A VISION FOR THE FUTURE

THE REPORT OF THE JACKSON DEMONSTRATION STATE FOREST ADVISORY GROUP

January 15, 2011

California Board of Forestry and Fire Protection

California Department of Forestry and Fire Protection

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Chapter 1. Introduction and Summary

Jackson Demonstration State Forest (JDSF) is a redwood and Douglas-fir forest of 48,652 acres located in Mendocino County, California. It starts near the coastal towns of Fort Bragg and Mendocino and continues 20 miles east. Most of the acreage was purchased by the state of California in 1947 and has been managed since by the California Department of Forestry and Fire Protection (CAL FIRE).

The Forest's management direction derives from state statutes and from policies set by the California Board of Forestry and Fire Protection. 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.

This report presents the recommendations of the Jackson Demonstration State Forest Advisory Group ("the JAG"). The JAG was formed in April of 2008 and charged with making recommendations on long-term management of JDSF to CAL FIRE and the Board of Forestry by January 2011.[1]

The results of the work of the JAG are remarkable on two counts.

First, the JAG has created an exciting vision for the future of JDSF. The vision includes:

- Creating a world-class forest research and demonstration center
- Developing older forest conditions across much of the landscape, including growing trees to their natural ages[2] in some portions of the forest
- Maintaining future options to shift land to different structural development goals
- Expanding public opportunities for camping, hiking, and outdoor education
- Maintaining and increasing timber harvests over time to support the local economy and to fund operations of the forest. The funding will support forest management, restoration of land and stream habitats, expanded recreation opportunities, forest research and demonstration programs, and enhanced public safety and resource protection.

Second, the JAG has achieved consensus to a degree some thought impossible on issues that had divided the community for over a decade.

The JAG brought together forestry professionals and managers, environmentalists, conservationists, recreationists, and forest researchers and scientists—thirteen members in all. Many members have technical knowledge about forests and forest management. Each member of JAG brings to it a unique and complex set of interests, values, knowledge, and perspectives.

On the one hand, the differing interests, experiences, and perspectives of JAG's members made reaching agreement on some issues difficult. On the other hand, these same factors helped inform the discussions in ways that ultimately led to reaching consensus on a number of challenging issues. The JAG was given just 2-1/2 years to accomplish the daunting task of developing consensus recommendations for the future management of JDSF.

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[1] The JAG has 13 members, plus a liaison to the Board of Forestry. JAG membership is provided in Appendix 1.

[2] Sometimes referred to as "restoring old growth", but in the 2008 Management Plan, old growth trees are defined as those existing prior to European settlement. To avoid confusion, This report sometimes uses the terms "old forest" and "growing trees to their natural ages" to refer to such restoration. In forestry literature, management for old forest development is termed "late seral development." This is the term generally used in the body of the report.

All members of the JAG supported the overall package of recommendations.[3] Moreover, every individual recommendation in this report is supported by a strong majority, and in most instances by all, of the JAG.

These consensus recommendations provide a framework for future of collaboration among the diverse parties and the successful operation of JDSF.

Reaching Consensus

From the beginning, JAG members generally agreed on the goals and objectives of the 2008 JDSF Management plan, as well as on a number of important issues:

- Timber harvesting should continue at levels sufficient, at a minimum, to support the operations of the forest
- Research and demonstration are important and need to be of high quality
- There should be a significant effort to explore the distribution and extent of older forest attributes across the Forest
- Recreation and aesthetics are important

Although there was much agreement on general goals, there were important differing viewpoints on the specifics of implementation. Background is provided here to enable readers to better understand how the JAG moved from disagreement to final agreement and why it is important for the recommendations to be considered as a whole, subject to subsequent review and analysis. The resolution of differing views required compromise. It was the balancing of differing interests within the overall package that made consensus possible.

The following identifies several areas of significant initial disagreement and describes key agreements and compromises that made consensus possible. Examples considered are:

1. What should be the management goals and methods for areas of the forest not designated for older forest development or for research or demonstration projects?

2. To what extent should areas designated for older forest development also be managed for timber production?

3. How much even-aged management (including clearcutting) would be desirable to provide the structural conditions needed to support the research and demonstration program?

The steps to resolving these differences are described below.

Issues in the Matrix

The JAG adopted the term “the Matrix” to refer to all areas of JDSF not in Reserves, the Older Forest Structure Zone, or Special Concern Areas. The Matrix areas are likely to be the major source of revenues to support forest operations. Matrix lands will be the primary areas allocated to research and demonstration projects that require treatments not compatible with the goals of the OFSZs, Reserves, and Special Concern Areas.

To manage the Matrix lands, early proposals were to use “light touch” or “thin from below” silviculture to continually grow stands to higher volumes and larger tree diameters, allow some

[3] See Appendix 9R for votes of individual members.

portion of trees to grow indefinitely (to old forest conditions), and to continue sustainable timber harvesting in perpetuity.

The initial proposals met with multiple concerns and objections. Some were concerned that a uniform management style across the landscape would not create sufficient diversity of conditions to support research and wildlife needs. Some members worried that if the trees got too big, the public would shut down logging. Others worried that the proposed approach would lead to lower harvests over time. Yet others were concerned that JAG would be applying an untested management method as a standard.

Agreements that led to developing consensus include:

- Creating carefully crafted guidelines for selection silviculture prescriptions in the Matrix that includes flexibility for varying site conditions to limit the risk of uniform application.
- Encouraging focused research and demonstration projects in the Matrix that use prescriptions other than the standard silvicultural prescriptions.
- Adoption of a 40-year term for JAG recommendations that, in effect, defers the decision on allowing trees to grow old to a later generation of managers and stakeholders.
- An agreement not to allow trees, other than old growth trees, to grow beyond the largest feasible size for harvesting during the planning period.
- Guidelines for approvals of research and demonstration to ensure that the integrity of such projects would be maintained.

Older Forest Development versus Late Seral Development

The 2008 Plan contains a band of older forest, termed the Older Forest Structure Zone (OFSZ) that runs primarily along the northern boundary of the eastern half of JDSF, with some smaller areas on the eastern boundary.

Many on the JAG felt that the functionality of the OFSZ for habitat could be improved by enhancing connectivity, keeping the general concept of the OFSZ as a band, and adding a north-south corridor to link with the Woodlands and Marbled Murrelet Late Seral Development in the southwest quadrant of the forest.

Debate occurred in JAG about how much of the additions to the OFSZ should be Older Forest Development Areas (OFDAs), in which sustained timber harvesting would be one priority, and how much should be in Late Seral Development Areas (LSDAs), in which older forest restoration would be the primary goal. Concerns were expressed about moving land into Late Seral Development because of loss of future harvest potential and reduction of the research and demonstration capacity of the forest.

Several factors led to JAG reaching a near-consensus on the division of added land between OFDAs and LSDAs. The 40-year planning horizon adopted by JAG helped create a pathway to consensus. Many of those wanting more late seral forest agreed that in the 40-year planning horizon there would be little difference in forest development between the two designations. Decision makers in the future would still have the option to shift areas from Older Forest to Late Seral Development with little loss of structural development.

The JAG also agreed that one component of the overall research and demonstration program should be research on the relative benefits of OFDAs versus LSDAs, and to apply the findings in future reviews of the allocations as new information becomes available.

Concerns over the impact of the OFSZ allocations on research and demonstration were alleviated by agreement on formation of a Research Planning Team, as part of the overall Research and Demonstration plan. The Planning Team would review these allocations in the context of recommending overall forest allocations to support the R&D program. The JAG also agreed that, when an analysis of the economic impacts of JAG landscape recommendations becomes available, the recommendations would be reviewed for possible revision.

After acceptance of these conditions, several larger proposed Late Seral Development areas were changed to Older Forest Development Areas. JAG added 137 acres of Late Seral Development, largely around old growth groves, in addition to designating for LSD 641 acres that had recently been harvested under Late Seral Development prescriptions agreed to in a prior negotiated settlement. With only a few exceptions, the final allocation recommendations were supported by all JAG members

Even-Aged Management

Another challenging area of debate was the issue of even-aged management, particularly in the context of providing diversity of structural conditions across the landscape. The main focus of debate was on the roles of diversity and use of even-aged silviculture in support of research and demonstration objectives.

The 2008 Management Plan proposed that even-aged management could occur on up to 2,700 acres per decade, as necessary to create a diversity of stand conditions for future research and habitat.

Largely because of the strong public sentiment against even-aged management, and the substantial even-aged habitat in surrounding commercial forests, general agreement was reached fairly quickly on restricting the use of even-aged management to research and demonstration. This did not resolve the issue.

Some JAG members and outside researchers felt it was important to do regular even-aged management so there would always be even-aged stands at different stages of regrowth for potential future research. Other outside researchers and members did not share this perspective and thought that even-aged harvesting should be done only for specific research projects.

This issue represented one of the most challenging issues for the JAG.

The final outcome was agreement that even-aged management would be tied to specific research and demonstration projects. Important factors in reaching this agreement were:

- Bringing in outside experts. Outcomes from a workshop of scientists confirmed early thinking by JAG to focus research on a limited number of “Centers of Excellence” and to design silvicultural allocations to support specific research programs.
- A decision to recommend establishing a Research Planning Team that would develop a Strategic Research Plan based on Centers of Excellence and recommend silvicultural allocations that would provide sufficient diversity of forest structure conditions to support the Plan.
- Agreeing that the entire forest was available for research, and that research-driven harvests could expand the extent of structural diversity across the landscape.
- Limiting even-aged management to specific research projects that would be peer-reviewed, restricted to the minimum size required for scientific validity, and for which funding was reasonably assured.

Keys to Consensus

The review above identifies the content of significant decisions and accommodations that made consensus possible, but how was it possible to come to these? Several aspects stand out:

- The charter established consensus as the goal, and this goal was always at the forefront of all discussions. Whenever an apparent impasse arose, members kept searching for common ground, often looking for creative solutions.
- The viewpoints of members were generally treated with respect by other members, even when they disagreed. Respect for others was crucial to moving people to middle ground.
- Consulting with outside experts when members couldn't agree. This was central to resolving several contentious issues.
- The identification by all members of their "core or bottom-line needs" and "red flags" made a crucial contribution. At a point when progress was stalled, core needs were put up against the list of proposed recommendations, and members could see that most core needs were being met. The JAG was then able to focus on meeting remaining core needs and removing red flags.
- Looking at the recommendations as a whole. Members became more willing to give ground in some areas when they felt their core needs had been met in other areas.
- The dedication and hard work of the members.
- Last but not least, Jackson Demonstration State Forest was large and "rich" enough so that it could accommodate the core needs of the diverse stakeholders.

Advisory Group Recommendations

Introduction

During the initial implementation period (not to exceed 3 years), the Jackson Advisory Group was charged with providing recommendations on a number of aspects of the 2008 JDSF Management Plan.

The Management Plan and associated Draft Environmental Impact Report are comprehensive, professionally-developed documents. The Plan sets out, in substantial detail, all aspects of mission, goals, current and desired conditions, research and demonstration programs, monitoring and adaptive management. Its numerous Appendices provide details of legislation, policy, regulations, and programs.

In the context of the JDSF mission and in support of its management goals, the charter[4] specifically charges JAG with commenting, by January 2011, on the following topics:

1. Desired future forest structure condition goals for the Forest and the forms, amounts, and spatial designation of silvicultural treatments to be applied to attain those goals.

2. Long-term goals for a wide range of forest structures, including but not limited to:

    a. The extent and general location of the areas to be dedicated to late-seral development and older forest structure, where timber production will be secondary to habitat development.

[4] The complete JAG Charter is in Appendix 2.

   b. The extent and general location of areas to be dedicated to old forest structure zones (OFSZs). The OFSZs will maintain or develop key old forest features. The OFSZs will be available for timber harvest.

3. The Management Plan's approach to (a) protecting residual old growth and (b) restricting the extent and conditions under which herbicides may be utilized to control native hardwoods.

4. The process of conducting a recreation users survey, establishing a recreation user group, and developing a new recreation plan for the Forest. This plan would indicate the desired extent and location of recreation areas, corridors, roads, trails, and facilities that will be managed to enhance the full spectrum of appropriate recreational opportunities given JDSF's management goals.

5. The need to modify other elements of the Management Plan, as requested by the Director.

This report presents JAG's recommendations in the context of the 2008 Management Plan. The appendices provide supplemental material to support recommendations found in the body of the report.

It is important to consider the recommendations as a whole. Although not every recommendation satisfies everyone, the complete package represents a balancing of interests that enabled reaching overall consensus.

Goals that Frame the Recommendations

The goals of the Management Plan, with some modifications, provided a comprehensive framework for the JAG's work. In making its recommendations, the JAG consciously strove to see that no one goal was pursued to the detriment of others and that the multiple goals of the forest were respected.

The Goals of the Management Plan listed in order, with an additional goal adopted by the JAG appended, are:

6. RESEARCH and DEMONSTRATION

7. FOREST RESTORATION

8. WATERSHED and ECOLOGICAL PROCESSES

9. TIMBER MANAGEMENT

10. RECREATION and AESTHETIC ENJOYMENT

11. INFORMATION, PLANNING, and STAFFING:

12. PROTECTION OF THE FOREST

13. MINOR FOREST PRODUCTS.

14. PROPERTY CONFIGURATION

15. EDUCATION and OUTREACH [Goal added by the JAG]

See Appendix 4 for the Goals as modified and adopted by the JAG.

Guiding Principles

Several key principles guided JAG's work. These included:

- **Redwood Forests as a World Treasure**: Redwood is an iconic species, and the redwood ecosystem is unique. JDSF is a pivotal component and unique research forest within this ecosystem.
- **Becoming a World Leader**: JDSF should become a recognized leader in innovative redwood forest management, research, demonstration, and recreation.
- **Public Trust and Collaboration**: The ultimate success of JDSF depends not only on the professional and scientific credibility and quality of its programs but also on the building of public trust and collaboration. Recommendations in this Report reflect the consensus view that the goals of the Plan can only be met with the involvement and support of all sectors of the public.

Qualifications to the Recommendations

In considering the JAG's recommendations, please keep the following in mind:

- The JAG recognizes and desires that all recommendations regarding allocations, research and demonstration, modified silvicultural approach, recreation, outreach, and other considerations be evaluated for their effects on forest revenues and costs.

  Such an evaluation requires an analysis of likely growth and yield under diverse constraints and scenarios. This analysis was not available for JAG in time to be considered with the necessary depth prior to the reporting date. As a result, some modifications may be necessary.

  JAG recommends that the analysis should be conducted early in 2011. Financial implications of this analysis must recognize the current national economic downturn, sustained depression of the timber industry, and low log prices.
- The JAG was requested to provide input on "Long-term goals for a wide range of forest structures..." Although we explicitly allocated areas for older forest structures, we did not set goals for "a wide range of forest structures" because these are intimately related to the design of the research program. The design of the research program was felt to require more expertise and time than that available to the JAG. The JAG has therefore recommended that a Research Planning Team be created to assist in developing a research plan and associated long-term allocations of forest structures.
- JAG recognizes that achieving the long-term vision outlined in this Report will take considerable time, organization, and funding. Implementation of the recommendations, if adopted, may need to be staged over time, depending on the funds available.
- JAG also recognizes that moving the Forest towards a higher proportion of older forest structures and enhancing the aesthetic and economic value of sustainable, annual timber sales by increasing the size and quality of redwood trees will also take time. Our immediate goal is to recommend practices that will set forest development on trajectories towards attaining the Plan's stated goals.
- Forest management entails long-term planning that is responsive to new knowledge and experience. JAG recommendations are intended to provide a long-term plan with a 40-year planning horizon, but the JAG also realizes that our plan will require periodic revisiting to

examine its provisions in light of advances in knowledge and changes in both ecological and societal factors.

- Some of our recommendations contain the words “will” and “shall” when the intent of the group was that the related element of the recommendation be mandatory. However, we recognize this report constitutes a set of recommendations and that the Board of Forestry and Fire Protection has the responsibility and authority for determining provisions of the JDSF management plan.

Recommendations Overview

The JAG’s recommendations, taken together, form an integrated package designed to enhance the capacity of JDSF to become a world-class research and demonstration forest. The recommendations are also designed to foster strong public support and a sense of ownership. To attain this, the recommendations aim at maintaining or increasing the sustained production of timber, restoring forest habitats and structures, enhancing recreational opportunities, and developing stronger educational and outreach programs.

The most far-reaching recommendations concern landscape management and development of a framework for developing research and demonstration programs. Brief summaries of these components are included here. Complete summaries are at the beginning of the chapters on these components.

Summary of Recommendations

(For complete recommendations, see appropriate sections of the Report)

Landscape Management

Planning Horizon: Limit JAG allocation and silviculture recommendations to a 40-year planning horizon. Reasons include higher degree of confidence in modeling projections, and to achieve a higher degree of consensus for the Late Seral allocations.

Matrix Forestry: A set of goals and guidelines for applying single-tree selection silviculture at JDSF, including group selection under limited circumstances, to be applied on areas of the forest not designated for Older Forest Structure, Reserve, or Special Concern, and when no research and demonstration project is proposed.

Older Forest Structure Zone: Allocate more Older Forest Structure (OFSZ) to fulfill the Goals and Guidelines of the Management Plan and to provide more substantial buffering for old growth groves; to recognize the negotiated litigation settlement regarding two Timber Harvesting Plans; to provide strengthened contiguity for the Older Forest Structure Zone; and to create a more robust north/south Older Forest Structure corridor. Specific Goals and Guidelines apply.

OFSZ Components: Old Growth Groves, Reserves, Late Seral Development (LSD) Areas, and Older Forest Development (OFD) Areas. Logging is permitted in LSD Areas and OFD Areas to differing degrees.

> **Late Seral Development**: Areas to be managed for goals identified in the Management Plan. Predominantly use single-tree selection with additional provisions applied. LSD Areas will, at some point, reach a stand condition where manipulation is no longer necessary.
>
> **Older Forest Development**: Areas to be managed for goals identified in the Management Plan, including timber harvest of trees of all ages and sizes. Utilize single-tree and group selection, and commercial thinning, with additional provisions applied.

Requested Research: As a component of the overall research and demonstration program, conduct research to determine whether Late Seral Development provides significantly more benefits than does Older Forest Development, which allows more timber harvest. The intent is to provide a scientific basis for discussions and to help guide future decision makers.

Other Reserves: Designated to recognize and study special attributes, forest stand types or particular stand histories to assure management consistent with maintaining them for research and demonstration, and other purposes.

Hardwood Study Reserves: Designation of a specific set of hardwood-dominated areas to provide habitat and to study the ecology and appropriate management of hardwoods in the landscape.

Allocations: Fourteen allocation changes include Other Reserves, Older Forest Structure Zone Reserves, Late Seral Development Areas, and Older Forest Development Areas.

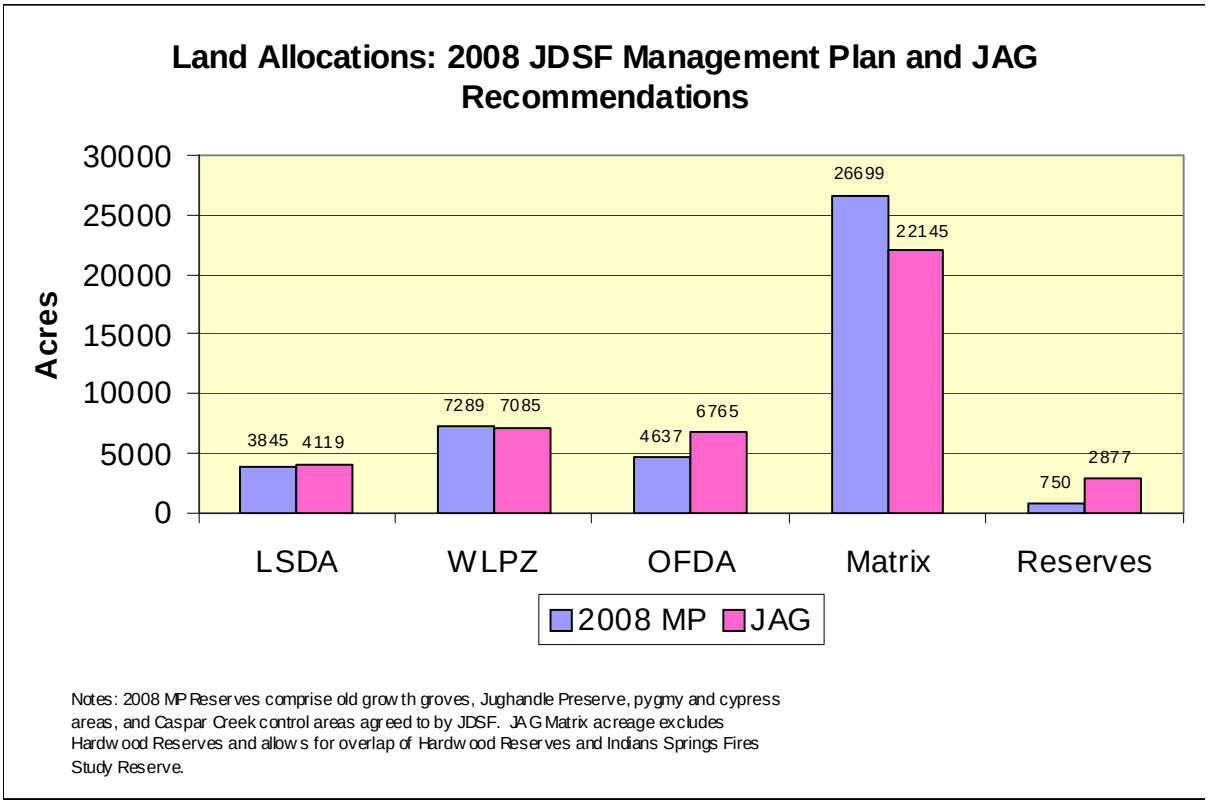
Woodlands STA: Close cooperation and early information sharing between JDSF and California State Parks whenever management activities are considered for the STA.

Other Management Issues:

- Campground Buffers
- Buffers for Old Growth Trees Outside Reserves
- Even-aged Management
- Information to be provided to assist JAG THP Review

JAG Recommendations Compared to 2008 Management Plan Allocations

The figure below summarizes the allocations recommended by JAG and compares them to those in the 2008 JDSF Forest Management Plan. See Appendix 5-C for allocation details.



Research and Demonstration

JAG is recommending a Research-Oriented Management Framework that would move JDSF toward becoming a world-class research and demonstration forest. The main elements of this framework include:

- Organizing research and demonstration within up to three Centers of Excellence that would integrate multi-disciplinary research in a manner that would resolve complex (often difficult) management challenges
- Developing a strategic research and demonstration agenda and research-oriented landscape allocation that incorporates a regional perspective and the needs of stakeholders in scientific, landowner and conservation communities
- Assurances that the entire forest is available to Research and Demonstration while providing guidelines for silviculture constraints in support of landscape objectives
- Establishing an Experimental-Basis for Management that would leverage management activities as opportunities to test hypotheses
- Considerations for integrating the framework with monitoring and adaptive management practices
- Implementing the program through:
    - Convening a Research Planning Team (short-term consultant) to develop the Strategic Research Plan and associated land allocation.
    - Establishing a Redwood Research Group (science staff and mangers) to administer the program.
    - Forming a Regional Research Consortium of landowners and agencies to guide continued collaboration

Recreation

- To the extent feasible, incorporate the recommendations of the recently formed JDSF Recreation Task Force for expanded low-impact recreation and education in the new Recreation Plan for JDSF.
- As soon as possible, hire a single contractor to develop a recreation plan and associated user survey.
- Prior to the completion of the Recreation Plan process, proceed with recreation maintenance and improvements to existing sanctioned trails and facilities as needed or as recommended by the Recreation Task Force.
- JDSF staff should develop, in coordination with the JAG, situation-appropriate guidelines, including measurable guides where appropriate, to apply to Timber Harvesting Plans for protecting recreation resources wherever located in the forest and for protecting aesthetic resources along highly traveled roads (e.g., Hwy 20 and Road 350).

Economics

- Identify cost centers and develop quarterly profit-loss statements with allocation to each based on revenue sources and time or supplies spent in the categories.
- The timber sale program should reflect the standards for silviculture consistent with JAG landscape allocation recommendations.

- If feasible, and gradually as market conditions allow, a three-year “Prudent Reserve” fund should be established with the funds to be invested in a money-market-type fund. Interest earned should be applied to state forest programs.
- A year-by-year projection of individual research project costs should provide for annual budget allocations as a line item.
- JDSF-initiated research projects should use the above recommendation for annual and future budgets, and other projects should be required to provide long-term projection of costs with assurance of budget support by the project initiator.
- JDSF should continue to support local utilization of materials produced in nearby forest and saw mill operations in order to raise net values from timber sales.
- Capital support for basic infrastructure should serve all or major portions of JDSF and be separate from direct operation of an individual timber sale.
- Consistent with the applicable authority of law and policies of the Board of Forestry, JDSF should charge fees for forest uses, other than and in addition to, the sale of forest products.
- CAL FIRE should obtain professional grant-writing capability as a way to gather funds for the science program.

Herbicides

Although the current use of herbicides on the Forest is very limited, we recognize public sensitivities and concerns regarding the application of herbicides – especially on public lands – associated with potential or perceived impacts on human and wildlife health, water quality, and aesthetics. Because of these concerns the JAG recommends that, in addition to provisions in the JDSF Management Plan, particular attention be given to the following:

- Explore alternative treatments with a goal of eventually eliminating herbicide utilization on JDSF.
- All significant herbicide applications/programs should be reviewed for their potential to contribute to addressing the objectives and questions of the research, demonstration, and monitoring programs.
- All scheduled herbicide applications should be posted in the field and at the JDSF office to enable the public to be aware of areas to be treated. The minimum posting requirement will be for a period extending an order of magnitude beyond the label posting requirement.
- In particularly sensitive habitats and public use areas, such as campgrounds, roads, and trails, an enhanced level of evaluation should be utilized.
- All herbicide use should be limited to non-aerial applications using minimum effective doses and concentrations recommended for treatment success.
- All operations should be prepared and conducted recognizing the need to minimize, to the extent feasible, the development of conditions that potentially lead to the introduction of invasive weeds or excessive hardwood regeneration.
- As with all research and demonstration on the Forest, use and evaluation of herbicide applications should be incorporated in public outreach and information programs.
- JAG recognizes the important ecological values of hardwoods and supports the JDSF Plan goal of maintaining hardwoods on the forest at historic levels. JDSF should establish guidelines for what level of hardwood cover will trigger use of herbicides for their management.

- With respect to invasive plants, JAG supports the careful and limited use of herbicides to control their development in context with the Integrated Weed Management Program.

Outreach

- Move ahead with the many provisions in the 2008 Management Plan.
- Provide funding and facilities that ensure the development of a high-quality and effective outreach and public education program.
- Provide grants and technical assistance to schools and colleges to establish study areas within existing and proposed allocation areas to enable successive classes to gather time-series data on ecosystem dynamics and management.
- Form a collaborative Outreach Consortium that fosters complementary outreach and education interests, goals, and programs among interested parties.
- Develop an imaginative, high-quality JDSF Website that provides information to the public on all programs, activities, and publications on JDSF.

Chapter 2. Landscape Management

I. Introduction

The Charter of the Jackson Demonstration State Forest Advisory Group (JAG) provides broad direction for JAG to review the 2008 Management Plan and make recommendations regarding landscape allocations and management activities. Among other charges, JAG was specifically asked to review goals for future forest structure, silviculture to attain those goals, and the extent and location of areas to be dedicated to late seral development and older forest structure. (See Appendix 5A for Charter excerpt)

Early in the JAG process, members volunteered for and were appointed to committees, including the Landscape Committee, which did extensive preliminary work. The committees met regularly, often once a month between regular JAG meetings, and JAG Chair Dr. John Helms often participated. Periodically, the committees brought recommendations to the full JAG for discussion and feedback. Each recommendation of a committee was reviewed, discussed, often modified, and then adopted by the full JAG. The recommendations in this Report are those of the full JAG. The process leading to these recommendations is described below.

JAG has asked staff to project potential changes in timber harvest attributable to JAG's allocation and silviculture recommendations compared to timber harvest proposed by the 2008 Management Plan. When the projections are available, JAG will review them to determine whether modifications to its recommendations are warranted.

Background

For a number of months, meetings revolved around a general discussion of desired future conditions as they related to the many Management Goals for JDSF that are articulated in the 2008 Management Plan. Discussions also often revolved around how management might be modified to better satisfy stakeholders.

A number of themes and principles developed:

- Assuring harvest levels to sustain the operations of the forest
- Providing a wide variety of Research and Demonstration opportunities
- Satisfying key concerns of stakeholders
- The extent to which it is possible and desirable to mimic natural processes given the many mandates under which the forest operates
- The place of even-aged management outside the Research and Demonstration context
- How to best fulfill the Goals and Guidelines articulated in the Management Plan
- Other specific issues identified over time or within the Charter

The JAG spent a great deal of time considering whether and how to develop a default silviculture that could be used to guide timber harvest throughout the areas of the forest not designated for special treatment and when no particular research or demonstration project was proposed. JAG recognized it was particularly important that any broadly applied silviculture at JDSF must assure harvest volumes sufficient to support the operations of the forest. With these considerations in mind, JAG created the Matrix Forestry provisions as described in Section II of

this chapter. The rationales and development process are more thoroughly discussed in that section, and the context for those decisions is described in Appendix 5D.

The JAG identified locations where it believed that a reallocation toward more Older Forest Structure (OFSZ) was desirable to fulfill the Goals and Guidelines of the Management Plan. These recommendations were generally made to provide more substantial buffering for old growth groves; to recognize the negotiated litigation settlement regarding two Timber Harvest Plans; to provide strengthened contiguity for the Older Forest Structure Zone; and particularly to create a more robust north/south Older Forest Structure corridor. The Goals and Guidelines for OFSZ silvicultures and specific allocation recommendations are articulated in Sections III and IV of this chapter.

To achieve a higher degree of consensus for the Late Seral allocations, JAG is recommending that allocations are on a 40-year interim basis. The recommendation includes prioritization of research to determine whether the Late Seral designation provides significantly more benefits as habitat than does the Older Forest Development designation, which allows more timber harvest. The intent of the analysis is to provide a scientific basis for some of the more contentious discussions of the JAG process and to help guide future decision makers.

The JAG identified a number of areas where there were opportunities to recognize and study special landscape attributes, forest stand types, or particular stand histories and to assure that management would be consistent with maintaining those special attributes for research and demonstration. These areas are identified in Section V of this chapter.

The JAG identified a set of hardwood-dominated areas with replicates in each major region of the forest to establish a land base from which to study the appropriate management of hardwoods in the landscape. These areas and the rationale for designating them are also discussed in Section V.

Management of the Woodlands Special Treatment Area (WSTA) presents a particular set of challenges because of the unique history of its transfer by the federal government, legal constraints, and the high-visitor-use state park that the WSTA surrounds. Section VII of this chapter provides a set of recommendations designed to augment the management measures provided in the 2008 Management Plan for the WSTA.

Section VIII provides recommendations regarding a number of specific management issues identified either by the JAG or the Charter for review. These are:

- Campground Buffers
- Buffers for Old Growth Trees Outside Reserves
- Even-aged Management
- Presenting THPs to JAG for Review

Section IX of this chapter contains maps identifying the landscape-allocation-related recommendations of JAG.

Appendix 5, Sections A-D provides more detailed information and background material related to the recommendations in the Report.

Each recommendation was taken up and discussed in detail by the full JAG. In many instances, initial proposals were modified. The recommendations in these sections represent the landscape- and allocation-related recommendations of the full JAG. After each specific recommendation, a chart will indicate the degree of support. The votes on the landscape allocations are collected in Section VI. In the few instances where consensus was not achieved, the specific concerns leading to the disagreement are noted. A detailed tabulation of each JAG member's vote on each recommendation is included as Appendix 9.

Overall, JAG kept a sharp focus on maintaining the availability of timber harvest volume adequate to sustain the operations of the forest and to implement the Management Plan. JAG has asked staff to project potential changes in timber harvest volume from its recommendations. When this information becomes available, JAG will consider whether modification of its recommendations is warranted.

The Landscape Recommendations work together with the other chapters of the Report and the 2008 Management Plan to fulfill the charge given to JAG by the Charter.

II. Matrix Forestry

A. Matrix Lands Defined

JDSF "Matrix Lands" are those lands not allocated to Older Forest Structure Zones (Older Forest Development, Late Seral Development, Old Growth, and Reserves), or other Special Concern Areas defined in the Management Plan and are shown in Map B. Matrix lands will be the primary areas allocated to research and demonstration where projects require treatments not compatible with the goals of the OFSZs, Reserves, and Special Concern Areas.

B. The Development of Matrix Forestry

During the early months of the JAG, and subsequently in the committee meetings, there were a series of discussions about how the forest resources of JDSF could be managed to fulfill the legal mandates and goals of the forest while meeting the needs of the widest possible set of stakeholders. Keeping in mind the discussions in the full JAG, committee members explored to what degree it would be possible to mimic natural processes while conducting timber harvest sufficient to meet financial requirements and ensuring the broad set of stand conditions necessary to facilitate research and demonstration. This discussion included a review of the size and frequency of naturally occurring forest openings in the redwood region.

By September 2009 the JAG had created a draft set of silviculture Goals and Objectives intended to be applied to timber harvest not associated with research and demonstration in areas of the forest that were not allocated for Older Forest Structure or as Special Concern Areas. The method under consideration had as its goal the sustainable harvest of large, high value trees while creating multiple aged stands and complex structures similar to those found in older uneven-aged forests within the range of the coast redwood/Douglas-fir forest type.

To get feedback from redwood region foresters who were known as practitioners of this type of silviculture, JAG organized a field day where a group of invited foresters visited four sites chosen by JDSF staff. The purpose was to better understand the range of possibilities, benefits, limitations, advantages and disadvantages of such a designation for JDSF. The primary emphasis was to compare different approaches to this goal and the types of growth and yield projections that could be applied. JAG also solicited from this group information about research and demonstration projects that they had found helpful, those they would have liked to have seen in the past, and the sort of research and demonstration they thought would be beneficial going forward. Extensive stand history was provided for the field sites.

The all-day field trip was held on October 24, 2009, with JAG member Linwood Gill (RPF # 2491) hosting the field day and providing the introduction and background on behalf of JAG.[5]

Four sites were introduced:

- Site 1: a second growth, hardwood challenged stand
- Site 2: a 65 year old unmanaged stand
- Site 3: a 120 year old unmanaged stand and
- Site 4: a 120 year old stand with two entries

Participants were asked to consider each of the stands and reflect on the maximum tree size, the number of age classes, growth and yield projections, wildlife considerations, species diversity and numerical targets for snags and logs. By the end of the day, the foresters had concluded that the silviculture they practiced, which was being proposed for general application at JDSF, could be productively applied to each of the stands presented in the field. JAG members were energized by the field visit, and continued to develop and refine what came to be known as Matrix Forestry.

Research and Demonstration in the Matrix

To ensure that the needs of the Research and Demonstration program for varied stand conditions would be met, JAG adopted the principle that R&D needs would take priority over the application of Matrix Forestry as necessary to implement approved R&D projects.

Forty-year Planning Horizon

In the course of the refinement process, a divergence of views developed within JAG over whether or not to designate some trees within Matrix acres to be indefinitely retained. In part to resolve this issue, the JAG has chosen to restrict its management recommendations to a 40-year planning horizon. The 40-year time horizon, in effect, defers the decision on allowing some trees to grow to their natural ages to a later generation. The Matrix Silviculture recommendations of the JAG ensure that an ample number of larger trees will be available in 40 years to grow to old ages. Adopting the 40-year planning horizon permitted those with differing views on old-tree retention to agree on Matrix silviculture recommendations.

Modeling

JAG has asked staff to project potential changes in timber harvest attributable to its recommendations compared to timber harvest proposed by the 2008 Management Plan. When the projections are available, JAG will review them to determine whether modifications to its recommendations are warranted.

The following sections outline the details of Matrix Forestry as JAG recommends it be applied both within the context of research and demonstration and when no particular research and demonstration project is proposed.

[5] Attending were: Greg Blomstrom, Mike Jani (JAG), Bill Libby, Fred Euphrat, Forest Tilley (JAG), Mark Andre, Jere Melo (JAG), Marc Jameson (staff), Linwood Gill (JAG), Steve Butler, Pam Linstedt (staff), Nick Kent, Pascal Berrill, Mike Faye, Mike Liquori (JAG), Steve Zuieback (JAG facilitator), Mike Anderson (JAG), Steve Staub, Russ Henly (staff), Lynn Webb (staff), Greg Giusti, Craig Blencowe, Bill Hesler, Linda Perkins (JAG), Kathy Bailey (JAG), Richard Wilson, Ed Tunheim, Chris Browning, Henry Leibetz, Wally Stall, Lindsey Holm, Dan Porter (JAG), Vince Taylor (JAG), and Gerry Garvey.

C. Silviculture Goals and Guidelines for Harvests in Matrix Lands not Associated with Approved Research and Demonstration

Goals (to be implemented together as a whole)

- Allow and encourage research and demonstration projects throughout the Matrix.
- Manage the forestland at JDSF that is not included in Special Concern Areas, research and demonstration projects, or otherwise designated for a special status to develop a stand component of large, old trees that will be used for harvesting valuable timber and maintaining habitat as well as to provide a landscape that the community can feel good about.
- Use a variety of silviculture techniques and document stand responses to treatment.
- Maintain or increase timber harvest revenue over time, assuming reasonably normal economic conditions.
- Recognize and plan for aesthetic values.

Guidelines

Harvest on matrix lands will utilize single-tree selection, pre-commercial thinning, commercial thinning, and group selection as defined in the Forest Practice Rules with the following provisions and conditions applied. These conditions are to be addressed simultaneously and as a whole.

- Manage for stand components of larger diameter harvest trees.
- Favor redwood where appropriate.
- While protecting other forest resources, grow a component of trees in each stand toward the maximum size that can feasibly be harvested and milled without undue environmental impact to the site.[6]
- Promote the growth of the larger and better phenotypes of conifers and hardwoods while maintaining and enhancing structural diversity for wildlife needs at the stand and landscape level.
- Retain old growth trees as defined in the JDSF Management Plan.
- Where no old growth trees are present, retain a component of dominant conifers, hardwoods, or both within each THP area outside the WLPZ for development of old forest structure across the landscape for at least the next 40 years.
- Depending on the planned reentry period, the percentage of basal area removal should range from 25-40%.
- Promote forest health and adequate regeneration that is free to grow for future harvest.
- Where stand conditions are such that adequate regeneration cannot be achieved by single-tree selection, small group openings should be used. Openings should be kept as small as possible, typically not greater than one and a half times dominant tree height in any direction, but not to exceed 2 acres. As the size of the openings increases, individual

[6] Factors affecting feasibility include, but are not limited to site slope, yarding method, equipment access, mill utilization, and others. In 2011, depending on specific conditions, this may be approximately 48-72 inches DBH, but this is only an estimate and is likely to change over time. The JAG recognizes that as trees get bigger, the public may resist harvesting them, but it is JAG's intent that in the matrix area these trees will be available for harvest.

and/or small clusters of trees should be retained within the openings to provide desired structural characteristics.

- In stands historically dominated by conifers, and where previous management or fire occurrence has resulted in hardwood-dominated stands, exceptions may be made to the standard Matrix Silviculture Guidelines. Exceptions must be approved by the JAG upon recommendation of the Forest Manager.

Table 2.1.

Support				Disagreement			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
	10	1	2				

For individual votes of members, see Appendix Table 9.1 in Appendix 9A.

D. Silviculture in a Research and Demonstration Context within the Matrix

Silviculture other than that described in Section II (C) above, including even-aged management, is expected to be a continuing component of operations in the Matrix lands of JDSF within the context of a professionally designed research and demonstration program. Initially, an evaluation of these proposed harvests will be made by JAG until alternative review processes are developed.

In the period prior to the development of the full Strategic Research Plan and Structure, harvests in the Matrix implementing other than Matrix Silviculture will only be conducted in the purple-blue areas of Management Plan Map 5, and only for research projects that meet the Guidelines for Silviculture in a Research and Demonstration Context within the Matrix. These Guidelines are located in Chapter 3 (Research and Demonstration) of this Report.

Table 2.2.

Support				Disagreement			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
	10	1	2				

For individual votes of members, see Appendix Table 9.1 in Appendix 9A.

III. Older Forest Structure Zone

A. Definition and Purpose

The OFSZ is a generally contiguous area that includes Old Growth and other Reserves, Late Seral Development Areas (LSDAs), and Older Forest Development Areas (OFDAs). Harvesting is permitted within LSDAs and OFDAs to the extent that is consistent with their designated goals (see: Definitions).[7]

[7] Clarification To Distinguish the Older Forest Structure Zone from Older Forest Development: There has been some confusion regarding the way the 2008 Management Plan uses the terms Older Forest Structure Zone and Older Forest Development. The following explanation is best understood when looking at Management Plan Map Figure 5. This Map indicates an area outlined in red identified in the key as Older Forest Structure Zone. A subset of this red-outlined area is dark green to indicate Late Seral Development (LSD); within most LSD areas is a very dark olive area that indicates Old Growth Groves (OG). The extensive cross-hatched areas within the OFD are not keyed separately. This cross-hatching indicates Older Forest Development Areas (see Management Plan p 70). Separately, an area in the SW corner of the forest identified with a distinctly different kind of crosshatching indicates Marbled Murrelet/Late Seral Development.

The purpose of the OFSZ is to produce structural characteristics of older forest, which include large trees, snags, down logs, multiple canopy layers, and a high level of structural diversity. A key feature is the connectivity of the OFSZ across the Forest.

The portions of this zone available for timber harvest will be managed on an uneven-aged basis to recruit these structural conditions and wildlife habitat elements; to coincidentally grow and produce timber through careful thinning including, in some allocations, periodic replacement of large trees; and to provide recreational opportunities.

B. Research and Demonstration within the OFSZ

Research and Demonstration within the OFSZ are conducted consistent with the management goals and guidelines recommended for each component of the OFSZ.

C. Recommendation

JAG is recommending an expansion of acreage to be designated Older Forest Structure Zone, primarily via an increase of acreage designated Older Forest Development, which is a subset. (see Maps A and B)

D. Rationale for Augmenting the Older Forest Structure Zone (OFSZ)

The JAG Charter requests recommendations regarding the Older Forest Structure Zone and the extent and location of Late Seral Development Areas and Older Forest Development Areas. In this context, JAG reviewed the relevant goals in the Management Plan.

Goal #2 of the 2008 Management Plan is "Forest Restoration." Within that Goal, the first two Objectives are:

- Increase the amount of older forest structure and late seral forest available for terrestrial wildlife, including areas adjacent to aquatic habitats
- Improve habitat connectivity and reduce forest fragmentation, including the concepts of corridors and contiguous habitat

Additionally, Page 70 of the Plan states: "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…. The [OFSZ] will have high value for research concerning topics such as restoration of older forests and the ecological processes associated with older forests. It will also improve the long-term conditions for wildlife, particularly species that prefer older forests…."

The JAG reviewed the OFSZ allocations in the Management Plan in relation to the Goals and Objectives and the purpose of the OFSZ as stated on Page 70 and elsewhere in the Plan and concluded there is justification to recommend augmenting the OFSZ. Particularly, the north/south corridor appeared to be significantly less robust than the east/west gradient, and the desired contiguity was absent in a number of instances. Additionally, the JAG concluded that the older forest attributes in some of the forest's oldest second growth stands could be leveraged to create a more functionally effective OFSZ.

In its deliberations, JAG was mindful that increasing the OFSZ would, over time, affect the potential volume available for timber harvest. This effect would mainly come through the designations of Late Seral Development and Reserve. By contrast, the Older Forest Development designation provides a high level of flexibility for timber harvest so the OFD allocations may not have a negative effect on harvest outcomes during a 40-year planning horizon. In this period, even the Late Seral designation is likely to provide significant timber yield. JAG focused primarily on a 40-year planning horizon because, among other reasons,

anticipating outcomes over that period seemed relatively reliable compared to trying to predict results over a longer term.

To achieve a higher degree of consensus for the Late Seral allocations, JAG is recommending that research be conducted to determine whether the Late Seral designation provides significantly more benefits than does the Older Forest Development designation, where more timber harvest is permitted. The intent of the analysis is to provide a scientific basis for some of the more contentious discussions of the JAG process and to help guide future decision makers.

Determining OFSZ Allocations

Using stand maps and other tools provided by staff, the JAG considered a variety of options. Early on, the principle was established that boundaries of allocations would be made based on natural features of the landscape, including streams, ridges, existing stand boundaries, and roads (where appropriate). This principle guided how allocation boundaries were crafted.

JAG or members working in subcommittee visited the areas proposed for inclusion and refined recommendations. Proposals were carefully considered and in many cases were revised. Some proposals were dropped and the boundaries of others were changed.

After many votes, modifications, and in some cases reconsideration to raise the level of consensus, the full JAG adopted the recommendations presented in this report. These are outlined in detail in the following sections.

IV. Components of the OFSZ and Recommendations

A. Older Forest Development

Goal

The goal of Older Forest Development is to manage for structural characteristics of an older coast redwood forest, which include large old trees, snags, down logs, multiple canopy layers, and a high level of structural diversity while allowing for timber harvest of trees of all ages and sizes.

These areas will provide opportunities for research and demonstration that will benefit forest ownerships with an interest in wildlife habitat, aesthetics, and long-term sustainable production of forest products.

Guidelines for Timber Harvest in Older Forest Development Areas

Harvest shall utilize single-tree and group selection, and commercial thinning as defined in the California Forest Practice Rules with the following provisions and conditions applied. Site-based silvicultural prescriptions should be made based on stand condition at the time of harvest. The guidance below should not limit innovative forest management as new information becomes available on older forests.

- Manage stands under an uneven-aged silvicultural system to recruit and retain older forest structural conditions and wildlife habitat elements identified in the Goal, and at the same time, to grow and produce timber through careful thinning and periodic replacement of large trees.
- Short-term, emphasis should be on favoring development of the redwood component of the stand over the Douglas-fir component, if appropriate, and reducing competition between co-dominant crown classes. Longer term, retention trees, should be determined

based on unique structural characteristics and their contribution to horizontal and vertical diversity as well as potential future timber production.

- Depending on the planned re-entry period and site specific conditions, the percentage of basal area removal should range from 25-40%. It is anticipated stand management entries would be approximately 15-25 years apart.
- Where stand conditions are such that adequate regeneration cannot be achieved by single tree selection, group selection should be used. Openings should be kept as small as possible, typically not greater than one and a half times co-dominant tree height in any direction, but not to exceed 2 acres.
- As the size of the openings increases beyond one-half acre, individual and/or small clusters of trees should be retained within the openings to provide desired structural characteristics.
- Any timber operation should take care to maintain standing snags and large woody debris on the forest floor and to promote development of these features across the forest.

Constraints

- Retain old growth trees as defined in the JDSF Management Plan.
- While giving consideration to the capacity of the site, 10-20% of the post-harvest conifer basal area will be comprised of trees over 40" diameter at breast height (DBH). Where this condition cannot be met: 1) no trees over 40" should be removed, unless under special circumstances; and 2) no more than 50% of the stems over 30" DBH should be removed. Special circumstances may include, but not be limited to, such things as individual sprout clumps that have 2 or more trees 40" or greater, larger diameter trees that are in the intermediate crown class, or where removal of such tree would have less impact on the residual stand or reduce breakage.
- There should be no upper limit of tree diameter that may, or may not, be harvested.

B. Late Seral Development

Goal

The goal for areas designated for Late Seral Development is to manage for structural characteristics of older, mature forest, which include large old trees (greater than 150 years), large snags, large down logs, deformed trees, multiple canopy layers, and a high level of within-stand variability and both vertical and horizontal structural diversity.

These areas will provide research sites to explore creation of late seral redwood forest via passive and active management.

Guidelines for Timber Harvest in Late Seral Development Areas

The portions of this zone available for timber management are to be managed on an uneven-aged basis to recruit the structural conditions and wildlife habitat elements identified in the Goal. 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.

Harvest on Late Seral Development Areas will predominantly use single-tree selection as defined in the Forest Practice Rules with the following provisions and conditions applied. Precise silvicultural prescriptions should be made based on site specific conditions. The

guidance below should not limit innovation as new information becomes available on late seral redwood forests.

- Prescription emphasis will focus on: 1) accelerating the growth of dominant and co-dominant trees into larger size classes, 2) retaining and developing other basic elements of late seral conditions such as deformity and decadence, 3) retaining trees of various vigor to maintain an on-going process of dead-wood elements recruitment, 4) Minimizing regeneration so that it is similar to natural levels in late seral stands, 5) developing a complex canopy structure.
- It is anticipated stand management entries would be approximately 20 to 30 years apart.
- When thinning groupings or clumps of redwood, thin to variable levels to promote random stem distribution and variable growth responses. Generally avoid harvest of isolated redwoods.

Constraints

- Retain old growth trees as defined in the JDSF Management Plan.
- [This constraint is to be applied for modeling purposes only and not as an actual management constraint: While giving consideration to the capacity of the site, at least 10-20% of the post-harvest conifer basal area will be comprised of trees over 40" diameter at breast height (DBH). Where this condition cannot be met: 1) no trees over 40" should be removed, unless under special circumstances; and 2) no more than 50% of the stems over 30" DBH should be removed. Special circumstances may include, but not be limited to, such things as individual sprout clumps that have 2 or more trees 40" or greater, larger diameter trees that are in the intermediate crown class, or where removal of such tree would have less impact on the residual stand or reduce breakage.]
- About 10 percent of the clumps should remain un-thinned to promote slow tree growth, high quality trees, and enhance heterogeneity in stand structure. About 10 percent of the clumps should be heavily thinned to create patchy diversity.
- Removal of entire clumps should be used sparingly to mimic natural disturbance events.

C. Reserved Old Growth Groves

There are 459 acres in ten Reserved Old Growth Groves as identified in the 2008 Management Plan on Page 196 and mapped in Map Figure 5, Special Concern Areas. These areas will not be harvested.

JAG proposes no change. Old Growth Groves are included here because they are a component of the Older Forest Structure Zone.

D. OFSZ Reserves

Two Reserves are proposed as components of the Older Forest Structure Zone: Camp Three and Caspar Creek. Camp Three and Caspar Creek are no-harvest areas.

E. Specific OFSZ Recommendations

The JAG is recommending augmentation of the Older Forest Structure Zone for the reasons outlined in Section III (E). Allocation recommendations are specifically described in this section and are arranged more or less by their geographical location, beginning from the east. The numbers refer to the identifying numbers in Maps A and B of this report. Also, see Appendix 5C.

1. **Highway 20 East** / Old Forest Development (OFD) / 221 acres
   Areas adjacent to the old growth grove located along Highway 20 just before it turns sharply west after traveling steeply downhill from the east. Contiguous with a strip of already designated OFD along the highway that extends into the forest to the north to connect with #2, below. Buffers the old growth grove.

2. **Dresser Grove, N. James Cr.** / Late Seral Development (LSD) / 76 acres
   Extends already designated Late Seral adjacent to Dresser Grove to further develop old forest characteristics and buffer the existing old growth. Contiguous with already designated OFD extending west along the northern boundary of the forest.

3. Void (either eliminated or combined with another allocation)

4. **Road 1000 Old Growth complex** / LSD / 8 acres
   Small extension of existing LSD to better conform to topography.

5. **West of Waterfall OG Grove** / LSD / 45 acres
   Extension of existing LSD to better conform to topography.

6. **South of Waterfall Grove** / OFD / 105 acres
   Extends existing OFD to leverage area of existing large, old trees.

7. See Section V, Other Reserves

8. See Section V, Other Reserves

9. **North of N. Fork S. Fork Noyo** / OFD / 432 acres
   Adjacent and across the river to the north of already-designated Late Seral Development area surrounding the Pentagon old growth grove and adjacent on the northwest with the proposed LSD area in Brandon Gulch (see 12). Will protect microclimate and older forest values and provide corridor between LSD areas.

9a. **South of Pentagon old growth grove** / LSD / 8 acres
   Buffer for adjacent old growth grove

10. **Volcano East Thumb** / OFD / 144 acres
    Links already designated OFD to the east and north with proposed OFD to the west.

11. **Camp 6 Brandon Headwaters** / OFD / 180 acres
    Extends OFD area to northernmost point of JDSF, which includes the headwaters of Brandon Gulch.

22. **Volcano Brandon Tributaries** / OFD / 331 acres
    Provides for older forest characteristics in side tributaries to proposed Brandon Gulch LSD area (see #12).

12. **Brandon Gulch THP** / LSD / 453 acres
    Litigation settlement required THP to use late seral prescription. Designation provides research opportunity to study effectiveness of prescription.

13. **Camp Three THP North and East** / LSD / 188 acres
    Litigation settlement required these sections of THP to use late seral prescription. Designation provides research opportunity to study effectiveness of prescription.

14. **Camp Three THP Reserve** / Reserve / 160 acres
    Litigation settlement specified no-harvest reserve area. Designation provides research opportunity to compare late seral prescription with no harvest.

15. Void (either eliminated or combined with another allocation)

16. Void (either eliminated or combined with another allocation)

21. Void (either eliminated or combined with another allocation)

17. **Noyo to Big River Link** / OFD / 715 acres
    Crosses Highway 20 to create north/south linkage between OFD in Noyo watershed and the watersheds south of the highway, including Hare Creek, Caspar Creek, and the already designated LSD area in the Big River watershed/Woodlands area, which in turn is adjacent to the designated Russian Gulch LSD/marbled murrelet area. Implements 2008 Management Plan vision of contiguous OFD across JDSF landscape.

18. **North Fork Caspar Controls** / Reserve / 193 acres
    Three areas that are already being used as controls in the long-running Caspar Creek cutting trials. Some of the oldest second growth redwoods on the forest. Continues to provide research opportunities to compare areas that have not been harvested since at least 1926 with areas more recently harvested.

19. See Section V, Other Reserves

20. See Section V, Other Reserves

21. See #13 and #14

22. See #10, #11, and #12

V. Other Reserves

Four Reserves are proposed independent of the Older Forest Structure Zone. These are identified by number on Maps A and B.

7. **Indian Springs Fire Study** / Potential Reserve / 213 acres
   Area in West Chamberlain drainage affected by 2008 fire event with good internal replicate areas that have each been subject to different burn intensities. To be reviewed by Research Planning Team to determine utility for research. Area is also overlapped by one of the Hardwood Study Reserves (see #20).

8. **Bob's Woods Meadow** / Reserve / 8 acres
   Rarely occurring woodland meadow.

19. **Jughandle Pine/Cypress Staircase Complex** / Study Reserve / 1,155 acres
    Mostly pine and cypress forest adjacent to the Pygmy Forest managed by JDSF. Completes often studied Ecological Staircase that begins on the Coast at Jughandle State Park, and then proceeds inland through numerous terraces and geological conditions until eventually reaching soils that will support redwood forest. Provides unique research opportunities in an area that is also heavily used for recreation.

    See Below

20. **Hardwood Study Reserves** / Temporary Reserve / 671 acres

    See Below

Jughandle Pine/Cypress Staircase Complex

Adjacent to Pygmy Forest stands, and the "Ecological Staircase," a rare display of the geology of coastal terraces and the plant communities associated with them, the Complex is generally a mix of Bishop pine, Bolander pine and Mendocino cypress with varying amounts of redwood, Douglas-fir, other conifers, and hardwoods inter-mixed. As one moves inland, the stand composition trends away from the pine/cypress community.

The Goals for the Reserve are:

1. To provide research and demonstration opportunities to study the pine/cypress plant community, particularly in relationship to reintroducing fire to facilitate regeneration
2. Demonstration of the full ecological progression of the staircase
3. Recreation consistent with protection of ecological values

Management:

Fire exclusion has led to unusual conditions in the fire-dependent closed cone pine/cypress. Management is to include consideration of ultimately reintroducing fire to allow for natural regeneration. For the safety of the public and the pine/cypress forest itself, vegetation management (understory thinning) may be necessary prior to reintroduction of fire.

Management activities in the Reserve are to be conducted consistent with the Goals of the Reserve and within a research and demonstration context. After review by the Research Study Team in consultation with a forester or ecologist who has specific expertise with the pine/cypress community, consider applying Older Forest Development Silviculture, or other silviculture as determined to be appropriate, in areas dominated by redwood/Douglas-fir east of the termination of Road 530 in order to help underwrite research and demonstration in the Reserve and to support associated staff activities.

Table 2.3.

Support				**Disagreement**			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
	8	2	2				

Note: This vote was part of the Group 1 vote reported in Section VI of this chapter. There was one abstention due to a potential conflict of interest.
For individual votes of members, see Appendix Table 9.2 in Appendix 9B.

Hardwood Study Reserves

The JAG recommends retaining specific hardwood-dominated early/mid-seral stands as identified in Maps A and B. Doing so will explicitly provide for this distinct seral stage / habitat. Important non-exclusive goals supported by this action include:

- Ecological: allow for both biotic and abiotic natural successional processes to lead to coniferous forest seral conditions;
- Wildlife: provide for hardwood and hardwood stand associated species;
- Research: provide examples of this stage in the forest's successional trajectory for research purposes, including use as 'controls' for evaluating costs and benefits of nearby rehab efforts;
- Educational: exemplify a segment of the forest's response to severe disturbance;

- Recreational: provide mushroom diversity and mushrooming opportunities.

Using the information from Map Figure 7 of the 2008 Management Plan to identify specific stands for retention, the following guidelines were applied:

a. for research opportunities (replicates, east-west gradient), distribute across the forest with 3 stands identified in each of the east west 1/3 segments of the JDSF;

b. minimize area influence of size and shape relatively large and circular to attain "internal" conditions and minimize edge effects;

c. range of stands' tree size age (there was an attempt to provide for some diversity, but there are few in size classes less than 4 that meet guidelines a & b.)

These stands range in size from 17 to 166 acres, and are all classified as Mixed Hardwood Conifer (Table 2.4). These areas are intended to be fixed, and they will not be rotated to replacement stands as they grow out of an early-mid seral hardwood dominated condition.

The **Management Guideline** for these stands is to conduct no timber operations or hardwood control in them until after conifer basal area exceeds 2/3 of the stand's total basal area, as confirmed by a field inspection. Road building, tail holds, etc. are acceptable within these stands. Stand manipulation is not permitted.

Table 2.4.

TO Table Map	Acres	JDSF Type details	Description
W1	17	MHC4D	Scattered conifers over RW, Fir and Tanoak mix
W2	30	MCH4M	Moderate conifer mix over Tanoak and DF
W3	87	MCH3D	Scattered conifers over Tanoak and RW mix
C1	52	MCH4D	Moderate conifers along with Tanoak
C2	92	MCH3D	Scattered conifers over Tanoak and Madrone
C3	166	MCH4D	Tanoak and DF with some RW
E1	70	MCH4M	Scattered conifers over Tanoak and RW mix
E2	50	MCH4D	Dense tanoak and DF mix
E3	106	MHC4	Scattered conifers over Tanoak and DF mix
Total	671		

Table 2.5.

Support				Disagreement			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
5	3		4			1	

For individual votes of members, see Appendix Table 9.3 in Appendix 9C.

Statement of Disagreement

Jere Melo's verbatim statement of reasons for disagreement can be found in Appendix 9. His reasons include concerns about the actual stand composition of the designated areas, the potentially conflicting management measures, and a preference for the redwood/Douglas-fir forest type.

VI. Consensus Votes on Allocations

The allocation recommendations identified in Sections IV and V, above, were broken into three groups for the purpose of voting on them. The groupings and votes are reported below indicating the name of the allocation and its map # (if any.) The vote is noted below each grouping.

Group 1

2. Dresser Old Growth Grove
4. Road 1000 Old Growth Complex
5. West of Waterfall Old Growth
8. Bob's Woods Meadow
9. North of NFSF Noyo
13. Camp 3 THP LSD
14. Camp 3 THP Reserve
17. Noyo to Big River Link
18. North Caspar Controls
19. Jughandle Pine/Cypress Staircase Complex

Table 2.6.

Support				**Disagreement**			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
	8	2	2				

There was one abstention due to conflict.

For individual votes of members, see Appendix Table 9.2 in Appendix 9B.

Group 2

1. Hwy 20 East
6. South of Waterfall Grove
12. Brandon Gulch THP

Table 2.7.

Support				**Disagreement**			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
	2	5	3			1	1

For individual votes of members, see Appendix Table 9.4 in Appendix 9D.

Disagreement Comments

Linda Perkins was in Fundamental Disagreement with this vote because it did not designate the Highway 20 East allocation as LSD.

> *"In order to conserve old growth groves, considering that most are small in size and edge effects created by wind damage, drying, light, predation, etc, diminish their ecological value, I think it necessary to buffer these groves. In the absence of protective protocols applied to all groves and/or specific criteria for each grove; in the interest of consistency for buffer designations throughout the forest; and in the short term; giving old growth buffers the designation of "late seral development", seems prudent as well as critical for the groves' protection."*

Kathy Bailey was in Strong Disagreement with this vote because it did not designate the Highway 20 East allocation as LSD.

> *"There is very little old growth redwood reserved in this region of California, even less than in other areas. An LSD allocation would have provided a stronger buffer to the old growth here in this steep, unstable area right next to Highway 20."*

Group 3

7. Indian Springs Fire Study Tentative Reserve
10. Volcano E Thumb
11. Brandon Gulch Headwaters
22. Volcano tributaries

Table 2.8.

Support				Disagreement			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
	3	6		3			

For individual votes of members, see Appendix Table 9.5 in Appendix 9E.

Disagreement Comments

Mike Liquori

> *"I generally feel that the Landscape Committee did not provide a compelling case for the benefits of these additional allocations relative to other values for these areas (e.g., research, demonstration, monitoring, revenue, operational accessibility, leveraging work done to date by staff, etc.). I also have concerns that the cumulative extent of additional allocations may challenge the ability for the forest to satisfy its sustainable harvest obligations, and without information on the cost impacts, I feel it is irresponsible to approve these lower priority areas."*

Lynwood Gill

> *"I voted Qualified Disagreement for this section. I based my vote on my opinion that the Brandon Gulch headwaters and the Volcano THP area should be left as Matrix area. This would give the unique*

opportunity to contrast and compare the effects of LSD, OFDA and Matrix management within the confines of a single watershed."

Forest Tilley

"I share the above concerns expressed by Liquori and Gill."

VII. Mendocino Woodlands

Mendocino Woodlands State Park is a unit of the Parks Department that is bordered on three sides by the JDSF Woodlands Special Treatment Area (WSTA). The Park has been operated by the Mendocino Woodlands Camp Association, a concessionaire, since 1949.

JAG makes the following recommendations regarding the Woodlands Special Treatment Area:

1. Interactions regarding management of the Woodlands Special Treatment Area should initially be directed to the State Parks Department, which is responsible for notifying the Camp Association and designating personnel to represent the State Park's interests.

2. Maintain the 2008 Management Plan STA designation as LSD and LSD/marbled murrelet.

3. Include State Parks at earliest discussion of any potential management planning activity or research and/or demonstration proposal.

4. Develop a watershed context and overall management objectives prior to any potentially significant new management activities or potential environmental impacts in the WSTA.

5. As part of item #4, above, consider establishing some areas for long-term deferral of activities or reserve areas within the STA, including determination of an appropriate buffer zone in which management activities will reflect State Park goals.[8] Priority for such protection should be in areas with hiking trails and high recreation use. In making these determinations, engage the Mendocino Woodlands Camp Association.

6. All management activities should place a high priority on maintaining values important to camper experience, overall Woodlands sustainability, and marbled murrelet considerations.

7. Prior to any potential timber harvest in the STA, a similar cut should be implemented elsewhere (preferably on JDSF) as a demonstration.

8. Use opportunities at the Woodlands as part of implementing the JDSF education mandate.

9. Where feasible, research and demonstration, including education, should be incorporated into any timber harvest.

10. The Railroad Gulch Demonstration Area will continue to be designated as a Research Area, with future research utilization to be considered by the Research Planning Team.

[8] For the purpose of their current growth and yield modeling of the JAG recommendations, CAL FIRE staff should assume a 200-foot buffer per the Forest Practice Rules buffer requirements for state parklands.

Table 2.9.

Support				Disagreement			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
	7	4		1			

For individual votes of members, see Appendix Table 9.6 in Appendix 9F.

Disagreement Comments

Mike Liquori's verbatim statement of Qualified Disagreement can be found in Appendix 9. His reasons include: recommendation #4 does not specify how it differs from typical THP planning activities; recommendation #5 calls for specific reserves or deferment without assessment of alternatives; and although recommendation 7 may be desirable there are more cost-effective ways to educate stakeholders.

VIII. Other Landscape Management Recommendations

A. Campground Buffers

The JAG Charter requests input regarding ongoing implementation of the Management Plan. JAG makes the following recommendation:

The primary goal for management of the 300-foot buffers around campgrounds shall be enhancing the camper experience of the woodland environment, including safety. Timber harvest may be conducted to the extent necessary to implement this goal.

Enhancements of the camper experience may include, but are not limited to: Sunlight, fire safety, brush reduction, access, privacy, trails, quiet, poison oak control.

Table 2.10.

Support				Disagreement			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
	8	2	2				

Note: This recommendation was part of the Group 1 vote reported in Section VI of this chapter. There was one abstention due to a potential conflict of interest.
For individual votes of members, see Appendix Table 9.2 in Appendix 9B.

B. Buffers for Individual Old Growth Trees Outside Reserves

The JAG Charter requests input on The Management Plan's approach to protecting residual old growth. JAG makes the following recommendation.

Management Measures

The intent of this section is to maintain and enhance biological values of old growth trees outside of reserves. This measure is intended to build on the old growth protection measures provided in the 2008 Management Plan. Any exceptions to the following will need approval by, at least, the Forest Manager and RPF, and will require a field visit. Exceptions may include the need for removal of buffer trees for safety.

In areas proposed for harvest, using the professional judgment of JDSF Staff, identify all old growth trees designated for retention as defined on Page 104-105 of the 2008 Management Plan. Once the old growth trees are identified, as applicable, utilize the following guidance:

- Maintain screen trees if doing so would benefit the old growth tree as a whole (e.g., wind-firmness, fire resilience) or its significant attributes (e.g., microclimate maintenance, visual cover). Primary trees to select as screen trees are those that appear to have intermingling limbs, or will grow to have intermingling limbs with the old growth tree.
- Determine whether the ecological values of the old growth tree's attributes (including those described in the 2008 Management Plan) could benefit from additional buffering. If additional buffering trees are needed, select those that best enhance or protect the attributes.
- Other criteria for selecting buffer trees include health, fire resilience, and wind firmness subsequent to the harvest.
- For old growth trees that have immediate, same-aged side-sprouts originating from the same root crown, leave all same-aged/similar-aged side sprouts.
- Where feasible, avoid and/or minimize compaction of the root zone with an equipment limitation zone delineated by an evaluation of the site conditions around the tree.

Table 2.11.

Support				Disagreement			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
1	5	3	3				

For individual votes of members, see Appendix Table 9.7 in Appendix 9G.

C. Even-Aged Management

The JAG Charter asks JAG to review and comment on proposed even-aged harvesting.

JAG recommends that the following changes be made to the language on page 255 of the Management Plan:

> "The total area of the Matrix receiving even-aged silvicultural treatments shall be the minimum required for the scientific validity of the research and the achievement of the associated demonstration objectives. This constraint does not apply to even-aged management necessary for addressing forest health or problematic regeneration conditions."

Table 2.12.

Support				Disagreement			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
	2	6	5				

For individual votes of members, see Appendix Table 9.8 in Appendix 9H.

D. Recommendations for Presenting Proposed Timber Harvests for JAG Review and Providing Post Harvest Results

The JAG Charter requests input regarding ongoing implementation of the Management Plan. JAG makes the following recommendation:

A summary of proposed timber harvests for JAG Review prepared by JDSF staff should consist of an approximately two-page statement, plus maps, tables or graphs, commenting on the following elements:

1. **Goals**
    - Clear statement of management objectives
    - How plans for individual harvest areas relate to plans for neighboring areas and conform to overarching management goals
2. **Research and demonstration activities and opportunities**
3. **Current Stand Conditions**
    - Broad quantitative and qualitative description, including maps, of existing variability and health of vegetation (conifers and hardwoods, diameter and volume distributions) within proposed harvest area
    - Description of current wildlife habitat
    - Description of understory, ground cover plants, and other important floral features
    - Aerial photos showing pre-harvest conditions and location of sample mark.
4. **Desired Future Stand Conditions**
    - Broad quantitative and qualitative description and rationale of desired outcome of harvesting, including desired species mix and projected post-harvest size class distribution data
    - Description of desired wildlife, understory, and other flora/fauna conditions
5. **Proposed Prescription**
    - Include comments on the proportion of existing volume or basal area to be removed, anticipated timing of the next entry, and the extent to which methods are chosen to stimulate regeneration.
6. **Ecological Constraints or Opportunities**
    - Presence of legacy elements, and problematic soil, topographic or geomorphological features
7. **Logging Methods**
    - Anticipated use of cable and tractor systems
    - Slash disposal
8. **Aesthetic Considerations**
    - Special considerations given to aesthetic and recreational values and constraints, including existing or potential trails and views
9. **Anticipated Timber Yields**
    - By species and size class
10. **Economic Analysis**

11. Post-harvest Outcomes

- A general description of post-harvest outcomes relative to items 1-10, above, to be reported back to the JAG after the completion of the THP

Table 2.13.

Support				Disagreement			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
3	7	2	1				

For individual votes of members, see Appendix Table 9.9 in Appendix 9I.

IX. Maps

See Appendix 10.

Chapter 3. Research and Demonstration

Summary

JAG proposes a comprehensive research-oriented management framework as a pathway toward moving JDSF toward a World-Class Research and Demonstration Forest. The framework is focused on transitioning the forest toward a more rigorous scientific basis consistent with other research forests in western North America. The framework views forest management as an opportunity to inform managers and policy-makers on the effectiveness of management, the validity of working assumptions, and the impacts on environmental resources. It would facilitate innovations in forest management policies and practices that would yield improved overall sustainability and stewardship of forest resources throughout the state in general and the redwood region in particular.

Our proposed research-oriented management framework would develop narrowly defined "Centers of Excellence" utilizing JDSF's unique strengths. The Centers would position JDSF as a hub for multi-disciplinary research addressing issues and challenges associated with redwood forest management. It envisions that each Center would leverage JDSF resources within a regional context by utilizing lands throughout the redwood region through collaboration with a broad consortium of stakeholders. Example topics of focus (subject to additional review) could include Centers on Coho Salmon Recovery, Upland Terrestrial Habitat & Forest Structural Relationships, and/or Sustainable Forest Management Practices.

Our vision has been presented to numerous stakeholder groups and has generally received broad support. We recommend that the next step should be to convene a Research Planning Team to develop much of the detail for this framework in the form of a professional research agenda focused around the Centers of Excellence. We anticipate that this team will need to comprise a group of professional scientific researchers and managers with the skills and tools necessary to develop a professional research agenda. We note that this team could be at a substantial disadvantage if it is staffed by volunteers, since it will require considerable attention to detail and professional due diligence to develop a quality plan. Our recommendations provide some initial thoughts about the scope of work for this Research Planning Team, subject to review and refinement by the Board and CAL FIRE staff to identify a scope that can be implemented within available resources.

The long-term implementation of the scientific, demonstration and adaptive management mission of the forest could best be guided by a semi-independent research-oriented organization (Redwood Research Group) that would be primarily responsible for the administration of all research, adaptive management, monitoring and possibly demonstration**.** This group would consist of the scientists, technicians and support staff responsible for various scientific programs within each Center of Excellence, and would leverage additional resources through universities, landowners, conservation groups, and other research organizations. The Redwood Research Group should seek to leverage funds from timber harvests with other funding mechanisms (e.g., grants, foundations, partnerships, conservation funding, etc.) both as a means of extending resources and ensuring that the forest is generating marketable value to a diverse group of stakeholders. The Research Group could also act as a facilitator for a broader regional collaborative (Redwood Regional Consortium).

I. Introduction

This document describes our vision for how JDSF could improve its status toward a **World-Class Research Forest**. Such a forest is fostered by its integrated research program and is realized by the ability of that program to drive forest management activities in a manner that is broadly recognized as a source of quality, rigorously tested, scientific knowledge. A World-Class Forest is one where:

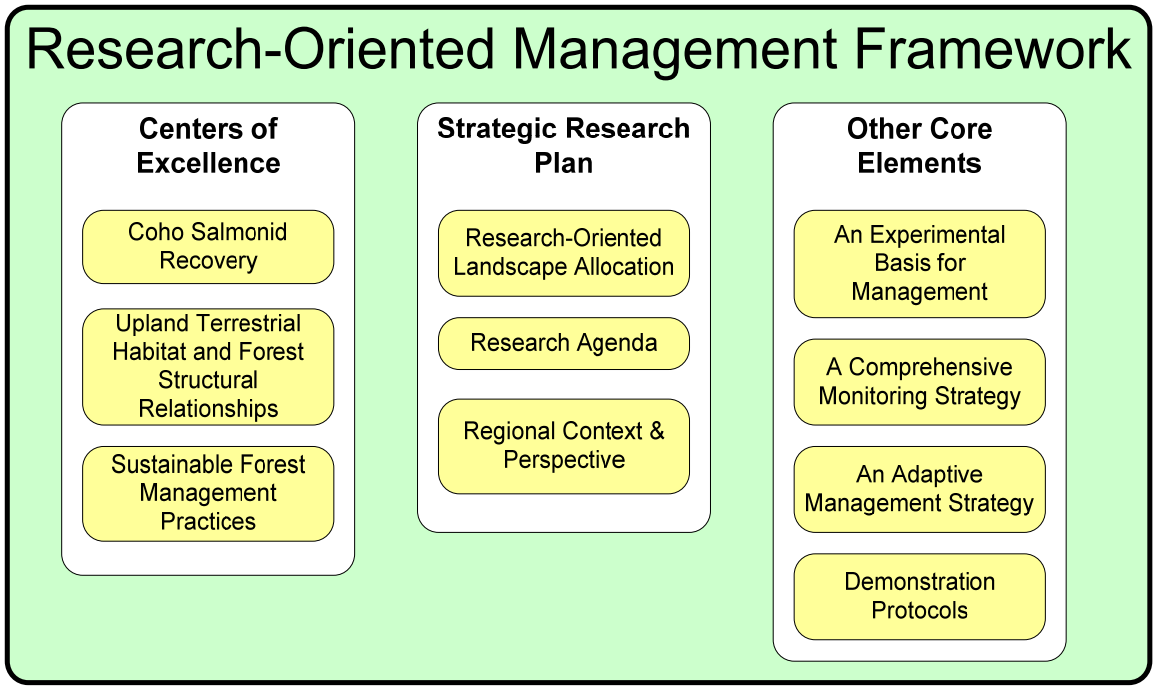
- The management plan and its landscape allocation create the opportunities for testing important hypotheses related to forest science, policy and management.
- Research efforts extend beyond the forest to integrate studies and lessons from, and inform management decisions on, other relevant forestlands.
- The forest uses opportunities, both on the forest and regionally, to seek answers that are relevant to a broad cross-section of stakeholders and other landowners.
- Research results are published and cited widely, in a breadth of professional and scientific journals, especially those highly regarded within and among disciplines.
- Techniques are actively developed that support sustainable forest management practices and knowledge-based policies, both of which are transportable to other landscapes and inform key issues.
- Data, maps, and history are well tracked and well maintained.

Together, these qualities will create a compelling set of conditions that will attract cooperative funding opportunities and diverse researchers investigating a broad array of subjects.

The following Research-Oriented Management Framework represents JAG's best effort to develop a management framework that would fit within the existing Management Plan framework and other JAG recommendations. It was compiled using the general principles described in Appendix 6A and was substantially informed by a 2-day Science Workshop summarized in Appendix 6B.

II. A Research-Oriented Management Framework

To put JDSF on a path toward World-Class status, we recommend that the Board adopt and implement a **Research-Oriented Management Framework**, as described in this document. The long-term objective for a Research-Oriented Management Framework on JDSF is to provide a transparent and objective scientific basis for forest management in California's redwood region. A scientific basis describes a rational system of technical information, models and other tools that inform policy and management, and collectively describes the methods for achieving sustainable economic, ecologic, and social stewardship of the forest.



The proposed Framework would integrate several key concepts (each described below) that together provide an organizational structure for testing and improving forest policies and practices both within JDSF and throughout the Redwood region (and perhaps beyond). This Framework should be organized around **Centers of Excellence** that describe the state-of-the-art science using models that range from simple conceptual models to more detailed empirical and/or quantitative models. Such models would provide organizational rigor that could provide a structure for scientists and would over time, improve the ability to predict impacts associated with management practices and enable management to achieve ecological goals.

The framework should also consider a **Strategic Research Plan** that leverages the Forest's resources to the benefit of core management issues. Such a Strategic Research Plan would integrate the efforts related to Centers of Excellence with the operational management of the forest. It would identify and implement a landscape allocation that better supports research activities, and would provide a structure for organizing relevant research at a regional and/or state-wide scale.

Over a period of a few years, this Research-Oriented Management Framework should lead to the development of formal management systems (combinations of regulations, policies, practices and Adaptive Management) that would provide important tools and management models for other landowners.

The proposed Research-Oriented Management Framework should be designed to provide more than sufficient opportunities to generate substantial revenues while meeting all the other goals of the forest (as described in both the Management Plan and these JAG recommendations). Additional Core Elements for the Research-Oriented Management Framework are described in greater detail within Appendix 6C.

III. Centers of Excellence

JAG recommends pursing **Centers of Excellence** that define a focused set of multi-disciplinary research programs for the Forest that help resolve critical issues facing forest management and forest resources within and beyond the Redwood Region. Such Centers of Excellence should

focus on informing applied forest management issues while recognizing that sustainable forest management is best ensured by an underpinning based on a fundamental understanding of ecosystem dynamics. Centers of Excellence should be drawn from issues that are politically and socially important and of likely continuing interest to stakeholders and researchers. Centers should be aimed at obtaining information that will help develop a greater understanding between important forest outputs and management by informing policies, practices, and associated consequences. The Centers of Excellence will be compelling, integrative, and exciting, drawing researchers from broad national and international professional networks. The Centers will also be durable, focused on solving complex challenges, the solutions to which will likely to be iterative and for which Jackson Demonstration State Forest, at the center of the redwood region, is well positioned to address.

To avoid spreading resources too thin, the number of Centers should be constrained, with an initial JAG recommendation tentatively set at three. In addition, Centers should be focused enough to prevent the largely ad-hoc approach to forest management JAG believes exemplifies R&D activities on JDSF to date. Additional criteria for selecting Centers of Excellence and other considerations are described in Appendix 6D.

We recommend that additional outreach and more detailed consideration by the Board of Forestry and Fire Protection and the Research Planning Team (see Section VII of this chapter) should help to define and/or revise the finally selected centers. JAG recognizes that adopting Centers of Excellence may have some undesirable consequences such as over-riding R&D on other important topics. Thus, JAG believes that allowances for these should explicitly be acknowledged in subsequent considerations by bodies discussed further in this document. With explicit recognition of other important research, these risks are offset by the value of the focus brought by the Centers of Excellence. Examples of Centers of Excellence discussed within JAG include:

- **Coho Salmon Recovery and Restoration of Aquatic Communities** – To rapidly recover aquatic communities by understanding the integration of watershed process and functions using both active and passive restoration processes.
- **Upland Terrestrial Habitat and Forest Structural Relationships** – To understand habitat and population processes and develop predictive models of animal/plant/ habitat dynamics of upland species on a continuum from younger to older forests.
- **Sustainable Forest Management Practices** – To understand and develop improved stand development pathways that integrate sustainable timber harvesting in the context of aesthetics, ecosystem management, timber growth and yield, forest product quality, carbon sequestration, and development of older forest conditions.

These example Centers of Excellence outlined above evolved from discussions within JAG, science workshop participants, and limited external outreach. We recommend elsewhere that the Research Planning Team should consider a more thorough development of these concepts before finalizing the Centers.

IV. A Strategic Research Plan

A Strategic Research Planning process would integrate an analysis of existing and desired future conditions using proven scientific methods with other key concepts and goals described in the Management Plan and JAG Recommendations. The primary components of our recommended Strategic Research Plan include:

- A Regional Context & Perspective that considers JDSF in the context of management regimes and practices available on other lands, so as to extend the Research Program's relevance to stakeholders throughout the entire Redwood region.
- A Research Agenda that works collaboratively with scientists and stakeholders to develop a list of key issues and management questions related to each Center of Excellence. The Research Agenda will provide a framework for identifying desired research projects, monitoring requirements, and management activities needed to support desired research projects.
- A Research-Oriented Landscape Allocation process that carefully and thoughtfully apportion the forest to support research on key issues outlined in the Research Agenda, as it will establish the context by which research is crafted and documented.

A. A Regional Context & Perspective

A landscape-based, cooperative approach to developing the Research and Demonstration Program increases the relevance of JDSF to many stakeholders. Also, the ability to influence management at regional scales is greatly improved by collaborating with other landowners throughout the Redwood region. An extensive evaluation of existing land bases, silvicultural systems, management systems, and information needs will inform this regional context, and will support allocation, landscape planning, and a more cooperative approach to research.

While considering this Regional context, a Research-Oriented Management Framework should also consider how to **Leverage JDSF's Unique Qualities** – both in terms of what is special to JDSF as well as what is common to other lands. Studies are possible virtually anywhere, opportunities for active manipulation on other lands are often incidental to and supportive of achieving economic goals. One of the unique qualities of JDSF is its capacity for Research and Demonstration that allow for manipulations that foster the goal of learning and teaching about forest management as opposed to a focus primarily on revenue generation. JDSF supports independent and / or geographically distinct areas for replicates of land management and associated studies. Other lands may be more tightly bound by Habitat Conservation Plans or conservation easement constraints, and have less stability of ownership and purpose. By providing a contrast to these land-bases, JDSF can expand the range and depth of experimental study designs that may yield new innovations in forest management. Also, focus on common features will encourage more interest by other landowners and will expand the influence of JDSF. Recommendations 5, 6 and 7 can be used to provide such a regional context and perspective.

B. A Research Agenda

A Strategic Research Plan requires that priorities be clearly assigned so that resources can be identified and integrated into the management plan and overall management infrastructure. The Research Agenda is an effort to compile the relevant issues and priorities for each Center of Excellence, in a manner that is supported by stakeholders, updated regularly, and accurately reflects knowledge gained (both within and external to JDSF research).

A Research Agenda works collaboratively with stakeholders and scientists to develop the programmatic focus for each Center of Excellence, including the key science questions/issues, monitoring needs, synthesis opportunities, methods of study, funding requirements, desired outcomes, etc.

C. Research-Oriented Landscape Allocation

A critical step in creating a Research-Oriented Management Framework is aligning the contemporary and future landscape allocation of stand-level characteristics (e.g., age, structure,

composition) in ways that provide a landscape that supports research and demonstration directed towards the Centers of Excellence. Equally important is the recognition of the Regional Context in which work at JDSF is conducted, which is to say JDSF is one of handful of large, consolidated ownerships where forest management experiments and adaptive management can take place in the redwood region.

JAG's recommendations for Landscape Allocation and Matrix Silviculture (see Chapter 2) provide a management system that will generate revenues needed to help fund the operation of the Forest, including portions of the Research and Demonstration Program, while preserving and advancing many of the unique stand structures within JDSF. JAG has compiled "Guidelines for Implementing Silviculture in the Matrix in Support of Research and Demonstration" (see Section D of this chapter) compiled *Guidelines for Interim Research* (see Appendix 6B: Key Themes and Take-Home Messages from the Science Workshop) that we believe these guidelines would provide appropriate constraints to ensure that silviculture for R&D is appropriately evaluated both before and after during the period required by the completion of the Strategic Research Planning process and the transition toward implementation of the overall framework. We anticipate that JAG's recommendations should be subject to appropriate scientific peer-review and comment, while respecting JAG's landscape recommendations and other values as described by the scope of work in Section VII (A) of this chapter and in Appendix 6E.

The existing allocation (Tables 1 and 7) described in the Management Plan describes silvicultural allotments designed to support an ad-hoc approach to research opportunities, and are not necessarily in alignment with the Centers of Excellence concept. The proposed revisions to the landscape allocation (see recommended landscape allocations in Chapter 2, Section IV(E) and Section V and Appendix 5C, Appendix Table 5.2) are a first step toward a landscape allocation that promotes all the goals of the Management Plan while preserving options for integrating a research focus more fully into forest operations. As described in the Research Planning Team Scope (see below), future iterations of landscape allocation should also be informed by JAG's Landscape Recommendations, the Strategic Research Planning process, and broader coordination with the Board's Research and Science Committee.

We recognize that a diversity of forest and stand conditions maintained and created over time is a common feature of research and demonstration forests and that such conditions are best created as a result of a well-organized, well supported, and focused research program described by this Research-Oriented Management Framework. Thus, we favor the adoption and/or development of stand classification systems that better describe the range of structural and habitat conditions that can support the research program.

The landscape allocation of forest stand conditions and silvicultural systems defines the research setting for the forest. Thus, it enables and constrains assumptions and hypotheses the research community can apply to evaluate ecosystem response to management activities. The allocation can also provide stability in stand structure that supports long-term research. A poorly considered or unstructured allocation substantially restricts potential research opportunities, and would compromise the Centers of Excellence.

While JAG's charter requests that we provide a spatial allocation of the forest, we were unable to complete this request. Development of the landscape allocation to support research on JDSF is a complex and highly technical task. Because the research focus is derived from pursuing scientific Centers of Excellence, we suggest that JAG is not the appropriate group to develop the final spatial allocation for JDSF. We therefore recommend that this task be done primarily by a Research Planning Team in cooperation and coordination with the JAG, the Board's Research and Science Committee, JDSF Staff, CAL FIRE, and other Stakeholders. Discussions of a scope of work and other guidelines for the Research Planning Team are described in Section VII of this chapter.

The preferred approach to develop spatial harvest allocations on large productive forestlands would use a planning process that requires considerable scientific and analytical effort including growth and yield modeling, spatial harvesting modeling, wildlife modeling, and cumulative effects analyses. The teams necessary to develop these planning efforts include biometricians, forest analysts, wildlife biologists, watershed scientists, operational managers, and others. Developing a "world-class" landscape allocation for JDSF with the intent of improving management practices in the redwood region should be consistent with this approach. A review of approaches used by other research forests, and other cooperatives would benefit this effort.

An approach for implementing a Research-Oriented Landscape Allocation is described in Section VII of this chapter.

D. Recommended Guidelines for Silviculture Variations in Support of Research and Demonstration

While the JAG agrees by consensus that the entire forest should be available for research and demonstration, JAG believes that guidelines are necessary to provide appropriate constraints to ensure that silviculture for research and demonstration is appropriately evaluated.

Silviculture other than that described in Chapter 2, Sections II(C) and II(D) (including even-aged management) is expected to be a continuing component of operations within the context of a professionally designed research and demonstration program. Initially, an evaluation of these proposed harvests will be made by JAG until alternative review processes are developed. The following guidelines should apply:

1. **Prior to Completion of the Strategic Research Plan**
   In the period prior to the adoption of the Strategic Research Plan, harvests that are inconsistent with the silviculture guidelines described in Chapter 2, Sections II(C) and II(D) and Sections IV(A) and IV(B) of this report will only be conducted in the purple-blue areas of 2008 JDSF Management Plan Map 5 and the designated brown, tan and red research areas with the exception of JAG-recommended three control areas on North Fork Caspar Creek (see Map B in Appendix 10), and only for research projects that meet the following guidelines:

   All proposed timber harvests in the Matrix not utilizing Matrix Silviculture will be presented to the appropriate advisory entities for review and recommendation prior to implementation. Criteria used by reviewing bodies should include:

   - Harvest is pursuant to a peer-reviewed research plan
   - The total area receiving the treatment is the minimum required for the scientific validity of the research involved
   - Purpose of project, area of sub-watershed or watershed (including replications), and duration of project
   - History of proposed project location in relation to age, structure, and past silviculture treatments
   - Potential conflict with overarching Centers of Excellence, ongoing research projects, neighbors, sensitive areas, designated special treatment areas, and recreation use

2. **After Completion of the Strategic Research Plan**
   After adoption of a Strategic Research Plan (and associated landscape allocations), harvests justified by research will be implemented only when there is reasonable confidence that the associated research will be carried out. Factors that will determine the level of confidence include:

- Approval of the research by a standing research committee as part of the Strategic Research Plan.
- A reasonable expectation that professional and financial resources needed to implement the project and associated work plan over the specified term will be available.
- Goals and specific contributions to an associated Center of Excellence are clearly identified

V. Demonstration in a Research-Oriented Management Context

Research and Demonstration are closely related and indistinct concepts. Both are related to knowledge needed by forest managers and policy makers. Research focuses on learning, while demonstration focuses on showing and teaching.

The JAG views demonstration as a primary component of an effective Research-Oriented Management Framework. Rather than referring to a "Research Projects" or "Demonstration Projects" we suggest thinking of them as elements of a more comprehensive Research & Demonstration Program.

Research on forest management will be more influential if it is associated with an effective demonstration component. Thus, demonstrations generally should be explicit complements to research projects. Evaluation of an activity for Research and Demonstration funding should give strong weight to the proposal's provisions for both research (what can we learn) and demonstration (what and how we can teach). Very few demonstrations should be made without a research complement.

Some basic research may not lend itself to demonstrations. Absence of associated demonstrations should not preclude important research from being funded. Similarly, some demonstrations may not have nor need a research complement. However, any research and/or demonstration activity that involves non-Matrix silviculture in the Matrix, or that would involve silviculture at variance with the silvicultural guidelines for OFDA and Late Seral Areas, will meet the management goals for these areas, and will be carried out only following review and approval by an appropriate review body. Any demonstration that departs from silvicultural guidelines should provide new information of significant value.

	Research (tends to be more)	**Demonstration (tends to be more)**
Intent	Learn	Teach, show
Design	Random allocation of treatments among replicates over space and time; BACI approaches; consideration of the sampling / extrapolation universe.	Few replicates to one instance, site access and availability important in locating treatment(s).
Data	More likely to be quantitative; Statistical tests.	More likely to be qualitative and visual
Presentation	Tables, Figures, Statistical tests	Photographs, videos, tours
Outlet	Professional and Scientific Society journals, conferences	Newsletters, fieldtrips
Subject	Ecological processes, timber economics, human dimensions, …	Financial considerations; logistics, techniques
Focus	Results, implications.	Methods and Equipment

Demonstration Protocols

JAG notes that standard Demonstration Protocols would help to build confidence that activities on the forest are implemented to benefit the broader forestry community. A demonstration program framework should outline how basic information will be compiled and reported for significant management actions on the forest. Such information could be developed into a series of brief reports (e.g., Forestry Notes and Forestry Reports) that would be available to the public via a website or other available communication media. The reports should be compiled for the following activities (including but not limited to):

- Harvest Treatments
- Reforestation and Restocking
- Road Construction, Maintenance and Abandonment
- Burns (both Prescribed and Wildfires)
- Restoration and Enhancement Treatments
- Invasive Weed Control

Demonstration is described within this framework as those management treatments that provide examples for forestland owners, managers and the general public. Demonstration information included in these Notes and Reports should typically include:

- Pre-treatment and post-treatment data
- Economic costs & value data
- Operational consideration information
- Effectiveness evaluations
- Location maps
- A discussion of the treatment design
- A description of the justification for selected management treatment
- Relevant treatment quantities (e.g., volumes, areas, lengths, etc)
- Planned costs and actual treatment costs
- Revenues generated
- A list of monitoring and/or research activities associated with the treatment
- Availability of more detailed data and resources

The Demonstration Program should consider subsets of Demonstration for which JDSF staff will develop more detailed information and educational resources.

VI. Other Framework Elements

Other core concepts that should be explicitly integrated into this Research-Oriented Management Framework include:

- An Experimental Basis For Management – is a management philosophy that views every significant management activity as an opportunity for research, experimentation, demonstration, and/or monitoring activities that can inform management practices and/or policies. All significant management activities should be reviewed for their potential to contribute to addressing the objectives and questions of the research, demonstration, and monitoring programs. An Experimental Basis is driven by testing as many hypotheses as

practicable, within a range of scientific rigor appropriate to the issue. An Experimental-Basis for Management improves the ability to predict responses to management activities by encouraging hypothesis testing at every opportunity, and providing the infrastructure to engage the resources to provide conclusive resolution to these hypotheses. An Experimental Basis supports repetitions of treatments and analysis over time can help minimize spurious results derived from short-term variability (e.g., climatic), and will be critical in long-term understanding of forest ecology/management in the face of novel environments (e.g., global climate change, new pests/pathogens, etc.). That is, long-term studies can circumvent problems with the more standard practice of substituting space for time.

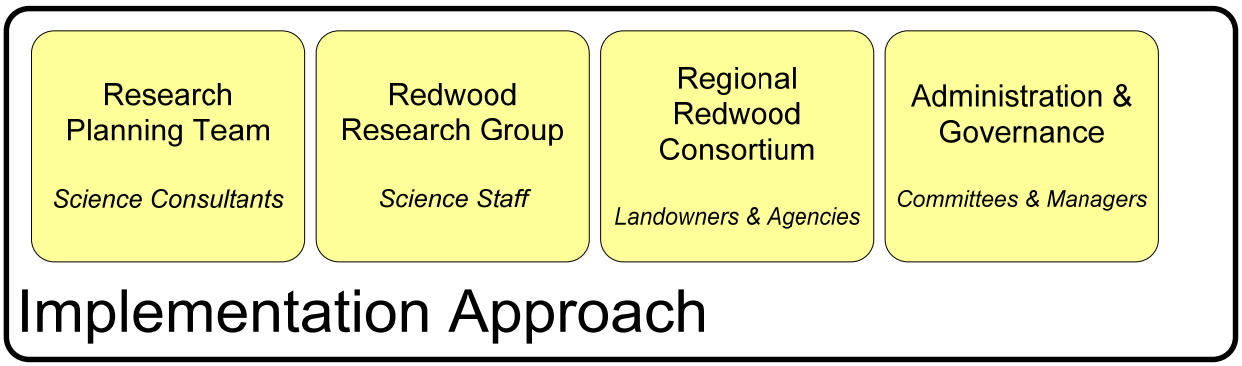
- A Comprehensive Monitoring Strategy – that outlines necessary monitoring approaches, protocols, staffing needs, access, etc., and is tightly coupled with Centers of Excellence, the Research Agendas, Landscape Management Planning, the Adaptive Management Framework, and the Demonstration program. The Monitoring Strategy should extend beyond timber stand measurements to include other important ecological and scientific data related to wildlife, water resources, air quality, carbon, etc.
- An Adaptive Management Strategy – that identifies performance measures, resource objectives, study designs, key questions, and other elements that integrate and direct monitoring and research activities within the forest (and beyond). The Adaptive Management Strategy is an integral component of the overall Framework and should inform practices both on JDSF and throughout the Redwood Region.

These are each described in more detail in Appendix 6C.

VII. Recommended Implementation Approach

We recommend that the Board consider implementing this proposed Research-Oriented Management Framework by:

- A Research Planning Team that will develop strategies for aligning the Centers of Excellence with the Landscape Allocation and Research Agenda
- A Redwood Research Group that would be responsible for developing the Centers of Excellence and overall research, monitoring, demonstration, adaptive management and outreach programs
- A Regional Research Consortium that promotes collaboration and outreach among all stakeholders, including landowners, conservation groups, agencies and academia, and
- Developing an Administration and Governance structure that fits within the existing resources of CAL FIRE and the Board of Forestry and Fire Protection



A. Research Planning Team

JAG recognizes that planning for a professionally developed research program is beyond the scope of the JAG membership, and thus we recommend that a Research Planning Team should be compiled to provide important technical review, analysis and recommendations that will help JDSF develop a Strategic Research Plan that will guide the transition toward a Research-Oriented Management Framework.

The purpose of the Research Planning Team is to provide professional recommendations to the JAG and Board of Forestry and Fire Protection regarding the allocation of forest structure, age and composition for the forest that is best suited to supporting the Centers of Excellence, consistent with the guidance provided by JAG and adopted by the Board of Forestry and Fire Protection.

JAG would note that the allocation classes described in the approved management plan have been amended substantially by the JAG to increase the quantity of old forest structure and enhance habitat connectivity. JAG's recommended landscape allocations are made based on the full range of Goals articulated in the Management Plan. The JAG advises the Research Planning Team to be cognizant of those Management Plan Goals when making its recommendations. The rationale for deviations from JAG's recommended allocations should be articulated in the Research Planning Team's report. Both the Research Planning Team recommendations and the JAG's recommendations regarding them should be delivered to the Board of Forestry and Fire Protection for consideration in determining the final allocation.

We would like the team to be as inclusive and collaborative as possible, given recognized constraints of the work being performed by an outside contractor. We would expect the team to engage the Board of Forestry and Fire Protection's Research and Science Committee, USFS Pacific Southwest Research Station, JDSF staff and JAG, among others.

The Team (working in coordination with the Board's Research and Science Committee, JDSF Staff, JAG, CAL FIRE, and other stakeholders) would be responsible for several tasks, which may include all or some of the following (subject to scoping by CAL FIRE):

- Synthesizing information for the existing landscape – using existing studies and data to begin to develop simplified (cartoon) conceptual models that could be used (over time) to build toward more quantitative models used to test what we think we know and don't know about the key relationships in each Center of Excellence, and how the forested landscape (both within and beyond JDSF) can be used to leverage our collective understanding
- Providing comments to and refinements for the Centers of Excellence – including a more complete description of the mission for each Center of Excellence, how it will look on the landscape, what the key research questions would be for each center, and the associated research activities.
- Populate and refine the areas of applied-research: for the community of applied and academic scientists and environmental professionals likely to use JDSF as a research platform, provide a more detailed definition for the Center's research focus in terms of our current scientific understanding, how the Center can improve our understanding, what tools may evolve from this effort, and how the Centers may impact redwood forest management.
- Formulating testable working hypotheses (including peer-review from cooperators) that could form the basis for a research program, including limiting factors models, desired future condition trajectories, experimental approaches etc.
- Develop simple and conceptual allocation models: using established and/or successful research forests allocations (e.g., H.J. Andrews Experimental Forest) as a reference point,

develop conceptual allocation models for JDSF that are tailored to the three areas of applied research and leverage models already established in the redwood region. The products should produce landscape development hypotheses in a manner that can be understood by both technical and non-technical audiences.

- Describe and delineate allocation classes: reconcile the landscape development hypotheses with the existing forest structure, special status management zones, growth and yield projections and harvest schedule. The goal of this analytical task is to represent management / allocation units that create, maintain or develop desired stand conditions necessary to support research on the prioritized research questions, with explicit reference to the special status management areas, forest productivity and harvest. The delineation of allocation classes should be consistent with core elements of the management plan and the JAG principles articulated in the body of this report.
- Developing a Research-Oriented Landscape Allocation: building on the approaches described within the Management Plan and JAG Recommendations, and providing rationale for deviations from these approaches, the Team should provide maps and/or criteria for allocating stands into management units that would support the Centers of Excellence and other goals for the forest (as described in the Management Plan).
- Informing and prioritizing key research questions for the Research Agenda within each Center of Excellence – by providing recommendations down to the level of working hypotheses based on the key questions within each COE and provide guidance on the research agenda. In addition, identify the scientific gaps.
- Comment on the financial requirements for implementing the research program – including any influences on timber harvest, and estimated costs for research recommendations
- Begin to outline a research agenda for the forest: by developing a prioritized list of research questions and working hypotheses for each of the Centers of Excellence. The prioritized research questions will serve as a primary input for the development of recommended allocations necessary to support research on these questions. In addition, comment on the appropriateness of these three areas generally, in terms of their feasibility and relevance for JDSF and the redwood region; suggest and justify any new or alternative categories of research if warranted.

Given the detailed technical rigor necessary for these tasks, this team will need to be sourced by professional staff, consultants and academics that can be paid for their efforts. A voluntary team will not be able to provide the amount of time and attention to detail necessary to complete these critical tasks. The Team's work should also be subject to appropriate review.

The envisioned Research Planning Team would integrate across existing conditions using scientifically based methods (e.g., Watershed Analysis & Landscape Ecology), stakeholder needs, a Redwood Region context, and the Centers of Excellence. The outcome will be a Strategic Research Plan that better supports the research associated with Centers of Excellence, and will have a broad base of support by stakeholders. We also expect the Research Planning Team to operate within specific sidebars so as to build on the work done to date and ensure that the goals of the Management Plan and JAG's Landscape Recommendations are recognized.

Our vision is that CAL FIRE would refine the scope of work (outlined below) such that the team could produce its deliverables within 6-9 months. We also prefer that JAG be provided some time to respond to the Planning Team's report before the Board acts on its recommendations. A key outcome of the Research Planning Team's work is the presentation of landscape allocation alternative(s) for the forest that if adopted, will create, maintain or develop the forest structures

needed to support an applied research agenda focused on the proposed Centers of Excellence over a planning horizon of approximately 40 years.[9]

The Research Planning Team should develop its detailed work plan in consultation with the Board of Forestry and Fire Protection's Research and Science Committee, JDSF staff and JAG. Before the analysis is initiated, the Research Planning Team will convene at least one 'immersion session' with JAG to understand this group's principles and recommendations. In addition, JAG and the Research Planning Team will meet when team has outlined the core elements of its analysis but before it initiates the analysis. Periodic status check-ins during the analysis and alternative development will be administered by the Chair of JAG and the Deputy Director of CAL FIRE.

Guiding Principles

The following is an excerpted list of guiding principles offered by the Jackson Advisory Group and a panel of scientists that JAG believes should guide the Research Planning Team in its deliberations related to the Research Planning Team:

- The basis for the landscape allocation should reflect to the degree possible, a more natural temporal distribution for forest characteristics based on principles of landscape ecology. Such principles include but are not limited to (a) the integration of old forest structure and conditions into matrix forest development, (b) forest gap dynamics including possibly shifting mosaics, and (c) pre-settlement disturbance regimes.
- The landscape condition should support the needs of a well-developed, programmatic adaptive management program that clearly identifies resource objectives, performance measures, etc. and considers the economic goals of the forest.
- The landscape allocation should reflect the diverse needs of key stakeholders, including researchers, landowners, conservation groups, the public, recreationalists, regulatory and resource management agencies, and policy-makers.
- Research and demonstration at JDSF with major commitments of land should have regional relevance; start with simple, focused hypotheses and increase the level of sophistication as knowledge develops
- Make maximal use of existing forest inventory data to test key assumptions, identify data gaps and develop working hypotheses.
- Focus recovering coho populations as quickly as possible. Focus on limiting factors and life-cycle models as a starting point.
- In developing and testing working hypotheses, focus on reliable, efficient and feasible measurements that are financially sustainable over time.
- The Research Planning Team should include in its report the guidelines, maps, and principles used to arrive at their recommendations so as to aid in JAG and the Board of Forestry and Fire Protection in further deliberations related to landscape allocations.

B. Redwood Research Group

The effective implementation of the Research-Oriented Management Framework and the overall Research Program should be led by an organization whose mission is to establish and maintain the Centers of Excellence through research, coordinated monitoring, advocacy, education, outreach, and policy advisement.

[9] Additional alternatives or variations may be produced and presented by the team as necessary to meet the purposes of their assignment.

We recommend that research, demonstration, and monitoring programs at JDSF should be managed, administered and staffed by a broadly based research organization that is affiliated with, but semi-independent from, CAL FIRE and JDSF operations. This will enable JDSF Management to focus on the day-to-day management and operations on the Forest, while developing the organizational infrastructure to support the Centers of Excellence and other research tasks.

The organization should consist of professional staff of interdisciplinary scientists dedicated primarily to a research and/or monitoring mission (e.g., interacting with, but not necessarily directly associated with, JDSF operations). It could be led by senior scientist(s) and/or an Executive Director team, and it would substantially benefit by seeking funds beyond JDSF revenue sources (e.g., research grants, foundations, partnerships, etc). The organization should seek to coordinate research activities beyond JDSF properties where it serves a Center of Excellence, and it should provide extensive outreach and educational roles to all stakeholders (including academic scientists). It should collaborate closely with academic researchers, but as an applied research organization, may benefit by being outside of an academic institution.

The roles of the Redwood Research Group could include:

- **Acting as Scientific Stewards for each Center of Excellence** – by developing internal staff and external research partners who can integrate expertise, develop models, and otherwise coordinate the "brain-trust" that will facilitate the development of each Center
- **Staffing and/or Coordinating Field Monitoring and Data Management Activities** – for JDSF lands, by providing the technical staff capable of collecting core monitoring data, developing standard protocols, maintaining data inventories, developing quantitative models, and other research-oriented tasks
- **Acting as a Facilitating Agency** – to ensure relevance to the broader forestry community by coordinating and funding research activities throughout the redwood region
- **Acting as Staff for Regional Cooperatives** – to help facilitate greater coordination of scientific and analytical tasks among landowners, agencies, and others
- **Administering Research on JDSF** – including grants to outside research organizations (e.g., consultants, academics, etc), development of requests for proposals, acceptance of projects, review of requests for research and demonstration, etc.
- **Leading Outreach Efforts** – which could include both educational and fund-raising functions that seek to build a broad base of support and resources from multiple stakeholders and partners, including foundations, grant agencies, universities, etc
- **Liaison with JDSF Operations** – to coordinate data exchange and scientific designs with timber operations (harvest design and layout, etc).
- **Leading Adaptive Management** – by acting as advocates for new practices and policies that are developed as a result of JDSF research, the Research Group could help the dissemination of new technologies, and working to advance those recommendations thru the appropriate administrative and/or collaborative bodies

This organization could exist in various forms (e.g., An independent 3rd-party entity, independent CAL FIRE center, within JDSF, within a University Extension, as a multi-agency cooperative, etc). The Board should carefully consider the advantages and disadvantages to these various structures.

We recognize that the implementation of the Redwood Research Group may take several years to occur. Thus several of the governance and administration functions may require additional oversight during the interim.

C. Redwood Regional Consortium (Long-Term)

Formation of a Redwood Region Consortium is an integral part of implementing the Research Framework. It positions JDSF within an integrative entity that unites efforts across the Redwood landscape by acting as a Hub for collaborative research that includes private and public lands. As such, this Consortium would differentiate itself from similar cooperatives by primarily drawing its participants from scientists employed by agencies, consultants, landowners, research scientists and other applied forestry practitioners (as opposed to strictly research-oriented organizations). Within the Consortium, JDSF's role can be a resource that provides data, funds and logistical support as well as part of the land base for research. Similarly, Consortium members can provide support for advancing research implications through adaptive management and policy revision efforts. In addition, members can provide financial support through in-kind services and additional funding. JDSF's lead in forming and sustaining a Consortium also increases the relevance of JDSF to stakeholders. Finally, the ability to manage and conduct meaningful research at landscape-scales is greatly improved by collaborating with other landowners throughout the Redwood region. CAL FIRE could look to Washington (e.g., Washington's TFW) and Oregon (H.J. Andrews Forest) for models of functioning Research Cooperatives that involve a broad group of stakeholders.

The consortium would differ from the Redwood Research Group in that the Consortium would exist as a collaborative group of stakeholders and partners, while the Group would consist of paid staff dedicated to implementing the Research-Oriented Management Framework.

D. Administration and Governance

The administration and governance of the Research-Oriented Management Framework could be developed in coordination with the Board's Research and Science Committee, as well as the groups described above. Additional JAG thoughts are discussed in Appendix 6E.

VIII. Research and Demonstration Consensus Votes

Research Votes

This recommended integrated Research and Demonstration Framework evolved over two-and-a-half years of active discussion. Elements of the Framework are based on principles formulated from a series of eight recommendations that were acted on in two groups. In some cases, significant revisions have occurred to the report subsequent to these votes, with JAG concurrence. These and the consensus votes supporting this approach are:

1. A research-oriented management framework should be developed that leads to JDSF being regarded as a World-class research and demonstration forest, as described in Section II of this chapter.

2. Up to Three Centers of Excellence should be established at JDSF as described in Section III of this chapter.

3. JDSF should develop a strategic research plan similar to that described in Section IV of this chapter that supports the Centers of Excellence and Research-Oriented Management Framework. (note: some modification of this section occurred after the vote).

4. Integrate all management treatments and methodologies within JDSF with the over-arching principles of hypotheses testing, monitoring, adaptive management, and demonstration as described in Section VI of this chapter.

Table 3.1.

Support				Disagreement			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
	6	7					

For individual votes of members, see Appendix Table 9.10 in Appendix 9J.

5. Convene and support a Research Planning Team responsible for developing a working Strategic Research Plan as described in Section VII (A) of this chapter.

6. Establish and support a Redwood Research Group responsible for implementing the Strategic Plan as described in Section VII (B) of this chapter.

7. Establish a Redwood Research Consortium that integrates and leverages research and demonstration efforts across the Redwood Region and includes diverse land ownerships, agencies, universities, and research interests as described in Section VII (C) of this chapter.

8. The Board should establish appropriate administration and governance for the Research-Oriented Management Framework that integrates these recommendations within existing committees and structures as described in Section VII (D) of this chapter.

Table 3.2.

Support				Disagreement			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
	9	3	1				

For individual votes of members, see Appendix Table 9.11 in Appendix 9K.

Demonstration Votes

Recommendations on the approach to demonstration as described in Section V of this chapter were supported as follows:

Table 3.3.

Support				Disagreement			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
	11	2					

For individual votes of members, see Appendix Table 9.12 in Appendix 9L.

Research and Demonstration Votes

Consensus Vote of Overall Research and Demonstration Recommendations:

Table 3.4.

Support				Disagreement			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
2	4	6	1				

For individual votes of members, see Appendix Table 9.13 in Appendix 9M.

NOTE: Appendix 9, Sections J, K, L, and M provides additional information and clarity on these recommendations.

Chapter 4. Recreation

Introduction

The JAG was charged with providing input on:

> The process of conducting a recreation users survey, establishing a recreation user group, and developing a new recreation plan for the Forest.

The JDSF Management Plan goal for recreation is:

> RECREATION and AESTHETIC ENJOYMENT: Plan for and provide enhanced levels of low impact recreational opportunities that are compatible with forest management objectives and healthy ecological processes, that are consistent with historic recreational use characteristics, and that allow for engagement of recreation user groups.

The JAG generally endorses this goal.

The Management Plan proposes initially to maintain existing recreation facilities until a new recreation plan is developed. Prior to the creation of the recreation plan, JDSF is to establish a Recreation Task Force with members from the recreation community and to conduct a user survey.

The JAG assisted JDSF staff in forming the Recreation Task Force. The Task Force was established in mid-2009 and has met monthly since that time. It has produced a preliminary set of recommendations for expanding recreation opportunities and use in the forest.

The JAG Recreation Committee provides liaison between the Recreation Task Force and the JAG . We recognize that the Task Force is the primary source of user recommendations to JDSF with respect to recreation. At the same time, the JAG has the responsibility to express its opinion on the appropriate management priority given to developing recreation enhancements and to facilitate the timely development of the new recreation plan. Also, because the JAG members were chosen from a broad range of backgrounds, the JAG is best equipped to recommend policies to minimize potential conflicts among timber management, research activities, and recreation use.

Recommendations

Recommendation 1

The recreation plan for JDSF should incorporate to the extent feasible the recommendations of the Recreation Task Force, with the exceptions noted below, recognizing that the recommendations are preliminary and in some cases conceptual and, therefore, will be subject to revision to make them consistent with the new recreation plan.

Rationale

The JAG favors expansion of low-impact recreation opportunities in Jackson Forest. Recreation is one of the cornerstones of public support for the forest.

Taken together, the recommendations of the Task Force provide a practical vision for long-term future expanded recreation that is consistent with the recreation goal of the management plan. The JAG endorses that vision. It also wishes to emphasize that the elements of the Task Force recommendations need to be consistent with the Recreation Plan that is ultimately adopted.

Key elements of the Task Force recommendations are:

1. Provide dedicated funding and staffing for recreational and educational projects, maintenance and programs.
    a. JAG recommends increasing security in recreation areas.
2. Designate a dedicated, enthusiastic staff member responsible for education and recreation in the JDSF.
    a. JAG qualification: The JAG recommends at least one dedicated staff member, but possibly more.
3. Develop three sets of looped multi-use trails, each in different areas of the forest.
    a. JAG qualification: the JAG does not support any specific number of sets of trails.
4. Increase the number of access points with sufficiently large parking areas to accommodate equestrian trailers.
5. Expand and modernize existing camps; provide backpacking camps; make group camps available throughout the year.
6. Establish a target shooting range.
7. Increase promotion of recreation and education, including development and maintenance of a JDSF recreation website, contact with public schools throughout the state, and by establishing and maintaining informational kiosks in the forest for easy access by visitors.
8. Help establish an unaffiliated but cooperating non-profit “Friends of Jackson Forest” to gain grant funds and facilitate volunteer support of recreation facilities.
9. Consider developing legal OHV use, with careful attention to potential environmental, potential user conflicts, and other regulatory issues.
    a. JAG qualification: The JAG acknowledges that OHV user groups are interested in using JDSF for OHV activities. The JAG takes no position on OHV issues at this time, but points out that currently, the Management Plan Recreation Goal is to *“provide enhanced levels of low impact recreational opportunities.”*

Recommendation 2

As soon as possible, JDSF should hire a single contractor to develop a recreation plan and associated user survey.

Rationale

At present, JDSF staff is preparing a request for proposal (RFP) for development of a user survey, but not including development of the recreation plan. We believe there will be substantial economies of time and money in hiring a single contractor to develop both the user survey and the recreation plan. The RFP process itself is time consuming, taking many months

from start to finish. There will be substantial duplication of learning and delay in completion if separate contractors are hired for the survey and plan development.

It is common practice to have the user survey and recreation plan done by the same organization. This was the case for the previous recreation survey and plan for Jackson Forest done about 1990.

It has been 3 years since the management plan has been approved. It will help to keep public trust to demonstrate, now that funds are available, that the department is acting to complete the recreation plan quickly.

Recommendation 3

Recommend that JDSF proceed, prior to the completion of Recreation Plan process, with recreation maintenance and improvements to existing sanctioned trails and facilities as needed or as recommended by the Recreation Task Force.

Rationale

The management plan is vague about the extent to which recreation trails and facilities can be improved prior to completion of the recreation plan described in the management plan. The position of the department, as stated in a letter from the Director of Cal Fire to the JAG is:

> The activities of the Recreation Committee should not get ahead of the recreation planning process that is described in the Management Plan and the Charter. It is intended that major decisions about recreation management on JDSF are to be developed through this recreation planning process.[10] [Emphasis added]

The JAG concurs with this position, but improvements to existing facilities and sanctioned trails are not major decisions. The management plan will soon be in place for 3 years and it is likely to be several more years before the recreation plan is approved. Revenue generation in the forest is recovering to reasonable levels. JAG supports beginning to maintain and improve existing recreation facilities as needed or as recommended by the Recreation Task Force.

Recommendation 4

JDSF staff should develop in coordination with the JAG, situation-appropriate guidelines, including measurable guides where appropriate, to apply to Timber Harvesting Plans for protecting recreation resources wherever located in the forest and for protecting aesthetic resources along highly traveled roads (e.g., Hwy 20 and Road 350).The guidelines should be flexible to adapt to specific situations and will need to be implemented with coordination between the licensed timber operator and the staff.

Prior to developing these guidelines, the JAG and JDSF staff should review and evaluate the results of the aesthetic protection measures applied to Brandon Gulch. Lessons learned from this evaluation should be applied in developing future guidelines for protecting the aesthetics of recreation resources.

Rationale

The JAG believes that recreation, timber harvesting, and research can all occur throughout the forest, with appropriate protection measures for heavily used recreation trails and campgrounds.

[10] Letter to JAG Chairman Helms from Director Grijalva and Chairman Dixon, October 22, 2008.

Therefore, the JAG recommends adopting protection guidelines to be applied wherever appropriate.

Visual impact from logging is often a major negative for recreationists. Although some impact is unavoidable, sensible measures can substantially reduce public upset without major impacts on timber revenues.

Given the determination of the JAG that Jackson Forest should strive to accommodate the multiple values of timber harvesting, recreation, research, and education, JAG recommends that aesthetic protection measures be part of all timber harvest plans that contain trails or roads receiving recreation use. Those that receive significant use should receive greater protection.

The table below presents the consensus votes on the Recreation recommendations as a whole.

Table 4.1.

Support				**Disagreement**			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
2	1	7	3				

For individual votes of members, see Appendix Table 9.14 in Appendix 9N.

Chapter 5. Economics

JAG worked strictly from the questions in the Work Plan approved by the Board of Forestry and Fire Protection and the Director of the Department of Forestry and Fire Protection. While a number of subjects were considered to enhance revenues, none were found to be viable, including contracts to receive carbon sequestration payments. The sale of timber remains as the primary source of funds to support the programs at JDSF.

In line with the general economic downturn throughout California and the nation, timber stumpage values currently being received are about half the values indicated in the adopted Management Plan. The JAG adopted a Table (See Appendix 7A), "Harvest Levels to Raise $6 Million", as a reference.

Chapter 2 "Introduction" includes statements that the costs and revenues of all the JAG recommendations have not been analyzed. JAG intended to address the second portion of Task 5, "What can we afford?" However, JAG consideration of individual policy recommendations and development of modeling outcomes by Staff continued into December 2010, leaving no time to address this matter as single or cumulative recommendations. Included as Appendix 7B is a Table, "Camp 3 Research and Costs", as an example that quantifies a policy matter.

Tasks

Task 1: What revenue requirements are needed to meet the desired budget?

Task 2: What is the desired budget?

> Comment: The estimate to implement the Management Plan as adopted by the BOF is $6 million per year. The JAG adopted Appendix Table 7A that indicates the volume of timber that must be harvested to raise $6 million per year at bid prices ranging from $50 to $800 per MBF.

Task 3: What is the needed budget?

> Comment: In 2009, $2.3 million was needed to meet the existing staff and expense levels, or about 38% of the amount needed to implement the Management Plan. In June, 2010, staff estimated that $1.84 million would meet staff and expense levels, or about 31% anticipated for Management Plan implementation.

Task 4: Is CAL FIRE able to produce a profit-loss statement, at least quarterly, to track revenues, costs and cash flows?

> Comment and Recommendation: Yes. JDSF staff presented an outline that identified cost or revenue centers for JDSF. These were timber sales, recreation, security, monitoring and research. The JAG recommends adoption of these cost and revenue centers, with allocation to each based on revenue sources and time or supplies spent in the categories.

Task 5: How do we balance revenue generation and our priority goals? What can we afford?

Recommendations

1. The timber sale program should reflect the standards for silviculture consistent with landscape allocation.

2. If a “Prudent Reserve” is established (see Task 6), the reserve funds could be invested in a money-market-type fund, and that interest earned should be applied to state forest programs.

3. A year-by-year projection of individual research project costs should provide a base for annual budget allocations as a line item.

4. JDSF-initiated research projects should use the above recommendation for annual and future budgets, and that other projects should be required to provide long-term projection of costs with assurance of the initiation of budget support.

5. JDSF should continue to support local utilization of material produced in nearby forest and saw mill operations in order to raise net values from timber sales.

6. Capital support for basic infrastructure should serve all or major portions of JDSF and be separated from direct operation of an individual timber sale.

7. Consistent with the applicable authority of law and policies of the Board of Forestry and Fire Protection, JDSF should charge fees for forest uses, other than, and in addition to, the sale of forest products.

8. Explore cost-efficient methods to facilitate the participation of smaller timber operators in JDSF timber harvesting.

9. Explore offering smaller timber sales (in the range of 100,000 to 500,000 BF) that provide a better scale of demonstration for small forest landowners.

Task 6: How do we leverage resources to develop the Science Agenda?

Recommendations

1. PRC Section 4799.13 may need to be amended to allow for a “Prudent Reserve”.

2. A three-year reserve should be created, gradually, as market conditions allow.

3. CAL FIRE should obtain professional grant-writing capability as a way to gather funds for the science program.

Table 5.1.

Support				Disagreement			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
1	10	2					

For individual votes of members, see Appendix Table 9.15 in Appendix 9O.

Chapter 6. Herbicides

Introduction

JAG reviewed the guidelines, policies, and concerns related to herbicide application on JDSF as outlined in the JDSF Plan and EIR and has general support for the strict limitations that determine herbicide use (Plan p. 95). Although the current use of herbicides on the Forest is very limited, we recognize public sensitivities and concerns regarding the application of herbicides – especially on public lands – associated with potential or perceived impacts on human and wildlife health, water quality, and aesthetics. Because of these concerns we recommend that, in addition to provisions in the Plan, particular attention be given to the following recommendations.

Recommendations

- Explore alternative treatments with a goal of eventually eliminating herbicide utilization on JDSF.
- All significant herbicide applications/programs should be reviewed for their potential to contribute to addressing the objectives and questions of the research, demonstration, and monitoring programs. As a part of this, seek opportunities to add to the body of research knowledge and data regarding the feasibility and environmental consequences of herbicide use relative to alternative methods of vegetation control.
- All scheduled herbicide applications should be posted in the field and at the JDSF office to enable the public to be aware of areas to be treated. The minimum posting requirement will be for a period extending an order of magnitude beyond the label posting requirement.
- In particularly sensitive habitats and public use areas, such as campgrounds, roads, and trails, an enhanced level of evaluation should be utilized.
- All herbicide use should be limited to non-aerial applications using minimum effective doses and concentrations recommended for treatment success.
- All operations should be prepared and conducted recognizing the need to minimize, to the extent feasible, the development of conditions that potentially lead to the introduction of invasive weeds or excessive hardwood regeneration. Silvicultural prescriptions and harvest operations should include the goal of minimizing the potential for future weed control problems that may require herbicide applications.
- As with all research and demonstration on the Forest, use and evaluation of herbicide applications should be incorporated in public outreach and information programs.

Management of Hardwoods

The JAG Charter requests comments on “conditions under which herbicides may be utilized to control native hardwoods”. In this context, JAG recognizes the important ecological values of hardwoods and supports the JDSF Plan goals of maintaining hardwoods on the forest at historic levels (page 107). JDSF should establish guidelines for what level of hardwoods will trigger use of herbicides for their management, but will not rule out removal by other means. Prescriptions

for managing hardwoods should clearly indicate objectives, how goals are set, and what conditions are triggering action.

Management of Invasive Plants

Although not specifically identified in the JAG Charter, JAG supports the careful and limited use of herbicides for controlling the development of invasive weed species in the context of Integrated Weed Management (IWM) Program as outlined in the JDSF Plan (page 93-95, 259 and elsewhere).

Table 6.1.

Support				**Disagreement**			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
	6	5	1				

For individual votes of members, see Appendix Table 9.16 in Appendix 9P.

Chapter 7. Outreach

Introduction

The JDSF Management Plan, in accordance with the Public Resource Code and Board policy, contains many excellent provisions to enhance outreach and education on the Forest and provide regular information to the local community. JAG strongly supports the concepts of these provisions, with details depending on resources and land allocations available. The provisions noted in the Plan, with page numbers referenced, include:

- Staff – additional positions in the research, education, and outreach program (p. 55)
- Demonstration areas (p. 71)
- New maps, posters, and displays (p. 118)
- Educational information to help prevent human-caused fires (p. 122)
- Tours – for schools, landowners, scientists, professional groups (p. 143)
- Data bank and website – use the internet to make data, publications, and other information available to the public (p. 143-4)
- Newsletters – minimum of two per year (p. 144)
- Interpretive Center – either on Highway 20 or at the proposed Noyo Center for the Environment in Fort Bragg. The Center would provide a conference center, classrooms, library, and internet services. Volunteer docents would be supported (p. 146-7)

Recommendations

In addition we wish to convey that, regardless of the quality of management, research, and demonstration on the Forest, JDSF will only gain strong public support and recognition if: a) its programs and activities are communicated through a high quality and effective outreach and education program, and b) if the public becomes active in programs on their Forest. Therefore, in addition to supporting provisions within the Plan, JAG strongly recommends:

1. Staffing, Funding, and Facilities – should be provided at the levels necessary to ensure the development of a high-quality and effective outreach and public education program. This program should enable the public at large to become actively involved in and aware of all programs related to understanding redwood forest ecosystem dynamics and the management, research, and demonstration programs on the Forest.

2. Schools and Colleges – should be encouraged through grants and technical assistance to establish study areas within existing and proposed allocation areas to enable successive classes to gather time-series data on ecosystem dynamics and management. Potentially interested local schools and colleges include: Mendocino HS, Fort Bragg HS, Sonoma State University, Humboldt State University, College of the Redwoods, Mendocino College in Ukiah, Pacific Union College Albion Field Station, Angelo Preserve University of California Berkeley, and other entities such as voluntary monitoring groups.

3. A Collaborative Outreach Consortium – should be established among interested parties having complementary outreach and education interests, goals, and programs. This would

build synergisms, leverage opportunities and overall effectiveness, and raise awareness of any possibly desirable duplication. Potentially interested groups include:

- JDSF Recreation Users Task Force
- Redwood Forest Foundation, Inc.
- Mendocino Woodlands Residential Outdoor Science School
- Pacific Environmental Education Center (MacKerricher State Park)
- Mendocino Area Parks Association
- California State Parks Mendocino District
- Other Timberland Owners and Managers

4. The Proposed JDSF Website – should be imaginative, high-quality, and interactive and become the “go-to” site for students and public interested in understanding the ecology, management, and policy development of redwood ecosystems as well as providing information on all programs, activities, and publications on JDSF.

Table 7.1.

Support				**Disagreement**			
Unqualified	Strong	General	Qualified	Qualified	General	Strong	Fundamental
	11	1					

For individual votes of members, see Appendix Table 9.17 in Appendix 9Q.

Chapter 8. Public Involvement and Stakeholder Input

Public Involvement

Throughout all its deliberations, the JAG has fully recognized that the new Vision for JDSF must be centered on rebuilding public trust that will enable the public to enthusiastically support the goals, mission, and programs of their Forest. Through re-focused JDSF management, the public must be able to take pride in the central role their Forest plays in the ecology and economy of the redwood region of Northern California.

The central focus of gaining public support is reflected in the combined recommendations of this Report. Recommendations on land allocation are aimed at gaining increased acceptance by the public who use its forest for diverse recreation, experiences, and values. Research and demonstration has a prime focus on broad collaboration. Recommendations on timber management and silvicultural guidelines are aimed at demonstrating that timber management can be done in a manner that is sensitive to aesthetic considerations while providing funds for refocused forest programs that promote both JDSF and community welfare. In particular, recommendations recognize the critical role of outreach in gaining broad public support through strong programs in education and communication.

The “public” represents a very broad range of needs and values. These recommendations, taken together, represent the JAG’s best collective judgment on how to move management on JDSF towards gaining this critical base of broad public support.

Appendix 8 contains a statement on public participation by Mr. Ray Duff, who attended and contributed to most of the JAG’s public discussions and who requested that this be included in the Report. While Mr. Duff’s letter was the only overview received, other written public input received relating to specific agenda items has been recorded in the Minutes of JAG meetings.

Stakeholder Input

For JAG recommendations to be as well informed as possible, JAG held a number of meetings and workshops that involved a broad cross-section of potential stakeholders who are concerned or involved with the redwood/Douglas-fir ecosystem.

The objectives of these meetings and workshops were:

1. To inform JAG of diverse views and values on ecology, management, and policy issues
2. Request comments from participants on current JAG thinking
3. To build a climate of strong collaboration and trust that is essential to moving towards JAG’s vision of building a world-class research and demonstration forest.
    a. Silviculture Practitioners Workshop, Oct. 2009
    b. Science Workshop, Berkeley, Feb. 2010
    c. Agency Workshop, Santa Rosa, Oct. 2010

d. Public Meeting, Fort Bragg, Nov. 2010

e. Conservation Groups, San Francisco, Dec. 2010

f. Conservation Groups, Boonville, Dec. 2010

JAG recommends that such meetings and workshops should continue periodically and become a regular feature of the new, collaborative approach to conserving, managing, and developing policy related to redwood/Douglas-fir forests of the region.

A summary of discussion from each Workshop is provided in Appendix 8. Input from the Silviculture Practitioners' Workshop is incorporated within Chapter 2, Section II(B).

Chapter 9. Acknowledgments

The JAG Chair and Vice Chair acknowledge, with appreciation, the dedicated work and commitment of volunteer time provided by all JAG members. Each member is an expert in their field and brought to the discussion their diverse knowledge, experience and values, which is reflected in the scope and breadth of recommendations in this Report.

We recognize, with appreciation, the invaluable help of Facilitator Steve Zuieback, who very competently helped JAG through the complex process of reaching consensus.

The work of JAG could not have been accomplished without the very strong technical support of CAL FIRE staff who responded promptly and very professionally to JAG's frequent requests for information, discussion, and analysis. In particular, we sincerely thank Russ Henly who provided primary staff support, and also Helge Eng, Marc Jameson, Pam Linstedt, Lynn Webb, and Craig Pedersen.

The JAG would especially like to thank Ruben Grijalva, Director of CALFIRE from 2006 to 2009. During his entire tenure as Director, Mr. Grijalva encouraged and supported efforts to find common ground on the future of Jackson Forest. He selected the members of the JAG, and he inspired the advisory group to strive to make Jackson Forest into a leader in innovative redwood forest management, research, demonstration, and recreation.

All JAG meetings were open to the public. We thank all those who attended and helped JAG appreciate the diverse values held by society. In particular we thank Ray and Loraine Duff of Caspar, who attended and provided input to almost all meetings. We also thank Bill Heil, who was a frequent participant.

Appendix 1. Jackson Demonstration State Forest Advisory Group Membership

Appointments by CAL FIRE Director Ruben Grijalva and Approved by the Board of Forestry and Fire Protection

Member	**Occupation**
Mike Anderson	Licensed Timber Operator, Registered Professional Forester (RPF)
Kathy Bailey	Environmental Advocate (Sierra Club)
Peter Braudrick	Recreation, former State Parks superintendent
George Gentry	Executive Officer, Board of Forestry and Fire Protection, Board liaison to JAG
Linwood Gill	Registered Professional Forester
John Helms (Chair)	UC Berkeley, Emeritus
Mike Jani	Industrial Forest Land Manager, Mendocino Redwood Company
Mike Liquori	Physical Scientist (Hydrology/Geology)
Jere Melo	Local Community, Ft. Bragg City Council, RPF
Linda Perkins	Environmental/Conservation Advocate
Dan Porter	North Coast Regional Ecologist, The Nature Conservancy
Vince Taylor (Vice Chair)	Environmental Advocate/Local Community
Forest Tilley	Small Private Forestland Owner, RPF, former JDSF manager
Brad Valentine	Biologist, California Department Fish and Game

Facilitator	
Steve Zuieback	Synectics, Ukiah

CAL FIRE Support Staff	**Title**
Russ Henly	Assistant Deputy Director
Helge Eng	Deputy Chief, Demonstration Forests
Marc Jameson	JDSF Forest Manager (Ret. Nov. 2009)
Pam Linstedt	Timber Sale Program Manager
Lynn Webb	Research and Demonstration Program Manager
Craig Pedersen	Administration, Recreation, and Law Enforcement Program Manager

Appendix 2. Charter and Duties

Mission

The mission of the Jackson Demonstration Sate Forest (JDSF) Advisory Group (Advisory Group, JAG) is to provide advice/recommendations to:

- The Board of Forestry and Fire Protection (Board) and Director, Department of Forestry and Fire Protection (CAL FIRE) regarding issues relevant to review of the JDSF Management Plan for possible changes during the Initial Implementation Period.
- Director/CAL FIRE and the Board regarding ongoing implementation issues
- Board and Director/CAL FIRE on policy matters relevant to JDSF.

Duties

A. During the initial implementation period (not to exceed three years) the Advisory Group shall provide input on the following:

1. Desired future forest structure condition goals for the Forest and the forms, amounts, and spatial designation of silvicultural treatments to be applied to attain those goals.

2. Long-term goals for a wide range of forest structures, including but not limited to:

    a. The extent and general location of areas to be dedicated to late-seral development and older forest structure zones, where timber production will be secondary to habitat development.

    b. The extent and general location of areas to be dedicated to old forest structure zones (OFSZs). The OFSZs will maintain or develop key old forest features. The OFSZs will be available for timber harvest.

3. The Management Plan's approach to (a) protection residual old growth and (b) restricting the extent and conditions under which herbicides may be utilized to control native hardwoods.

4. The process of conducting a recreation users survey, establishing a recreation user group, and developing a new recreation plan for the Forest. This plan would indicate the desired extent and location of recreation areas, corridors, roads, trails, and facilities that will be managed to enhance the full spectrum of appropriate recreational opportunities given JDSF's management goals.

5. The need to modify other elements of the Management Plan, as requested by the Director.

B. On an ongoing basis:

1. Review of ongoing implementation of the Management Plan, as requested by the Director.

2. When requested by the Director of Board, provide periodic recommendations on forest management policies and the Management Plan.

3. Review and comment on proposed even-aged harvesting.

4. Provide advice to the Director, CAL FIRE staff, or the Board on other specific issues as determined by the Director, CAL FIRE staff, or the Board.

C. JDSF Advisory Group responsibilities defined in the JDSF Forest Management Plan are hereby incorporated by reference.

D. The JDSF Advisory Group will inform the Demonstration State Forest Advisory Group (DSFAG) on the effectiveness of the implementation of the JDSF Management Plan.

Appendix 3. Committee Membership and Charge

Work Plan

Facilitate JAG organizing its work, learning the content of the current Management Plan, evaluating the Plan, getting the JAG the information it needs to move forward with its tasks, and coordinating the development of the JAG's final report at the conclusion of the Initial Implementation Period.

Members: Helms (chair): Taylor (Recreation), Melo (Economics), Liquori (Research and Demonstration), Bailey (Landscape), Tilley (Timber Harvest Plan Review), Braudrick (Outreach). Henly (staff).

Landscape

Review and develop recommendations on landscape allocations (Management Plan Map Figure 5 and related Plan elements such as found in Chapter 3) and desired mix of forest conditions over time.

Members: Bailey (chair), Gill, Perkins, Taylor, Valentine, Jani. Jameson and Henly (staff).

Research and Demonstration

Develop the framework for research and demonstration in the context of collaboration with others, scientific basis for management, key research questions to be addressed, mission-oriented research, administration/governance and funding; monitoring, basis for adaptive management.

Members: Liquori (chair): Porter, Helms, Valentine, Taylor. Webb (staff).

Recreation

Provide initial input to JDSF on user needs, particularly in relation to THPs being considered during the Initial Implementation Period, recreation elements of the Management Plan, and the process of establishing a Recreation User Group.

Members: Taylor (chair), Braudrick, Tilley. Pedersen (staff).

Economics

Review and comment on current and projected revenue flows, operating costs, cash flow, and funding needs for JDSF, as well as the broader economic implications of the management of the Forest.

Members: Melo (chair): Liquori, Tilley, Braudrick, Taylor. Jameson and Eng (staff).

Outreach

Review and make recommendation related to outreach on research, demonstration, education, recreation, and Forest management in general.

Members: Braudrick (chair), Helms

Timber Harvest Plan Review

Conduct field reviews of THPs on behalf of JAG as requested.

Members: Tilley (chair): Melo, Taylor, Braudrick, Perkins. Linstedt, Webb (staff).

Appendix 4. JAG Agreements on Goals

1. RESEARCH, & DEMONSTRATION: Improve the amount and quality of information concerning economic forest and timber management, forest ecosystem processes, watershed processes, and performance of forest protection measures that are available to the general public, forest landowners, resource professionals, timber operators, the timber industry, and researchers.

2. FOREST RESTORATION: Manage the Forest to promote and enhance forest health, ecological sustainability, and productivity using active and passive methods.

3. EDUCATION AND OUTREACH: Engage the public and community about the forest's research and demonstration activities through education and outreach, and recreation.

4. WATERSHED AND ECOLOGICAL PROCESSES: Promote and maintain the health, sustainability, ecological processes, and biological diversity of the forest and watersheds during the conduct of all land management activities.

5. TIMBER MANAGEMENT: Manage the forest on the sustained yield principle, defined as management which will achieve continuous yields of high quality timber products that contribute to local employment and tax revenue, consistent with environmental parameters related to watershed, wildlife, fisheries, and aesthetic and recreational enjoyment and constraints related to providing a diverse, dynamic matrix of forest habitats and seral stages for researchers.

6. RECREATION and AESTHETIC ENJOYMENT: Plan for and provide enhanced levels of low impact recreational opportunities that are compatible with forest management objectives and healthy ecological processes, that are consistent with historic recreational use characteristics, and that allow for engagement of recreation user groups.

7. PROTECTION of the FOREST: Protect the Forest from damage and ensure the safety and enjoyment of those using and working in the Forest.

8. INFORMATION, PLANNING, & STAFFING: Develop, maintain, and update management plans and other planning documents and processes. Manage and support the information needs and staffing needs of all State Forest programs. Communicate with the public, and actively seek input from the public, regarding management of the Forest.

9. FOREST PRODUCTS: Maintain a program that provides an opportunity for the public and small businesses to purchase forest products.

10. PROPERTY CONFIGURATION: Improve the boundary layout of the State Forest to facilitate management logistics and increase demonstration and research opportunities.

Appendix 5. Landscape Allocations

A. Excerpt of JAG Charter Regarding Landscape and Allocation, Identifying Recommendations JAG Is Making In Response

(See bold italic type below for location of JAG's responses to specific Charter requests for input regarding Landscape and Allocation issues.)

Excerpt of Charter

Jackson Demonstration State Forest Advisory Group

Relevant to Landscape Report

Mission and Duties

Mission: The Mission of the Jackson Demonstration State Forest (JDSF) Advisory Group (Advisory Group) is to provide advice/recommendations to:

- The Board of Forestry and Fire Protection (Board) and Director/Department of Forestry and Fire Protection (CAL FIRE) regarding issues relevant to review of the JDSF Management Plan for possible changes during the initial implementation period.
- Director/CAL FIRE and the Board regarding ongoing implementation issues.
- Board and Director/CAL FIRE on policy matters relevant to JDSF.

Duties: The JDSF Advisory Group will conduct its activities in accordance with its Mission and in support of the goals of the Management Plan for JDSF. These goals are Research and Demonstration; Forest Restoration; Watershed and Ecological Processes; Timber Management; Recreation and Aesthetic Enjoyment; Information, Planning, and Staffing; Protection; Minor Forest Products; and Property Configuration.

A. During the initial implementation period (not to exceed three years) the Advisory Group shall provide input on the following:

1. Desired future forest structure condition goals for the Forest and the forms, amounts, and spatial designation of silvicultural treatments to be applied to attain those goals.

2. Long-term goals for a wide range of forest structures, including but not limited to:

    a. The extent and general location of areas to be dedicated to Late Seral Development and older forest structure, where timber production will be secondary to habitat development.

    b. The extent and general location of areas to be dedicated to old forest structure zones (OFSZs). The OFSZs will maintain or develop key old forest features. The OFSZs will be available for timber harvest.

Landscape Sections II- Matrix Forestry, III- Older Forest Structure Zone, IV- Components of the OFSZ and Recommendations, and Section V- Other Reserves provide JAG's input regarding the forest structure and allocation questions posed to JAG.

3. The Management Plan's approach to (a) protecting residual old growth and (b) restricting the extent and conditions under which herbicides may be utilized to control native hardwoods.

   Landscape Section VIII B provides JAG's input regarding residual old growth. The Herbicide issue is dealt with in a separate section.

(A. 4-5 not relevant to Landscape Section)

B. On an ongoing basis:

1. Review of ongoing implementation of the Management Plan and overall Forest management.

   Section VII – Woodlands, Section VIII A – Campground Buffers, and Section VIII D – Presenting THPs to JAG for Review provide a component of JAG's input on the above implementation and management issues posed to JAG. Other aspects are covered in separate sections of the Report.

2. When requested by the Director or Board, provide periodic recommendations on forest management policies and the Management Plan.

3. Review and comment on proposed even-aged harvesting.

   Section VIII C – Even-aged Management responds to the above question.

C. JDSF Advisory Group responsibilities defined in the JDSF Forest Management Plan are hereby incorporated by reference.

B1. Comparison of Matrix, Older Forest Development Areas and Late Seral Development Guidelines

Appendix Table 5.1.

	Matrix	**OFDA**	**LSD**
Goals	Develop a stand component of large, old tre es that will be used for harvesting valuable timber. Maintain and increase timber revenues over time. Recognize and plan for aesthetic values.	Manage for structural characteristics of older forest, including large diameter trees, snags, down wood, multiple canopy layers, and high level of horizontal and vertical structural diversity.	Manage for structural characteristics of older, mature forest, which include large old trees (greater than 150 years), large snags, large down logs, deformed trees, multiple canopy layers, and a high level of within-stand variability including both horizontal and vertical structural diversity.
Research and Demonstration	Encourage research and demonstration throughout Matrix area.	Research and demonstration that follows goals of OFDA.	Research and demonstration that follows goals of LSD.
Silviculture	All methods encouraged under research and demonstration. Outside of research and demonstration, single tree and group selection, commercial thinning.	Single tree and group selection, commercial thinning.	Single Tree Selection.
Emphasis	Promote growth of larger and better phenotypes while maintaining diversity. Growing a component of trees to their maximum size that can be feasibly harvested without undue environmental impact to the site.	Short term: Reduce competition between co- dominant crown classes. Long term: Retain trees based on structural characteristics and contribution to horizontal and vertical structural diversity.	Accelerate growth of dominant and co-dominant trees. Retain and develop elements of older, mature forest such as nonconforming crowns, snags, and large, downed logs. Retain trees of various degrees of vigor to maintain a source of dead-wood recruitment. Foster the development of complex (old forest-like) horizontal and vertical structural diversity including management for understory diversity.
Old-Growth	Retain old-growth trees as defined in the JDSF Management Plan.	Retain old-growth trees as defined in the JDSF Management Plan.	Retain old-growth trees as defined in the JDSF Management Plan.
Large tree Recruitment	Where no old-growth trees are present, retain a component of dominant trees.	Retain trees over 40”dbh and half of trees over 30”dbh if less than 10-20% of basal area is comprised of trees 40”dbh or greater. Based on site capacity, exceptions allowed.	Accelerate growth of dominant and co-dominant trees (see Emphasis).
Regeneration	Promote regeneration for future harvest. When regeneration goals are not met through single tree election, allow for openings up to 2 acres.	Manage for structural characteristics of older forest, including large diameter trees, snags, down wood, multiple canopy layers, and high level of horizontal and vertical structural diversity.	Minimize regeneration to natural levels in late seral stands. Cutting of entire clumps to be used sparingly to mimic natural disturbance.
Long-Term Harvest Trajectory	Harvest Volume will stabilize over time.	Research and demonstration that follows goals of OFDA.	Harvesting may eventually cease.

B2. Definitions of Matrix, Older Forest Structure Zone, Older Forest Development, and Late Seral Development

The Matrix Lands

JDSF Matrix lands are those lands not allocated to Older Forest Structure Zones, or other Special Concern Areas defined in the Management Plan and shown in Map B. Matrix lands will be the primary areas allocated to research and demonstration where projects require treatments not compatible with the goals of the OFSZs, Reserves, and Special Concern Areas.

Older Forest Structure Zone

The OFSZ is a generally contiguous area that includes Old Growth and other Reserves, Late Seral Development Areas (LSDAs), and Older Forest Development Areas (OFDAs). Harvesting is permitted within LSDAs and OFDAs to the extent that is consistent with their designated goals (see: Definitions).

The purpose of OFSZ is to produce structural characteristics of older forest, which include large trees, snags, down logs, multiple canopy layers, and a high level of structural diversity. A key feature is the connectivity of the OFSZ across the Forest.

Components of the Older Forest Structure Zone

Older Forest Development (OFD)

The goal of Older Forest Development is to manage for structural characteristics of an older coast redwood forest, which include large old trees, snags, down logs, multiple canopy layers, and a high level of structural diversity while allowing for timber harvest of trees of all ages and sizes.

Late Seral Development (LSD)

The goal for areas designated for Late Seral Development is to manage for structural characteristics of older, mature forest, which include large old trees (greater than 150 years), large snags, large down logs, deformed trees, multiple canopy layers, and a high level of within-stand variability and both vertical and horizontal structural diversity.

Old Growth Groves

Reserves

C. Allocation Changes***

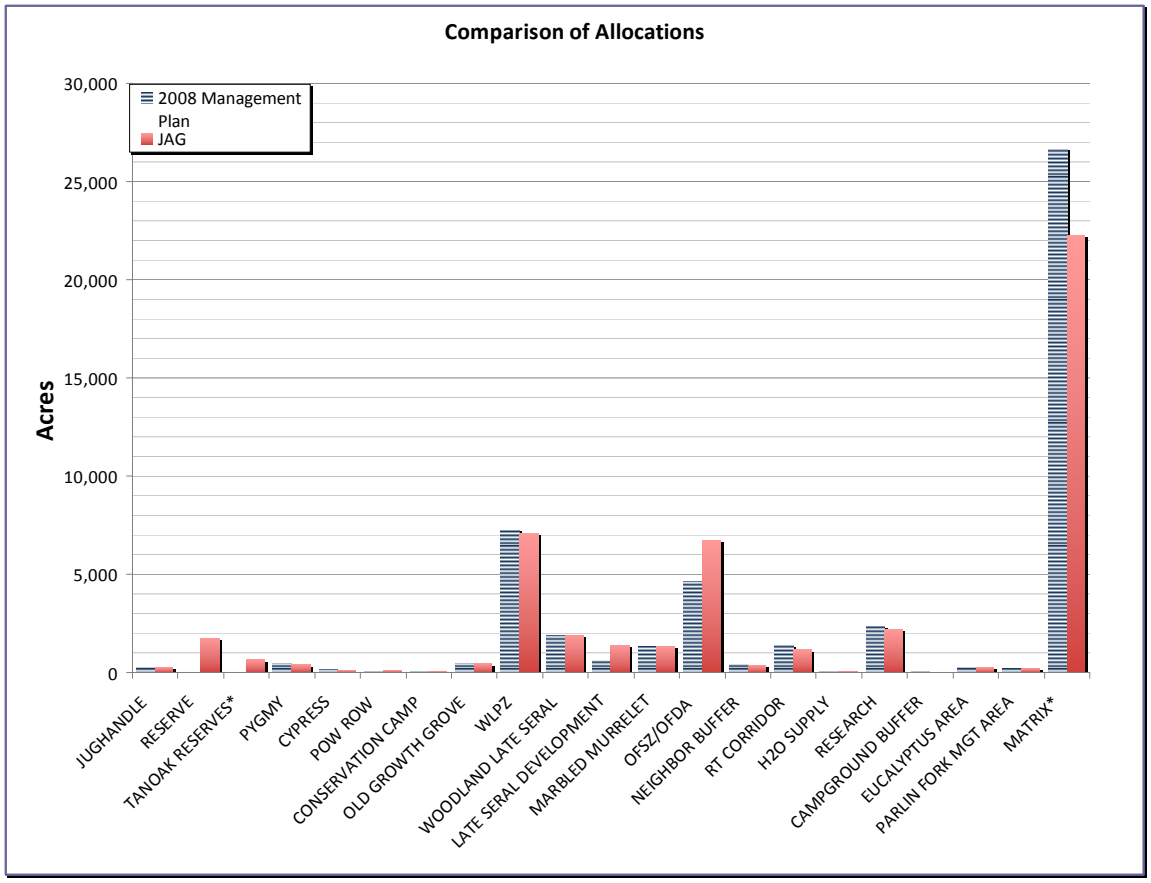
Appendix Table 5.2.

Map #	Name	Acres Study	Acres Reserve	Acres LSD	Acres OFD	JAG to	Reason	MP Goal
1	Highway 20 East				221	OFD	Buffer Old Growth	2
2	Dresser Grove			76		LSD	Buffer Old Growth	2
3	Void (omitted or consolidated)							
4	Road 1000			8		LSD	Buffer Old Growth	2
5	West of Waterfall Grove			45		LSD	Buffer Old Growth	2
6	South of Waterfall Grove				105		Leverage Residual OG	2
7	Indian Springs Fire Study (tentative) (includes one Hardwood Study Area)	213				Study	Unique Research Opportunity (to be reviewed by Research Planning Team)	1
8	Bob's Woods Meadow		8			Reserve	Unique Area	1-2
9 9a	North of NFSF Noyo OFD South of Pentagon Grove			8	432	OFD LSD	Adjust OFD to both sides of River, Buffer OG	2
10	Volcano East Thumb				144	OFD	Increase OFD block	2
11	Camp 6 Brandon Headwaters				180	OFD	Increase OFD block	2
22	Volcano Brandon Tributaries				331	OFD	Increase OFD block	2
12	Brandon Gulch THP			453		LSD	Recognize litigation settlement; Assess effectiveness of LS prescription	2
13	Camp 3 THP			188		LSD	Recognize litigation settlement; Assess effectiveness of LS prescription	2
14	Camp 3 THP Reserve		160			Reserve	Recognize litigation settlement; Provide control as contrast to LS prescription	1-2
15-16	Void (omitted or consolidated)							
17	Noyo to Big River Link				715	OFD	Strengthen N-S OFSZ linkage	2
18	North Fork Caspar Controls		193			Reserve	Provide no-harvest controls; Already in control status	1
19	Jughandle Pine/Cypress Complex*	1155				Study	Extension from Pygmy; Pine/Cypress Study; Recreation*	1-3, 5
20	Hardwood Study Reserves (temp)	671				Study	Study hardwood issues and ecology	1
21	See #13 and #14							
22	See #10, #11, and #12							
Totals		2,039	631	778	2,128			
Grand Total 5,306**								

** Potential for timber harvest to be reviewed by Research Study Team and stand-type experts.*

*** Includes non-timber; temporary designations; Pine/Cypress dominated.*

**** Every attempt has been made to provide accurate acreage; however the above information is an approximation and is not to be considered binding.*


Comparison of Allocations
2008 Management Plan
JAG
Acres
30,000
25,000
20,000
15,000
10,000
5,000
0
JUGHANDLE
RESERVE
TANOAK RESERVES*
PYGMY
CYPRESS
POW ROW
CONSERVATION CAMP
OLD GROWTH GROVE
WLPZ
WOODLAND LATE SERAL
LATE SERAL DEVELOPMENT
MARBLED MURRELET
OFSZ/OFDA
NEIGHBOR BUFFER
RT CORRIDOR
H2O SUPPLY
RESEARCH
CAMPGROUND BUFFER
EUCALYPTUS AREA
PARLIN FORK MGT AREA
MATRIX*

Appendix Table 5.3. Allocations***

Allocation	JDSF Acres	JAG Acres	Net Change	Percent Change	Percent of JDSF JAG Changed
Jughandle Pygmy	246	246	0		
Jughandle Pine/Cypress Study	0	***1,115***	1,115	n/a	2.4%
Hardwood Study Reserve †	0	(* ***671)***	(671)	n/a	1.4%
Indian Springs Fire Study*	0	213	213		0.4%
Other Pygmy	457	*382*	† -75	-17%	
Cypress	164	*110*	† -54	-33%	
Power ROW	83	83	0		
Conservation Camp	32	32	0		
Bob's Woods Meadow	0	***8***	8		
Old Growth Grove	450	450	0		
WLPZ	7,289	*7,085*	† -204	-3%	
North Fork Caspar Controls	0	***193***	193		0.4%
Camp Three Reserve	0	***160***	160		0.3%
Woodlands LS Development	1,895	1,895	0		
Other Late Seral Development	602	***1,380***	778	129%	1.6%
Marbled Murrelet	1,349	1,349	0		
Older Forest Zones	(OFSZ) 4,637	(OFDA) ***6,765***	2,128	46%	4.4%
Neighbor buffers	397	*338*	† -59	-15%	
Road/trail corridor	1,413	*1,136*	† -277	-20%	
Water supply	32	32	0		
Research	2,372	2,191	† -181	-8%	
Campground buffer	45	*23*	† -22	-48%	
Eucalyptus area	266	266	0		
Parlin Fork Management Area	220	220	0		
Matrix	26,703	* 22,940	-3,760	-14%	
Total	48,652	48,652			10.9%

Bold Italic = JAG Changes

** Hardwood Reserve has undefined, variable duration, therefore not overlaid on other allocations. Did not subtract from Matrix acres.*

† Acreage reduction due to incorporation into other protective status, such as Reserve.

*** Tentative: To be reviewed by Research Planning Team. Also includes one Hardwood Study Area.*

**** Every attempt has been made to provide accurate acreage; however the above information is an approximation and is not to be considered binding.Appendix Table 5.4.*

Appendix Table 5.4. Desired Future Forest Structure Conditions**
Management Plan Table 7 Compared to JAG Recommendations
(See 2008 Management Plan, page 66)

2008 Management Plan, Table 7 (page 66)		**Including Proposed JAG Allocations***	
Forest Structure Condition	**% of Forest Acres**	**% of Forest Acres**	**Notes**
Late seral or old-growth	15-25%	26%	WLPZ, Woodlands, Other LS, MaMu, OG, N. Caspar Controls, Camp 3 Reserve
Older forest structure	10-20%	14%	Called OF Development in JAG, Campground buffer
Mature and large trees	5-15%	51%	Matrix (incl Hardwood Study), neighbor buffer, campground buffer, road/trail, water supply, Parlin Fork Management Area, Eucalyptus
Mixed age and size	30-40%		
Regeneration, pole, younger	10-20%		
No specific structure assigned	0-10%	9%	Jughandle Pine/Cypress Study, Research Areas, power ROW, JH Pygmy, Other Pygmy, Cypress, Indian Springs Fire Study, Bob's Woods
Total	70-130%	100%	

** Based on Appendix Table 5.3, which uses acreages calculated by CalFire. See also Appendix Table 5.5, Comparison Detail, for category acreage and allocation details.*

*** Every attempt has been made to ensure accuracy; however the above information is an approximation and is not to be considered binding.*

Appendix Table 5.5. Management Plan Table 7 Comparison Detail*
(Using Acreage as per Appendix Table 5.3.)

Forest Structure Condition	2008 Management Plan	MP % of Forest Acres	JAG Recommendations	JAG % of Forest Acres
Late Seral or OG		**Table 7 = 15-25%**		
OG Grove	450		450	
WLPZ	7,289		7,085	
Woodlands STA	1,895		1,895	
Other LSD	602		1,380	
Marbled Murrelet	1,349		1,349	
N. Caspar Controls			193	
Camp 3 Reserve			160	
LS/OG TOTAL	**11,585 acres**	**24%**	**12,512**	**26%**
Older Forest Development		**Table 7 = 10-20%**		
OFDA	4,637		6,765	
Campg buffer	45		23	
OFD TOTAL	**4,682**	**10%**	**6,788**	**14%**
Mature & Large		**Table 7 = 5-15%**		
Mixed Age & Size		**Table 7 = 30-40%**		
Regen/pole/young		**Table 7 = 10-20%**		
		Total Table 7 = 45-75%		
Neighbor buffer	397		338	
Road/trail corridor	1,413		1,136	
Water supply	32		32	
Eucalyptus **	266		266	
Parlin Mngt Area	220		220	
Matrix	26,703		22,940	
(incl Hardwd Study)			(671) (in Matrix)	
Mature/Mixed/Regen TOTAL	**29,031**		**24,932**	**51%**
No specific structure		**Table 7 = 0-10%**		
Jughandle Pine/Cypr			1,155	
Research***	2,372		2,191	
Power ROW	83		83	
Conservation Camps	32		32	
Jughandle Pygmy	246		246	
Other Pygmy	457		382	
Cypress	164		110	
Indian Springs			213	
Bob's Wds. Meadow			8	
No specific str TOTAL	**3,354**		**4,420**	**9%**
GRAND TOTAL	**48,652 acres**		**48,652 acres**	**100%**

** Every attempt has been made to provide accurate acreage; however the above information is an approximation and is not to be considered binding.*

*** To be restored back to redwood/Douglas-fir.*

**** Includes Caspar, Railroad Gulch, Whiskey Springs, other established research areas.*

D. Context for Silviculture and Allocation Recommendations

The Charter of the Jackson Advisory Group (JAG) charged JAG with reviewing the 2008 Management Plan and providing input regarding a number of key silviculture and landscape allocation issues, which are covered in this section of the Report. These include:

- Desired future forest structure condition goals for the Forest and the forms, amounts, and spatial designation of silvicultural treatments to be applied to attain those goals;
- Long-term goals for a wide range of forest structures, including but not limited to: The extent and general location of areas to be dedicated to Late Seral Development and older forest structure, where timber production will be secondary to habitat development; The extent and general location of areas to be dedicated to old forest structure zones [to] …maintain or develop key old forest features [as well as]…be available for timber harvest; Protecting residual old growth; and Even-aged harvesting.

During nearly three years of intensive meetings, JAG reviewed a wide variety of data provided by staff, considered a broad array of other information, and consulted with experts and practitioners. As a result, JAG is proposing an integrated set of forest allocations along with goals and guidelines for the silviculture to be applied in them. Additionally the Landscape section of the Report provides other recommendations regarding topics on which the Charter requested input. The recommendations are made in relation to a 40-year planning horizon.

The following is a brief summary outlining why JAG supports adoption of these recommendations as a package. JAG believes these recommendations will allow JDSF to fulfill its mission and implement the Goals and Objectives identified in the 2008 Management Plan.

The landscape allocations accommodate a full range of research and demonstration to address management questions relevant to all forestland owners from the largest to the smallest. Management Plan Goal # 1 is Research and Demonstration, and the JAG recommendations provide the flexibility to implement that goal. Details are provided in Chapter 3 (Research and Demonstration).

The recommended allocations and silviculture will provide opportunities for a broad range of research and demonstration that will be useful for non-industrial timberland owners. This is responsive to Management Plan Goal # 1, Research and Demonstration. According to a 2003 Report to the Legislature by the California Department of Forestry and Fire Protection, on the North Coast approximately 49% of privately owned forestland is held by non-industrial timberland owners. These owners represent the segment of forestland owners who have the greatest need for practical, low-cost information on how to manage their forests.

While the JAG recommendations allow for research and demonstration using even-aged management, the main management focus is on uneven-aged management. Because most small forestland owners manage their lands for a variety of purposes, most utilize uneven-aged management. Doing so is a requirement for approval of a Non-industrial Timber Management Plan (NTMP), which is one of the more flexible and potentially cost-effective permitting alternatives available to a small timberland owner. JAG's recommendation to broadly apply uneven-aged management by utilizing Matrix Forestry will provide research and demonstration opportunities across a wide variety of forest stands similar to those on regional non-industrial ownerships. Documentation of the results of this production-oriented approach, which is also likely to provide positive aesthetic qualities, is likely to be of interest to a significant segment of smaller landowners.

JAG's recommendation to expand acreage in the Older Forest Structure Zone, with a focus on documenting a variety of methods to maintain or create the horizontal and vertical diversity typical of older forests in the redwood region, will also benefit non-industrial landowners.

According to a number of panelists at JAG's two-day input session of regional science professionals, small landowners are very interested in maintaining or restoring structural features of older forests. For those landowners primarily interested in enhancing the fish, wildlife, and recreational aspects of their property, the JAG recommendations will provide opportunities for research and demonstration on managing for Late Seral Development starting from a variety of stand conditions typical of the redwood region. For those landowners who wish to periodically harvest timber while enhancing older forest attributes on their land, the Older Forest Development allocations, which also include a broad variety of starting conditions, will provide the opportunity for practical guidance.

JDSF's educational mission for non-industrial land managers will also be enhanced by JAG's recommendation regarding the information JDSF will provide regarding future JDSF timber harvests. These include an economic analysis of the proposed harvest and post-harvest outcomes. This sort of information will help landowners to understand the trade-offs among a variety of possible forest management options and make decisions that best reflect their needs.

The JAG recommendations will help JDSF to fulfill its educational mission in relation to the non-industrial timberland owner. In turn, this will help sustain regional timber production, milling capacity, and employment over the short- and long- term.

The managers of the expanding acreage of conservation and community-based forestland will also benefit from educational opportunities provided by JAG's allocation and silviculture recommendations. These managers currently include The Conservation Fund, the Redwood Forest Foundation, Pacific Forest Trust, and Save-the-Redwoods League.

- Since 2004, the The Conservation Fund has purchased approximately 40,000 acres at Garcia River, Big River, and Salmon Creek. Most of this land will be used for sustainable timber harvesting.
- In 2007, the Redwood Forest Foundation, Inc. (RFFI) purchased the 50,635-acre Usal Forest north of Ft. Bragg from the Hawthorne Timber Company. With the exception of the likely transfer of beach property and other non-timber, management is anticipated to be sustainable timber production.
- In July 2010, approximately 800 acres along the Sonoma County coast was purchased by Save-the-Redwoods League for eventual transfer to Pacific Forest Trust and other entities. A yet-to-be determined portion of these acres will be reserved, while the overwhelming majority will be used as a working forest with conservation goals.

Along with managing some forests for sustainable timber production, these same conservation-oriented timberland owners, as well as the California State Parks Department, manage additional forestland for maintaining and restoring older forest conditions:

- In 2002, Save-the-Redwoods League purchased the 25,000-acre Mill Creek property, which is now part of Del Norte Coast Redwoods State Park. According to the League's website, their major long-term goal is to restore these logged lands to resemble old growth forests. The League has undertaken extensive forest thinning and other habitat restoration activities. Some of these activities are already benefiting from research being conducted on behalf of the League at JDSF.
- In 2002, California State Parks was able to acquire approximately 7300 acres of mostly second and third growth redwood forest for addition to the state park system at Big River, adjacent to JDSF near Mendocino. Research and demonstration on late seral designated allocations at JDSF can help guide the Big River effort.

The JAG recommendations will help JDSF to fulfill its educational mission in relation to conservation and community-based owners as well as public forestland owners. This will help sustain regional timber production, milling capacity, and employment over the short- and long-term. Additionally, it will assist these owners in maintaining and restoring the regional forestland environment.

Another important constituency that is well served by the JAG recommendations is the general public who use the forest for recreation. A review of Map Figure 2 in the 2008 Management Plan reveals that the amount of publically owned redwood forestland available for recreation in the area between San Francisco Bay and the south Humboldt County line is relatively small compared to what is available further north. This has always created a dynamic tension for JDSF managers who, by default, must accommodate much of the regional interest in redwood forest recreation. This includes the full gamut of forest-related recreation including hiking, biking, camping, horseback riding, mushroom hunting, deer hunting (in season), and general rest and relaxation.

JAG believes that its recommendations regarding Matrix Forestry and expansion of the Older Forest Structure Zone will provide for a satisfying visitor experience. This will implement Goal #5 of the 2008 Management Plan, Recreation and Aesthetic Enjoyment. JAG considered the historic recreation use patterns at JDSF and designated some areas for LSD and OFSD where there was a strong history of public use. Existing stand conditions were another factor driving determinations.

The same sorts of landscapes that most visitors find appealing also provide important habitats for forest-associated species of plants and wildlife, including threatened and endangered species. JAG's recommendations are meant to assure that JDSF continues to function as a leader in maintaining and restoring regionally scarce older forest resources. Fulfilling the 2008 Management Plan's Goal #2, Restoration and #3, Watershed and Ecological Processes, is important as demonstrated in the book, The Redwood Forest, edited by Reed F. Noss and published by Island Press in conjunction with Save-the-Redwoods League (SRL) in 2000. This is the most current comprehensive work on the History, Ecology, and Conservation of the Coast Redwoods. The map on page 42 shows how the range of the coast redwoods has been divided for the purpose of its analysis. Jackson Demonstration State Forest (JDSF) is located in the area characterized as the "central section" of the coast redwood range. This area includes the area north of San Francisco Bay to the northern boundary of Mendocino County.

This delineation is important. Statistics found on the SRL website in July 2010 indicate that fewer than 106,000 acres (5%) of ancient coast redwoods remain in the original approximately 2 million acre range. However, as The Redwood Forest notes on Page 265:

> "The redwood forest is, in fact, an assortment of many different plant associations responding to a plethora of site conditions. Several tree species, such as Douglas-fir and tanoak, often share dominance with redwood. These different associations have different species composition and ecological relationships. Protection of redwoods in parks and other reserves has not sampled the various associations equally. Some types of redwood forest are unrepresented. For example, 10.75 percent of the redwood forests in the southern section is in the highest category of protected areas, compared to 5.76 percent in the northern section and only 1.36 percent in the central section."

Since the book's publication there have been a number of public acquisitions in the central region, some of which will result in an increase in the acreage of redwood in the highest category of protected areas. However, even taking into consideration these new park and conservation acreages, *JDSF is located in the section where redwood forests have the lowest percentage of reserve protection compared to their original range*. Older forest characteristics are regionally in short supply. Management by the State Forest staff has resulted in some

forest stands at Jackson that are older, with larger trees than are generally available on private ownerships in the region, providing a unique opportunity to build old forest structure sooner at Jackson than will be possible elsewhere. Because Jackson is by far the largest public redwood forest in the region, the JAG recommendations to expand the Older Forest Structure Zone will make a significant contribution to maintaining and increasing the regional stock of older forest attributes.

Within the context of regional circumstances, JAG is recommending enhanced buffers around special concern areas and old growth groves and more Late Seral Development and a few new Reserves. Buffering old growth trees located outside reserves is another regionally appropriate recommendation. Additionally, areas have been recommended for designation as Older Forest Development to strengthen corridors and provide better contiguity of older forest structure, particularly in the north/south gradient. Even so, the JAG recognizes that while these designations will immediately enhance corridors and contiguity, the areas designated for Late Seral Development are not likely to achieve true late seral conditions for centuries.

Equally with the preceding reasons, JAG's recommendations provide for Management Plan Goal #4, Timber Management. JAG was careful to always consider what effects its recommendations might have on overall timber production and the value of the timber that will be produced over the short- and long-term. JAG has asked staff to provide its best estimates of potential differences between timber production under the 2008 Management Plan and using JAG's recommendations. While it is impossible to predict output with certainty, even if JAG's recommendations collectively result in less timber production than the maximum that is allowable under the 2008 Management Plan, there is no question that much timber production is allowed. When staff's analysis becomes available, JAG will consider whether changes to its recommendations are warranted. One long-term timber production emphasis is on developing older, larger, high value trees for ultimate harvest. Current market conditions provide dramatic evidence that older, larger redwood, in particular, holds its value and marketability in a way that some other timber resources have not. Growing these larger, older trees for harvest will, in the future, help sustain the value of timber harvested from JDSF even in less-than-ideal market conditions. In turn, this timber will contribute to maintaining regional milling capacity. Additionally, without a doubt, timber inventory will grow, providing a wide variety of options for future decision-makers.

Perhaps the single most important contribution to timber production made by the JAG silviculture and allocation recommendations is the high likelihood that the controversies that caused the absolute cessation of timber production over much of the last ten years will not reoccur. The recommendations are carefully drawn to meet the needs of the widest possible number of stakeholders while fulfilling the legal mandates under which the forest operates. The JAG believes its recommendations will allow JDSF to produce a sustainable, reliable harvest of timber that will make a significant contribution to the local and regional economy.

Taken together the JAG silviculture and allocation recommendations implement the JDSF mission in relation to, at a minimum, large timberland owners, non-industrial timberland owners; conservation and community-based land managers; state parks; the general public; recreationists; forest-associated plant and animal species, including threatened and endangered species; mill owners; and the local and regional economy.

Appendix 6. Research and Demonstration

DISCLAIMER

The Research Recommendations appendices are intended to provide background to the consensus JAG Research Recommendations described above and do not constitute a formal JAG recommendation. The appendices are intended to document an objective integration of ideas and concepts that were part of the discussion during the deliberations of the Research Committee, Science Workshop participants, JAG discussions, and in some cases, outreach with stakeholder groups.

These appendices are designed to convey the collective thinking to those responsible for implementing the recommendations by providing additional clarity and/or descriptions that should aid implementation. The ideas represented here reflect the development of ideas over a 2+ year timespan, and while significant efforts have been taken to be comprehensive and objective, the final product may not reflect a complete catalog of all discussion elements. In some instances, multiple authors have vetted the language. In other areas, the language in the appendices represents early discussions, or ideas discussed in detail only among a subset of JAG members. Thus the ideas conveyed in these appendices may not fully capture all perspectives; although all JAG members have been invited to contribute any diverging ideas or opinions.

JAG would like to be clear that in any instances where the Recommendations in Chapters 2 or 3 may be perceived to conflict with the appendices, the main body of the report should be viewed as governing.

A. General Principles

Several core principles supported the development of JAG's Research recommendations. These were formally adopted by the JAG in October 2008, and include:

- The entire forest will be available for research, demonstration, and monitoring activities
    - Manipulative research will be limited in some areas
    - All significant activities relating to the Centers of Excellence will support Demonstration by way of brief summary reports for each activity that document essential information (e.g., Pre-treatment conditions, Treatment goals, Treatment justifications, Methods, Results, Relevant economic data etc)
- Priorities will be based on the needs of policy-makers, scientific knowledge and stakeholder issues
- All requests for research are welcome on the forest and will be considered based on available resources (e.g., staff, funding, etc).
- Research should aim to reduce the risk of unanticipated outcomes due to lack of knowledge by:
    - Conducting research in areas of uncertainty, and
    - Managing for an appropriate degree of diversity at scales that support the needs of research, and
    - Carefully examining assumptions, and

- Implementing an appropriate forest-wide monitoring strategy, and
- Utilizing an adaptive management approach that is informed by an integrated monitoring approach

B. Key Themes & Take-Home Messages From The Science Workshop[11]

The convened experts broadly agreed that the Landscape Allocation for a "World-Class" Research and Demonstration Forest should be constructed using a Hypothesis-Oriented Framework that defines an organizational structure for testing and improving forest policies and practices throughout the Redwood region. Such a framework could be organized around models, ranging from simple conceptual models to more detailed quantitative models, that would provide some organizational rigor and could eventually improve the ability to predict potential impacts associated with management practices. This type of framework would provide stakeholders with reliable information for how to manage forests in a sustainable manner. It would allow the entire forestry community to leverage knowledge gained at JDSF throughout the Redwood region (and beyond), while also ensuring that management within JDSF meets the goals and objectives defined within the management plan. Embedded within this Hypothesis-Oriented approach should be:

- **An Adaptive Management Framework** that rigorously tests the assumptions around existing policies and practices that occurs within the Redwood region. Integrates monitoring, research, and demonstration in ways that improve practices and policies of interest to the forestry community
- **Sufficient diversity of structural conditions** exists (and is maintained over time) across the landscape such that current and future researchers will have a complement of varied conditions upon which to conduct research

A primary goal of this Hypothesis-Oriented Framework would be to test and refine Forestry policies and practices within the Redwood Region (and perhaps beyond) that can support continued extraction of resources in a sustainable manner without unraveling our watersheds and negatively impacting sensitive resources. Such a goal should more effectively lead to:

1. The recovery of endangered species, and
2. Restoration of old-growth redwood forest ecosystems

There was also broad agreement that the landscape allocation should reflect a focus on strategic "**Centers of Excellence**" that define a somewhat narrow, yet multi-disciplinary research focus for the forest that helps to resolve critical issues facing forest management within and beyond the Redwood region. Two suggested Centers of Excellence aroused a substantial degree of interest by all the workshop participants:

1. **Seek to understand the dynamics between habitat and structural relationships with Redwood Ecosystems** – specifically focused around upland species, among which would perhaps including a sub-focus of how to manage for older forests. Use models as the basis for our existing understanding. Formulate the models on existing structure of the landscape. Aim to be predictive so that the data can be validated through experiments.

[11] The Science Workshop was held on February 1-2, 2010. This summary was distributed for review to the invited participants and recommended edits have been incorporated herein. This summary reflects the collective opinions of the invited participants and do not necessarily reflect JAG consensus.

2. **Seek to understand how to achieve the recovery of watersheds by way of a focused approach to Coho salmonid recovery** – drive to restoration of coho habitat/riparian habitats/watersheds as fast as possible. Get really good about recovering fish. Test new rules. Invest heavily in restoration to see if we can recover the species. Construct more complete management system, so that we can export principles, policies and practices to other lands.

These two centers should follow parallel research pathways that could provide analytical and methodological references and thus support their mutual development.

In developing the Landscape Allocation, **JAG should think more about how JDSF can integrate opportunities across the entire Redwood landscape**. A landscape-based, cooperative approach increases the relevance of JDSF to many stakeholders. Also, the ability to manage at landscape-scales is greatly improved by collaborating with other landowners throughout the Redwood region (since there is probably limited opportunity within JDSF to address landscape-scale issues given its size, limited range of variability, and other management constraints). Building a Research Cooperative would:

- Leverage funding resources from a broader array of cooperators, agencies and granting entities
- Establish JDSF as a center of research that provides the staff, money and support for the cooperative
- Provide collaborators that can also support adaptive management efforts by engaging in evaluations of policies and practices throughout the region
- Leverage the unique capacities of JDSF to do manipulative studies that cannot be easily replicated by other land-uses, recognizing that generally,
    - Parks and Conservation blocks can provide references
    - Industrial landowners typically offer more active production-oriented forestry
    - USFS lands have different management constraints than typically apply to lands operating under Forest Practices regulations
    - Habitat Conservation Lands offer other management models
    - Descriptive studies can be conducted anywhere

The Experts briefly reviewed existing landscape allocation proposals under consideration by JAG and generally found that while containing some good ideas and concepts, generally:

- The Management Plan proposal is too focused around silviculture and lacks any defining hypotheses
- The Natural Forestry[12] default is too rigid and lack's sufficient diversity
- The working Research Committee's approach is too nebulous (in its current form). Needs more thoughtful framework built around *Centers of Excellence*.[13]

As an interim approach, the allocation balance as expressed in the Management Plan is pretty close to where it needs to be in the short-term. It is similar to Blodgett's allocation in its distribution, and it offers sufficient flexibility to respond to opportunities. As an interim allocation prior to developing a more definitive hypothesis-based approach, this is probably enough.

[12] "Natural Forestry" refers to an early version of the silviculture constraints that are described in the Landscape Section of this document.
[13] This recommendation from the Science Workshop participants has been incorporated into the proposed Research Recommendations contained in this document.

Constructing the Hypothesis-Oriented approach to allocation should start by:

3. Synthesize information for the existing landscape
    - Begin by developing simplified (cartoon) conceptual models
    - Use the conceptual models to begin constructing more quantitative models using existing inventories and data to test what we think we know and don't know about the key relationships in each Center of Excellence
        - Start simply, and increase the level of sophistication as knowledge develops
        - Note that many existing models can be found within the existing scientific literature (and other forest management experiences). The key for JDSF is to refine and integrate these tools so that the results are relevant. Look to Watershed Analysis and similar tools.
4. For Watersheds: begin active restoration of coho as soon as possible (recovery is urgently needed!)
    - Active restoration focused on wood placement, fish passage and other habitat improvements (e.g. reconnect floodplains, etc.)
    - Intensively monitor to document what works (and what doesn't)
    - Apply experimental methods using testable hypotheses
5. Develop limiting factors models
6. Formulate and test various working hypotheses (including peer-review from cooperators)
7. Define upland units on wildlife/ecosystems needs (watersheds probably not useful unit structure for uplands)
8. Define riparian units using geomorphic reaches
9. Begin to define a desired future condition trajectory for all stands (or management units). Every manipulation is an opportunity to develop and test hypotheses.

In addition to the above activities associated with developing the scientific basis for the Hypothesis-Oriented allocation, several relevant tasks include:

- Form cooperatives and adaptive management frameworks that can be used by those cooperatives (possibly integrating with the Monitoring Study Group and others)
- Hold a symposium of land/ocean recovery of salmonids (look to NSF as a resource here)
- Develop JDSF expertise center (staffing, partners, resources, etc.)

Over a period of years, this effort should target the development of formal management systems (combinations of regulations, policies, practices and Adaptive Management) that would make models available to other landowners. Start using the context of the existing regulatory framework, and actively refine as information evolves.

From a structural perspective, the Experts suggested that the building blocks should be units that integrate a) existing conditions, b) desired future conditions, and c) data-driven models that define research objectives (hypotheses).

The concept of shifting mosaics were not considered appropriate, as they can complicate studies by introducing greater complexity in legacy conditions (e.g. seed banks, etc.). Instead,

strong support was voiced for stable units that persist over time so as to provide that stability required for long-term studies. Specific recommendations for data and infrastructure needs are provided.

With regard to measuring (and thus ensuring) an adequate diversity of structural conditions on the forest, the experts advised JAG to keep it relatively simple, by using existing silvicultural classification systems (e.g. modified Oliver and Larsen as discussed in a paper by Dr. Kevin O'Hara's) as the base. Additional detail (silvicultural systems, habitat relationships, etc.) can be integrated as our collective sophistication of these landscape-scale processes and functions naturally evolves (and as the language develops to better describe these variations). Identify units (primarily around sub-watersheds or similar eco-system units) and keep those units stable. Units might consider defining classes of treatment types in a manner similar to Blodgett Forest (subject to variability within the units). Over time, as models evolve, move toward defining measures of diversity using hypothesis-based approach described above.

Invited Participants included:

Pete Cafferata, CAL FIRE

Ron LeValley, Mad River Biologists

Steve Norman, USDA Forest Service

Kevin O'Hara, UC Berkeley

Kimberly Rodrigues, UC ANR (Sierra Nevada Adaptive Management Program)

Frieder Schurr, UC Berkeley – Center for Forestry (Blodgett Forest)

Kate Sullivan, Humboldt Redwood Company

Hartwell Welsh, USDA Forest Service, Pacific Southwest Research Station

C. Expanded Discussion: Research-Oriented Management Framework

We envision that a Research-Oriented Management Framework as describe in JAG's recommendations would establish a regional context, research priorities, and landscape allocation that would provide the basis for forest management practices within JDSF. This Research-Oriented Framework provides a conceptual organizational structure for testing and improving forest policies and practices both within JDSF and throughout the Redwood region. Such a framework can be organized around scientific models, ranging from simple conceptual models to more detailed quantitative models, that would provide organizational rigor and could eventually improve the ability to predict potential impacts associated with management practices.

This type of framework would provide stakeholders with reliable information for how to manage forests in a sustainable manner. It would allow the entire forestry community to leverage knowledge gained at JDSF throughout the Redwood region (and beyond), while also ensuring that management within JDSF meets the goals and objectives defined within the management plan. A primary goal of this Research-Oriented Framework would be to test and refine Forestry policies and practices within the Redwood Region (and perhaps beyond) that can support continued extraction of resources in a sustainable manner with due consideration to the critical needs of ecosystem needs, watersheds and other sensitive resources. We believe this framework should more effectively lead to:

- The recovery of endangered species, and
- Restoration of old-growth redwood forest ecosystems
- An improved technical basis for forest policies and practices
- New innovations that solve complex challenges
- Cooperative alignment with external stakeholders

Over a period of years, this framework should help to evolve existing management systems (combinations of regulations, policies, practices and Adaptive Management) that could provide management models for other landowners. The framework would start by using the context of the existing regulatory and management framework, and actively refine systems and processes as resources allow.

The intention for the Research-Oriented Framework is to build a management system that:

1. Continuously tests key assumptions of existing management policies and practices in the face of changing climatic, economic and environmental conditions
2. Develops and refines policies and practices that support Sustainable Production Forestry
3. Develops and refines policies and practices that promote the recovery of Endangered Species and associated habitats
4. Tracks the impact of JDSF's research approach on the management of other lands and other stakeholders (e.g., measure and report on the feedback loop, impacts (benefits) from JDSF/JAG research activities on management policies and practices).
5. Integrates basic inventory and monitoring data to provide information to the community at large

Within this Research-Oriented Management Framework are several sub-components:

An Experimental Basis for Management

Historically, JDSF has in many ways operated more like a private timber company than a public experimental forest. Its management regime was largely driven by operational objectives that would generate revenues, provide demonstrations to other landowners, etc. Research activities on JDSF were generally considered on an ad-hoc basis as opportunities were presented, and were often (but not always) driven by academic interests.

By contrast, most other experimental forests in the western United States orient their management activities specifically around research objectives. This type of "experimental basis for management" is focused on creating the context for research by manipulating the distribution of stand conditions, structures, and disturbances in a way that supports research, monitoring and demonstration needs. Rather than allowing researchers to passively respond to available conditions, an Experimental Basis for Management would proactively develop the ecological and structural condition that best supports the research mission of the forest (as expressed by the Centers of Excellence). JAG believes that JDSF would benefit as a "World-Class" Research forest if it were to move more toward an Experimental Basis for Management.

One view of an Experimental Basis for JDSF Management would suggest that significant management activities be viewed as experiments (and/or demonstration), and that as such, sufficient information should be compiled and maintained that could test the validity of these "experiments". In some cases, it may be appropriate to integrate rigorous hypothesis testing, including statistical replicates, into some practices and/or activities. In other cases, measurements might be limited to a select set of pre-defined variables that are part of a

systematic monitoring program. In yet other cases, more anecdotal information may be sufficient to provide relevant information. The key is that these considerations are part of the planning process from the onset of a project, and that such planning is done in a manner that promotes systematic thinking and integration across the forest/region.

We note that a good experimental design requires some focus (need to define the questions) that may need to develop over time (e.g., in response to the Landscape Management Planning Process, selected Centers of Excellence, and associated Research Agendas).

The spatial and temporal scale associated with allocation for studies should support issues at a range of scales, including the individual tree level, stand (and sub-stand) level, watershed (and sub-watershed), and regional. As such, study designs should seek to leverage the unique landscape and structural characteristics of any given harvest planning area or management action (e.g., road maintenance, etc). JAG's recommendations for the Research Planning Team, Redwood Research Group, and Regional Consortium should help to coordinate around an overall scientific agenda for the forest that benefits a wide spectrum of stakeholders.

Studies will be designed based on existing or desired future stand conditions, and both research topics (see Research Agenda), including JAG advocated forest management practices and emerging science or operational issues. Individual harvests will contribute to landscape scale demonstrations and research. For clarity, JAG understands that not every facet of every THP will need an experimental focus.

One way to approach an Experimental Basis is to designate a desired overall landscape ecosystem pattern that can be used to guide management prescriptions. Such a pattern would be established using landscape ecology principles, and will be managed by allocating (zoning) lands across the forest into various characteristic classes, based on stand structure, species mix, number of cohorts, age classes, habitat guilds, etc. The Research Planning Team will help to define these classes in a way that integrates JAG's Landscape Allocation with Research priorities identified by the Centers of Excellence. Over time, the forest should seek to maintain an appropriate cumulative mix for each of these classes that will range over time according to the forest management plan.

An Experimental Basis will also benefit by:

- A science agenda for the forest that outlines experimental questions/issues (including criteria for key questions) that should be under consideration by the forest staff.
- A clearly defined monitoring program that provides the protocols, accuracy goals, and QA/QC so that study designs can leverage the information generated by the monitoring program to the greatest extent possible.
- A clearly defined Adaptive Management Program that defines resource objectives, treatment variations, performance measures, and action triggers

A Comprehensive Monitoring Program

To support the objective of a 'world-class research and demonstration forest', JAG recommends that considerable effort be given to developing an integrated **monitoring and inventory program**. Such a program should outline existing monitoring approaches, protocols, staffing needs, etc. The monitoring program should be tightly coupled with Centers of Excellence, the Research Agendas, Landscape Management Planning, the Adaptive Management Framework, and the Demonstration program.

The Monitoring and inventory program should develop, compile and analyze data to support research and management that addresses applied forestry questions. Under this program, inventory and monitoring activities along with research and demonstration activities provide a

comprehensive information system that supports management. Whereas the research program will develop specific data in ways that support specific research objectives, the monitoring and inventory program typically will provide data that is more broadly collected to serve as decision support and potential data for future studies, external stakeholder needs, modeling inputs, and independent validation assessments. Data sets might be integrated into the monitoring and inventory program in a way that allows public access to the data.

The monitoring and inventory program should meet several objectives, as identified during the course of JAG's deliberations and outreach efforts:

1. It should support the scientific basis for forest management within and beyond JDSF. Monitoring data can provide the feedback necessary to test working hypotheses and implement adaptive management. As such, the monitoring and inventory system should be sufficiently robust to accommodate an ever-evolving set of management questions, hypotheses, and working assumptions.

2. This program should incorporate the current JDSF resource information system, consisting of forest inventory databases linked to a GIS. The GIS contains all currently available data layers relevant to the Forest. The current system also contains flat files of data for individual research projects.

3. A project tracking system should be implemented, in which each project and activity on the Forest completes a simple standardized report that identifies standard information for each project type. Such fundamental "case study" data can provide demonstration value, offers increased transparency, and provides basic information that can be used to document basic economic and environmental trends.

4. Given that priorities and objectives will change over the life of this inventory system, the system should be comprehensive enough to allow the questions asked of the data to evolve over time. Rather than identifying a fixed set of objectives, the system itself must be flexible enough that it can evolve along with the questions being asked of it.

5. The system should be comprehensive enough to accommodate information that will allow us to make decisions on how to sustainably manage redwood forest ecosystems, not just timber resources.

6. The system should be sufficiently simple and inexpensive to implement that it can withstand inevitable fluctuations in budgets and staffing over time. Research and development programs are usually the first to experience budget cuts or elimination in difficult economic times. Most programs for data collection and monitoring in fact succumb to budget shortfalls, as evidenced by a dearth of property-wide permanent data sets going back more than 10 to 15 years. A modular system is proposed, in which a basic set of data is always measured. This basic data are then supplemented with more comprehensive measurements in "rich" years.

7. At a minimum, there should be enough data to enable us to detect changes over time in overall forest stand parameters, such as CWHR structure class, average stand diameter or stem volume.

8. Plot installations should be linked to the existing permanent plot (CFI) grid. Project plots should be tied to the plot grid at a higher density multiple of the Forest-wide grid to achieve the desired 10 plots per project.

9. Enough plots should be collected that it will permit making inferences to population parameters at a reasonable level of confidence. We propose that the required level of

confidence be achieved over a larger area than the individual project or THP level, such as a planning watershed or a portion thereof. We propose that a set of up to 10 permanent plots be installed on each major project, such as a THP, in order to evaluate effects of treatments. As data from several projects accumulate, statistical inference can be made at a rigorous level of confidence. At the same time, installation of 10 plots per major project is a burden that can realistically be achieved even with basic staff in difficult budget situations.

10. We recommend exploring the possibility for the Redwood Research Group, the Regional Consortium or other affiliated group to take the lead in facilitating a regional resource database including other data sources such as the FIA program's grid-based inventory.

JAG acknowledges that a grid-based inventory works best for even-aged management. As new silvicultural methods such as group selection and variable retention start to replace traditional methods, one may expect that for a given grid intensity the precision of growth and inventory estimates will decrease substantially. Conversely, the grid-based inventory possesses unsurpassed utility in terms of reusability of the same data for different purposes, and maximum flexibility for incorporating new data from a variety of sources over time. A modification of the existing grid-based inventory could very easily render useless the State's longest continuously measured forest inventory data set, the JDSF CFI system. We tentatively recommend maintaining and enhancing the grid-based inventory at JDSF, but suggest that a new design may be preferable in the near term.

Adaptive Management Framework

One role for JDSF as a Research Forest is to rigorously test the assumptions around existing policies and practices that occur within the Redwood region (and perhaps beyond). A formal Adaptive Management Framework should help to integrate monitoring, research, and demonstration in ways that improve practices and policies of interest to the forestry community. Such a framework should include performance measures, resource objectives, study designs, key questions, and other elements that integrate and direct monitoring and research activities within the forest (and beyond).

Adaptive Management allows for a more dynamic management planning approach that recognizes that changes in management environment will occur during the life of a management plan, and that provides a system to assess the effects of change and to modify management activities in response. Adaptive management can be either informal (via feedback resulting from casual monitoring) or formalized through a specific management system (with specific responses that are triggered upon meeting certain conditions). Formal approaches typically include:

- Desired Future Conditions
- Resource Objectives
- Performance Measures
- Ecological and Management Indicators
- Analytical Strategies
- Feedback Mechanisms
- Integrated Monitoring

Numerous examples of formalized Adaptive Management systems are available. As resources become available, JAG recommends considering the benefits of such a program on JDSF.

D. Expanded Discussion: Centers of Excellence

As described in our recommendations, JAG has identified several tentative themes for Centers of Excellence. Much discussion and document revision has sought to refine these general trends. The following expanded discussion is intended to inform those who will be responsible for developing implementation guidance. It documents much of the discussion developed within JAG and our associated outreach efforts to provide context for how we arrived at these fundamental recommendations.

As indicated in our Recommendations, JAG has identified 3 tentative Center of Excellence concepts as follows:

1. **Coho Salmon Recovery and Restoration of Aquatic Communities**: To rapidly recover aquatic communities, and coho salmon in particular, by understanding the integration of watershed process and functions using both active and passive restoration processes.

   Objectives might include:

   - Developing more active riparian management strategies that seek to recover functions at larger spatial scales
   - Active instream management practices for restoring habitat potential
   - More active measurements of nutrient dynamics and biotic integrity
   - Strategies to identify and improve limiting factors at site and watershed scales
   - Intensively monitored experimental trials
   - Expansion of Casper Creek studies
   - Etc

2. **Upland Terrestrial Habitat and Forest Structural Relationships**: To understand habitat and population processes and develop predictive models of animal/plant/ habitat dynamics of upland species on a continuum from younger to older forests.

   Objectives might include:

   - Seeking to move beyond seral classes as a way to identify habitat potential
   - Identifying specific structural elements that benefit various species (or guilds of species)
   - Improving the predictions of habitat characteristics associated with various silvicultural treatment practices
   - Responsiveness to specific treatment practices (e.g., snag generation, prescribed fire, fungal inoculation, etc)

3. **Sustainable Forest Management Practices**: To understand and develop improved stand development pathways that integrate sustainable timber harvesting in the context of aesthetics, ecosystem management, timber growth and yield, forest product quality, carbon sequestration, and development of older forest conditions.

   Objectives might include:

   - Improved growth and yield modeling in redwood and redwood/Douglas-fir stands
   - Best Management Practice innovations and trials

- Quantifying silvicultural treatments that yield innovations in harvest design
- Evaluating the biological response to Late Seral silviculture treatments as compared to Older Forest Development treatments.
- Etc

These preliminary ideas deserve additional consideration and planning. Factors that should influence the final selection and priorities or the Centers of Excellence

Additional thinking around the Centers of Excellence would benefit by:

- Greater outreach to agencies, landowners, conservation groups and other external stakeholders to identify those priority deliverable products from these Centers that stakeholders would value
- Clarity about the structure, funding, staffing and other resources available to JDSF and associated research organizations (e.g., Redwood Research Group and Regional Redwood Consortium, etc)
- A broader examination of how forest structural dynamics can be leveraged to support research across the entire redwood landscape
- Additional deliberation by the Research Planning Group

The deliberations and input described above would help to resolve include several outstanding concerns and issues, including:

The right number of Centers – some have suggested focusing on fewer centers, building as organizational capacity develops. Others have suggested a broader distribution of Centers to support developing usable innovations in a timelier manner.

Sufficient Synergizing Capacity – the core idea behind the Centers of Excellence is that they promote synergy and cross-discipline research that leads to applied innovations. One challenge in defining any Center is avoiding the tendency to include topics simply because there may be a relationship between them. Centers can easily become overwhelmed with an overly broad definition that dilutes the power of the Center. We suggest that it would benefit the Centers to err on a more narrow focus than one that tries to include too many topics or issues. In general, the more specific the problem statement defining the Centers, the more excellence they will be likely to generate.

In our outreach efforts with scientists and other stakeholders, we discovered that there was only limited support for using JDSF as a focus area for the following issues:

- Basic ecosystem processes
- Climate Change Issues
- How to restore old-growth characteristics
- Exotic invasive species & response to disturbances (e.g., fire, fog, etc)

Criteria for Selecting Center Priorities and Topic Areas:

In light of these considerations, the JAG through its work within the Research Committee, Science Workshop, and its outreach efforts has identified criteria for selecting the types of scientific priorities that could be contained within a programmatic Center of Excellence.[14] These criteria are provided here to help guide those who may be helping to influence the selection of

[14] These criteria are focused on selecting and/or refining the Centers of Excellence priorities. It does not preclude other research (including ad-hoc) that may be appropriate for JDSF.

Centers of Excellence. These are not intended to be comprehensive, but reflect work done to date that may benefit those giving additional consideration to this topic. Primary Criteria include:

- **Centers of Excellence should focus primarily on achieving outcome-oriented goals v. theme-oriented topics**. The intention is to focus toward specific tools that can be used by managers, landowners and policy-makers. One approach might seek to seek to develop and/or apply quantitative models as a way of guiding the development of knowledge and ensuring sufficient scientific rigor.
- **Centers of Excellence should focus on informing applied forest management issues**. Inherent in this concept is the idea that applied forestry requires the scientific basis provided by a fundamental understanding of the ecosystem dynamics, silviculture, and other natural processes and functions, and that developing our understanding in these areas will also need basic (theoretical) research.
- **Centers of Excellence should be politically and/or socially important and of interest to stakeholders**. Each Center should seek to integrate the understanding between the scientific, socio-political, economic, engineering and factors that affect the management and stewardship of these resources. A focus should be those values that are directed toward informing policy, which includes both knowledge-based and values-based issues, and is relevant to:
    - Developing a fundamental understanding of ecosystem functions and processes
    - Informs forestry regulations and/or policy
    - Is important to stakeholders
    - Is relevant to the redwood region forest and conservation issues
- **Each Center should represent a significant research topic that offers continuity and long-term research opportunities**. Priorities should be provided for those topics and issues that:
    - Leverage the unique position of JDSF to develop science that cannot easily be developed elsewhere
    - Offer the potential for results that lead to cutting-edge innovations
    - Research results should be relevant for several decades and relevant to large areas
- **Considers the capacities available from the pool of experts**, including researchers, consultants, partner agencies, etc. Ideally, the Centers should promote synergies and collaboration among a multitude of technical and stakeholder interests
- **Best leverages JDSF's unique characteristics**, which include an excellent opportunity for active, manipulative experimental research that takes approaches that are difficult to conduct on other lands. Descriptive studies are available anywhere, yet there are few opportunities for active manipulation of the landscape. Other lands are more tightly bound by state Forest Practice Regulations, Habitat Conservation Plans, Federal constraints, or conservation easement constraints. JDSF also offers stability in landscape structure; the ability for confidence that installations and studies can persist over the long-term (i.e. less subject to economic drivers or ownership changes, etc). However, another unique quality of JDSF is its similarity to other redwood landscapes. Greater focus on these common features will encourage more interest by other landowners and expands our influence. We note that JDSF

is probably NOT suited to landscape-scale studies in the absence of cooperation with other landowners. By itself, JDSF offers too few replicates, too few sub-watersheds, and too little variation. As such, JAG and JDSF can play a vital role in linking researchers with managers and the public. By providing a contrast to these land-bases, JDSF can expand the range and depth of experimental study designs that may yield new innovations in forest management.

Additional preferences have been captured by various stakeholders that may also warrant consideration in selecting the core Centers. These include:

- Focusing on developing a fundamental understanding of ecosystem functions and processes
- Informing forestry regulations and/or policy
- Representing all stakeholder interests in a way that maintains relevancy to the redwood region forest and conservation issues
- Representing a significant research topic that offers continuity and long-term research opportunities
- Innovating toward cutting-edge solutions to key management and policy issues
- Promoting research that will be relevant for several decades and relevant to large areas (perhaps even beyond the redwood region)
- Considering the capacities available from the pool of experts (researchers, consultants, partner agencies, etc.)
- Promoting synergies and collaboration amongst multiple disciplines and topic areas
- Providing a sufficiently compelling interest to funding entities (e.g., grants, foundations, non-profits, industry, etc.), possibly using public/private models
- Leveraging JDSF lands by integrating with other lands (both managed and unmanaged) throughout the redwood region (and perhaps beyond)
- Creating a narrative that describes the story of the forest in a way that the public can understand and appreciate
- Characterizing our certainty about the consequences of management decisions, with a preference towards research that seeks to improve confidence around our predictive capacity
- Promoting the skills and capabilities needed to use management to influence the forest on its trajectory toward natural recovery of important ecosystem functions and processes
- Research that promotes the ability to maintain a broad range of dynamic conditions (including early to mid-seral habitats)

E. Expanded Discussion: Redwood Research Group and Regional Redwood Consortium

Generally, we see the Redwood Research Group as the center for Administration of Research and Demonstration, Adaptive Management, and possibly monitoring. Its semi-independence of CAL FIRE could provide an autonomy that would strengthen the perception of objectivity and scientific rigor. This status might improve its ability to leverage funding and resources from a broader base. Complete independence would also allow the Group to operate outside of the constraints of a State agency. Benefits might include improved credibility of research results, enhanced collaboration with other landowners, and eased adoption of new management practices outside of a regulatory context. Independence might also enable financial

management that helps insulate R & D activities from governmental budgeting swings and better assures long-term research.

There are several models for how such an entity could be organized. Each offers various pros and cons that the Board of Forestry and Fire Protection and CAL FIRE may want to weigh carefully. Examples include:

- Public/Private Partnership
- Independent Non-Profit Entity
- Academic Affiliation
- Multi-Agency Task Force
- CAL FIRE Department

The organizational structure of the Redwood Research Group may want to include a separate Executive Director as well as a Senior Scientist. The Executive Director's role might focus on funding, administration, facilitation, adaptive management and policy issues. The Senior Scientist's role might focus on the scientific aspects of the organization's mission. Staff may also want to include a full compliment of multi-disciplinary scientists ranging from field staff to senior researchers, who can be responsible to collecting data, implementing studies, and publishing results.

There is a wide range of example organizations to model in the development of this type of organization. We recommend looking to other "world-class" forests for examples, including HJ Andrews (OR), Olympic Experimental Forest (WA), Carnation Creek Experimental Station (BC) and others. Another potential model is the California State Parks Foundation.

A Collaborative Research Cooperative

A research cooperative would position JDSF as an integrative entity that unites efforts across the Redwood landscape by acting as a Hub for collaborative research that includes private lands, parks, conservation forests and federal lands. JDSF can be a resource that provides staff, money and logistical support as a center of research. Similarly, collaborative members can provide support for adaptive management and policy revision efforts. Such an approach increases the relevance of JDSF to many stakeholders. Also, the ability to manage at landscape-scales is greatly improved by collaborating with other landowners throughout the Redwood region.

We recognize that the extent that the broader forestry community will support JDSF depends in part on how stakeholder perspectives and concerns are solicited and addressed in objective, transparent, and well-designed R&D. The community of relevant stakeholders is quite large, and consists of

- Landowners and Associated Technical Support
    - Industry and non-industrial family owners
    - UC Extension
    - Consultants
- Researchers
    - USFS Pacific Southwest Research Station
    - Key University professors at HSU, UCB, and Cal Poly
    - Other Research Institutions
- Conservation groups

- Policy, regulatory, and agency groups

The Research Cooperative could provide a pool of competent and trained technicians, capable of collecting various forms of field data, including forest inventory, biological surveys, stream data, etc. It could also provide internal peer-review of the Research Agendas, study designs, and work products. CAL FIRE could look to Washington (e.g., TFW) and Oregon for example models of functioning Research Cooperatives that involve a broad group of stakeholders. Building a Research Cooperative would:

- Leverage funding resources from a broader array of cooperators, agencies and granting entities
- Establish JDSF as a center of research that provides the staff, money and support for the cooperative
- Provide collaborators that can also support adaptive management efforts by engaging in evaluations of policies and practices throughout the region
- Leverage the unique capacities of JDSF to do manipulative studies that cannot be easily replicated by other land-uses, recognizing that generally,
    - Parks and Conservation blocks can provide references
    - Industrial landowners typically offer more active production-oriented forestry
    - USFS lands have different management constraints than typically apply to lands operating under Forest Practices regulations
    - Habitat Conservation Lands offer other management models
    - Descriptive studies can be conducted anywhere

Appendix 7. Economics

A. Harvest Levels Needed to Raise $6 Million

Question 3 from the Work Plan: "What revenue requirements are needed to meet the desired budget?"

Given Information: JDSF staff estimates that the revenue requirements to implement the Management Plan, as adopted by the Board of Forestry and Fire Protection, are about $5.974 million. For the purpose of this table, revenue requirements are rounded to $6.0 million.

Given Information: The Management Plan provides for a timber harvest of between 20 to 25 million board feet (MMBF) per year, not to exceed 35 million board feet (MMBF) in any single year.

Assumption: JDSF is directed to cover its costs by raising revenues. The primary source of revenue has been the sale of timber. For a number of years, while JDSF had an active timber sale program, the basis of bids was for a single price per thousand board feet (MBF), regardless of species. This allows for a simple calculation to show the relationship between a level of harvest, based on the bid price for timber, to raise $6.0 million.

Bid Price per Thousand Board Feet	Million Board Feet to Raise $6.0 Million[15][16]
$50	120
$100	60
$150	40
$200	30
$250	24
$300	20
$350	17
$400	15
$450	13
$500	12
$550	11
$600	10
$650	9
$700	9
$750	8
$800	8

[15] Timber volumes rounded to the nearest 1 million board feet to match the JDSF Management Plan harvest numbers.
[16] This table reflects the Economics Committee understanding for a full budget to implement the Management Plan as adopted by the Board of Forestry. See a similar table for actual estimates for FY 2008 – 2009, prepared by Helge Eng.

B. Camp 3 Research and Costs

On October 8, 2008, a subcommittee consisting of Jere Melo (Economics Committee Chair) and Lynn Webb (Staff) met to review the JAG report, "Recommended Late-Seral Forest Development Prescription for the Camp Three Timber Sale". Based on our own interpretation of the tasks listed in that report, we prepared an initial outline of tasks, and in some cases, made a rough estimate of the time required. This was considered by the CAL FIRE staff, and on October 29, Director Grijalva clarified the work to be done within the current available CAL FIRE resources. We assume that all JAG members have received that letter.

Accordingly, on November 13, we met for a second time to prepare this report based on the Director's letter. Through discussion with CAL FIRE staff, we have estimated the time necessary to complete the tasks and used "Cost to Government" daily rates as follows:[17]

Staff Position	**Daily Cost**
Forester II	$670/day
Forester I	$560/day
Biologist	$562/day
Assistant II	$393/day

Fiscal Year 2008-2009

Task: Remark the Camp Three Sale

Units A, B, C & D total 224.5 acres. We assumed a production of 6 acres per day to flag the boundaries and to remark the harvest trees, or 38 working days, using a crew of a Forester I and a Forester II.

Forester I, 38 working days X $560 per day	$21,280
Forester II, 38 working days X $670 per day	$25,460
Total	$46,740

Task: Install CFI plots in the Control Unit and in Harvest Units B & C

The task is to install five (5) full, 1/5-acre CFI plots in each unit and ten (10) basic plots, 1/20-acre in size, also in each unit. Due to the need to take increment cores, we assume a production level of 0.7 plots per day for the full size plots and 1.0 plot per day for the basic plots, using a crew of a Forester I and a Forester II. This works out to a total of 51.4 working days, and we assume a cost of supplies of $1,000.

Forester I, 51.4 working days X $560 per day	$28,784
Forester II, 51.4 working days X $670 per day	$34,438
Supplies	$1,000
Total	$64,222

[17] This cost estimate is based on use of current "Cost to Government" amounts, not including an allowance for inflation.

Task: Establish and Monitor Bird Species Presence Plots

This task is to monitor for the presence of bird species. The assumption is that a biologist would spend two days to establish plots and a half day on ten separate days for this work.

Biologist, 2 full days +10 working days X 0.5 X $562 per day	$3,934

Fiscal Year 2008-2009 Grand Total: $114,896

Fiscal Year 2009-2010

Task: Refresh Plots in Harvest Units B & C

Following timber harvest, plots will need to be refreshed in Units B and C. That will also be a good opportunity to make a list of harvest trees, residual trees and damaged trees. We assume a production of 1 plot per day, 30 working days, using a crew of a Forester I and an Assistant II.

Forester I, 30 working days X $560 per day	$16,800
Assistant II, 30 working days X $393 per day	$11,790
Supplies	nominal
Total	$28,590

Task: Input Plot Data, Process Data using current CFI Program and Prepare New Subroutines to process CFI Results.

We assume production of two days for a Forester I and an Assistant II to enter the plot data. Because data processing is essentially instantaneous on existing software, a nominal cost is assigned to that step. Some new subroutines for processing outputs is necessary, such as the 50th to 80th percentile growth analysis, use of increment cores to establish a prior inventory, and assignment to clumps or individual tree status.

Forester I, Input Data, 2 working days X $560 per day	$1,120
Assistant II, Input Data, 2 working days, X $393 per day	$786
Process Data	nominal
Forester II, New Subroutines, 2 working days X $670 per day	$1,340
Total	$3,246

Task: Monitor Bird Species Presence Plots

See description for same in 2008-2009 FY, also for each subsequent year.

Biologist, 10 working days, X 0.5 X $562 per day	$2,810

Task: Demonstration, Interpretation and Education

This task requires planning and design, materials and construction and the installation of one station to interpret the Camp Three Timber Sale. It also requires development of a professionally designed questionnaire to evaluate public reaction and understanding of this example of forest management.

Forester I, plan and design station, 2 working days X $560 per day	$1,120
Materials	$1,500
Forester I, construct station, 10 working days X $560 per day	$5,600
Forester I, Install station, 1 working day X $560 per day	$560
Forester II, plan and print brochure, 10 working days X $670 per day	$6,700
Total	$15,480

Fiscal Year 2009-2010 Grand Total **$50,126**

Fiscal Years, 2014-2015 and 2019-2020

Task: Re-measure the Plots and Process the Data

At five and ten years after timber harvest, the plots will need to be re-measured and the data input and processed. We assume that the 1/5-acre CFI plots will be re-measured at the rate of 1.5 plots per day and that the 1/20-acre plots can be re-measured at the rate of 2.0 plots per day.

Forester I, 40 working days X $560 per day	$22,400
Forester II, 40 working days X $670 per day	$26,800
Forester I, input data, 2 working days X $560 per day	$1,120
Forester II, input data, 2 working days, X $670 per day	$1,340
Process Data	nominal
Total	$51,660

Ten Years Cost Estimate, Including a Year For Harvest

2008-2009	$114,896
2009-2010	$50,126
2010-2011	$2,810
2011-2012	$2,810
2012-2013	$2,810
2013-2014	$2,810
2014-2015	$54,470
2015-2016	$2,810
2016-2017	$2,810
2017-2018	$2,810
2018-2019	$2,810
2019-2020	$54,470
Total	$296,442

Appendix 8. Public Involvement and Stakeholder Input

A. Public Participation

Letter from Mr. Ray Duff, Caspar, California

Received December 16, 2010

The amount of public participation during Jackson Advisory Group's existence has been limited. Few public members attended most meetings. All meetings of JAG allowed time for Public Comment as part of the agenda, but the limited amount of public attending most JAG meetings permitted JAG to allow some public participation during ongoing regular agenda items. Primary topics of public interest related to aesthetics of the forest and great interest in recreation issues, but there was also public interest in avoiding even-age harvest (clear-cutting), use of herbicides by JDSF staff, reducing timber harvest in favor of carbon sequestration, salmon restoration and creating more favorable access to the forest. JAG heard several complaints from public about so called speed bumps on Road 500, a primary access road to the forest on private land that JDSF has right of way that has been severely blocked by the property owner, an issue that could no be reconciled during the last two years of JAG's deliberations. There was no public comment related to resumption of timber harvests in JDSF, but bidders on a timber harvest plan that was withdrawn for economic reasons were heard, at the JAG meeting following withdrawal of the harvest from the bidding process.

It is recognized public participation may have been limited by the timing of meetings, as many were on weekdays. There are also the complexities of learning forestry jargon, and associating forest procedures with public use of the forest. It is expected there would be a higher degree of interest by Mendocino County citizens and more interest would come from that specific portion of that County where the forest is closer to the small coastal city of Ft. Bragg, and inland towns of Willits, and Ukiah.

JAG recognizes JDSF is a State Government managed forest available to all citizens of the state and nation, and with this in mind the report may not give full due to all public interest in activities conducted there. It is clear there is substantial support for a new direction in use of the JDSF, and opposition to resumption off the old way JDSF was operated with little public input. It is likely the recommendations regarding the 2008 JDSF Management Plan do not represent the full interest of all the public.

B. Silviculture Practitioners' Workshop, October 2009

Summary incorporated into Chapter 2 (Landscape Management), Section II (B).

C. Science Workshop, Berkeley, February 2010

See Appendix 6B.

D. Agency Workshop, Santa Rosa, October 2010

Notes from Agency Stakeholder Meeting

Hosted by Matthew Buffleben at the offices of the North Coast Regional Water Quality Control Board, Santa Rosa

Attendees

Agencies:

Tom Spittler, California Geological Survey

Julie Bawcom, California Geological Survey

Clay Brandow, Department of Forestry and Fire Protection

Renee Pasquinelli, CA Department of Parks and Recreation

Tony LaBanca, CA Department of Fish and Game

Charlotte Ambrose, NOAA Fisheries

JAG Members:

Brad Valentine

George Gentry (Board of Forestry and Fire Protection liaison)

Staff:

Lynn Webb, Department of Forestry and Fire Protection

Russ Henly, Department of Forestry and Fire Protection

Eric Huff, Board of Forestry and Fire Protection

Comments/Questions from Stakeholders

- The Department of Forestry and Fire Protection (CAL FIRE) used to issue Forestry Notes; they seem to have been dropped. They covered applied research, observations, silviculture tested, etc. Bring them back.
- The South Fork road rehabilitation process—the local landowners have done more than CAL FIRE. We could do coordinated research with them and they could contribute to Forestry Notes. They have done a lot of interesting things.
- Private landowners often can act more quickly; JDSF should dovetail with that.
- Re road decommissioning: need some scientific research, quantitative studies. A Lee Mac Donald student could do this.

- There has been a lot of road decommissioning work in the Parks district to the north. They have a lot of information on costs. We need monitoring of full versus partial decommissioning. This has been an issue for Parks. They are starting to look at this on the Big River watershed. Is the purpose sediment reduction versus broader restoration?
- It comes down to money—what are the best BMPs, the least cost per yard of sediment avoided? There are 300 miles of roads on the Forest. This is a very important area that fits into 2 of the 3 Centers of Excellence.
- Timing of decommissioning and spacing over the watershed is a research area with potential value.
- We need a road inventory in all watershed areas to start. Then set decommissioning and road upgrade priorities.
- Road approaches to stream crossings is a key issue at the Board of Forestry and Fire Protection (Board). The area between the last functional waterbar and stream itself—how much sediment is getting delivered from these areas? Drew Coe at the Central Valley Regional Water Quality Control Board did some research on this area. It would be very helpful for Board rulemaking.
- There have been lots of changes to the Forest Practice Rules (FPRs) for anadromous salmonid protection. We need to study their effectiveness.
- Set up a basic list of research projects/scope by priority. Send to universities and try to recruit researchers. Need a research coordinator position at JDSF to do this.
- As part of this, convey how much existing information is already available.
- Road research will help to inform the next round of Board rulemaking.
- Agrees that a research coordinator for the Forest is a good idea.
- The National Marine Fisheries letter to the Department of Fish and Game asking them to more equitably distribute their fisheries restoration grant funds across the state, especially the Central Coast. The NOAA Restoration Center is a significant source of funds from many sources. Coho survival is a key area of emphasis. Happy to help with this.
- The proposed Soquel Demonstration State Forest project needs a long channel survey to figure out what features are needed in what reaches. Could be very good for JDSF, too. What does each stream reach need? What is the minimum amount of treatment needed to have a positive effect? This would be helpful to small landowners.
- Agencies need up-front money to scope and write grants. Does CAL FIRE have funds that they can use for this? There may be seed money from elsewhere in the CA Natural Resources Agency.
- Multi-stakeholder agency funding requests will be favorably received at NOAA Fisheries.
- Regarding large woody debris (LWD) at Soquel DSF, we are working on permit streamlining. Can we do a pilot project for this on JDSF as well—maybe related to road work?
- JDSF should build on the LWD work that was done on Parlin Creek.
- AmeriCorps and the CCCs have been working on the Noyo River.
- We need more science: will we make the same mistake with LWD placement that we did with LWD removal? We need to address the whole range of in-stream issues. Parlin Creek was easy since it is a low-energy system. Work on nucleating large jams from University of Washington.

- Test assumptions; this is critical for the Centers of Excellence. We have a lot of data already; analysis is very tough. Test assumptions about LWD and pools, sediment, fish response, etc. The University of Washington is further along and getting a lot of federal funding for this kind of research.
- The intent of the Centers of Excellence is to do good science and test assumptions. You will not contribute to research and demonstration unless you do this.
- An unspoken assumption: there is not just a habitat response but also a fish response.
- Coast Monitoring Plan (DFG and NMFS doing this; Kevin Shaffer at DFG in the lead. Target outreach starting soon.)—any discussion about contributing to that? Moving the Noyo weir; develop a lifecycle station; use PIT tags to monitor all the fish going in and out.
- Look at riparian function with different buffer strips, sediment, and light. Do new FPRs do what we intended them to do?
- There is a lot of interest in testing FPR effectiveness. What are the effects of clearcutting on solar isolation and windthrow?
- Recognize that JDSF needs to provide recreation and aesthetic benefits, but want research needs to trump them.
- In upland areas, what type of landscape is most beneficial for what species? What are positive and negative effects? Need more experiments to create landscape structures. Long-term studies spanning multiple careers.
- Look at water withdrawals from streams, effects and permitting processes.
- Botanical information: lacking for many species, e.g., Astragalus agnicidus. JDSF has this species in landscape areas that won't get the disturbance that it likes.
- Ecological processes are another area we don't have opportunities to work with large landowners on, including processes such as fire and windthrow. What species benefit from long-term natural succession processes versus disturbance regimes.
- Invasive species and species diversity.
- A lot of our issues are related to people who use evenage management; we would like to have a way to study this. Harvest rates and cumulative effects; use a large watershed on JDSF to study this (cf. Randy Klein studies).
- We focus on road impacts to streams, but need to look at a lot of additional issues such as invasive species and wildlife effects.
- Need to study what happens to invasive species post road decommissioning.
- We need a standard suite of questions to look at with respect to any research project.
- Could go out right now and look at invasive species on roads that have been ripped or not. The Forest Learning Center provides free housing to researchers—this typically is a big cost.
- Need to commercialize the in-kind value of research support services that JDSF offers. The funding issue for research is tough. Research will benefit California.
- Hydrologic disconnection is an important topic—how do you know a road is disconnected? What are the costs, initial and maintenance, to disconnect a road?
- Performance measures or standards are important. Are beneficial uses being protected? Monitor roads and the improvements over time—need good performance measures to report

to the public. Look at TMDLs, culvert size, decreasing diversion potential over time. Start with simple performance measures then move on to more difficult in-stream measures.

- Total road inventory process at JDSF would help with this. JDSF is now putting all new roads at the top of watersheds.
- Cumulative watershed effects gross measures of road density and rate of harvest. As roads get better, the number of roads is less important. Sediment budgets for harvests help to refine the rate of harvest.
- Need more information on sediment developed during the road decommissioning process itself. The next round of research on Caspar Creek will address this issue, as well as legacy roads and skid trails.
- Look closely at skid trails during timber harvest and address any problems at that time when you have equipment on site. Think about skid trails when the Forest has a long-term harvest plan.
- How do you identify the sediment cost-benefit of entering an area to fix a sediment issue? Need more information on the costs of road fixes and road maintenance, including paving, rocking, grading, etc.
- Sees as useful a matrix that looks at water quality benefits of road fixes, invasive species access, access for illegal activities, etc. Can we develop a weighted system to look at primary and secondary benefits and impacts?
- The short-term impact of road decommissioning (e.g., sediment inputs) is not a risk that we can take in the Central Coast ESU.
- Research is needed on methods and techniques, and also how do you learn from something?
- A place to test tools is a very important role that the Forest can play. Applied research is valuable.
- Tools/methods for measuring in-stream sediment—there are a lot of issues there. Use JDSF as a place to develop tools, e.g., measuring of fine sediment. He likes V*, but not many people use it.
- Drew Coe's research says that getting a road down to 10 percent connection removes the bulk of sediment delivery, more than proportionally.
- Surface Mining and Reclamation Act (SMARA): with more road rocking, need more quarries. For quarries above threshold sizes, develop a template for how to comply with SMARA. Timber harvest quarries are exempt from SMARA reporting. If a quarry is not tied to a THP, it should go through a county permit—this is expensive, requires bonding. JDSF's staff geologist could write guidelines for this. Also, demonstrate how to identify and develop rock sites.
- Agreement re Forestry Notes and their value. Every JDSF THP should generate a Forestry Note. Just basic observations are valuable and help with communicating with timber operators.
- The Board of Forestry and Fire Protection and its strategic policies:
    - Permeated by preservation of working forest landscapes.
    - Regulations in the redwood region most affect small landowners since the large landowners have Habitat Conservation Plans, etc.

- Fuels issues, climate issues—use of CA wood versus exports from other areas.
- Cost effectiveness of actions is a major issue for all regulations. The Board has always been interested in performance-based regulations. This implies monitoring for effectiveness. How do you make monitoring cost-effective for small landowners? These landowners are no longer considering timber production as a land use due to higher costs. What are the costs of regulations for small landowners? The cost analysis for the Board's recent anadromous salmonid protection rules showed that the impacts are primarily on small landowners.
- Governance issue: there are too many organizations focused on the same thing. How do these fit together—the Board's Research and Science Committee, Monitoring Study Group, Demonstration State Forest Advisory Group, Jackson Demonstration State Forest Advisory Group, redwood forest research consortium concept? Need a clear structure for all of this. The Research and Science Committee's report on research will be an important part of this.
- How do you help educate and assist smaller forest landowners?
- Re preserving working forests, community forests are a good option. A lot of the concern is at the periphery of development, where development pressure is the greatest. How do we keep forest productivity and recreation together and compatible? Example: Arcata Community Forest. Sociology: how do people interact with working forests? What do they get out of it?
- Re small forest landowners and monitoring, what are state personnel roles in doing monitoring and supporting small landowners?
- A huge issue for small landowners is that they are not able to get access to data. Small landowners can preconsult with agencies and get information. Suggest a JDSF pilot on how to make information available on the Internet.
- The public may be hesitant about asking regulators for help.
- Hold seminars for small landowners on the Forest. Need to reach out to all small landowners, not just those who belong to associations.
- The greatest value to small landowners is road maintenance and the lowest cost means of sediment reduction.
- Increasing numbers of small landowners do not realize that THPs can provide funds for restoration and cover CEQA costs.
- Fix roads for small landowners adjacent to JDSF.
- Comprehensive analysis and surveys of streams:
    - More information on old growth and late seral areas.
    - Hyphoreic areas on Class III streams
    - Channel migration zones, terraces, mapping.
    - Baseline information on mammals and birds.
- For Department of Fish and Game, good wildlife information that overlaps with the vegetation information, allow study of wildlife-habitat relationships.
- The adjacent State Parks are a lot smaller than JDSF—could we look at the area as a whole. Would love to partner with JDSF on research opportunities. There is lots of climate research right now. Steve Sillet's research from Save the Redwoods League. Have a plot at Montgomery Woods and in the giant sequoia.

- In the pygmy forest area, boardwalk, off-highway vehicles (OHVs), illegal use are problems. Research how to recover impacted pygmy forest areas. There has been past research by Theresa Sholars on areas affected by OHVs.
- The biggest needs are related to stream temperature and sediment. Class III channel incision and bank erosion research would be very helpful. Temperature: what kind of shade and riparian harvesting will work and meet their standards? Need both research and demonstration. Also have windthrow as a concern; windthrow and increasing light, LWD recruitment and monitoring.
- Thinks that JAG has chosen the three centers of excellence (COEs) with the most relevance. Climate change is less critical for coastal redwood forests. Fire may be an opportunity.
- Climate as a COE at JDSF may not work, but it makes sense for the Demonstration State Forests as a whole.
- If the focus of the one COE is on coho alone, it is too limited. What about how upland/terrestrial areas tie in with coho and other salmonids? Maybe it's a riparian health issue rather than coho alone.
- The 2010 CA Strategic Fire Plan identifies fuels buildup as a concern. Need to decrease this in the long term, using mechanical treatments first, then use live fire. How do you reintroduce fire when you have neighbors, smoke issues, etc.?
- Retain roads for fuel reduction and fire protection, but which roads?

E. Public Meeting, Fort Bragg, November 2010

Notes from Public Meeting

1. Growing wood for carbon payments?
2. Improve camping opportunities. Should recreation be a profit center?
3. Does JDSF really require $6 million when current operations are $2 million. Can we see documentation?
4. Why is stumpage of $200 per thousand so much lower than $800 mill price?
5. Demonstration of good management practices for landowners should be highest priority on JDSF, not research.
6. How much redwood is sold overseas? Is there international interest in redwood research?
7. Need woods operations/contracts/sales for small operators.
8. There has been a lot of pain and suffering in the local logging industry. JDSF has lost veteran administrators who did a great job getting THPs up and running.
9. Consider setting aside areas not open to humans. Need emphasis on aesthetics, protection of rare species. No clearcutting. Encourage biodiversity and fungi. Ensure that recreation does not harm conservation.

10. Need to eliminate use of herbicides that wipe out biodiversity. What are JAG's recommendations?

11. Ten years ago couldn't find a place to camp. Does JDSF give full support to recreation vs. timber management. Big constituency does not want Forest to step back into the old way of doing business. Need to recognize a groundswell of support for recreation.

12. Forest THPs and plans don't seem to adequately address wildlife, large tree retention, habitat. Would like more trails for biking and hiking.

13. Glad to hear about protection of areas. Need areas for OHVs that don't degrade land.

14. Know that recreation and timber harvesting can go together on a public forest.

15. Agree that proper use of OHVs needed. Need biologists and botanists to provide input. Probably not possible to eliminate use of OHVs on Forest, but need reasonable compliance, e.g., "greensticker" associated with fee payment, law enforcement? Cal Poly Pismo Beach study shows revenue of $100 million of economic activity in the area. Are there similar opportunities at JDSF?

16. Families in the logging business also love forests and forest recreation for their children just the same as everyone else.

F. Conservation Groups, San Francisco, December 2010

Notes from Conservation Stakeholder Meeting

Hosted by Dan Porter at the offices of The Nature Conservancy, San Francisco

December 13, 2010

Attendees

Conservation Organizations:

Jason Pelletier, North Coast Project Director, The Nature Conservancy

Emily Limm, Director of Science, Save the Redwoods League

Don Foreman, Sierra Club Bay Area Chapter

JAG Members:

Dan Porter (host)

Mike Jani

Mike Liquori

CAL FIRE Staff:

Lynn Webb

Russ Henly

Comments from Stakeholders

- Would be good to have more avenues for input to JDSF from organized elements of the mushroom community, such as the San Francisco Mycological Society and the Santa Cruz Fungus Fellowship.
- The Demonstration State Forest role is very valuable.
- How will controls be taken into consideration?
- Who would do the research and how would it be funded?
- Climate change trumps everything—this has to be a concern for how it will affect long-term research.
- JDSF's advantage is that it will continue to be available for research into the future. Standardization of data collection could be very important for long-term research.
- Broad access to data and research findings is critical. Currently, a lot of information exchange occurs via informal networks, but it is incomplete. This information needs to be provided via the Web.
- JDSF is a 50,000-acre piece of the 200,000-acre Big River watershed. CAL FIRE should use its resources to convene a larger part of the landowners on the watershed to look at management on a larger landscape basis.
- Interpretation is very important. How much interpretation is being done now? How much does is focus on the important topic of working forestlands?
- How does one find out about hiking and other recreation opportunities on JDSF? How does the public key into interpretation opportunities?
- Pygmy forest is a unique area in the world. It deserves something comparable to National Monument status. Such a designation would bring in a lot of people: tourists, researchers. Among other things, this would be good for the local economy.
- Was a time when he was disposed to ending logging on JDSF and turning it into a park. But what he has heard here is persuasive about managing it as a Demonstration State Forest.

G. Conservation Groups, Boonville, December 2010

Notes from Environmental/Conservation Stakeholder Meeting

December 6, 2010

Attendees

Mike Miller, Mendocino Land Trust

Lori Hubbart, CA Native Plant Society, Dorothy King Young Chapter

JAG members:

Kathy Bailey

Linda Perkins

JDSF Staff:

Lynn Webb

Kathy Bailey, assisted by Linda Perkins and Lynn Webb, presented a brief overview of the JAG process and the main work product outputs, with particular focus on Recreation, Research and Demonstration, and Landscape Management.

Recreation

Participants expressed support for increasing low-impact recreation uses and coordination between JDSF and the newly expanded Big River Beach State Park. Participants reported good communication between JDSF and others on this.

Both interest and concern were expressed regarding possible Off-Highway Vehicle (OHV) use at Jackson. Participants recognized that JDSF currently experiences illegal OHV use, which often causes noise impacts and potential pollution. Participants discussed user-group interest in legal OHV use and the potential for significant revenue generation. Recognizing the potential conflicts with other recreation uses on the forest that have less potential for negative impacts, participants wondered whether an alternative, off-JDSF, site might be more appropriate.

Research

A recurring theme was the need to have better outreach to the public about research and demonstration results, including the suggestion that a marketing and outreach position be established. Additionally, the participants advised avoiding unfunded mandates.

The following issues were discussed:

The needed restoration of pygmy forest and associated plant communities does not generate money, so money would have to be found.

One participant was recently at a workshop where UC Extension Forester Greg Giusti expressed grave concern for the regional viability of Bishop pine because of accelerating disease and pest problems. A discussion ensued regarding the generally fragmented nature of Bishop pine and cypress communities outside JDSF and the relative importance of the pine and cypress at JDSF for understanding this plant community.

Universities might be able to fund restoration efforts on fungi. The CA Lichen Society may also provide funding opportunities.

Research on fungi and lichen has immediate application to silviculture by promoting understanding of the relationship between fungi and long-term forest health. This ties in well with the JAG direction to grow larger, older trees, also important to fungi and lichen.

Regarding Coho Recovery Center of Excellence: Might be good to include all native salmonid species, including Chinook. Need to coordinate with NOAA. Participant stated that NOAA requested that CDFG increase its allocation for funding in Mendocino County because of the federal Recovery Plan's emphasis on trying to avoid the imminent extinction of coho in the Central Coast Environmentally Significant Unit (ESU), where Mendocino County is located. Participant suggests designating at least one JDSF sub-basin where all activities would promote coho recovery.

Landscape Management

Mendocino Land Trust has good working relationships with JDSF staff. Has created a Big River Watershed Coalition with JDSF, Parks, Mendocino Redwood Company, Weger, and Willits Woods (Padula) that encompasses the ownership of 86% of the land base of the Big River watershed. They are working well together and hoping for the synergy that working together can create. In the pipeline are specific projects on Road 700 and 720, and a culvert project on Road 120 in the James Creek area. A watershed conservation plan is being prepared. A total of 12 projects are identified and prioritized. MLT finds JDSF easy to work with.

Participant suggests that the Oregon watershed enhancement plan could be a good model. They fund watershed coordinators. A local team could include CDFG, NOAA, CGS, a biologist and hydrologist. Could facilitate one-stop permitting process.

There will be a January decision regarding a Dept. of Conservation grant for a watershed coordinator ½ time on Russian, 1/2 on Navarro.

Herbicides – Industrials may be leaving 10-15% of tanoaks not sprayed. May be important to do because of Sudden Oak Death. Staff pointed out that the role of tanoak in the forest is multi-dimensional. Participant suggested retaining some tanoak and other non-timber species for habitat and fungi. The hardwood study reserves were cited by JAG members as an avenue to explore these issues.

Weedy species – CNPS hopes funding can be found for controlling jubata and other invasives. CNPS policy supports the limited, targeted use of herbicides to control non-native invasives. Some of the public does not understand judicious use of herbicides.

What is the current level of weedy infestation, particularly in the OFSZ? Lynn already has a control project in one area.

Scale: Can Jackson facilitate economic activity by smaller scale local operations, for instance, setting aside part of a timber harvest so a portable mill owner could set up after operations and provide a local product?

Final thought: The more communication, the more funding may flow!

Appendix 9. Compiled Consensus Votes

A. Landscape 1 and 2 Section 1: Silviculture Goals and Guidelines for Harvests in Matrix Lands, as Modified

Appendix Table 9.1.

Anderson	Strong Support
Bailey	Strong Support
Braudrick	Strong Support
Gill	Strong Support
Helms	Strong Support
Jani	Strong Support
Liquori	Strong Support
Melo	Qualified Support
Perkins	Strong Support
Porter	Strong Support
Taylor	Strong Support
Tilley	Qualified Support
Valentine	General Support

See Tables 2.1 and 2.2 in Chapter 2.

B. Landscape 3, 5, and 9 Group A (Items 2-5, 8, 9, 13-19) Landscape Allocations

Appendix Table 9.2.

Anderson	General Support
Bailey	Strong Support
Braudrick	Strong Support
Gill	Abstain
Helms	Strong Support
Jani	Strong Support
Liquori	Qualified Support
Melo	Qualified Support
Perkins	General Support
Porter	Strong Support
Taylor	Strong Support
Tilley	General Support
Valentine	Strong Support

See Table 2.3, 2.6, and 2.10 in Chapter 2.

C. Hardwood Stand Retention

Appendix Table 9.3.

Anderson	Qualified Support
Bailey	Unqualified Support
Braudrick	Unqualified Support
Gill	Qualified Support
Helms	Strong Support
Jani	Strong Support
Liquori	Strong Support
Melo	Strong Disagreement
Perkins	Unqualified Support
Porter	Qualified Support
Taylor	Unqualified Support
Tilley	Qualified Support
Valentine	Unqualified Support

See Table 2.5 in Chapter 2.

Disagreement Comment from Melo

I am the single JAG member who voted in "Strong Disagreement" to the proposal from the Landscape Committee for retention of some specific hardwood stands. The background for the Landscape Committee proposal is:

- *Six (6) stands were shown on a very small scale map of JDSF as the ones for retention, three (3) on the west side and three (3) on the east side.*
- *A one-page report was provided. The report indicated that the stand sizes ranged from 17 to 166 acres, and that the Management Plan classified them as Mixed Hardwood Conifer.*

The report contains the following statements:

- "I (the author) have not visited each site, so do not know the accuracy of the map relative to either the dominance of hardwoods or the tree sizes."
- "Management guidelines for these would be to conduct no timber operations or conduct hardwood control in them until after conifer basal area exceeds 2/3 of the stands total basal area. An option for retention would be to allow conifer harvest that does not decrease the Hardwood:Conifer ratio."
- "Also as an aside, the area and distribution of hardwood-dominated stands will likely decline without some even-aged management coupled with fire and minimal hardwood control efforts."

My "Strong Disagreement" vote is based on the following:

> *1st Bullet: The stands are not "Hardwood Dominated"; they are Mixed Hardwood Conifer. Because the stands are not defined on the ground, nor has hardwood dominance been determined, staff will not be sure of compliance if the proposal is adopted by BOF and CALFIRE. No information was provided as to how these small areas related to JAG proposals to revise the allocation of forest structure conditions.*
>
> *2d Bullet: This is an attempt for a prescriptive set of rules, very complex rules, and a choice with conflicts. There is no reconciliation between the standards, ".."no timber operations".., and "…allow conifer harvest…". There is no firm standard for staff to follow. I object to the attempt by JAG to set prescriptive rules that contain conflicts.*
>
> *3d Bullet: I happen to agree with this statement. However, the call for even-aged management to maintain hardwoods seems out of character with the theme of the Management Plan as adopted by BOF. Further, my experience as a forester is that there always have been various mixtures of hardwood and conifers on JDSF and other ownerships on the west side of Mendocino County. I should also state that I am no fan of the thick tanoak areas that are largely not productive. Give me Redwood or Douglas-fir, anytime.*

D. Landscape Allocations Group 2: 1, 6, 12

Appendix Table 9.4.

Anderson	Strong Support
Bailey	Strong Disagreement
Braudrick	General Support
Gill	Qualified Support
Helms	Strong Support
Jani	General Support
Liquori	Qualified Support
Melo	General Support
Perkins	Fundamental Disagreement
Porter	
Taylor	General Support
Tilley	General Support
Valentine	Qualified Support

See Table 2.7 in Chapter 2.

Disagreement Comments

Linda Perkins was in Fundamental Disagreement with this vote because it did not designate the Highway 20 East allocation as LSD.

> *"In order to conserve old growth groves, considering that most are small in size and edge effects created by wind damage, drying, light, predation, etc, diminish their ecological value, I think it necessary to buffer these groves. In the absence of protective protocols applied to all groves and/or specific criteria for each grove; in the interest of consistency for buffer designations throughout the forest; and in the short term; giving old growth buffers the designation of "late seral development", seems prudent as well as critical for the groves' protection."*

Kathy Bailey was in Strong Disagreement with this vote because it did not designate the Highway 20 East allocation as LSD.

> *"There is very little old growth redwood reserved in this region of California, even less than in other areas. An LSD allocation would have provided a stronger buffer to the old growth here in this steep, unstable area right next to Highway 20."*

E. Allocations Group 3: 7, 10, 11, 21, 22

Appendix Table 9.5.

Anderson	Strong Support
Bailey	General Support
Braudrick	General Support
Gill	Qualified Disagreement
Helms	General Support
Jani	Strong Support
Liquori	Qualified Disagreement
Melo	General Support
Perkins	General Support
Porter	
Taylor	Strong Support
Tilley	Qualified Disagreement
Valentine	General Support

See Table 2.8 in Chapter 2.

Disagreement Comments

Mike Liquori

"I generally feel that the Landscape Committee did not provide a compelling case for the benefits of these additional allocations relative to other values for these areas (e.g., research, demonstration, monitoring, revenue, operational accessibility, leveraging work done to date by staff, etc.). I also have concerns that the cumulative extent of additional allocations may challenge the ability for the forest to satisfy its sustainable harvest obligations, and without information on the cost impacts, I feel it is irresponsible to approve these lower priority areas."

Lynwood Gill

"I voted Qualified Disagreement for this section. I based my vote on my opinion that the Brandon Gulch headwaters and the Volcano THP area should be left as Matrix area. This would give the unique opportunity to contrast and compare the effects of LSD, OFDA and Matrix management within the confines of a single watershed."

Forest Tilley

"I share the above concerns expressed by Liquori and Gill."

F. Woodlands Special Treatment Area

Appendix Table 9.6.

Anderson	Strong Support
Bailey	Strong Support
Braudrick	Strong Support
Gill	General Support
Helms	Strong Support
Jani	Strong Support
Liquori	Qualified Disagreement
Melo	General Support
Perkins	Strong Support
Porter	
Taylor	Strong Support
Tilley	General Support
Valentine	General Support

See Table 2.9 in Chapter 2.

Disagreement Comment

Liquori voted qualified disagreement

> *"While I was not present when the final language was adopted, it appeared to depart somewhat from previous discussions for reasons that were not satisfactorily communicated to me. The recommendations as written appear unclear and potentially misleading with regard to implementation actions and do not adequately represent prior JAG discussions. Specifically, I object to recommendation #5 as it calls for a specific restriction (reserve or deferment) without the benefit of an assessment that might identify other alternatives or approaches for achieving similar goals. It does not specify how recommendation #4 should differ from typical THP planning activities, and while #7 may be desirable, there are more cost-effective ways to educate stakeholders without the expense and challenge of setting up a trial demonstration (which could be especially challenging if the harvest design is complex). Aside from these qualifications, I strongly support greater engagement with the Woodlands and State Park management, as well as additional efforts at watershed-scale assessment and planning."*

G. Item 1. Section 6: Buffers for Old Growth Trees Outside Reserves

Appendix Table 9.7.

Anderson	Strong Support
Bailey	Strong Support
Braudrick	Strong Support
Gill	General Support
Helms	General Support
Jani	Unqualified Support
Liquori	General Support
Melo	Qualified Support
Perkins	Qualified Support
Porter	
Taylor	Strong Support
Tilley	Qualified Support
Valentine	Strong Support

See Table 2.11 in Chapter 2.

H. Item 4. Section 7: Even-aged Management

Appendix Table 9.8.

Anderson	General Support
Bailey	Strong Support
Braudrick	General Support
Gill	Qualified Support
Helms	General Support
Jani	Qualified Support
Liquori	Qualified Support
Melo	General Support
Perkins	Qualified Support
Porter	General Support
Taylor	Strong Support
Tilley	General Support
Valentine	Qualified Support

See Table 2.12 in Chapter 2.

I. Item 2 Section 5: Recommendations for Presenting THPs for JAG Review

Appendix Table 9.9.

Anderson	General Support
Bailey	Unqualified Support
Braudrick	Unqualified Support
Gill	Strong Support
Helms	Unqualified Support
Jani	Strong Support
Liquori	Strong Support
Melo	Qualified Support
Perkins	Strong Support
Porter	Strong Support
Taylor	Strong Support
Tilley	General Support
Valentine	Strong Support

See Table 2.13 in Chapter 2.

J. Research and Demonstration Recommendations 1-4

Appendix Table 9.10.

Anderson	Strong Support
Bailey	General Support
Braudrick	Strong Support
Gill	General Support
Helms	Strong Support
Jani	General Support
Liquori	Strong Support
Melo	General Support
Perkins	General Support
Porter	Strong Support
Taylor	General Support
Tilley	Strong Support
Valentine	General Support

See Table 3.1 in Chapter 3.

K. Research and Demonstration Recommendations 5-8

Appendix Table 9.11.

Anderson	Strong Support
Bailey	General Support
Braudrick	Strong Support
Gill	General Support
Helms	Strong Support
Jani	Strong Support
Liquori	Strong Support
Melo	General Support
Perkins	Strong Support
Porter	Strong Support
Taylor	Qualified Support
Tilley	Strong Support
Valentine	Strong Support

See Table 3.2 in Chapter 3.

L. Demonstration in a Research and Demonstration Context

Appendix Table 9.12.

Anderson	General Support
Bailey	General Support
Braudrick	Strong Support
Gill	Strong Support
Helms	Strong Support
Jani	Strong Support
Liquori	Strong Support
Melo	Strong Support
Perkins	Strong Support
Porter	Strong Support
Taylor	Strong Support
Tilley	Strong Support
Valentine	Strong Support

See Table 3.3 in Chapter 3.

M. Overall Research and Demonstration Statement

Appendix Table 9.13.

Anderson	Unqualified Support
Bailey	General Support
Braudrick	Unqualified Support
Gill	General Support
Helms	Strong Support
Jani	General Support
Liquori	Strong Support
Melo	General Support
Perkins	General Support
Porter	Strong Support
Taylor	Qualified Support
Tilley	Strong Support
Valentine	General Support

See Table 3.4 in Chapter 3.

N. Recreation Recommendations

Appendix Table 9.14.

Anderson	Strong Support
Bailey	General Support
Braudrick	Unqualified Support
Gill	General Support
Helms	General Support
Jani	Qualified Support
Liquori	Qualified Support
Melo	General Support
Perkins	General Support
Porter	General Support
Taylor	Unqualified Support
Tilley	General Support
Valentine	Qualified Support

See Table 4.1 in Chapter 4.

O. Economics Recommendations

Appendix Table 9.15.

Anderson	Strong Support
Bailey	Strong Support
Braudrick	Unqualified Support
Gill	Strong Support
Helms	Strong Support
Jani	Strong Support
Liquori	Strong Support
Melo	Strong Support
Perkins	Strong Support
Porter	Strong Support
Taylor	General Support
Tilley	Strong Support
Valentine	General Support

See Table 5.1 in Chapter 5.

P. Herbicide Recommendations

Appendix Table 9.16.

Anderson	General Support
Bailey	Strong Support
Braudrick	Strong Support
Gill	Strong Support
Helms	Strong Support
Jani	Strong Support
Liquori	Qualified Support
Melo	General Support
Perkins	General Support
Porter	
Taylor	General Support
Tilley	General Support
Valentine	Strong Support

See Table 6.1 in Chapter 6.

Q. Outreach Committee Report

Appendix Table 9.17.

Anderson	Strong Support
Bailey	Strong Support
Braudrick	Strong Support
Gill	Strong Support
Helms	Strong Support
Jani	Strong Support
Liquori	Strong Support
Melo	Strong Support
Perkins	Strong Support
Porter	
Taylor	General Support
Tilley	Strong Support
Valentine	Strong Support

See Table 7.1 in Chapter 7.

R. Overall Report Recommendations

Appendix Table 9.18.

Anderson	Strong Support
Bailey	Strong Support
Braudrick	Strong Support
Gill	Strong Support
Helms	Strong Support
Jani	Strong Support
Liquori	General Support
Melo	General Support
Perkins	General Support
Porter	Strong Support
Taylor	Strong Support
Tilley	Strong Support
Valentine	General Support

Note: All members of the JAG supported the overall package of recommendations. See Chapter 1 for more information.

Appendix 10. Maps

Maps A and B can be found on the following pages. Each map is 11 inches by 17 inches.

Map A. JAG Allocation Recommendations Overlayed on 2008 FMP Older Forest Structure Zone

Map B. Recommended JAG Allocations Integrated with 2008 FMP Special Concern Areas

Map A
JAG Tentative Allocation Overlayed on FMP Older Forest Structure Zone

Note: FMP Special Concern Areas Symobolized per Map Figure 5 with some exceptions to improve clarity.

State Park

State Park

State Park

State Park

N
W E
S

0 0.5 1 2 3 4
Miles

JAG Tentative Allocations as of 12/2010

- LSD
- OFDA
- Reserve
- Study Reserve
- Hardwood Reserve

Forest Management Plan Specal Concern Areas

- Old Growth
- Jughandle Reserve
- Pygmy
- Cypress Group
- Riparian Zone Estimated
- LSD
- Marbeled Murrelet LSD
- OFSZ

Map B
JAG Tentative Allocation Overlayed on FMP Special Concern Areas

Note: FMP Special Concern Areas Symbolized per Map Figure 5 with some exceptions to improve clarity.

State Park

State Park

State Park

State Park

N
W E
S

0 0.5 1 2 3 4 Miles

JAG Tentative Allocations as of 12/2010

- LSD
- OFDA
- Reserve
- Study Reserve
- Hardwood Reserve
- Matrix

Forest Management Plan Specal Concern Areas

- Old Growth
- Jughandle Reserve
- Pygmy
- Cypress Group
- Eucalyptus Present
- Conservation Camp
- Parlin Management Unit
- Riparian Zone Estimated
- Water Supply Area
- Neighborhood Buffer
- LSD
- Marbled Murrelet LSD
- OFSZ
- Campground Buffer
- Road &Trail Corridor
- Major Demonstration, Experiment, and Education Area
- Existing Research Area
- Mushroom Management Area