Recommendation and Continuous Improvement Plan
(Attachment 8)

Summary
This attachment presents the Department's recommendation for management strategies on the Clatsop and Tillamook State Forests that would move toward achieving performance measure (PM) targets (Attachment 1) established by the Board of Forestry in November 2007. This attachment also describes the necessary policy adjustments and operational actions to implement this management strategy and identifies areas for improvement – a continuous improvement plan that strives to address the known areas of uncertainty surrounding the recommendation.

Context
At the November 2008 Board meeting, staff will present results of work to develop management strategies to achieve the established performance measure targets (Attachments 4-7) prior to presenting the recommendation. The management strategies in the performance measure model runs and the recommendation will require a refinement of the existing forest management plan.

Results – Not all performance measures targets are achieved
The results of this recent modeling effort indicate that both quantitative performance measure targets (PM 3 Revenue and PM 6 Wildlife) cannot be simultaneously achieved. Staff has developed a recommendation that moves in the direction of meeting both performance measures, recognizing that it meets the target for PM 6; however, the target for PM 3 can be only partly achieved. Therefore, additional revenue sources will need to be developed to achieve the remainder of the revenue target.

This recommendation also acknowledges many uncertainties involved in forest management decision making. The continuous improvement plan attempts to address these areas of uncertainty. Future boards will have regular opportunities to adapt to changing values, based on their assessment of new information developed through the continuous improvement process and presented in biennial reports on performance measures.

Recommendation
Assuming the Board maintains the existing performance measures and targets, Staff recommends movement in a direction to achieve the target for PM 3 and achieve the target for PM 6. If these performance measure targets are modified or removed, then modified recommendations may need to be developed. These performance measure targets cannot be met in isolation. The targets are linked to the strategies and resources necessary to achieve them. In the longer term, additional non-timber revenue sources may be developed to reduce this competition for resources and make these performance measures more complimentary.

Details
Performance Measure Target 3
The department recommends pursuing increased timber revenues by implementing incrementally a 3% per year increase, while on a trajectory toward the 30-35% revenue target. This increase is subject to a number of changes, including development of policy and strategies for species of concern. Based on the recent modeling efforts, a 5-10% increase is possible using the strategies applied during recent modeling work.

Performance Measure Target 6
To best meet performance measure target # 6, the department recommends designating 20% of the Clatsop and Tillamook State Forests towards complex structure development. This structure will be located where it is anticipated to develop into complex forest within 20 years and provide greatest benefit to species of concern.

Staff was directed by the State Forests Division Chief, State Forests Deputy Chief, and the Northwest Oregon Area Director, to carry forward in its analysis some of the framework in the existing NW FMP. Therefore, the guiding principles, vision, and goals; riparian management strategies; and other landscape level strategies such as green tree, snag retention, and down wood were retained for the analysis.

Given the direct competing relationships between the amount of complex forest structure and timber revenue levels, the Department recommends that the Board of Forestry direct the Department to explore strategies for species of concern within the limits of achieving the existing performance measure targets consistent with the Boards decision for PM 3 and 6.

Other Performance Measures
Maintain existing target language for the other seven performance measures. Continuous improvement efforts will continue to inform future Board decisions related to adjustments.

Implementation of Board Decision

Accomplishing these refinements to the NW FMP will take Board of Forestry and Staff work including Oregon Administrative Rule changes.

Northwest Forest Management Plan - Oregon Administrative Rule changes

1. Amend the NW FMP to remove references to the draft Western Oregon Habitat Conservation Plan (HCP). The department recommends ceasing to pursue the draft HCP. The draft HCP was developed in the context of seven western Oregon districts while the performance measures apply to only three. Additional factors inform this recommendation - there is a new federal Northern Spotted Owl Recovery Plan, changes in owl population status since development of the draft HCP strategies, and considerable resource investments required to obtain an HCP. Since direction to pursue this HCP is in the Northwest Forest Management Plan, which is an administrative rule, this is a rule making process subject to the Administrative Procedures Act.

   The draft HCP included strategies to ensure habitat for species of concern. The NW FMP includes direction that if the draft HCP is not adopted, then the NW FMP would be expanded to include further detail on managing habitat for specific species or populations. This work remains outstanding if the NW FMP is revised to remove references to the draft NW HCP. The department recommends developing Board Policy for species of concern in the 2009 work plan and including this policy in the NW FMP.

2. Amend the NW FMP to reflect a long term complex structure goal consistent with Board direction. Model results indicate that a long term goal of 30% complex structure could be

achieved, with 20% in areas to be attained in 20 years that provides the greatest benefit for species of concern. It is anticipated that this could be done consistent with the recommendation for PM 3 outlined above.

Implementation - additional changes necessary to implement the recommendation

Implementation Plans. After the Forest Management Plan refinements are complete and approved by the Board, the department would revise the Implementation Plans to reflect direction from the Forest Management Plan. These revised Implementation Plans, approved by the State Forester, would reflect revised goals and an updated landscape design that emphasizes inclusion of areas unavailable for harvest that are likely to become complex. Harvest objectives also would be revised to be consistent with the recommendation for PM 3 outlined above.

Continuous Improvement Plan

The staff recommendation is based on the best available data and assumptions. Future Board and staff work (planned and/or anticipated) will continue to inform the Board's decision making related to the ongoing process of balancing and adjusting the outcomes expected from the management of Board of Forestry lands. New and improved data will test and refine the assumptions associated with the recommendation. Following is a summary of anticipated or planned improvement efforts that will support and inform the Board's ongoing policy decision making:

Performance Measure Improvement Process

The current Board work plan recognizes the need for continuous improvements to the performance measures. There are a number of recommendations in the 2008 PM Report as well as other ideas that have surfaced through discussions with Board members that the Board will likely want to consider in their upcoming 2009 work plan.

Certification of Board of Forestry Lands

It is anticipated the Board and the Department will continue considering the value added by certifying lands to meet either the Forest Steward Council and/or the Sustainable Forestry Initiative certification systems. This process or subsequent certification could inform the Board on the results/outcomes they are striving for in their performance measures.

Biodiversity

It is recognized that the current performance measures may not explicitly quantify the benefits to biodiversity that are provided by the forest management plan strategies and the land base allocation process. Additional analysis is planned to quantify these contributions through spatial analysis of existing locations and the benefits to wildlife, fish and plants. This work will include coordination with Oregon Department of Fish & Wildlife to assure alignment with the Oregon Conservation Strategy.

Ecosystem Services

A current contract with Oregon State University will provide some results, specifically related to recreation values. Other work is underway related to ecosystem services, some of which will require further Board direction (i.e. wind energy, carbon credits).

Recreation
As a result of the recreation assessment in 2007, the department has developed and is implementing an action plan. It is anticipated that the Board will play a role in the visioning process (long term future condition) for recreation management beginning in 2009.

Research & Monitoring Strategic Plan
The department recognizes the research and monitoring strategic plan may need to be updated to reflect current questions and priorities. A process for updating this plan will be shared with the Board and implemented in 2009. This plan is currently part of the Implementation Plan package approved by the State Forester in 2003.

Other Districts
Evaluate and make recommendations to the Board of Forestry about appropriate management approaches for the other districts, which will include an analysis of the performance targets relevant to these districts.

Species of Concern
Analysis of species of concern based on model outputs is preliminary and incomplete, so all areas for continued improvement may not be identified. Completing species of concern policy work may be a higher priority than continued analysis of differences between management alternatives. Areas of analysis currently identified for continued improvement follow and are included in the table below.

1. Complete analysis for species of concern based on model outputs: Several uncertainties could be improved upon including internal and external technical review of selected metrics, interpretation of trends, and identify research and monitoring needs necessary to fill analysis gaps or better inform policy decisions.
2. Peer review of analysis: Conduct a scientific peer review of the analysis, including assumptions and metrics

Spatial data, forest inventory, yield tables, other model data and components and in evaluations of effects on fish and wildlife.
The table below lists the specific areas of improvement and an initial assignment of priority for each. The remainder of the document provides additional information for each area of improvement. All areas of improvement are important to create enhancements to the harvest model and resource strategy development, but priorities for work have been established as follows:

- High – critical to the reliability and accuracy of the harvest models, associated outputs and species of concern strategy development.
- Moderate – improve the reliability and accuracy of the harvest models, associated outputs and species of concern strategy development.
- Low – result in better outputs from the harvest models or is important to maintain its functionality in the future or longer term species of concern strategy refinements.

#	Description	Priority
	Spatial Data	
1	Maintaining Harvest and Transportation Data	Low
2	Tillamook Transportation Planning	Moderate
3	Tillamook Harvest Units	Moderate
	Forest Inventory	
1	Volume Estimates on Tillamook District	High
2	Stand Structure Algorithm	Low
3	Incorporate Additional Tillamook Inventory	High
	Yield Tables	
1	Volume Estimates on Tillamook District	High
2	Calibration of the FVS[1] Growth Model	High
3	Regeneration Growth Model	Low
4	Management Prescriptions	Low
5	Snags and Down Wood Model	High
6	Stand Structure Algorithm	Moderate
7	Reforestation Cost Tables	Low
	Modeling	
1	Logging and Transportation Costs	Moderate
2	Sensitivity Analysis and Testing	Moderate
3	Peer Review	Moderate
	Species of Concern	
1	Complete analysis for species of concern	High
2	Peer Review of analysis – assumptions and metrics	High
3	Develop species of concern strategies	High
4	Based on review of SOC strategies identify how information gaps can best be filled (e.g., via habitat and/or species surveys, research and monitoring, model improvements).	Moderate
	Landscape Design	
1	Determine the scale that the implementation landscape design will be designated. Options include; district level, forest level or combined forest level.	High
2	Conduct analysis of the amount, location and contribution that forested areas that are unavailable for harvest contribute to the longer term 30 percent complex structure goal.	High

Spatial Data
The spatial data identifies the physical locations of natural resources (such as stands, harvest units, riparian areas, and northern spotted owls) and other land attributes (such as counties and taxing districts) that are used by the model for decision making or generating reports. Areas of improvement for the spatial data include the following.

1. Maintaining Harvest Unit and Transportation Data: Develop a process for updating and maintaining the harvest unit and transportation systems used in the model.
2. Tillamook Transportation Planning: The existing road system on the Tillamook District is an obstacle to the efficient and effective management of the district. Continue the current transportation planning project for the district and use the results to revise the General Forest Road Plan for the Tillamook.
3. Tillamook Harvest Units: Evaluate and refine the Tillamook General Harvest Unit Plan using the results of the transportation planning project and the LIDAR topographic data.

Forest Inventory
The forest inventory provides information on the current condition of trees, such as species, size, and volume, and other vegetation across the forest. The inventory is used to generate yield tables that project the growth of the forest and its potential outputs (i.e., stand structure and volume). The following aspects of the forest inventory have been identified for improvement.

1. Tillamook Volume: An analysis of the model output for the Tillamook District indicates the harvest volume per acre is approximately 30 percent above actual harvest volume realized from recent timber sales. Currently, it is not known whether the issue is related to the forest inventory or the yield tables, but staff is developing a plan to analyze and resolve the issue.
2. Stand Structure: Continue to evaluate and improve the stand structure algorithm, with a focus on:
   - Refining the threshold for layering of hemlock and mixed hardwood stands;
   - Refining the distinction between Regeneration and Closed Single Canopy Stands;
   - Incorporating a "death and decay" model for snags and down wood; and
   - Developing a predictive model for understory vegetation.
3. Tillamook Inventory: Continue the accelerated inventory on the Tillamook District until 50% of the stands have been inventoried; maintain the inventory on the other districts. About 20% of the stands will be inventoried by the end of 2009. The department will continue to invest in inventory beyond 2009 on an annual basis (through contracts and current staffing), with a priority to complete the 50% level.

Yield Tables
While the forest inventory provides information on the current condition of individual stands and the forest, it is the yield tables that project the potential growth of these stands into the future and affect the predicted outputs (stand structure and volume) of the individual stands under a variety of management prescriptions. The harvest models use the outputs from the yield tables to generate their solutions. The following aspects of the yield tables have been identified as areas needing improvement.

1. Volume Estimates on Tillamook District: As noted above, the harvest volume estimates appear to be incorrect on Tillamook District. The underlying problem needs to be identified and

corrected. The results in the Board material have been adjusted to better reflect actual timber volumes being removed from recent harvests.

2. Calibration of the Growth Model: The yield tables are based on the Pacific Northwest Coast Variant of the Forest Vegetation Simulator (FVS) growth model. During the analysis of the yield table outputs, it became apparent this regional variant needs to be calibrated for the Clatsop and Tillamook State Forests. The data required to calibrate the growth model includes tree growth information from permanent plots; this information should be available for these two forests by the end of 2009.
3. Regeneration Growth Model: It is generally recognized that FVS does not grow stands less than 15 years old as accurately as desired. Identification of a young stand growth model to complement FVS will improve the accuracy of future yield tables. The Peer Review of the Harvest &Habitat (H&H) Model Project also made this recommendation.
4. Management Prescriptions: Each stand in the yield tables has up to 105 different management prescriptions that provide a variety of thinning intensities and timing options for use by the model. The current management prescriptions are based on the strata-based yield tables. The new yield tables should be reviewed to determine whether changes in the prescriptions should be made, because the stands are based on actual measures rather than strata averages.
5. Snags and Downed Wood: Calibrating and incorporating a "death and decay" model for snags and downed wood into the yield tables will allow these two structural components to be projected into the future. Incorporation of snags and downed wood into the yield tables will provide a better estimate of older forest structure (OFS) and allow a more detailed analysis of habitat for a wider variety of wildlife species.
6. Stand Structure Algorithm: As noted above, the stand structure algorithm in the yield tables does not result in a highly reliable distinction between closed single canopy (CSC) and understory (UDS), or layered (LYR) and OFS. The incorporation of snags and downed wood will help improve the identification of OFS. In addition, an analysis of the results of the stand structure algorithm in the stand-level inventory may identify stand characteristics that could be used in the yield table to distinguish between CSC and UDS.
7. Reforestation Cost Tables: The cost to establish a new plantation after a regeneration type harvest is identified in one of the yield tables. These tables were not updated in the current set of model runs due to a timing conflict. They should be updated before the end of 2008.

Harvest Models

Analysis of functionality and outputs of the harvest models has only recently begun, so all areas for continued improvement may not be identified. Areas currently identified for continued improvement include the following.

1. Logging and Transportation Costs: Logging and transportation costs within the model were not updated in the current set of model runs due to a timing conflict. They should be updated before the end of 2008.
2. Sensitivity Analysis and Testing: There is a need to conduct several analyses to determine the model's sensitivity to log prices, stand structure algorithms, inventory basis (i.e., strata versus imputation), long-term sustained yield, and others.
3. Peer Review: Continue to evaluate and implement recommendations from the Peer Review of the H&H Model Project.