BOARD ISSUES WORK PLAN

Issue #5: Dynamic Forest Ecosystems

Date Work Plan approved: September 7, 2005

Contact: David Morman, Forest Resources Planning Program Director
503-945-7413 dmorman@odf.state.or.us

CONTENTS **Page**

BACKGROUND

Historical Context

There has been considerable progress and growing consensus in the scientific community in understanding multi-scale ecosystem dynamics. But scientific understanding of dynamic ecosystems often appears to collide with a range of strongly held values, public perceptions, and long-standing natural resource policy frameworks based on notions of controllable ecosystems responding in fully predictable ways.

A 2003 Department of Forestry White Paper titled *Forest Practices Protection on Forestlands in the Context of Dynamic Ecosystems* (by reference an attachment to this work plan) was drafted as a result of direction from the Oregon Board of Forestry following discussions on how to better provide resource protection under the Oregon Forest Practices Act. With recent advances in our understanding that forest ecosystems are inherently dynamic, the purpose was to promote discussion and consider possible alternative policy frameworks for addressing resource protection within a dynamic ecosystems context.

The White Paper drew attention to the fact that use of the term "protection" can have various meanings and interpretations. Protection could imply that we are trying to prevent something from being changed or damaged. The precautionary principle is based on this interpretation, and it is evident in many current polices. The precautionary principal states that if an action or policy might cause severe or irreversible harm, in the absence of a scientific consensus that harm would not ensue, the burden of proof falls on those who would advocate taking the action.

A major focus of the White Paper was that modern understanding of forested ecosystems recognizes that natural processes will occur that change the composition, structure, and condition of forested ecosystems regardless of human activity. It discussed ecosystem disturbances; resiliency; and dynamics over time and across forested landscapes; and then discussed existing policy frameworks under which "protection" is applied, with a focus on those policies that attempt to impose a static and deterministic perspective on our understanding of ecosystem processes. The paper raised the question of how protection in the near term relates to protection in the long term when ecosystems are constantly changing over space and time due to forest growth and succession combined with periodic events such as drought, insect and disease

epidemics, and wildfire. Forest ecosystems are also affected, and sometimes altered, by management activities.

Given recent advances in scientific understanding of forest ecosystem dynamics and in light of often static policies, regulations, or land allocations, uncertainty in predicting disturbances, and protections having unintended consequences, the meaning of sustaining or protecting desired conditions has changed. We have discovered that some of our most "successful" short-term protections have created conditions that drive disturbances with intensities that we believe are greater than occurred in the past and are negatively impacting desired long-term processes and environmental, economic, and social sustainability. On this basis, the White Paper suggested the Board of Forestry begin discussions on the meaning of forest protection and how should protection be accomplished in dynamic forested landscapes with various ownerships and purposes.

Basic Work Plan Concepts

The primary issue this work plan addresses is how resource protection can best be accomplished in dynamic forested landscapes with various ownerships and purposes. Within the *Forestry Program for Oregon*, the Board has adopted a policy of promoting resource policies that sustain and enhance the health of Oregon's forest ecosystems, watersheds, and airsheds within a context of natural disturbance and active management. (*Forestry Program for Oregon* Strategy F.) The framework for implementing this policy recognizes that different forestlands will play different roles ranging from wood production emphasis to reserve emphasis. The *Forestry Program for Oregon* provides an important new policy context for scientific discussions about dynamic ecosystems.

"Protection" Defined

For the purpose of this Work Plan, *forest resource protection* is defined as the sustainable management of short-term and long-term risks to a forest resource.

Disturbance Regimes

Successful development of dynamic ecosystem concepts will be based upon an understanding of disturbance regimes. White and Pickett (1985) define disturbance as "any relatively discrete event in time that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment." Suffling and Perera (2004) identified an integrated set of natural disturbance regime components. These components are listed in the table below.

Table 1. The main components of a natural forest disturbance regime.

Disturbance Regime Component	Definition	Example
Frequency (return Interval)	Number of events caused by a given Disturbance agent per time period at a given point in the landscape. Return interval = 1/frequency	Five blowdown events in 250 years in a given stand.
Rotation period	The time over which an area equal to that of the study area is disturbed. This component integrates the frequency and size of a disturbance event.	If 0.5% of the landscape is burned per year, the rotation period is 200 yr. assuming 0.5% X 200 = 100%
Intensity	How much energy is released by a disturbance event per unit area per unit time.	4000 metric tons of earth move on average each year in landslides in a given valley.
Severity	The impact of the disturbance on the organism, community, or ecosystem.	An average of 55% of the soil's O horizon burned in one fire versus 5% in another.
Patch size	The sizes of individual disturbance patches as well as the size distribution of all patches.	In a management unit, the average wildlife size is 5000 ha and the modal size is 50 ha.
Residual structure	The complex of physical and biological materials and conditions left after a disturbance event.	Shapes of patches, number of live trees per ha remaining, number of snags >50 cm diameter per ha, average silt depth deposited after a flood.
Causal agent	The kinds of disturbance present in the study area, as well as their relative occurrence.	Fire, windstorm, and floods.
Relative influence of agents	How often each agent occurs and the magnitude of its impact relative to those of other agents.	The average return interval of 5 yr. for flooding in flood plains, affecting 7% of a region; a fire return period of 75 yr. affecting 85% of a region.
Interactions: Synergism and antagonism between agents	How different agents influence each other.	Synergism: a windstorm increases fire likelihood; antagonism: a fire **decreases** the severity of a subsequent insect outbreak.

The first two components, *frequency* and *rotation*, characterize how often disturbance events occur and how long they take to affect an area equivalent to that of the entire study area. *Intensity* and *severity* describe the magnitude of an event, and the *residual* component refers to the nature of the forest that remains after the disturbance. Disturbance legacy and *residuals* carry the same basic meaning and represents the aggregate of the physical, chemical, and biological conditions that remain after a disturbance event. The form of the disturbance legacy governs the success of emulating natural disturbance, for it represents both the outcome of the previous disturbance and establishes the conditions that govern the next one. It governs the organisms that use forested ecosystems between disturbance events. The last three components are integrally concerned with the mix of disturbance agents present and their interactions. These interactions have been subdivided into the categories of synergism and antagonism. Synergism is the interaction of two or more kinds of disturbance that act to increase the magnitude of one disturbance (intensity or severity) without a commensurate decrease in the remaining disturbance types. Antagonism is the interaction between two or more kinds of disturbance that acts to decrease the magnitude of one or more disturbance types.

Some forms of environmental variation occur over very long time periods, therefore, forest landscapes may never be at equilibrium over long temporal scales. Climate, for example, operates at a much broader scale than that of forest management units. By attempting to emulate natural disturbances based on a time period of, say, the past 300 years in temperate and boreal forests, managers are implicitly selecting current disturbance patterns as their model. Managers must recognize the existence of natural, long-term indeterminism in forest systems; that is, current forests are only stable within the bounds of the current climatic averages. Maintaining variability (from genes to landscapes) in forests is likely an important management objective to ensure that species have a chance to adapt to environmental variations that can be anticipated to occur (Thompson and Harestad, 2004).

Systematic Evidence Review

Ideally, rules and regulations focused on resource protection should be based on research information that demonstrates how much and what type of protection is needed. However, concerns have surfaced that current processes for gathering and analyzing scientific information are less than ideal in this regard. (Behan, Crawford, and Kleiner, 2005.)

Similar to the medical profession where formal systematic evidence reviews are institutionalized, natural resource management systematic evidence reviews could be formulated explicitly according to four variables: a specific ecosystem component or setting (such as aquatic productivity); the condition of interest (such as stream temperature and sunlight); and exposure to a test or treatment (such as buffer width and riparian conifer and hardwood density); and one or more specific outcomes (such as macroinvertebrate diversity and abundance and fish productivity). Therefore, a well-formulated ecologically relevant example question for systematic review might be: Does current stream buffer width and overstory density maintain or improve fish and aquatic ecosystem production and how does effectiveness vary under different site conditions?

The development of dynamic ecosystem concepts will be enhanced by a structured and non–value laden science process such as systematic evidence review. A systematic evidence review process is similar to primary scientific research and involves the careful and systematic collection, measurement, and synthesis of data (the "data" in this instance being research papers and publications). The term "systematic evidence review" is used to indicate this careful review process and is preferred to "meta-analysis" which is usually used synonymously but which has a more specific meaning relating to the combining and quantitative summarizing of results from a number of studies. A distinction is that while it may be appropriate and desirable to provide a quantitative synthesis of the data, a "systematic" review does not always occur.

A systematic review involves a number of discrete steps:

- Question formulation.
- Finding studies.
- Appraisal and selection of studies.
- Summary and synthesis of relevant studies.
- Determining the applicability of results.
- Reviewing and appraising the economics literature.

Adaptive Management

Adaptive management involves deliberatively altering management plans followed by monitoring, and analysis to observe the effects of these alterations, and thereby gaining knowledge about how the forested system responds to different strategies.

The combination of complexity, changing conditions, and lack of complete and high-quality information limits our ability to predict disturbances or how forest ecosystems will respond to these disturbances and management actions, especially at a landscape scale. Despite the uncertainties, forest managers must make decisions and implement plans to meet society's expectations for our environment, economy, and communities. Any forest management system should therefore produce a testable and measurable response or outcome. Developing future management plans can incorporate knowledge gained from monitoring the system responses to all forms of disturbance including human activity.

Adaptive management is a way for forest managers to proceed responsibly in the face of uncertainty. It provides a sound alternative to either charging ahead blindly or being paralyzed by indecision or static, rigid, and naive regulations which can foreclose management options and impact social, economic, and ecological values (Nyberg, 1999).

Adaptive management is a formal, systematic, and rigorous approach to learning from the outcomes of operational programs (management actions), accommodating change, and continuously improving management policies. It involves synthesizing existing knowledge (Systematic Evidence Review), exploring alternative actions, and making explicit forecasts about their outcomes. Adaptive management has been described as a six-step process comprised of: 1) problem assessment, 2) design management and monitoring plans, 3) plan implementations, 4) monitoring, 5) analysis and evaluation of monitoring and experience, and 6) evaluation of

policies in light of analysis and new information. Management actions and monitoring programs must be carefully designed to generate reliable feedback and clarify the reasons why particular outcomes occur. Policies and management objectives are then adjusted based on feedback from the analysis of monitoring information and quantitative modeling. The primary purpose of this information feedback system is to integrate decisions, actions, and outcomes in various forms of communication and documentation so that knowledge gained through experience is passed on, rather than being lost when individuals move or leave an organization.

The adaptive management process is primarily about finding ways of dealing with uncertainty in the management of renewable resources. The basic theme Carl Walters (1986), the author of *Adaptive Management of Renewable Resources*, promoted was that management should be viewed as an adaptive process. The Dynamic Ecosystems White Paper echoes the same natural resource management and policy issues that Carl Walters (1986) addressed in his thesis, that is, "we keep running up against questions that only hard experience can answer, and a basic issue becomes whether to institute policies that will deliberately enhance (or encumber) that experience."

There would be little need to develop new policies or methods if managers were dealing with stable, predictable ecological, economic, and social systems. However, we do not live in such a world, uncertainties are pervasive, and can be categorized as follows:

- Natural environmental variability (e.g., climate, fire, flooding, genetic composition of species, animal movements).
- Human impacts on the environment through global climate change, new technology, and growing population.
- Lack of knowledge about most aspects of the ecosystems being managed.
- Variations in social and political goals expressed as varying budgets, shifting policy directions, and changing demands for commodities, services, and aesthetic values from forests.

In contrast to basic trial-and-error or precautionary approaches, adaptive management encourages making explicit predictions of the expected outcomes of management actions, then comparing actual outcomes to the predictions before adjusting subsequent actions and the models used to make the initial predictions. By designing, or treating management actions as experiments, stronger inferences can be drawn from their outcomes, reducing the chance of generating false notions about forest functions and impacts.

Figure 2 below is a graphical representation of adaptive management modified from that presented by Nyberg (1999). The modification explicitly integrates the role of the Board of Forestry, systematic evidence review, and the *Forestry Program for Oregon's* Strategies and Indicators framework.

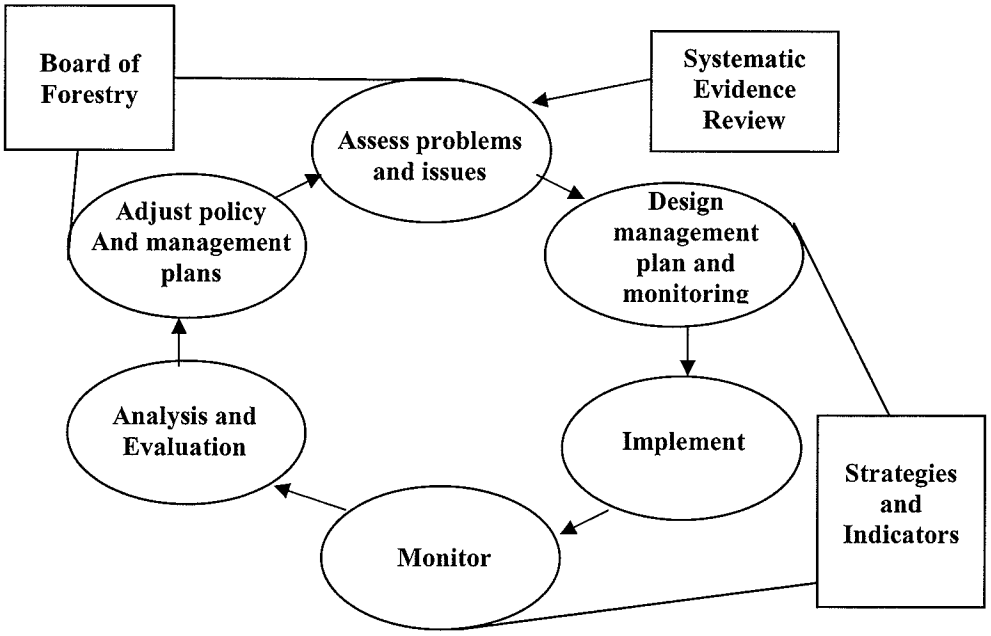


Figure 1.

Guidelines for Building Dynamic Forest Ecosystems Frameworks

A major purpose of the White Paper was to promote discussion and consider possible policy frameworks for addressing resource protection within a "dynamic ecosystems context." Knowledge of the disturbance legacy and accurate documenting of current disturbances within the disturbance regime framework (Table 1) could provide a set of potential management guidelines. Often missing from the discussion, however, is the question to what extent do we consider humans and human activities as part of the natural environment.

The inherent responsibility of sustainability requires every generation of scientists, resource managers, and stakeholders to understand the direct and indirect impacts that our utilization of resources has on the ecosystems within which our existence depends. Other questions worth considering, within in the context of the unidirectional nature of time, the development and spread of human populations, continuous technological advancements, and the understanding that ecosystems are dynamic, are (1) whether a goal to obtain pre-European settlement conditions in our forested ecosystems is realistic, and (2) whether setting a goal for a specific long-term desired future condition is realistic. These ideas and questions are part of the conceptual framework for the dynamic ecosystems paradigm.

The following guidelines could be applied in building a framework to implement dynamic ecosystem concepts:

- Explicitly describe the extent to which human disturbance is part of the regime.
- A reference time period should be selected for characterizing the disturbance regime.
- First, characterize the disturbance regime of a given area. This characterization requires explicitly quantifying the temporal and spatial patterns of natural disturbance beginning with most recent to some meaningful point in history.

- The reference area should be explicitly defined.
- Objective comparisons should be made between natural disturbance regimes and those imposed by management activities. Each disturbance should be characterized by the frequency, intensity, severity, patch sizes, and residual conditions.
- Disturbance regimes should be described in terms of their probability distributions for the size of discrete events, the spatial tendency of occurrence, and the variance in return intervals.
- Where multiple agents cause disturbances, attempts should be made to determine the relative influence of each agent and the interactions among agents.
- The means of characterizing disturbance regimes include observational, experimental, and simulation modeling. These methodologies are complementary and should be employed in focused combinations.
- In practice, information is incomplete and often imprecise; therefore, assumptions and gaps in knowledge should be identified.

GOAL

To promote the science, information acquisition, and analysis systems that are essential for developing sound natural resource policies that sustain and enhance the health of Oregon's forest ecosystems, watersheds, and airsheds within a context of natural disturbance and active management. (Based on *Forestry Program for Oregon* Strategy F.)

OBJECTIVE 1: Promote dialogue and greater understanding among scientists, decision makers, and stakeholders about dynamic forest ecosystem processes and their interactions with forest policies.

Board Products

-- Increased public understanding of dynamic forest ecosystem concepts in the context of forest policy and forest management. Up to six case study papers will be produced, each evaluating how a particular existing natural resource law or set of laws, policies or regulations that were designed to address a set of forest ecosystem elements has, or has not, incorporated an adequate understanding of ecosystem functions and dynamics.

-- A one-day public symposium on multi-scale forest ecosystem dynamics hosted by the Board of Forestry and a follow-up report.

Research and Information Gathering

Case Study Papers

A Request for Proposals will be developed to determine the level of interest among scientists and policy analysts to develop case study papers and to solicit case study proposals.

The Request for Proposals will incorporate the following requirements for case study papers:

History and Literature Review
This section of the paper will be a detailed history of the development and implementation of the referenced natural resource law, or set of laws, policies, or regulations. This section should include: 1) the rationale for why and how a particular law, policy, or regulation was developed; 2) the political process that resulted in the establishment of these laws, policies, or regulations; 3) if and how a mechanism for monitoring and analysis to evaluate the success of the law, policy, or regulation was an integral component; 4) analysis of both the intended and unintended effects and short and long-term resource risks created through implementation of the law, policy, or rule; and 5) a timeline graphic.

Ecosystem Dynamics
This section of the paper should be built around the case study and will be a thorough description of our current understanding of the ecosystem dynamics and the elements applicable to the case study. This will be the main body of the paper and contain an extensive reiteration and explanation of the scientific literature. It will identify and describe the relationship of existing natural resource law or set of laws, policies, or regulations to the current understanding of dynamic forest ecosystem science and any short-term and long-term consequences and risks resulting from this relationship to the resources cited in the study. This section will also discuss how the natural resource law or set of laws, policies, or regulations in the case study could more fully take into account the dynamics of ecosystems and therefore help mitigate unexpected and/or unintended outcomes. Finally, this section will discuss any alternative management strategies related to the case study that have the potential for improved short- and long-term outcomes.

Essential Research and Analytical Tools
This section of the paper will include a description of additional monitoring and analysis that must be conducted to supply policymakers and society with adequate information to create effective policies related to the case study for natural resource conservation and management. It should provide recommendations on how monitoring information should be collected, analyzed, and communicated to bring about 1) better understanding of the resources in question, and 2) a set of potential management and policy alternatives that more fully integrate analysis of monitoring information.

Management Implications
This section of the paper will be based on how natural resource management related to the case study could become more adaptive to the probabilistic changes in an ecosystem and be more proactive in anticipating potential future changes. It should include suggestions on how a particular set of management actions might be used to create potential for productivity, improve the long-term conservation of ecosystem components, prevent future undesirable environmental, economic, and social consequences to valued forest resources.

Literature Cited and Quality Rating
The literature cited will be different from a traditional format of listing each information item in alphabetical order. Elements gleaned from systematic evidence review concepts will be used.

Literature search strategies criteria for the selection of articles will be documented. Each cited article will be labeled using three major categories: 1) references that have conclusions based on empirical evidence with data collection and quantitative analysis; 2) subdivided as either experimental or observational; and 3) those that are not empirically based. A bar graph containing the proportion of articles in each category will occur at the end of the literature cited section.

Contingent on obtaining funding for these case study papers, science and policy experts may be invited to assist in the process of developing and distributing the Request for Proposals and in selecting the best candidate proposals.

Public Symposium

An effective means to promoting further dialogue and understanding on dynamic forest ecosystem concepts will be through a public symposium. The symposium would be organized and scheduled by a steering committee comprised of Department of Forestry staff and representatives of cooperating organizations. The purpose of the symposium would be to:

- Build upon the 2003 Department of Forestry White Paper and the completed case study papers to increase understanding of Oregon's dynamic forest ecosystems as a basis for improved forest policies and management.
- Share knowledge of dynamic forest ecosystem concepts with interested stakeholders and policy makers outside, and in advance of, regulatory and policy revision processes.
- Address the following key questions within the policy context of the *Forestry Program for Oregon*:
    - How have Oregon's diverse forests evolved and adapted in an environment of natural disturbance?
    - How has our incomplete understanding of ecosystem dynamics influenced the intended and unintended consequences of past forest management policies and practices?
    - Will natural processes move otherwise unmanaged forests towards an optimal, sustainable equilibrium? What are the various spatial and temporal dynamics that we need to understand and consider in developing future management frameworks?
    - What is our understanding of the social and economic forces that might be suppressing or exacerbating natural and introduced forest ecosystem disturbances?
    - Do our current applications of forest management and forest protection strategies appropriately incorporate dynamic ecosystem concepts?
    - In what specific ways could the entire forest protection framework, regulatory regimes, resource protection strategies, and adaptive management processes be improved to better address long-term risks and inherent natural disturbances regimes?
- Reference the *Forestry Program for Oregon* as the overarching policy framework for forest management in Oregon within which dynamic forest ecosystem concepts can be incorporated.
- Produce a published summary of the information, values, ideas, and outcomes from the symposium.

Stakeholder/Public Involvement

Draft case study papers will be distributed for invited review and, once finalized, will be made broadly available to the public via the Board of Forestry web site. A statewide symposium in 2010, hosted by the Board of Forestry and potentially co-hosted by the OSU College of Forestry, Oregon Forest Resources Institute, and USDA Forest Service PNW Research Station, will be promoted for broad public attendance and participation. The primary target audience would be the Board of Forestry, other state and federal natural resource decision makers, scientists, opinion leaders, landowners, forest interest groups, news media, and other interested citizens.

Timeframe with Milestones

The timeframe of this project is 2006 to 2010.

Milestones include:

- Securing funding for Case Study papers -- June 2007.
- Development of Case Study Request for Proposals -- August 2007.
- Evaluation of submitted proposals, selection of Case Study papers -- November 2007.
- Draft symposium agenda and logistics developed -- April 2008.
- Draft Case Study papers completed and distributed for invited review -- September 2008.
- Final Case Study papers publicly available -- December 2009.
- Symposium promotion underway by January 2010.
- Final symposium agenda and logistics developed -- February 2010.
- Symposium successfully conducted -- Spring 2010.
- Symposium summary published, follow-up as needed – Summer 2010.

Resources Required

Approximate cost for Case Study Papers is expected to be $60,000. These funds will be requested from the Oregon Forest Resources Institute. Department of Forestry share of symposium expenses is expected to not exceed $10,000.

Monitoring/Measuring Proposal

Invited reviewers will be used to evaluate and suggest improvements to draft Case Study papers. Final papers will be provided to the Board of Forestry.

Department staff and other symposium organizers will solicit evaluations for attendees to determine if symposium objectives have been achieved. This information can be made available to the Board of Forestry.

OBJECTIVE 2: Synthesize existing analytical tools, monitoring data, and research information to begin quantifying short-term and long-term ecosystem risks and opportunities from potential future forest management and policy choices.

Board Products

-- A one-day public symposium on Oregon forest conditions and trends, organized around the 2003 *Forestry Program for Oregon* strategies, Oregon Indicators of Sustainable Forest Management, and Oregon Forest Assessment Project and Interagency Mapping and Analysis

Project research results and management tools. These tools will assist in quantifying short-term and long-term ecosystem risks from potential future forest management and policy choices, including no action choices.

Research and Information Gathering

Interagency Mapping and Assessment Project and Oregon Forest Assessment Project

The USDA Forest Service (Pacific Northwest Research Station and Region 6), Bureau of Land Management, Oregon State University, Oregon Department of Forestry, and other partners are conducting a statewide assessment of forest conditions and trends in Oregon. The Interagency Mapping and Assessment Project (IMAP) will cover all 30 million acres of Oregon's forestland and as much non-forest land as is practical. This project will develop and test methods and complete: 1) mid-scale landscape modeling for revision of Oregon's National Forests plans, and 2) an assessment of long-term forest conditions in the State of Oregon, particularly for the Oregon Forest Assessment Project, which is based on the Oregon Indicators of Sustainable Forest Management.

Dynamics of vegetation development under IMAP will be modeled using the Vegetation Dynamics Development Tool or other ecological models, inventory plot data, information about fire condition and occurrence and land use change, and stand-scale vegetation models (e.g., the Forest Vegetation Simulator) to project potential future vegetation conditions, natural disturbances, management activities, and resource conditions or outputs. Use of these combined tools allows creation of realistic models of landscape-level conditions under varying management or policy scenarios. Disturbance scenarios (e.g., climate change, wildfire, insect and disease risk) and treatment scenarios (e.g., accelerated fuels treatments in dry provinces) will be used to improve understanding of the effects of alternative management strategies on ecosystem dynamics, e.g., the effects of a fixed reserve system with limited intervention vs. conservation-oriented management of older forests in fire-prone ecosystems.

The intent is for IMAP and the Forest Assessment Project to provide a scientific foundation, documentation, landscape analysis, and probabilities for a likely range of forest ecosystem dynamics as well as economic and social dynamics as they interact with a changing forest. The short-term objective is to develop information about current and projected forest conditions throughout Oregon and to develop processes that could be used to examine landscape-level effects of management alternatives and various policy scenarios at the statewide scale with the fifth field hydrologic unit (average area of 104,638 acres) as the minimum mapping unit.

Public Symposium

A major milestone for the projects will be a 2010 public symposium, where presented information will be organized within a framework formed by the *Forestry Program for Oregon* strategies and the Oregon Indicators of Sustainable Forest Management. This symposium will be linked with the Dynamic Forest Ecosystems Symposium proposed under Objective 1.

The purpose of the symposium will be to present cutting edge technical information on the environmental, economic, and social conditions related to Oregon's forest resources in a format that is understandable and engaging for the general public.

The information resulting from the projects and the symposium will provide a factual basis for preparing the 2011 *Forestry Program for Oregon*. Examples of issues to be addressed by IMAP include: land use change and the implications for the production of forest values that Oregonians have come to expect from their forests, fire condition class, and wildlife habitat.

Stakeholder/Public Involvement

Public and private stakeholders, including the current Board of Forestry Chair, serve on technical and policy oversight groups for IMAP. IMAP and Forest Assessment products will continue to be made public as they become available.

The Forest Assessment Symposium will be promoted for broad public attendance and participation. The symposium will be hosted by the Board of Forestry and potentially co-hosted by the OSU College of Forestry, Oregon Forest Resources Institute, and USDA Forest Service PNW Research Station, will be promoted for broad public attendance and participation. The primary target audience would be scientists, decision makers, opinion leaders, landowners, forest interest groups, news media, and other interested citizens.

Timeframe with Milestones

The timeframe of this project is 2006 to 2010.

Milestones include:

- IMAP and Forest Assessment Project technical work -- Ongoing.
- Finalizing IMAP Policy Oversight Group charter -- July 2007.
- Policy Oversight Group meetings -- February and July each year.
- Symposium promotion underway by January 2010.
- Final symposium agenda and logistics developed -- February 2010.
- Web-based IMAP and Forest Assessment Project data reports -- Summer 2010.
- Symposium successfully conducted -- Fall 2010.
- Symposium summary published, follow-up as needed – Fall 2010.

Resources Required

Three existing staff specialists and existing forest assessment funds budgeted within the Forest Resources Planning Program will constitute the Department of Forestry's contribution to this objective. Similar in-kind resources and funding will be contributed by partner organizations.

Monitoring/Measuring Proposal

IMAP and Forest Assessment Project products will be available for Board of Forestry and public review. Project data will be used to inform the Oregon Indicators of Sustainable Forest Management. Department staff and other symposium organizers will solicit evaluations for attendees to determine if symposium objectives have been achieved. This information can be made available to the Board of Forestry.

OBJECTIVE 3: Integrate adaptive management processes and evaluate and modify existing Board policies and Department of Forestry programs to accurately integrate the scientific understanding of forest ecosystem dynamics into forest management and protection strategies.

Board Products

-- The 2011 *Forestry Program for Oregon* will be used as the mechanism to develop and promote Board of Forestry policies that incorporate the use of indicators of sustainable forest management and adaptive management concepts that will lead to environmentally, economically, and socially sustainable outcomes given current understanding of multi-scale forest ecosystem dynamics.

-- Based on the 2011 *Forestry Program for Oregon,* the Board may perform a comprehensive reevaluation of existing forest protection and management frameworks to identify needed modifications in specific policies and programs to be more consistent with current scientific understanding of forest ecosystem dynamics.

Research and Information Gathering

The information presented at the October 2010 Dynamic Forest Ecosystems and Oregon Forest Assessment Symposiums will be followed by Board of Forestry discussions with Oregonians through managed public involvement processes. All of this input will be used by the Board of Forestry to craft the 2011 update of the *Forestry Program for Oregon.* (Also see *Forestry Program for Oregon* Implementation Work Plan Objective 4.)

Stakeholder/Public Involvement

Broad stakeholder involvement will be solicited in the 2011 *Forestry Program for Oregon* development process. Board of Forestry review of policies and programs will occur through the Board's issue scan and work plan processes and be conducted through regular Board public meetings.

Timeframe with Milestones

The timeframe of this project is 2010 to 2014.

Milestones include:

- Completion of the Oregon Forest Assessment public symposium -- Fall 2010.
- Symposium summary published, follow-up as needed -- Fall 2010.
- *Forestry Program for Oregon* public involvement -- Fall 2010 through Fall 2011.
- Board adoption of the 2011 *Forestry Program for Oregon* – Fall 2011.
- 2013 Board Issue Scan completed -- Fall 2013.
- Board Work Plans revised/adopted which include the identification and needed modifications in specific policies and programs to be more consistent with current scientific understanding of forest ecosystem dynamics -- Summer 2014.

Resources Required

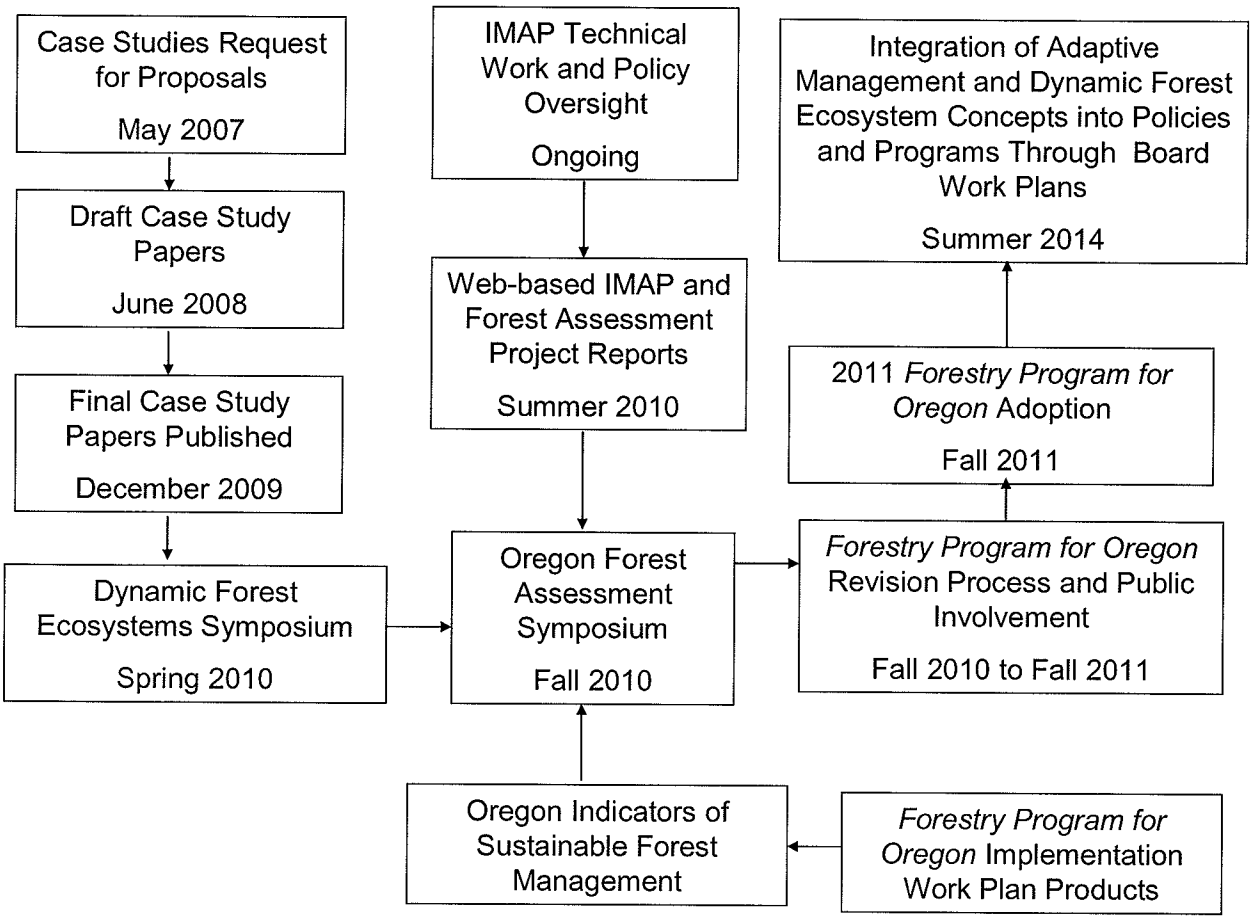
No additional resources needs beyond existing department resources are anticipated at this time.

Monitoring/Measuring Proposal

The Board will receive periodic agency performance measure reports, Oregon Indicators of Sustainable Forest Management reports, and Work Plan implementation reports.

WORK PLAN FLOW CHART

Figure 2



LITERATURE CITED

Behan, J., Crawford, S, and Kleiner, E. 2005. Applying Systematic Evidence Reviews in Oregon Forest Policy: Opportunities and Challenges. Institute for Natural Resources, Oregon State University. Corvallis, Oregon.

Beschta, R.L., Boyle, J.R., Chamgers, C.C., Gibson, W.P., Gregory, S.V., Grizzel, J., Hagar, J.C., Li, J.L., McComb, W.C., Parzybok, T.W., Reiter, M.L., Taylor, G.H., and Warila, J.E. 1995. Cumulative Effects Of Forest Practices In Oregon. Oregon Department of Forestry, Salem, Oregon.

Nyberg, B. 1999. An Introductory Guide To Adaptive Management For Project Leaders And Participants. Manuscript available at: http://www.for.gov.bc.ca/hfp/amhome/Pubs/Introductory-Guide-AM.pdf

White, P.S., and S.T. Pickett. 1985. Natural Disturbance And Patch Dynamics: An Introduction. Pages 3-13 in S.T. Pickett and P.S. White, editors. The Ecology Of Natural Disturbance And Patch Dynamics. Academic Press, San Diego, California.

Thompson, I.D. and Harestad, A.S. 2004. The Ecological And Genetic Basis For Emulating Natural Disturbance In Forest Management—Theory Guiding Practice. *In* Perera, A.H., Buse, L.J., Weber, M.G. *editors*. 2004. Emulating natural forest landscape disturbances, concepts and applications.

Walters, C. 1986. Adaptive Management Of Renewable Resources. Macmillan Publishing Company. New York.