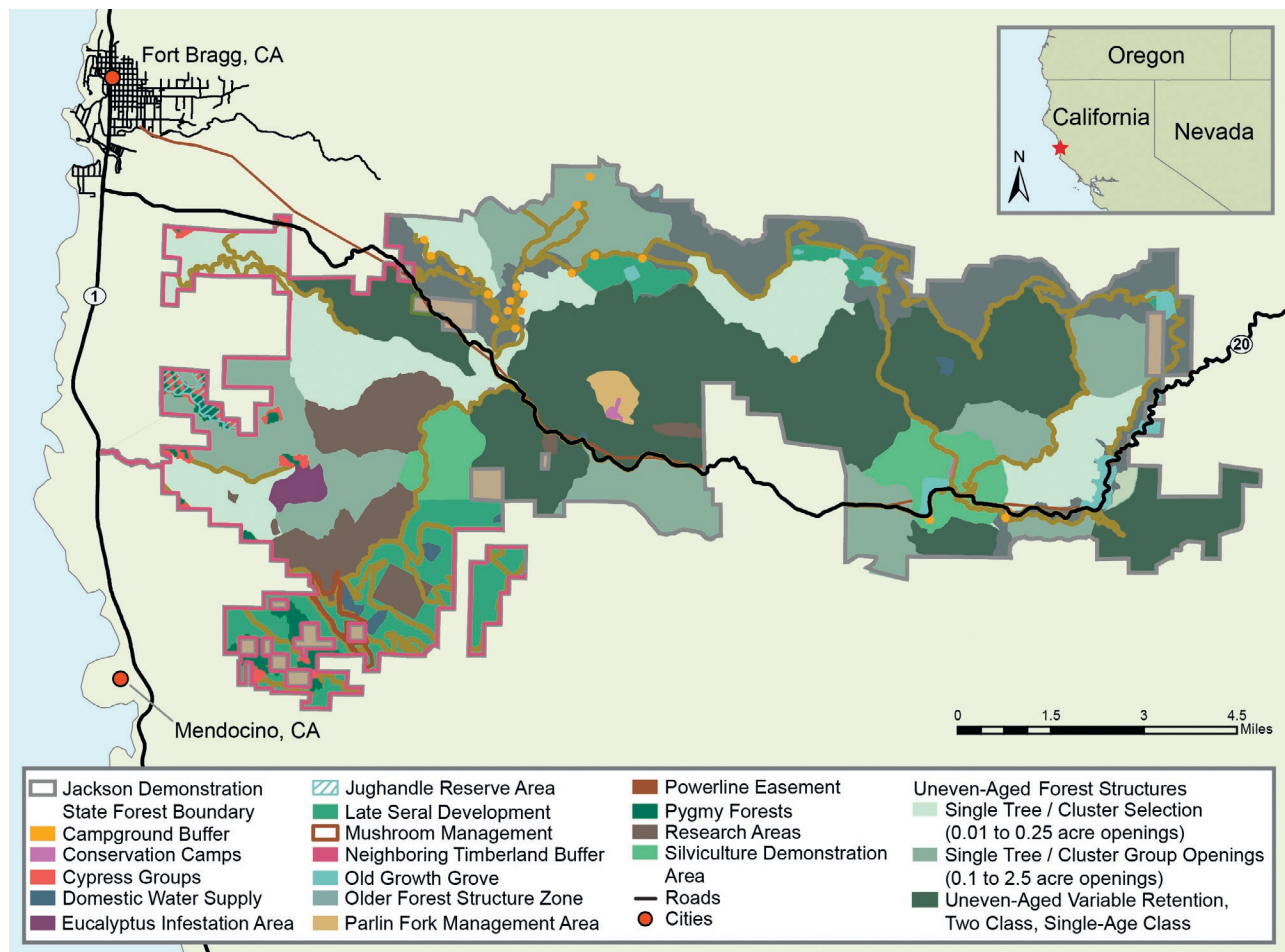


FIGURE 21.1 Forest management areas and special concern at the Jackson Demonstration State Forest.

Many SCAs physically overlap. Examples include the power line rights-of-way crossing through the watercourse and lake protection zones or the uneven-aged management areas; the overlap of pygmy forest and the Jughandle Reserve; and road and trail corridors located within the Woodlands Special Treatment Area. The areas noted below are those that are assigned to each SCA independently; thus, the total is more than the total forest area affected by SCAs. 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 the following SCAs on the Forest:

1. An *Older Forest Structure Zone* (6,803 ac, 2,753 ha) that consists of areas 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 of 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 ft, (91 m) and only single tree selection may be used within the first 100 ft (30 m) adjacent to these areas.
2. *Cypress groups* (253 ac, 102 ha), or 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. Conifer stands containing cypress that occur on more productive sites may be subject to harvesting and are not included in this SCA.
3. The *Pygmy forest* (613 ac, 248 ha) is a unique type of dwarf vegetation occurring on a unique soil profile that includes an underlying hardpan and highly acidic soils that offers an inhospitable environment for species and greatly stunts growth. Pygmy forest can be found on old marine terraces dominated by pygmy cypress and other specially adapted species. These areas will not be harvested.
4. The *Jughandle Reserve* (247 ac, 100 ha) is an administrative area designated to protect a tract of pygmy forest within the JDSF and to manage recreational access to these lands in a manner compatible with human use in the adjacent Jughandle State Reserve. This SCA lies almost entirely within the pygmy forest SCA, and there will be no harvesting within this SCA.
5. A *eucalyptus infestation area* (300 ac, 121 ha) is an area in the Caspar Creek planning watershed that includes eucalyptus species mixed with the native species. 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. The JDSF intends to convert this area to native conifer species.
6. *Inner gorges* are steep slopes adjacent to streams 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 timber harvest plan preparation.
7. *Northern spotted owl nest areas* are 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.
8. *Osprey nest areas* are 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.
9. *Watercourse and lake protection zones* (7,440 ac, 3,011 ha) are 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 uneven-aged regimes designed to promote development of late-successional forest stand conditions.
10. *Woodlands Special Treatment Areas* (2,511 ac, 1,016 ha) are 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.
11. *Domestic water supply areas* (195 ac, 79 ha) are designated areas for domestic water supply in the JDSF that are sensitive to disturbance. Only a limited range of silviculture is allowed in these areas.
12. *Buffers adjacent to non-timberland neighbors* (875 ac, 354 ha) are areas along the boundary of the JDSF that are 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.
13. A *power line right-of-way* (89 ac, 36 ha) that bisects the forest, is generally parallel to Highway 20, and is operated by the Pacific Gas and Electric power company. The right-of-way is not available for timber production.
14. *State Park Special Treatment Areas* (415 ac, 168 ha) are areas adjoining state parks where the application of silvicultural systems must take the values of the parks into consideration.
15. *Reserved old-growth groves* (459 ac, 186 ha) includes the existing mapped old-growth grove reserves. These areas will not be harvested.

16. *Late-seral development areas* (2,762 ac, 1,118 ha) 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. A buffer will be applied if timber harvest is conducted near late-seral development areas. No even-aged silvicultural systems may be used within 300 ft (91 m), and only single tree selection may be used within the first 100 ft (30 m) adjacent to these areas.
17. *Campground buffers* (133 ac, 54 ha) are areas immediately adjacent to campgrounds that are managed for public safety and esthetic enjoyment. Even-aged silviculture is not allowed within the campground buffers.
18. *Conservation camps* (43 ac, 17 ha) are areas occupied by the Parlin Fork and Chamberlain Creek Conservation Camps. These areas will not be managed for timber production.
19. *Road and trail corridors* (4,790 ac, 1,938 ha) are buffer areas along trails and roads intended to maintain aesthetic qualities valued by the public. Only a limited range of silviculture is allowed in these areas.
20. *Parlin Fork Management Area* (279 ac, 113 ha) is an area adjacent to the Parlin Fork Conservation Camp that is used as a demonstration area for small woodlot management.
21. *Research areas* (1,680 ac, 680 ha) are areas set aside for various existing research studies.
22. *Areas with a high relative landslide potential* are areas identified from California Geological Survey 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 established guidelines. They are potentially subject to limitations on road construction, yarding methods, and silviculture and may need to be evaluated by a certified engineering geologist.
23. *Mushroom Corners Management Area* (330 ac, 134 ha) is an area 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.

## Plan Development Methods

The planning team for developing the management plan was drawn from both the JDSF and Department specialists and included specialists in forestry, silviculture, measurements, growth and yield, harvest scheduling, forest economics, wildlife biology, hydrology, geology, and cultural resources.

The analysis used to develop the management plan was driven by simultaneous consideration of the multiple goals and objectives identified for the JDSF. SCAs that contain unique resource values were first identified and mapped, and management regimes were tailored to the resource values of each. An example of this analysis is provided by the case of the marbled murrelet. Although the marbled murrelet has not been observed at the JDSF, sightings have occurred on nearby state parks land; therefore, activities in the southwestern portion of the forest were restricted to silvicultural methods intended to accelerate the development of late-seral forest conditions, which can be suitable habitat for this species.

A major focus during management plan development was identifying the desired future forest conditions in terms of forest structure, seral stages, and wildlife habitat values. The uncertainty surrounding future management situations and research priorities, and limitations of the science, in particular on wildlife values, led to general consensus on creating and maintaining as wide a range of forest structure conditions as possible, so as not to foreclose on future management and research options.

Wildlife in the Northern California Ecological Sub-Region, which includes the JDSF, is relatively diverse, although few species are endemic (occurring nowhere else) to the region. With the exception of heavily studied species such as the northern spotted owl, there is only limited information on the role of forest composition and forest patch, or stand, juxtaposition on population dynamics. Maintaining a diverse forested mosaic that helps support the many species in the region is beneficial for both forest management and research. Habitat protection and restoration of relatively rare habitat types is also an important element of forest management. Not all large trees have the same value to wildlife; nor does age alone determine a tree's value to wildlife. Many slow-growing redwood trees retained after logging activity in the 1880s and early 1900s are no longer shaded by neighbors and now grow vigorously, appearing to be younger second-growth trees. When the core of these trees is examined, the actual age would date the tree back to pre-European settlement. These trees lack the structural elements, large limbs, and cavities that other old trees possess, and they have wildlife value equivalent to second-growth trees. Because of the favorable climate and soils of the region and history of harvest, some young trees are now larger than trees that are indeed old. In general, as time progresses, tree size will vary more with the resources (sunlight, nutrients, water) available for growth rather than the number of growth years. Because of redwood's potential to reach great size and age, assessing age only by size is likely to be inaccurate.

With the SCAs identified, a plan was formulated to maintain or enhance ecological functions in all areas, to create diverse forest types, to produce high levels of sustainable timber growth, and to create the diverse range of forest structures from early- to late-successional stages (Figure 21.2). The plan required the development of a high-quality research and demonstration program. The forest was divided into management areas where the boundaries approximated watershed boundaries. The range of silvicultural methods permitted within each SCA were then identified. Those watershed areas not covered by SCAs were designated to receive a larger range of potential management regimes. Some watershed areas will be selectively harvested, while others will incorporate a component of even-aged management dispersed in time and space to maintain a variety of forested habitats. Still, other watershed areas may be left unmanaged for short or long periods of time to act as controls for experiments.

A long-term harvest schedule with a planning interval of 100 years was developed to estimate the sustainable annual harvest level. Decision variables in the harvest schedule included vegetation, site class, land types (including the SCAs), silvicultural methods, and time of harvest entries. Following the completion of the long-term plan, a short-term harvest plan was formulated for the next 5 years with the objectives of identifying feasible harvest areas and volumes. This short-term harvest plan was spatially explicit and accounted for timber sales already in the planning stages, the road management plan, the complete set of constraints noted above, and other logistical constraints.

## Guiding Laws, Regulations, and Policies

This management plan meets the requirements of the California forest practice rules (California Department of Forestry and Fire Protection, 2013). These rules are promulgated by the Board under the 1973 Z'berg-Nejedly Forest Practice Act. A companion document to the management plan, the JDSF "Option A" plan, the sustained yield plan requirements in the Forest Practices Act, meets the regulatory requirements for estimating sustainable harvest levels on the JDSF under Section 913.11(a) of the forest practice rules. Timber harvest plans, written by a California Registered Professional Forester, are required for individual timber sales developed under this management plan. **The Department has the statutory authority to approve all timber harvest plans.** The JDSF timber harvest plans are approved by the Department's forest practice program by Department employees who have had no involvement in writing them.

In addition to protection measures in the Forest Practice Rules, the California Porter-Cologne Water Quality Control Act and the federal Clean Water Act control management activities to protect water quality. The California Endangered Species Act and the Federal Endangered Species Act (16 U.S.C. 1531–1544) control management activities to protect wildlife and habitat.

The Forest's management direction derives from state statutes and from policies set forth by the California Board of Forestry and Fire Protection. The Public Resources Code specifies the overarching direction for the JDSF of research into economical forest management, timber production, and recreation. Board policy describes the JDSF as *commercial timberland areas managed by professional foresters who conduct programs in timber management, recreation, demonstration, and investigation in conformance with detailed management plans.*

More specifically, Board policy states that the primary purpose of the JDSF is to conduct innovative demonstrations, experiments, and education in forest management; that timber production will be the primary land use; and that recreation is recognized as a secondary but compatible land use on the JDSF. Further noteworthy Board policy directions include: research and demonstration projects shall include silviculture, mensuration, logging methods, economics, hydrology, protection, and recreation; and research and demonstration projects shall be directed to the needs of the general public, small forest landowners, timber operators, and the timber industry.

The Department is in the process of obtaining Forest Stewardship Council certification for the JDSF. Many of the mills in the area are certified by the Forest Stewardship Council, thus there is an incentive for the JDSF to obtain this certification. Additionally, many of the certification requirements are already met by the California Forest Practice Rules and the California Environmental Quality Act public comment requirements.

## OUTCOMES OF THE PLAN

Planned harvest actions are designed to achieve desired forest structural conditions in addition to achieving growth and revenue goals. Under this management plan, standing timber volumes per unit area will continue to build over time (Figure 21.3), 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 slightly more than 25 MMBF per year. This harvest level represents approximately half the total annual growth increment, or about 1% of the total inventory on an annual basis.



FIGURE 21.2 Berry Gulch, on the Jackson Demonstration State Forest.

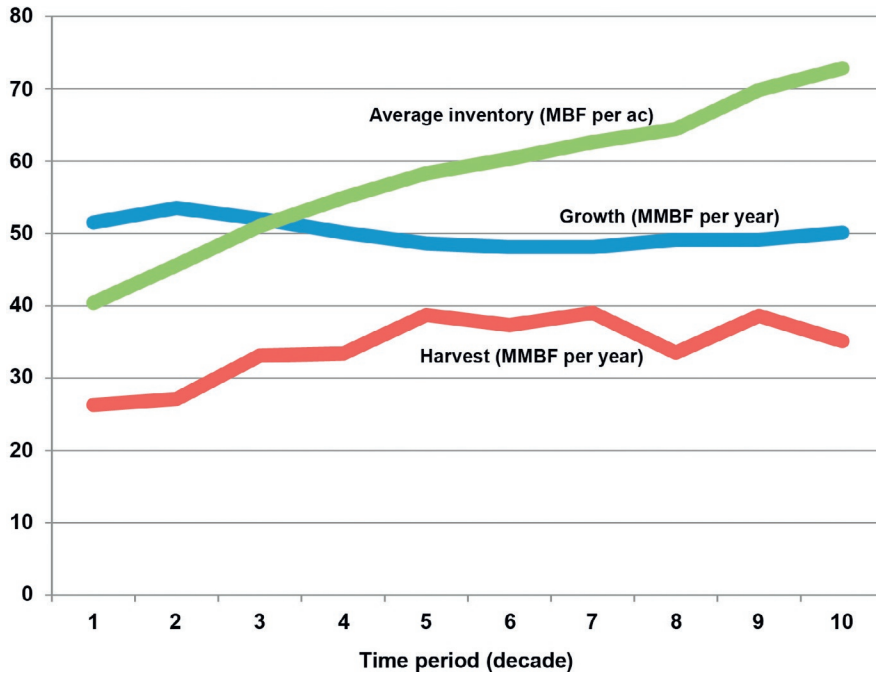


FIGURE 21.3 Inventory, growth, and harvest over time for the coniferous resource at the Jackson Demonstration State Forest.

The Forest Learning Center located at the JDSF was completed in 2009, with partial funding from the U.S. Department of Agriculture Forest Service. It is a 2,000 ft<sup>2</sup> (186 m<sup>2</sup>) facility strategically located in the middle of the Forest with easy access close to a public highway. It provides a meeting location, and it is a convenient facility for researchers to stay in while conducting research at the JDSF.

The JDSF management plan establishes desired future conditions or targets for management. The central goal is to create and maintain a diverse range of forest structure conditions, a set of forest structures that to the maximum extent possible

preserves options for future research and management. The management plan provides long-term goals for the establishment of particular forest structures over time that include the following:

- Late-seral or old-growth forests: 15–25%
- Older forest structure: 10–20%
- Forests with mature or large trees: 5–15%
- Mixed ages and sizes of forests: 30–40%
- Regeneration and forests with pole-sized younger trees: 10–20%
- No specific structure assigned: 0–10%

The structure goals allow a 5% deviation on either side of these figures, recognizing the long time it will take to reach these targets and the inevitable changes in management situation and natural disturbances along the way. The desired future conditions represent a dynamic matrix of seral stages designed to move across the landscape over time. Any particular area that is not permanently protected from management can be harvested and a different area can take its place to represent a given seral stage or forest type.

Given the current low level of older forest in the redwood region, a significant portion of the structural goals are oriented toward accelerating the development of older forest structures. The management plan specifies sustained yield of high-quality sawtimber, emulating natural processes, and a broad diversity of forest structures and habitats. Silvicultural systems are just one of the management tools that will be used to help achieve these desired future conditions. The management plan emphasizes that restoration of natural ecosystems is a high priority. A range of watershed management measures are prescribed to reduce sediment inputs to streams and improve large woody debris inputs. The management plan includes an aggressive road management plan.

This management plan preserves all existing old-growth groves, augmenting most of them to provide large, contiguous areas of older forest habitat. It leverages existing late-seral and old-growth areas by connecting these areas in a contiguous corridor of forest with older forest structural characteristics that extends from the west to the east and the north to the south. Individual large old-growth trees and smaller residual old-growth trees with unique habitat attributes are protected. The management plan sets goals for increased retention of structural habitat elements such as snags, downed logs, and large green trees.

The allocation of silvicultural methods to be used to achieve the desired forest structure conditions (Table 21.1) suggests that even-aged management will be used as necessary to achieve the forests with mature and large trees, as well as the regeneration and pole-sized forests. Uneven-aged forest management practices will be used to facilitate the development of the other forest structure classes. Even-aged management also may be used to address forest health and problematic regeneration conditions, as well as for research and demonstration purposes.

**TABLE 21.1** Planned Distribution of Silvicultural Methods on the Jackson Demonstration State Forest

Method	Land Area (ac)	Land Area (ha)	Proportion of Forest (%)
No harvest <sup>a</sup>	1,350	546	3
Late seral development and older forest structure prescriptions	15,801	6,395	33
Uneven-aged management <sup>b</sup>	8,933	3,615	18
Uneven-aged management <sup>c</sup>	7,325	2,964	15
Uneven-aged or even-aged management <sup>d</sup>	12,788	5,175	26
Unclassified <sup>e</sup>	2,455	994	5
Total	48,652	19,689	100

<sup>a</sup> Old-growth groves, pygmy forest, cypress groups, conservation camps.

<sup>b</sup> Single tree or cluster (of trees) selection.

<sup>c</sup> Group selection or single tree/cluster selection.

<sup>d</sup> Single tree/cluster selection, group selection, variable retention, two-aged management, or one-aged management.

<sup>e</sup> Research areas (variable silvicultural treatments) and power line rights-of-way.

In response to public concerns, limits were placed on the use of even-aged management. The total area receiving any form of even-aged silvicultural treatments will not exceed 2,700 ac (1,093 ha) per decade, or 5.5% of the JDSF area. Clear-cutting will be conducted only where necessary for the purposes of research, demonstration, addressing forest health, or addressing problematic conditions for regeneration.

Herbicide use in forestry is often the subject of public controversy in California. The management plan describes in detail the measures required to minimize the use of herbicides. There are four management situations where herbicides will be used at the JDSF:

1. In road maintenance treatment of native vegetation.
2. In reforestation treatments that target native shrubs.
3. In the control of hardwoods to adjust the conifer/hardwood stocking ratio.
4. In the control of invasive weed species as part of an Integrated Weed Management program.

A total ban on herbicide use would compromise the research and demonstration value of the JDSF and could result in adverse environmental consequences, such as expansion of the area, on and off of the forest, occupied by invasive species. Herbicides and other vegetation control methods may be used without restrictions in research and demonstration projects. In an operational context, herbicides will be used only when no other feasible control methods are available.

## DISCUSSION AND CONCLUSIONS

California's Demonstration State Forests, and notably the JDSF, meet an important need to advance research and demonstration into sustainable forestry practices. This is particularly critical in helping address the pressures associated with a rapidly growing population, increasing demands on forest lands for recreation, forest products, environmental protection, and conversion of forest land to residential and other uses. Given the often controversial role of timber production in California, the JDSF fills an important role in helping create solutions to difficult and controversial environmental issues related to forest management.

The management plan has helped the Department to coordinate daily activities, to plan research activities, and to focus public discussions and involvement. This chapter could only describe the main elements of the JDSF management plan. More information about the JDSF, including the complete management plan and accompanying EIR, can be found using the Internet links provided at the end of the chapter.

### Sustainability Issues

The management plan specifies that the JDSF will continue to move toward a late-seral forest condition. There is some concern about growing the forest into a condition where the resulting logs are too large for local sawmills to process. There are currently two sawmills within a reasonable hauling distance from the JDSF that are capable of processing logs greater than 48 in (122 cm) in diameter. An annual harvest level that is approximately half of annual growth on the forest may also result in challenges for the creation and distribution of forest structures envisioned. The management plan will be updated over time to achieve a trajectory toward the forest conditions specified above in the Outcomes section.

### Plan Development Challenges

Developing the management plan took 6 years, exceeding the normal 5-year Board review interval. This led to logistical challenges as the regulatory and legal environment, and stakeholder representatives and interest, changed during the development of the plan. Developing the EIR took more time than developing the management plan itself, reflecting a climate of ongoing litigation during the development of the management plan and EIR.

The management plan was developed to reflect the best science pertaining to JDSF management. The science pertaining to many of the resources at the JDSF, in particular watersheds and threatened species, evolved during the development of the management plan, requiring re-analysis in some instances. In the case of the JDSF, characterized by rapid changes in public preferences, science, laws and regulations, there is clearly a premium on minimizing the amount of time spent on developing or updating a management plan.

### Plan Implementation Challenges

Because of the many resource values associated with coastal redwood forests, the JDSF and its management is the subject of considerable public interest. In 2001, the Dharma Cloud Foundation filed a lawsuit against two timber sales at the JDSF, alleging that the Department's 1983 management plan for the JDSF was out-of-date and therefore invalid. This effectively

halted all timber harvest operations on the JDSF along with its potential revenue. In November 2002, a new management plan and associated EIR for the JDSF was approved by the Board, and timber harvesting resumed. The Dharma Cloud Foundation along with Forests Forever then filed a new lawsuit against the Department in 2003, this time alleging that the EIR prepared for the management plan was inadequate, and sought an injunction on forest management activities. The judge ruled that the EIR should have been approved by the Board not the Director of the Department, the “regional setting” cumulative impacts were not sufficiently addressed, and the environmental setting was not adequately addressed. This lawsuit halted two active timber sales until the issues raised in the lawsuit were addressed and, again, effectively shut down all timber sales on the JDSF. The Department decided to rewrite the entire EIR, which was completed in November 2005. The EIR went out to public review for 45 days and public comments were addressed. A revised management plan was completed in 2007, addressing the judge’s directives. In January of 2008, the Board approved this management plan, and both the management plan and EIR were then sent back to the judge to clear the court case via a settlement agreement. Timber harvests finally resumed on the JDSF in the summer of 2009.

As part of approving the management plan, the Board authorized the formation of the Jackson Advisory Group (JAG) and charged it with reviewing the management plan. The 12-member JAG consisted of a wide range of stakeholders, from the principal of the Dharma Cloud Foundation, the original litigant against the Department, to timber companies and loggers. The JAG presented its report, *A Vision for the Future*, to the Board in 2011 ([Jackson Demonstration State Forest Advisory Group, 2011](#)). The Board adopted the JAG landscape allocations and associated goals as well as the general direction for research and demonstration and adopted a research governance process for the JDSF. As a part of the research governance process, the Board charged the Department with developing a research plan for the JDSF. The Department is presently completing a research plan and incorporating the Board’s findings into the management plan. The Board stated that the next planned full review of the management plan will occur in 2016 unless there are further changes that result from the research governance process. The set of documents consisting of the 2008 management plan, the JAG recommendations, and the research plan effectively constitute the management plan direction for the JDSF until the next scheduled Board review of the management plan in 2016.

## ADDITIONAL READING AND RESOURCES

This chapter represents a synthesis of the 2008 forest management plan for the Jackson Demonstration State Forest in California. To view the plan itself, please visit this Internet site, which was available on July 16, 2014:

[http://calfire.ca.gov/resource:mgt/resource:mgt\\_stateforests\\_jackson\\_mgtplan.php](http://calfire.ca.gov/resource:mgt/resource:mgt_stateforests_jackson_mgtplan.php)

The EIR for the Jackson Demonstration State Forest can be found by visiting this Internet site, which was also available on July 16, 2014:

[http://calfire.ca.gov/resource:mgt/resource:mgt\\_stateforests\\_jackson\\_deir.php](http://calfire.ca.gov/resource:mgt/resource:mgt_stateforests_jackson_deir.php)

If in the future the links to these sites appear broken, search the Internet using the title and the keywords provided.

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