

RESEARCH PROJECT SCOPE OF WORK
OREGON STATE UNIVERSITY
INSTITUTE FOR NATURAL RESOURCES

TITLE: Ecosystem Dynamics Policy Study

PRINCIPAL INVESTIGATOR: Sally Duncan, Policy Research Manager, Institute for Natural Resources

PARTICIPATING RESEARCH SCIENTISTS:

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BACKGROUND: The Oregon Board of Forestry and many others recognize that forest management policy has not always kept pace with rapidly evolving scientific understandings of forest ecosystems and their affiliated social and economic systems. The Board is challenged to keep pace with the science while meeting the changing demands of dynamic social environments, including economic, political, and social preferences among diverse management approaches for state and private lands. Thus the Board seeks to develop new approaches to forest management laws and policies that better reflect current scientific understanding of ecosystem dynamics and ultimately how those relate to dynamic social and economic systems.

Ecological science has undergone several significant shifts in emphasis and perspective during the past four decades. One of the most recent, and perhaps most challenging from a policy perspective, is the shift in scientific thinking from an equilibrium paradigm, based on Clementsian ecology and sustained yield, to one that recognizes the non-equilibrium, dynamic nature of ecosystems and species, captured most eloquently by Daniel Botkin in his 1992 book *Discordant Harmonies*. The old concept of controllable, predictable ecosystems that managers could regulate to produce sustained yields of particular goods or services generated static and deterministic policies such as maximum opening sizes, fixed rates for reforestation, the Endangered Species Act and the Clean Water Act. Advances in scientific findings about the importance of interrelated ecosystem structure and function, dynamic processes, and resiliency of biodiversity to environmental stresses and shifts, have encountered interrelated social and economic imperatives. One result has been the spreading impetus to move from single-item sustained yield approaches to highly integrated, multi-value sustainability approaches. These new understandings and new ways of approaching how forests interact with society and vice versa underscore the growing need for policy change. While the shift in ecological understandings and the profound implications of sustainability as a concept beyond sustained yield have crucial implications for forest management, they have not yet become commonly

understood within society, nor have they been translated into sufficient management information, law reform, or new policies.

Three of the most immediate difficulties with performing this translation are: (1) the existence of *considerable uncertainty* around the relationships suggested by non-equilibrium ecology; (2) the challenge of *social acceptance* of policies founded on the principles of ecosystem dynamics, i.e., many people are uncomfortable with change and uncertainty; and (3) the challenge of “*tradeoffs*”: if you make management decisions for a particular ecosystem service – say, carbon sequestration – it typically affects other services such as water, wood yield or habitat. Thus, in order to make a wise decision about one value, managers need to be exceptionally vigilant in order to avoid unintended consequences – some of which can be known, and some of which cannot. Forest managers, of course, are caught in the midst of the complex web formed by science, society, sustainability, and uncertainty.

SCOPE OF WORK: To assist the Board, this project will examine experiences with various approaches to integrating ecosystem dynamics into forest management in order to identify successes, drawbacks, and unintended consequences. The ultimate objective is to use the results of the project to frame forest management policies that embody current and future understanding of forest ecosystem dynamics.

The project work to be completed by UNIVERSITY will include:

1. **Synthesis Report:** A synthesis report on lessons learned about ecosystem dynamics and their effects on current management will be developed. The report will contain all relevant and available case studies of actual experiences with forest managers trying to apply new scientific understanding to forest management, including studies from the literature and the experience of the investigators. The case studies will be presented within a larger synthesis of scientific literature which focuses on lessons learned. Along with an executive summary of key findings, the report would provide an overall legal and policy context in its introduction. This overall legal and policy framework will address the elements described in Section 1.2 a. of the May 29, 2007 Department of Forestry (ODF) Request for Proposals (RFP). Specifically, this section will address the Clean Water Act, the Clean Air Act, the Endangered Species Act and state forest practices acts. The objective will be to synthesize a large body of existing information in a tiered/ranked format for easy access to busy forest managers. The synthesis will also begin the process of identifying information gaps. Project researchers will consult with the Oregon Departments of Environmental Quality and Forestry to obtain an accurate understanding of current administration of the federal Clean Air Act and Clean Water Act and the state Forest Practices Act within Oregon. Both Department of Forestry and Department of Environmental Quality will also be given sufficient opportunities to review and comment on a draft synthesis report.

Components:

- Introduction: overall legal framework and specific policy frameworks
- Cases developed from the literature and the researchers' experience across four key themes: "protection" concept, fire and fuels, flooding/aquatics, climate change and adaptation. The cases are likely to include the Northwest Forest Plan Aquatic Conservation Strategy or Spotted Owl Strategy, the Oregon Forest Practices Act rules, the Healthy Forest Restoration Act
- Lessons learned within and across all four theme areas, synthesized

Time frame:

- 9 months to first draft:
 - 3 months to include initial meeting with key scientists for consulting on cases + literature review (responding to 1.2.a and 1.2.e in the RFP)
 - 3 months writing (responding to 1.2.b with case summaries under each of four main headings)
 - 2 months developing Lessons Learned (responding to 1.2.c research and tools needed, 1.2.d management implications)
 - 1 month revision by the Principal Investigators (PIs) and lead writer
 - Submission to BOF for review: subsequent revisions to be incorporated into final report

Personnel:

- 1 graduate student
- 4-5 scientists
- 1 legal/policy expert
- INR coordinator

2. Seminar Series: Contingent on SPONSOR's satisfaction with the draft synthesis report, a seminar series of four presentations, addressing four selected theme areas will be developed and conducted. These theme areas encompass almost all of the forest policy topics listed. Specifically, *fire and fuels* incorporates snags and down wood, terrestrial wildlife habitat, reforestation, air quality, insects and diseases, silviculture and ecosystem processes; *aquatics and flooding* incorporates riparian areas, water quality, aquatic habitat, roads and ecosystem processes; *climate change and adaptation* incorporates insects and diseases, invasive species, and short- and long-term risk assessment; and the "protection" concept incorporates late successional forests, threatened, endangered, and sensitive plant and animal species, and ecosystem processes. The themes correlate with the key laws and policies now governing forest management.

All four areas will incorporate human dimensions and actual case studies to bring social and ecological intersections into the studies. The case studies reflecting these themes will include riparian area laws and regulations, spotted owl conservation, smoke management and key watersheds or salmon anchor habitat areas. The seminar series will be publicized to draw interest from the broader university system, other agencies, and the public.

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Attachment 1

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Seminar speakers may be locally or nationally based, and each will contribute knowledge and suggestions to the synthesis and final reports. After each seminar, an invited group consisting of Department of Forestry and Department of Environmental Quality (DEQ) managers and field staff along with selected researchers and invited cooperators and stakeholders, will convene for a 3-hour work session, to identify key challenges for Oregon forest resource managers in the area defined by the seminar, discuss options for addressing potential policy adjustments, and identify essential research and analytical tools needed for monitoring, utilization of monitoring data, and management implications. A report on each of these work sessions will be circulated before the final summit workshop (described in #3), and will contribute to the final report. Specific details of workshop design will be planned in collaboration with ODF and with opportunities for DEQ staff input.

Components:

- 4 synthesizing seminar subjects, using themes proposed
- Open to the public, to seek other cross-disciplinary areas of interest
- Invited speakers, may be local or national depending on expertise needed
- Speaker to provide input to synthesis report
- 3-hour workshop for invited participants after seminar to identify and develop key policy issues
- Brief reports written on issues identified in each seminar workshop, addressing essential research and analytical tools needed and their management implications.

Time frame:

- Academic year 2008-09, one seminar every 2-3 months
- Seminar ~50 minutes, question time, open to public and campus audiences
- Work session, 3 hours following completion of seminar, invited participants only

Personnel:

- Core ODF and DEQ managers and invited seminar participants
- 4 speakers (may be PIs, may be from outside the Oregon University System)
- 1 graduate student/organizer
- INR coordinator for facilitation and report writing

3. Summit Policy Workshop: Contingent on SPONSOR's satisfaction with the draft seminar series, a summit policy workshop will be developed and conducted that brings together core ODF and DEQ managers and OUS scientists, other state and federal agency cooperators, and stakeholders to synthesize needed policy changes based on key themes from seminar work sessions, known areas of disconnect from ecosystem dynamics, and findings from the literature. This final workshop will be an invited event with the central goal of developing a new menu of policy choices guided by the four theme areas, fleshing them out with current knowledge, and identifying key areas of uncertainty, further information and research needed, and preferred analysis systems. A final report will be

produced after the workshop, tying together all three stages of the proposed work, and capturing the framework developed at the summit workshop.

The final summit policy workshop will be 1.5 to 2 days long, with carefully-planned presentations intermixed with facilitated, iterative work sessions to develop an overall policy framework for addressing management of dynamic landscapes. Using this format, specific outlines of policy change options will be developed by state agency staff with informational input from university researchers and other invitees. Specific details of workshop design will be planned in collaboration with ODF and with opportunities for DEQ staff input closer to the time, and will be based on the types of outputs generated by the earlier seminar workshops.

Components:

- Scientist-agency policy workshop at OSU
- Invited participants to collaborate on policy issues developed from seminars and associated workshops
- Keynote speaker and/or several presentations (tbd)
- Output 1: Final report and recommendations
- Output 2: Multiple-issue policy framework for addressing dynamic ecosystems and species

Time frame:

- Fall 2009 for workshop, 1.5 to 2 days
- Final draft of report by fall 2009, revisions by 12/1/09

Personnel:

- Core ODF and DEQ managers and invited participants
- PIs on this project
- Graduate students
- INR coordinator, writer of final report
- Facilitator

The Scope of Work will elicit two complementary kinds of information and knowledge: (1) synthesis of findings from the literature will bring to state agency staffs, in a rapidly readable and prioritized form, the most current information on the complexity of managing in concert with ecosystem dynamics. The synthesis will resolve the ongoing challenge to agency staff of finding the time to stay abreast of the most recent scientific findings, and help them identify further information needs and preferred analysis systems; and (2) knowledge and understanding gained from agency interactions with researchers, wherein managers and theorists can spend structured time discussing emerging ideas and constraints for alterations to policy. In other words, the project will help to establish a two-way communication between scientists and managers rather than a unidirectional flow of information from scientists to managers.

The three-part work Scope of Work does not erode the value of in-depth cases. Where those exist in the literature, they will be included, highlighted, and fully summarized in the synthesis. Leading scientists, each of whom is familiar with a number of cogent case studies based on her or his own work, will consult with the synthesis writer to be sure full coverage of our current ecological understandings is reflected in the final report.

To the degree possible, the synthesis will use systematic evidence review-type rankings (using the three types of categories described in the RFP) for reports on experimental forest treatments. Given that these are only strictly applicable in certain kinds of experimental cases, this will not cover all the literature addressing ecosystem dynamics issues. The suggested bar graph or other similar method will be used to indicate level of evidence review. Such a literature ranking procedure will help us determine which lessons are most robust in having been tested. For key papers, the project may also be able to determine how much monitoring data has been accumulated in the time since original treatment, to verify which sites can continue to provide data useful for future policy consideration. This is critical to assessing whether adaptive management has any chance of working with uncertainty and system dynamics.

The seminars with follow-up workshops will allow ODF and DEQ staff and forest managers to engage in productive dialogue with researchers, cooperators, and stakeholders. The seminar series would provide the added value of opening a broader discussion about such larger issues as managing forests within changing conditions, adapting to climate change, and addressing ever-changing social values. Workshops following seminars will be designed to help develop deeper knowledge of key policy issues in selected areas, including developing more adaptive and anticipatory approaches to policy. Findings and discussions from seminar workshops will subsequently be brought forward to the summit workshop.

The lead researchers for this project will contribute to this work via the following commitments:

1. Availability to consult with graduate student on development of synthesis report, individually and possibly in one group meeting, on relevant literature and cases
2. Recruitment and scheduling of a seminar speaker, or preparation of their own presentation for the seminar
3. Leadership in the workshop following seminar
4. Participation in the summit workshop with agency staff and other PIs

PROPOSED INITIATION AND COMPLETION DATES: December 1, 2007 to December 31, 2009