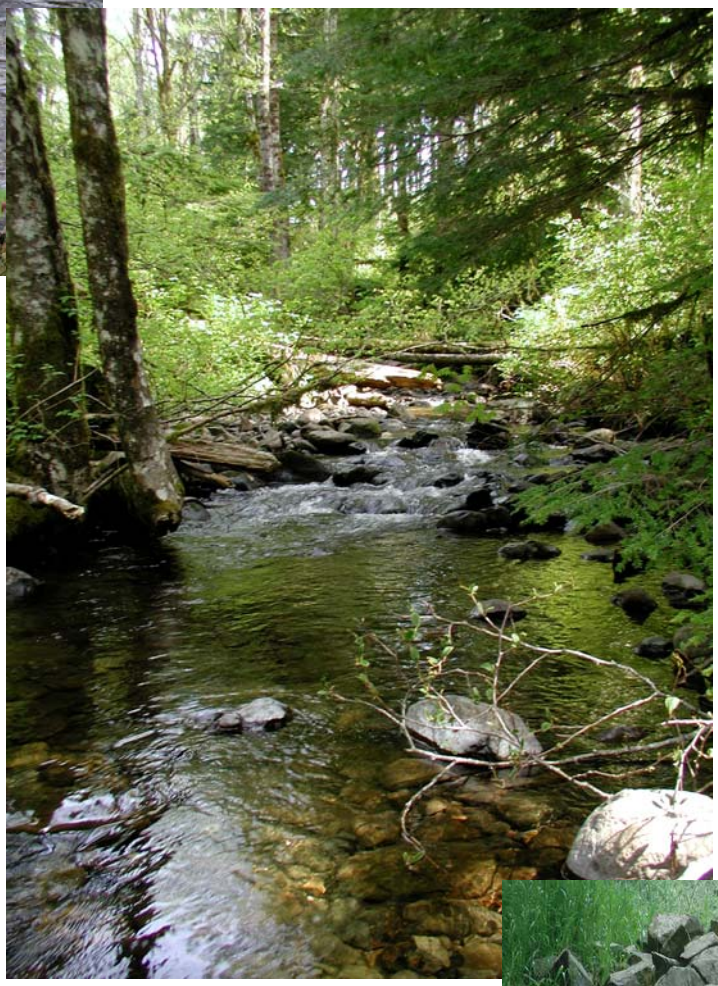
STATE FOREST PROGRAM
WATERSHED ANALYSIS MANUAL

Version 1.0 - June, 2004



Acknowledgements

This manual is the result of almost three years of development. Existing methods were researched, two pilot projects were completed and ODF worked closely with a sub-committee of the State Forest Citizens Advisory committee for public input. The Citizens Advisory sub-committee met 13 times over a period of 18 months to develop, refine and review material for manual inclusion. Below is a short list of some of the many individuals who worked to develop this manual.

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Cover photos by Frank Evans, Jeff Foreman and Jennie Cornell

Citation form. If this work is cited please use the format listed below.

Oregon Department of Forestry. State Forests Program Watershed Analysis Manual, Version 1.0, June 2004. Salem, Oregon.

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Preface

Organization of the Watershed Analysis Manual

This manual is arranged in three sections and each section is designed for a different audience.

Section one is designed for a broad range of audiences: ODF personnel, watershed councils, other stakeholders, and the general public. This section is a brief overview of the goals and process of an ODF watershed analysis project from start to finish.

Section two describes the specific watershed analysis process that will be employed by ODF, with the assistance of a third-party contractor, and is designed primarily for that audience. It includes specific details on how each watershed analysis project will be conducted and the analysis goals to be completed. The specific modules for watershed analysis are delineated and discussed. It provides a description of each step of the project design and contract administration processes. It also contains an example of a checklist and timeline for completion of tasks associated with an individual watershed analysis project. It should be noted, however, that this chapter does not include details on specific data-collection and/or analysis protocols. A summary of the OWEB watershed assessment manual and other protocols are referenced in the appendices in section three.

Section three consists of appendices and includes the following background and supporting information that will be utilized in the watershed analysis process:

A. State Forests Watershed Analysis Background: This is an overview of how and why State Forests Watershed Analysis process was developed. It also describes the various policy considerations that played a role in the design of the process. The role the state forest program plays inside ODF and how ODF fits into the larger statewide process is also outlined.

B. Contributions to goals and objectives of Oregon Plan by State and Federal Agencies

C. Summary of Other Watershed Analysis Methods

D. Public Involvement and Technical Review

E. Prioritization of Watershed Analysis Projects

F. Northwest Oregon Forest Management Plan Concepts for Aquatic and Riparian Conservation

G. Expanded project action plan: A detailed plan with all actions, all resulting products and personnel typically assigned to that responsibility in a typical project.

H. Process for Selecting Contractors

I. Requirements for GIS Products in ODF Watershed Analysis Projects

Section One

Executive Summary/Overview

Section One

1) Background

The Oregon Department of Forestry (ODF) manages two categories of forestlands. The first is on behalf of the Board of Forestry (BOF); the second is Common School Forest (CSF) Lands held in trust by the State Land Board. Oregon statutes direct that BOF lands be managed to provide the "greatest permanent value" to the people of Oregon. Administrative rules adopted in January 1998 define "greatest permanent value" as healthy, productive, and sustainable forest ecosystems that over time and across the landscape provide a full range of social, economic and environmental benefits. The CSF lands are managed under the mandate to "maximize revenues over the long term, consistent with the conservation of this resource under sound techniques of land management." CSF lands are also managed for a full range of social, economic, and environmental benefits.

The State Forest watershed analysis program was implemented after the Board of Forestry adopted the *Northwest Oregon and Southwest Oregon State Forests Management Plans (FMPs)* in January 2001.[1] The FMPs' aquatic and riparian strategy 1 states, "Implement watershed assessment and analysis" (p. 4-60 NWFMP, p. 4-57 SWFMP). The FMPs include specific strategies related to watershed assessment and analysis.[2] These strategies include developing a watershed assessment and analysis process for state forestlands that is compatible with, but expands upon, the existing OWEB process. The FMPs also specify that watershed analysis will be conducted on priority watersheds (see appendix E) within the initial ten-year implementation period. Finally, the FMPs direct the State Forests program to apply the results of watershed analysis at the appropriate planning level through the adaptive management process.

As part of the adoption of the Northwest and Southwest Oregon FMPs, the Board of Forestry also issued intent statements related to watershed analysis and the implementation of these plans. They included the following:

- Ecosystem restoration and watershed health are important components of achieving "healthy, productive, and sustainable forest ecosystems that produce a full range of social, economic, and ecological benefits".
- ODF will perform watershed analysis at a pace consistent with available funding.
- To avoid delays in completion of management activities, existing management strategies will be employed until watershed analyses are completed.
- Implementation of FMPs will be adjusted at the appropriate level based on the results of watershed analysis.

[1] See Appendix A for a detailed description of the processes that led to the development of the State Forests Watershed Analysis Manual.

[2] Although the FMPs for the Elliott State Forest and the Eastern Oregon Area do not specifically prescribe watershed analysis, they share many aquatic and riparian goals with the Northwest and Southwest Oregon Areas. For this reason it is anticipated that watershed analysis will be performed statewide.

The watershed analysis program is an important component of the implementation of the FMPs. Watershed analysis projects will collect needed information at both watershed and site-specific levels and analyze that information in order to accomplish FMP objectives. This watershed manual describes how State Forests watershed analysis will be carried out.

2) Watershed Analysis Goals

The ODF watershed analysis process focuses on those functions and processes across the landscape that influence aquatic and riparian habitat conditions on State Forest lands. The primary goal of the various FMP strategies for aquatic and riparian habitat conditions is to manage for "properly functioning" aquatic systems. Properly functioning condition is based on the following premises:

- Native aquatic species have co-evolved with the forest ecosystems in western Oregon.
- High quality aquatic habitats result from the interaction of many processes, some of which have been greatly influenced by human activity.
- Aquatic habitats are dynamic and variable in quality for specific species, through time and across the landscape.
- No single habitat condition constitutes a "properly functioning" condition.

Providing diverse aquatic and riparian conditions over time and space is intended to more closely emulate the historical conditions maintained by the natural disturbance regimes under which native species evolved. The biological and ecological objective of the FMP strategies is to maintain or restore the key ecological functions of aquatic, riparian, and upland areas that directly influence the freshwater habitat of aquatic species, within the context of the natural disturbance regimes that created habitat for these species.

To meet this objective there are four explicit strategies that the watershed analysis will address that originate directly from both the Northwest Oregon (NWO) FMP and the Southwest Oregon (SWO) FMP aquatic and riparian strategies:

Limiting Factors

Identify potential factors that could be contributing to undesirable aquatic habitat conditions, or that could be limiting the recovery of aquatic habitat.

Alternative Vegetation Management

Identify where in the watershed the management standards for aquatic and riparian areas are likely to achieve properly functioning aquatic habitat conditions. Where they are not likely to achieve these conditions, identify alternative vegetation management options likely to achieve these conditions.

Slope Stability

Complete a broad level assessment of landslide hazards, defined by ODF geotechnical specialists, on state forestland in the planning area (level 1).

Roads

Complete an inventory of the condition of existing roads on state forestland in the planning area.

ODF watershed analysis is not intended to analyze all past and current information on all potential biological and ecological processes and natural resources on State Forests. Rather, specific to the strategies from the FMPs, the analysis focuses on those issues that tie most directly to aquatic and riparian conservation and the current management strategies intended to address those issues. Upland processes are considered in the context of how they may be influencing aquatic and riparian conditions.

3) Project Overview

ODF watershed analysis projects build on OWEB watershed assessments. To accomplish this, each project includes an assessment phase with the critical questions outlined in the OWEB watershed manual components. The assessment phase also includes additional ODF assessment questions. Following the assessment phase is an analysis phase that will focus on four "core analysis goals" (described below) that tie directly to the NWO FMP strategies related to aquatic and riparian conservation.

Answering the assessment questions will necessitate compiling existing data sets. Completing the OWEB watershed assessment manual components and answering the additional ODF assessment questions may require additional data collection within a given watershed. There also may be modifications to both the assessment and analysis questions based on individual watershed characteristics. ODF will make these determinations during the initial project design phase of the watershed analysis project.

The analysis phase will occur after completion of the assessment phase. The analysis phase of each project will be conducted at the 6th-field HUC scale[3], grouped by management basins as delineated in the Implementation Plan of the applicable ODF district. Both the assessment and analysis products will be in the form of ArcView shape files that are compatible with ODF district GIS systems. These GIS files will be accompanied by a narrative and the appropriate metadata.

Once the analysis phase is completed the results will be incorporated in the appropriate State Forests planning processes as part of the "application of analysis results" phase of the watershed analysis project.

[3] A 6th field HUC is the smallest delineation in the hydrologic unit hierarchy. These watersheds range in size from 10,000- 40,000 acres. Examples are Cook Creek in the Nehalem or South Fork of the Trask.

4) Project Process

The following is a short overview of the process. An expanded version with specific descriptions of the process, products, timeline and responsibilities are in section 2 of this document.

Proper project design is the most important step in each project. It is imperative that this step be completed before any other work is done. Project design is a joint exercise by Salem staff, area staff and district staff, with input from local groups like watershed councils. The purpose of this exercise is to confirm that the assessment and analysis questions to be answered are sufficient to meet the watershed analysis goals, and to clarify the availability of specific data-sets that will be used to answer those questions. This group will review the OWEB and ODF assessment questions and key analysis questions and evaluate whether modifications and or additions are needed in order to complete the core analysis goals. They will gather and review pertinent information, review existing data sets for quality control, and design any needed data collection work.

Salem staff will then write the Request for Proposals (RFP), solicit proposals, write the contract, award the project and administer the contract. A contractor will prepare a document that answers the assessment and analysis questions. ODF staff will work closely with the contractor to review contractor products and ensure quality and applicability.

5) Project Product

This is an abbreviated outline of an ODF watershed analysis product. An expanded version with a full description is in section two of this document. Once the project design is completed and a contractor has been selected, the next phase of the project is answering the assessments and analysis questions. The contractor will provide answers to the assessment questions and analysis questions for each of the four core analysis goals (limiting factors; alternative vegetation management; slope stability; roads).

Assessments

Watershed Overview

This section will give an overview of the watershed and surrounding area. The purpose of this section is to provide a brief overview of the relevant physical, biological, and social characteristics of the watershed. Examples of this can be found in the *ODF Trask River Watershed Analysis* and the *ODF Elliott State Forest Watershed Analysis.*

Historical Conditions Assessment

The section will describe the historical conditions across the watershed consistent with the “Historical Conditions Assessment” methodology in component II of the OWEB watershed assessment manual. The purpose of this section is to provide a comprehensive description of major historical disturbance events for the analysis area and to characterize historical management trends.

Current Condition Assessment

The current condition assessment includes the results of the assessment procedures described in the OWEB manual for components III through IX. Most of these components also have additional ODF assessment questions to be answered. Section two of this document has a full list of questions, both OWEB and ODF. Answers to assessment questions will be in the form of ArcView shape files that are compatible with ODF district GIS systems as well as a written narrative. The following assessment topics will be addressed:

- Stream Channel
- Hydrology & Water Use
- Riparian/Wetlands
- Sediment Sources
- Water Quality
- Fish & Fish Habitat

Analyses

The analyses will be conducted at the 6th-field HUC scale for each of the core analysis goals below. They will be organized by management basins as delineated in the Implementation Plan of the applicable ODF district. The Key Analysis Questions for each are listed in Section two of this document.

6) Application of Analysis Results

This section will describe how the analysis results will be integrated into the appropriate ODF planning process for State Forests. Results will be summarized for each of the core analysis goals and organized by Implementation Plan (IP) management basins. Results that are inconclusive and/or would require additional research or data collection will be summarized for each of the core analysis goals.