APPENDIX II: RESPONSES TO COMMENTS ON THE FINAL REPORT

The following are comments offered by participants in the Dynamic Ecosystems Project, along with a response from INR that explains why these comments may not have been addressed by the final report.

Comment #1:

Executive Summary and elsewhere: The Department believes the report may tend to lead readers to believe that its recommendations are not being implemented currently. In fact, our State Forests and Private Forests Programs are already quite far down the path in implementing some of the recommendations.

For example, Recommendation #2 suggests that current State Forests and Forest Practices Act riparian management is resulting is a "hard line" between riparian and upland areas. The reality is current requirements allow active management all the way down to within 25 feet of the streambank. At the same time, retention of upland trees is either required or promoted. So we are confused on how management could be "softened" any more. We recommend the recommendation be reworded as "Restore the functionality of stream disturbance processes by using flexible, fine-scale, spatially explicit landscape analysis to 'set the stage' for disturbance events."

Response to comment #1:

The final report acknowledges that there are some mechanisms within current management frameworks to retain trees in upland areas. We remain convinced that there are differences in management strategies for upland versus riparian areas that are not reflective of our understanding of ecosystem dynamics. The final report suggests that additional programs and policies should be developed to address this issue. Our recommendations are onpoint with the discussions at our February 17, 2009 seminar about aquatic system management and previous scientific research. For instance, the Independent Multidisciplinary Science Team (IMST 1999), a scientific review panel charged with advising the State of Oregon on matters of science related to the Oregon Plan for Salmon and Watersheds, observed that:

> Managing riparian areas differently than upslope areas as a strategy for protecting fish habitat is scientifically valid only if it is done with the goal of maintaining the dynamics of landscape structure and function. Sharp demarcations between riparian forest and upslope forest, and between fish bearing and nonfish-bearing streams are not consistent with the historic pattern.
> …
> There is a critical need to restore the ecological processes that produce and deliver large wood to the streams as well as upslope areas. Current riparian protection, large wood management, sedimentation and fish passage policies are not adequate because they are dominated by site- and action-specific strategies. Sharp distinctions in the management of riparian zones (as compared to upslope forests), based on the size of the stream and the

> presence or absence of fish, will result in a failure to maintain the dynamics of structure and function of riparian zones across the landscape.

INR (2009) provides more detail about how we believe this vision should be implemented:

> Regulatory policies by their nature limit degradation. Regulatory policies are not necessarily as well suited to proactively re-establish desired disturbance processes as incentivization policies may be. Although there is conceptual tension between static protection schemes and the flexibility implied by dynamic stream processes, this may be a false choice. Instead, the real management challenge is in development of "next generation" stream management methods which mate fine-scale, spatially explicit landscape analysis with market based incentives to integrate terrestrial and riparian management, allow managers to make better strategic choices, provide diverse sources of revenue for landowners, and leverage improved stream productivity over the long term without increased regulatory costs.

Comment #2:

Page 5 and elsewhere: On page 5, the paper discusses why use of the term "degradation" is problematic in a dynamic ecosystems context. Then the report proceeds to use the term five more times. Disturbance, even anthropologic disturbance, can have positive, negative, or neutral effects on ecological processes, depending on the values we ascribe to those processes (as far as nature is concerned, they are all neutral). "Degradation" assumes negative effects. We recommend searching for and replace the terms "degrade" and degradation" with "disturb" and "disturbance," respectively.

Response to comment #2:

The final report does not state that use of the term "degradation" is problematic. The report acknowledges that participants in the Dynamic Ecosystems Project have expressed concern with how we use the term.

This comment raises an important point. "Degradation" only has meaning relative to specific values. A cornfield may be a degraded grassland, but it is not necessarily a degraded cornfield. Interpreting the term "degradation" is highly dependent on variable spatial and temporal ecological dimensions. In eastern Oregon, many extant juniper woodlands are the result of anthropogenic degradation (including overgrazing and fire exclusion) of perennial bunchgrass and sage systems—other juniper woodlands are simply the result of environmental conditions, irrespective of anthropogenic management regimes. Sometimes what we perceive as "degradation" is really the result of vegetation community shifts in response to complex long time-scale interactive disturbance dynamics (two examples, conversion of forest to shrublands and conversion of shrublands to woodlands are discussed in Odion *et al.* 2009 and Miller and Wigand 1994 respectively).

As we have explain in the final report, the term "degradation" is in wide use in the ecological science literature to denote activities that create an impairment of ecological processes or physical properties, especially "ecological resiliency" as defined in the report. The term "degradation" is useful for distinguishing between processes that promote ecological integrity and resiliency and actions that undermine integrity and resiliency. "Degrade" and "degradation" are not synonymous with "disturb" and "disturbance." Conflating these terms undermines readers' understanding of the scientific research we have synthesized for this project.

Comment #3:

Page 11, paragraph 2 under Section D: In is unfortunate that the study has not focused much on the "structure-based management" approach being tested on State Forests. This management model is much more in sync with dynamic ecosystems science than either the reserve model or the industrial forestry model. Could something be added to this paragraph to highlight our State Forest's efforts to accelerating the development of late-successional forest characteristics through active management?

Response to comment #3:

We agree that it is unfortunate that our work did not focus more on structure-based management. However, a detailed evaluation of this success of this strategy is beyond the scope of the Dynamic Ecosystems Project, and indeed depends on long-term monitoring results that are currently unavailable. Other reports have addressed the effectiveness of state forest management strategies on a conceptual level (Rockwell *et al.* 2006).

The synthesis paper that INR prepared for this project contains a detailed analysis of experiments to accelerate the development of late-successional forest characteristics through active management (INR 2008). This paper describes landscape simulation models that compare the economic and ecological consequences across different land ownerships of current management practices versus management that uses past disturbance patterns to move the landscape towards the historical range of variability. Within a hundred years, historical disturbance-based policies were found to re-establish the historical proportion of younger forests, while the proportion of older forests moved closer to, but remained below historical levels. The study showed a 20-60 percent decline in harvest volume under the disturbance-based policies relative to current management, and noted that public lands would be relied upon heavily to provide large patches of older forest in order to approximate historic conditions (Thompson *et al.* 2005).

Comment #4:

Page 12, paragraph 5 under Section D: We agree with Ted Lorensen's comment that the text understates the extent and intensity of historic stand replacement disturbances. Furthermore, it is important to acknowledge that most streams exist in a setting where landslides are not the dominant process for delivery of either wood or sediment.

Response to comment #4:

We do not believe that the report understates the extent and intensity of historic stand replacement disturbances. Our reports for this project have cited numerous studies that characterize and quantify the extent and intensity of historic stand replacement disturbances in forest ecosystems in Oregon (Barbour *et al.* 2007; Benda and Andras 2004; Benda *et al.* 2004; Bormann *et al*. 2006; Nonaka and Spies 2005; Reeves *et al.* 1995; Roloff *et al.* 2005; USDA 2003; USDA 2001; Wales *et al.* 2007; Wimberly *et al.* 2004).

The amount of large wood delivered by landslides to streams in western Oregon varies widely, from as little as 10% to as much as 80% (Keller and Swanson 1979; Benda and Sias 1998; May and Gresswell 2003; Reeves *et al.* 2003). The precise range depends on topography and the prevalence of debris flows (May and Gresswell 2003).

We acknowledge that our work on the Dynamic Ecosystem Project has been somewhat "westside-centric" with respect to aquatic issues. As our reporting indicates, landslides are an important process for delivery of material to streams throughout much of western Oregon, which contains a high density of streams and productive industrial timberland.

Comment #5:

Page 16, Recommendation #3: We appreciate the rewording of Recommendation #3. The term "regime standards" in the supporting text for this recommendation remains problematic because it is ambiguous and therefore needs a well-developed definition. If a "regime standard" is the basis of policy management and enforcement then it must have some quantitative foundation. Please describe that quantitative foundation. In other words, can additional insight be provided how best to "describe a desirable distribution of conditions for water quality over time and space?"

Response to comment #5:

Our intent in this report is to provide a concise summary of policy recommendations, not to provide a detailed quantitative foundation for these recommendations. Our aquatic management white paper (INR 2009) states that:

The variability within and across landscapes for a particular system component that serves as a regulation standard creates a distribution of values if measured through time. These distributions serve as quantitative records of system behavior that regulations are created to maintain. Rather than use a single value for a standard, our current understanding of stream dynamics indicates that it may be more appropriate to compare distributions of values that emerge from a system through time. Writing new regulatory standards that embrace this concept should be a collaborative inter-agency effort.

Additional information about regime-based standards can be found in INR (2008) and Poole *et al.* (2004).

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