JAG Research Allocation Workshop
Synthesis Notes
February 1-2, 2010

KEY THEMES & TAKE-HOME MESSAGES (EXECUTIVE SUMMARY)

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 occur 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 Understanding 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.

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 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*.

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.

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

1. 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.
2. 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

3. Develop limiting factors models and begin documenting
4. Formulate and test various working hypotheses (including peer-review from cooperators)
5. Define upland units on wildlife/ecosystems needs (watersheds not ubiquitously useful unit structure for uplands, e.g., firescapes)
6. Define riparian units using geomorphic reaches
7. Begin to define a desired future condition trajectory for all stands (or management units). Every manipulations is based on testing 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 land-owners. 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 (sized at approximately 500 acres) 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 ANSWERS TO JAG'S KEY QUESTIONS: LANDSCAPE ALLOCATION

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.

Provide specific ideas for landscape allocation that would underpin a strong long-term research and demonstration program. These ideas may be presented in the form of specific criteria, general objectives, and/or approaches that would deliver a preferred allocation.

JAG should think more about how JDSF can integrate opportunities across the Redwood landscape. 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. Thus building a Research Cooperative would:

- 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, dynamic

policy interaction, etc

- One of the unique capacities of JDSF is its ability to do manipulative studies that cannot be easily replicated by other land-uses
    - Parks and as references
    - Conservation blocks as 'light touch, some reference
    - Industrial landowners as more active production-oriented forestry
    - USFS lands that have different management constraints than typically apply to lands operating under Forest Practices regulations

Criteria, Approaches and General Objectives for Landscape Allocation

- Landscape allocation should reflect a focus on strategic "Centers of Excellence" that define a narrow research focus for the forest that integrates multiple issues. Restrain from trying to be all things to all people.
- Watersheds (or sub-watersheds) in the range of 100 to 500 acres are a preferred unit of management, although there is a range of ideas expressed for how such a unit of management would be managed
- Harvest activities should financially sustain both management and scientific costs
- Leverage existing & historical data to inform research activities
- Amount of acreage in any management unit type should ensure enough lands for replicates (not necessarily exclusive to JDSF), but remember loss of control when not on JDSF lands.
- Create opportunities to allow flexibility in research to ensure an attractive place for researchers
- Allocation patterns should be developed based on what the forest community needs to know to understand redwood ecosystems

- Some core research topics should be capable of providing useful answers independent of any cooperative research efforts

- We can use conceptual or analytical models as organizing frameworks for habitat/organism relationships, and the information needed to inform both science and management

- Given the time it takes to grow trees, there is some advantage to using the existing structures as a guide, although we should be aware of opportunities to create the kind of landscape over time that is desirable (e.g. view the existing structure as an opportunity, not a constraint)

Expert comments on the current landscape allocation proposals (The Management Plan, Landscape Committee Proposal and Research Committee Principles) to identify how it would enhance and/or impact research and demonstration activities and projects including the

The Management Plan proposal is too focused around silviculture and lacks any defining hypotheses [alternate observation is that it views timber as the primary researchable subject]

The Natural Forestry 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*.

This approach to allocation should start by:

1. **Synthesizing information for the existing landscape. Build scientific models for the existing conditions to demonstrate what we know (and don't know) about the dynamics between habitat and structural relationships (and watersheds). Use the inventory of criters and structures to inform and test models.**

2. **Defining upland units on wildlife/ecosystems needs (watersheds use as the unit of allocation for upland resources can be inconsistent with landscape and habiat forming processes, e.g., firescape)**

3. **Defining riparian units using geomorphic reaches**

4. **Sending all stands (or management units) onto a desired future condition trajectory.**

5. **Every manipulations is based on testing hypotheses.**

What Experts Like About Existing Proposals

- The Research Committee's approach that every activity is an experiment, and that it should be tested
    - Not necessarily a good experiment – requires some focus (need to define the question) some amount of design is appropriate
- Good focus question is how do you accomplish old-growth/late-seral conditions (or restoration forestry, or ecosystem restoration) while extracting economically viable productions
- Natural Forestry is one reasonable hypothesis worthy of consideration, but not as sole management practice
- The allocation would substantially benefit by a rigorously developed landscape management plan

What We Might Do Differently

NOTE: these comments are incomplete, as we never formally requested critiques. Some participants offered critique anyway (which are reflected here). Thus not all perspectives have been properly captured.

- Really need to focus on a more narrow mission(s) for the forest
    - Can't effectively be all things to all people
- Natural Forestry option requires future research questions to be designed now, or we risk not having the structures in place
    - Need much greater diversity of conditions
    - Kate: can't just hold all options open for the future. There will be opportunities. Need to decide on what we want to answer, and move forward
- Entire discussion of landscape allocation needs to be hypothesis driven
- Steve – we don't yet have good dynamic habitat models – all based on seral classes.
    - How could we separate legacy issues that allows for more dynamic modeling approaches
    - Dan: assembly theory –

  - Brad – seral classes based on dominant trees. Ignores much of the values important to wildlife (like understory, etc)

- Kate: need to make silviculture models relevant to more stuff (including wildlife)
- CWHR and similar existing models could be a starting point for lessons on building habitat models
- Concerns about the lack of variation associated with the Landscape Committee's proposal
- Concerns about the ability to predict future research needs today in the Landscape Committee's proposal

Identify potential landscape-scale elements (building blocks) that should be considered upon the forest to support research objectives. Such elements may include shifting mosaic zones, reserves, intensively monitoring (or sensored) areas, specific research installations (e.g. canopy cranes, weirs, etc), or other elements.

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 discussed below:

Data Requirements

The following data should be made available as soon as possible to support an initial analysis of existing conditions, which should form the basis for developing hypotheses that in-turn define the landscape allocation.

Urgent Data

- Need a robust long-term database infrastructure

  - Existing database may be good (no basis for experts to judge). Look to see what is missing or needs to be done
  - State-of-the-art database GIS (web-based) OR staff resources available for inquiries

- LIDAR surveys for the entire forest
  - Valuable independent of research questions (many uses)
  - Look for local partners who may have unprocessed data
  - Casper Ck data (3-4 yrs ago)
  - Extract all available data (e.g. ground topography, habitat modeling, etc)
- Review certification requirements for FSC/SFI, to determine any additional data needs if certification of the forest is desired
  - May take time to develop

Other Data Opportunities

- Weather station (meterological), more representative (e.g. beyond Casper Creek) may be useful [some are available, e.g., RAWS station NE of Maquire's Pond.
  - Blodgett has found it to be the most requested data
- Low-cost carbon sensors are under development that may be useful if Carbon Sequestration is chosen as a Center for Excellence
- Intensive fish & stream monitoring (similar to CDFG practices on Freshwater Creek) throughout the ownership
- More hydrology stations, distributed throughout the forest
  - Go with more low-tech stations. No need for highly precise instrumentation like Casper Ck (use CC for highly precise questions)

Infrastructure Support Recommendations

- The forest should provide appropriate housing facilities for researchers and technicians [Forest Learning Center is avaialbalbe]

- The forest needs a well maintained road and trail system, that supports all-weather, accessibility
    - Researchers don't like to walk too far (especially if carrying equipment)
        - Distal sites can also compromise data integrity (Kate)
    - Disconnect roads from stream network (adequate drainage, etc)
- The forest should hire (or contract) to provide a pool of competent and trained technicians, capable of collecting various forms of field data
    - Including forest inventory, biological surveys, stream data, etc
    - Reconnaissance surveys should occur after major disturbances to document effects on pertinent resources
    - Routine surveys can rotate, stratify, etc as per study design
- Challenge: Chasing data from researchers is often tricky.
- Annual workshop (symposium) of researchers

Suggestions for alternative landscape allocation patterns that JAG should consider in light of research and demonstration priorities.

There are at least 2 dominant approaches to landscape allocation that the JAG should consider:

1. **Research-Oriented Framework** - the landscape allocation process would benefit by an organizational framework for how we approach the management of the forest. Such a framework could help define the allocation, research & monitoring approaches, and opportunities for collaboration. Note: the allocation inherently establishes a series of testable hypotheses that we should more explicitly leverage
    a. A variant of this approach is using an Adaptive Management Framework that integrates monitoring, research, and demonstration in ways that improve practices and policies of interest to the forestry community
2. **Build It and They Will Come** – define a structure for the forest that covers a ranges of expected silvicultural approaches and let

researchers self-select

ANSWERS TO JAG'S KEY QUESTIONS: RESEARCH AGENDA

*The following are in order of **rough priority (based on multi-voting and interpretations of comments)**. (the numbers in parentheses after Scribed version is the result of the multi-voting)*

A preliminary list of enduring big-picture, long-term issues and questions that should be used to direct management of JDSF, so that JDSF will become a core center for knowledge? These ideas will be used to a) inform the Research Agenda, and b) provide a relevant context for allocation discussions)

The Experts indicated a general degree of excitement around two topics as potential Centers of Excellence:

3. **Seek to Understanding Redwood Ecosystems** – specifically focused around the dynamics between habitat & structural relationships, perhaps including the context of how to manage for older forest. 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.

4. **Coho (watershed) 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/practices to other lands. Parallel the work for redwood ecosystems (stated) but on separate tracks.

There was also some discussion about the value of the following topic:

Carbon Sequestration? – how can forests sequester carbon and how can these relate to climate change management policies

Test assumptions of management policies and practices

Scribed: "Are the current management policies/practices taking us to our goal" (8 policies/13 practices)

Scribed: is or should there be monitoring data to support priority research and/or management decisions (5)

- Test the idea that if we build habitat that species will come (e.g. does providing habitat lead to recovery of species)
- Are current policies & practices achieving desired goals (e.g. riparian management assumptions, etc)
    - Complete an Adaptive Management framework

How do we continue to extract resources in a sustainable fashion without unraveling our watersheds and negatively impacting existing resources (e.g. fisheries, ecosystems, etc)?

Scribed: how do forest management systems achieve sustainable ws or other functional management goals (5)

Scribed: are coastal WS's unraveling, sustaining or improving (7)

- Do existing (or alternative) forest management systems (including but not limited to FPR) achieve sustainable (including ecosystem, watershed, and other functional) management goals.
- Are trajectories declining, stable or improving?

Recovery of Endangered Species

Scribed: What do common species tell us about managing for outcomes (6)

Scribed: can we understand habitat relationships to better predict populations trends in guilds and/or species (6)

Scribed: what organisms provide integrative knowledge of condition of watershed/forest (3)

Scribed: how do you manage for forest resiliance in light of cc uncertainties and consequences (2)??

- What is needed to maintain viable populations (veg, animals, etc)
- Build it they will come (e.g. does providing habitat lead to recovery of species)

- Can endangered species-oriented management inform forest management at a more holistic scale?
    - How can common species inform forest management?
- What organisms (or guilds) provide integrative knowledge of the condition of the watershed/forest?
- How can we integrate habitat needs (in the form of forest structure) at the landscape scale such that their status could be predicted (e.g. using GIS) in response to manipulations. Such a question would inform:
    - Management
    - Monitoring, AM, etc
    - Habitat/landscape models
    - Test hypotheses
    - [using this as an organizing framework]

How to restore old-growth characteristics

Scribed: does old growth structure = old-growth forests (e.g. is tree structure enough to support ecosystem structure/function) (4)

Scribed: what will we as a community of scientists, accept as our goal for restored ecosystems (0)

- does old-growth structure = old-growth forest (e.g. is tree structure enough to support ecosystem structure)
    - Using common species to characterize entire ecosystems may be necessary to address this issue
- What is the appropriate modern reference (targets, objectives, etc) for old-growth (i.e. historic analogs may not be appropriate)
    - What biological processes can be references?
- Is age the right metric?
    - i.e. can a 200-yr old forest provide all the critical ecosystem structures & functions of an old-growth system

- what critical ecosystem processes & structures are required to provide the basics of an old-growth forest system (watershed system, etc)

- DP: what will we as a community of scientists accept? as our goal for restored ecosystems?

Basic ecosystem processes

Scribed: What does WQ look like at the landscape scale (3)

Scribed: what critical ecosystem processes & structures are required to provide the functions (basics) of an old growth forest system (watershed system, etc) (3)

- Understanding what is biologically at stake and how inter-related
  - E.g. mycorrhizae info on tree productivity
- Enduring Big-Picture Questions:
  - Disturbance dynamics (short & long term)
    - How do modern analogs (e.g. active manipulations) mimic these
    - What is the role of fire in the ecosystem
  - What does WQ look like at the LS scale (build off Casper Ck)
    - What is the over-arching working model that Casper Ck describes at the landscape scale?
      - limiting factors analysis
      - Watershed-analysis-like synthesis
    - Look for reference sites that provide context (e.g. old-growth areas for headwater amphibians)

Climate Change Issues

Scribed: does climate trajectory = ecological trajectory? If so, how to incorporate into planning (3)

- Carbon sequestration
- Does climate trajectory = ecological trajectory

- Is the signal strong enough to be a driver beyond natural variation?
- How do we manage the forest to be resilient in the case of climate change (or uncertainties)?

Exotic invasive species & response to disturbances (e.g. fire, fog, etc)

Scribed: how do we manage for exotic invasive species so that they are incorporated into management goals (2)

- How can we manage for them within the context of existing management practices?

Other relevant comments regarding the Research Agenda

How to monitor (measure and reporting) on the feedback loop, impacts (benefits) from JDSF/JAG research activities to stakeholders (does JDSF have impact)

- How do we know that our recommendations are considered
- Structured process for data to be shared
- How are we doing AM and how do we know?
- Closing the AM loop
- Feedback is important
- Accountability at numerous levels (management, policy, community, etc)
- Monitoring is an essential element of both research & management
- Collected data should have an intended purpose (e.g. minimize (eliminate) data for data sake). Warning w/ example of weather stations & climate
- Is there appropriate monitoring data to support all key research questions?

Basic inventory data is essential to integrate information to make it available to research and the community at large

- What research opportunities exist here?
    - E.g. lidar, remote sensing technologies, etc
- This seems like an important early step
- This can make JDSF a focal point for a definitive research forest
- What core skill-sets define this place?
    - What do we really want to be good at?
    - With whom can we partner to extend the quality of practice

We need to increase the sense of urgency associated with Endangered Species

Use Adaptive Management as a euphemism for the term "monitoring" to bypass funding limitations on "monitoring."

- How does data we collect help us meet our research and management goals
- AM more likely to get funded than monitoring Truth in advertising!

Evaluate effects of active manipulation on resources

- Replicate watersheds (larger sample)
- Need broader representation of scale (e.g consider larger watersheds)

Extending to landscape/regional scales through greater coordination with other landowners

- Extends landscapes
- Provides a broader mix of management partners who can extend the range of potential management manipulations beyond what may be politically viable on JDSF
- Problem: too many extrapolations taken from small samples, assurances of access, management control, and QA/QC at off-JDSF sites.

ANSWERS TO JAG'S KEY QUESTIONS: STAND & STRUCTURAL DIVERSITY

The Experts appeared to be somewhat frustrated by this discussion, as it appeared largely irrelevant after the discussion of a model-based approach focused around Centers of Excellence. Only a few of the Experts actively participated in this discussion, thus the strength of these positions is uncertain.

Provide a sense for the desirable extent of diversity of stand condition and/or seral conditions needed to support a strong research and demonstration program Ideas for how should these be achieved?

Keep it relatively simple. Use existing silvicultural classification systems (e.g. modified Oliver and Larsen - see Kevin's paper) as the base. Integrate additional detail (silvicultural systems, habitat relationships, etc) as sophistications naturally evolves (and as language develops to better describe these variations).

Identify units (primarily around sub-watersheds or similar eco-system units) and keep those units stable. Units should define classes of treatment types (subject to variability within the units).

Move toward defining measures of diversity using hypothesis-based approach described above.

Other considerations include:

- Research questions should drive both the selection of diversity measures and the appropriate scale of measurement
- Use existing measures to define diversity
- Define what is there first, then sub-divide to allocation
- Keeping bins large is a good idea (i.e. provide flexibility)

Provide a sense for the extent to which land allocation and diversity should be blocked-up or dispersed, to enhance opportunities for landscape-level research and demonstration. Ideas for how such blocking should be established, and how diversity should be measured and managed.

ML Interpretation (please verify): **There were varied opinions represented by the Experts, with a common recommendation for sub-watershed groupings. However, when pressed to explain why, most answers were less than compelling (and never quite answered directly). 100 – 500 acres, with the later most commonly stated. Group noted that scale affects what landscape questions can or cannot be researched, and that there are landscape scale questions for which JDSF is, in its self, too small.**

Ideas for what scientific infrastructure is needed to support this agenda (e.g. key measures, instrumentation, access, staffing, etc)?

See above under Landscape Allocation Questions

John Helms add - What kinds and levels of stand structure and diversity are needed to be maintained over time to stimulate and enable long-term, mission-oriented research that is achieved through incremental or complementary pieces of research done by diverse collaborators that, over decades, cumulatively builds a body of interdisciplinary information?

This question was not specifically addressed. Answers to this can be inferred from above.

OTHER PROCESS DISCUSSION IDEAS

WHAT ARE THE COMPONENTS OF A WORLD-CLASS RESEARCH FOREST?

JAG should identify more specifically what it wants to be known for. These "Centers of Excellence" should be compelling, integrative, and exciting.

Other Considerations:

- In most Research Forests, research drives management activities

- Broadly consistent styles of Management on the ground that persist over time (e.g. predictable & adaptive conditions)\
    - Outcome oriented?
- Active Integration of research/demonstration with management objectives
    - Active management is focused on
    - Research historically opportunistic and passive
    - Research informs management
- Integrates science from other lands ("meta-analysis")
    - Research staff look beyond JDSF to integrate studies and lessons from other relevant forestlands
    - What are the qualities of managing here that are relevant outside redwood region as well
        - One opportunity: end product that results in a successful restoration of community & ecology in native forests
- Clear goal(s) that are well-defined and integrated into management practices and policies
- Results are published widely, in a breadth of journals (subject matter and stature), and cited widely and often.
- Most interesting thing we export is how we manage (techniques of management)
    - Practices, policies and knowledge of ecosystem process that are transportable to other landscapes
        - E.g. how
- Management Experiments
- Data, database, & history is tracked and well-maintained (including both management events and substantial natural events)

    - Accessible
    - Re-measured over time at a unit that is definable
        - Care taken if measurement protocols change (cross-walk)

- Research partnerships (universities or other research institutions)
- Kate: note that 50K acres is not a lot for landscape-scale questions – how to leverage the forest
- 100% of the forest inventoried with a level of information much more precise than normally applied by private forests (should mix remote sensing with ground data)
    - E.g. Blodgett measures 4% of the landscape (at what frequency?), enough to provide estimates at +/- 5% of volume

<u>Staff Comments</u>

- Substantial budget that can fund targeted research grants (Mission-Oriented and Research Agenda)
- Robust long-term monitoring data to provide baseline for researchers
- Broad range of forest conditions to support a broad range of research activities
- Demo & outreach to broad range of audiences
- Complimentary mix of long-term & short-term research
- Research on landscapes, controls & undisturbed areas

<u>Indicators (from Kathy/Brad/John)</u>

- Create context (conditions, clear mission, interaction) for attracting researchers
- Strong database design and effective maintenance

- Multi-disciplinary
- External funding
- Research director (PhD scientist)

Vince: how does all this happen within the "military-like" (e.g. command and control) structure of CALFIRE

Helge: how do we maintain a world-class status in a world of limited funding.

WHAT IS JDSF UNIQUELY SUITED FOR? ONLY OPENNESS, ACCESSIBILITY AND R&D FOCUS.

JDSF offers an excellent opportunity for active, manipulative experimental research that takes approaches that are difficult to conduct on other lands

- **Descriptive studies are available anywhere – few opportunities for active manipulation of the landscape**
- **Other lands are more tightly bound by**
  - **a) state Forest Practice Regulations,**
  - **b) Habitat Conservation Plans,**
  - **c) Federal constraints, or**
  - **d) conservation easement constraints**

Other Considerations

- Hartwell: CALFIRE Rules are inadequate – links to (old) aquatic rules
- JDSF offers stability in landscape structure: ability for confidence that installations and studies can persist over the long-term (i.e. less subject to economic drivers or ownership changes, etc)
- JDSF offers stability in goals and management practices:

  - E.g. ecological recovery (restoration)
  - Research compatible with goals

- Kate: To be more interesting: focus on how we are more like other places rather than how we are unique. This encourages others to be more interested in what JDSF is doing (ensures greater influence)
- Kim: JAG and JDSF can play a vital role in linking researchers with managers and the public
- JDSF offers various gradients (e.g. east/west; RW/DF; etc) that allow studies along ranges of continuums [note – limited latitudinal gradients]
- A more clearly defined mission could provide the context for the role of JDSF.
  - Doing too much reduces our impact
- JDSF is probably NOT suited to landscape-scale studies in the absence of cooperation with other landowners
  - Too few replicates
  - Too few sub-watersheds
  - Too little variation

Landscape Allocation Discussion

What is the purpose for Landscape Allocation

- Establishes the framework for inventory?? and management
- Kevin: let's design a landscape based on what we want, not just what is there
- Learn from NWFP – potential risks (AMA's hostage to wildlife rules)
  - Use it to identify/explore trade-off's (priorities) specifically …?
- To meet the objectives of the forest …

- Frieder: Allocation should be static spatially by management style?
    - Provides stability necessary to provide long-term responses
    - Is there a scale between landscape & stand scale
- Kate: **Allocation defines the experiment**
    - Implies Stand structure = ecological health
        - Establishes/defines assumptions and hypotheses
    - **States hypothesis: stand structure takes care of ecosystem functions**
    - **Probably can't address these assumptions at JDSF alone (needs coordination with others)**
    - Can address some questions at stand scale.
    - What can you do with that approach?
- Combining structure with watersheds creates challenges
- Kevin: sets the context for future experiments
    - Such future experiments would add to (and thus modify) the landscape-scale experiment
- Kate: World-class = how careful and thoughtful (and rigorously tested) our working hypotheses and assumptions are crafted and documented
    - E.g. models are reasonably predictive
- Kim: whole forest should be allocated to research – or at least clearly defined

What is an appropriate basis for allocation?

- Sub-basins that capture structural characteristics

- Logged by watersheds early in history

- Capture the most complete assemblage of organisms

What is left behind in using sub-basin approach?

- Potential for fire issues
- Certain wildlife bio issues

Evening Exercise Readouts

Group 3:

- Information desires
  - 2nd-order watersheds built up to "unit" sizes (~500-1000 ac units treated similarly)
    - Units treated in same manner, but not necessarily at the same time
  - Focus – sub-basin treatments
  - Could smaller units provide more opportunities (e.g. 500 units?)
  - What is key research questions and the appropriate scales needed
- Take home principle:
  - Harvest is economically self-sustaining harvest activities
  - Leverage existing & historical data to inform research
  - Potential research area: how to frame research around the silviculture of restoration forestry (paraphrased)

- Opinion: set the research context, researchers will come to participate in the opportunities

Group 2:

- Split forest into 5 major units with 3 management areas
    - Special areas – reserves
    - Old forest restoration – experimental, with no production goals (short-term allowable cut) 10%
    - Managed long (~200 yrs) rotation – including multi-aged stands. Extracting timber 40% (including riparian areas)
    - Multi-aged – selection silviculture designed to create new cohorts 25%
    - Even-aged (~100 yr rotation) – 25%
- Each area would have similar distribution of the above
    - Accounts for site quality and vegetative conditions
    - Features included connecting corridor of old forest restoration and managed long rotation
- Sub-watersheds used to allocate individual treatments
- Principles:
    - Amount of acreage in any management unit type is to ensure enough lands for replicates
    - 25% of even-aged would result in very small proportion of landscape in clearcut condition at any given time
    - Create opportunities to allow flexibility in research (build it and they will come). Doesn't build allocation on any specific research questions or approach.
- Even-aged stands allow greater control of variables that can support research at a number of redwood ecology issues
    - Blodgett experience: newest even-aged cuts are the most in-demand objectives

- Multi-aged research is very limited in landscape

Group 1:

- Got stuck in need for clearly defined research questions before they could delineate polygons on the map
    - What would we need to know to understand redwood ecosystems, including
        - Watershed sizes
        - Natural variability
        - Expanding scope beyond JDSF by setting up as a cooperative
            - Conservations easements
            - Private lands
            - USFS lands
            - Expands space for time and variability in treatments
    - Wanted core answers that could be provided by JDSF exclusive of the cooperative.
        - How do stands grow in response to treatments
        - How do organisms respond to these treatments
            - Using land management to iterativiely develop and test models (organizations frameworks) for habitat/organism relationships
    - Focused around catchment/sub-watersheds should be a fundamental unit of management
        - Replicates that are treated similarly
    - 2-3 zonations defined by existing landscape (similar to Group 2)

Morning Comments from Dan

(DAN: please refine):

- Monitoring
    - Importance of data usability to public, researchers, etc
    - Importance of data quality
    - Need to include understory conditions

- Mission-Oriented Priorities – sounds great, but what are they. Be more explicit about issues, associated assumptions. Openly test our assumptions.
- Are continued timber harvest activities compatible with sustainable ecosystem resources?
- How is info from JDSF packaged, shared & disseminated. Transparent to local community, policy, researchers
- Leverage past work to set direction for moving forward (gap analysis)
- What is the appropriate scale of research on the forest (self-contained or collaborative)

Recommended Next Steps

Move toward implementing systems based on Centers of Excellence. As a way to sell the benefits of approach to key decision-makers and funders, we'll need to enunciate short-term, mid-term, long-term approaches and associated deliverables (outcomes) that would arise.

- Short Term (few years)
    - Develop simplified (cartoon) conceptual models

- Use the conceptual models to begin constructing more quantitative models using existing inventories and data
- Get restoration of coho going as soon as possible (recovery is urgently needed!)
    - Active instream restoration focused on wood placement, fish passage and other habitat improvements
    - Intensively monitored to document what works (and doesn't work)
    - Apply experimental methods using testable hypotheses
    - R&D and allocation implications were not delved into.
- Develop Limiting Factors models
- Form cooperatives (see above)
- Hold symposium of land/ocean recovery of salmon (look to NSF as a resource)
- Develop JDSF expertise center (staffing, partners, resources, etc)
- Formulate hypotheses for stable v. dynamic landscapes
    - Natural AND manipulated
    - Look to find opportunities for collaboration with other landbases

- Medium-Term
    - Target the development of formal management systems (combinations of regulations, policies, practices and Adaptive Management) that would make models available to other land-owners. Start using the context of the existing regulatory framework, and actively refine as information evolves.

- Longer-term
    - Silvicultural outputs

FEEDBACK FROM EXPERTS

What final words of wisdom do you have to offer in summarizing this event.

- Hart: Ideas from Kate had a lot of merit. Potential for bringing in a lot of partners (cooperative) and hypothesis-driven approach specifically
- Pete: really likes cooperative – fits with efforts of Gentry, et al
    - Always wanted JDSF to be more like HJ Andrews. Appears to be moving in that direction
- Kim: Partnerships are key. Explore potential for Director (PI).
    - The Experts might have been more effective had they seen the plans in advance
- Ron: clear goals
    - Cooperation with local and broader community
- Fred: putting silviculture secondary to wildlife is exciting potential. Likely to have value to small landowners. Also likes the idea of growing old-growth.
- Nick: like's goal of Coho as center for excellence. Also use of JDSF as opportunity for professional interaction. More concerted effort for annual field days??
- Kate: pieces are there. Will volunteer to help. If we can hit on bigger ideas, it will help forestry in state overall. Will provide very rich way.
- Tom: Like's Kate's ideas, inventory, forest & aquatic, models as organizational ideas, coho. Hope that current plan would have minor adjustments to gain trust of the JAG.
    - How do we address budgets, government issues, civil service constraints, etc
- Steve: as scientist, a lot of fixation on more data. Sometimes more data is not helpful. Models are great organizations framework for moving this forward. Simple, transparent, predictability with changing inputs, reasonably accurate (but not necessarily precise). Data collection needs a context.

- Frieder: keep open options on the ground to generate $$ and keep those proprietary to forest (rainy day fund too). Keep & maintain data well. Have meetings to share insights and ideas.

- Kevin: prefers build-it-and-they-will-come approach. The approach used here is interesting. Care should be taken.

FEEDBACK FROM JAG

Has this been helpful?

- Vince: happy with where this workshop brought us

- Kathy: informative and interesting. Challenging to convey this discussion to remaining JAG members. Worthwhile, doable, and lots of work. JDSF is worth it.

- Dr. Helms: whatever direction we recommend has to be exciting, imaginative, engaging. Enjoyed idea of a center of excellence.

- Brad: learned much. Very interesting. Lots of overlap with prior JAG discussions. Few issues resolved, but different perspective. Like's the idea of a center of excellence, and as a focal point for cooperative.

- Pam: thanks

- Russ: thanks abound

- Helge: INSPIRING!! Didn't solve the elephant in the room. Moving in different direction than typically done. Will be interesting. Good effort at highlighting the tradeoffs.

- Dan: innovative, authentic way.

- Rick: pitched next Redwood Symposium (Santa Cruz, Spring 2011).