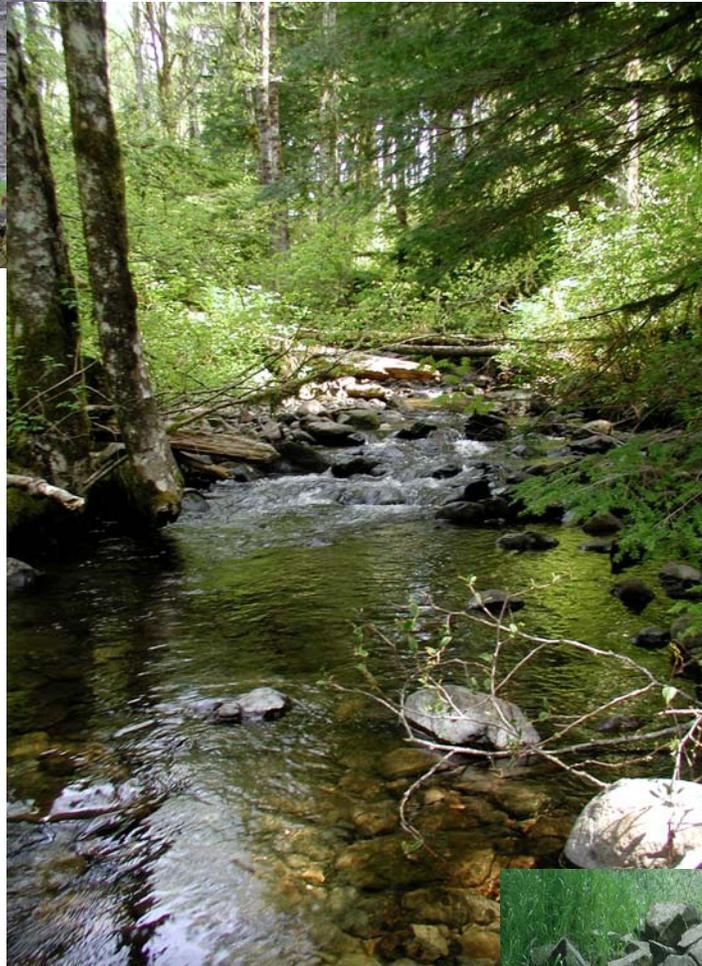


STATE FOREST PROGRAM WATERSHED ANALYSIS MANUAL

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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Table of Contents

PREFACE - ORGANIZATION OF THE WATERSHED ANALYSIS MANUAL.....	i
SECTION ONE	1-2
1) Background	1-2
2) Watershed Analysis Goals.....	1-3
3) Project Overview	1-4
4) Project Process	1-5
5) Project Product.....	1-5
6) Application of Analysis Results	1-6
SECTION TWO	2-2
1) Watershed Analysis Process.....	2-2
2) Watershed Analysis Goals.....	2-2
3) Public Involvement.....	2-3
4) Project Overview	2-3
5) Project Design.....	2-3
6) Contract Administration	2-5
7) Product Outline	2-5
7.1) Assessment Phase	2-5
7.2) Analysis Phase	2-10
8) Application of Analysis Results	2-13
9) Checklist.....	2-14
10) ODF Roles and Responsibilities	2-16
APPENDICES	3-1
Glossary.....	3-1
Appendix A: State Forests Watershed Analysis Background	3A-1
Appendix B: Sample Contributions to the Goals and Objectives of the Oregon Plan by State and Federal Agencies	3B-1
Appendix C: Summary of Existing Watershed Analysis Methods.....	3C-1
Appendix D: Public Involvement and Technical Review	3D-1
Appendix E: Prioritizing Watershed Analysis Projects	3E-1
Appendix F: Northwest Oregon Forest Management Plan:Basic Concepts for Aquatic and Riparian Conservation	3F-1
Appendix G: Expanded Project Action Plan (Draft)	3G-1
Appendix H: Selection of Contractor.....	3H-1
Appendix I: Requirements for GIS Products in ODF Watershed Analysis Projects	3I-1

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 scale³, 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.

Section Two

Process

Section Two

1) Watershed Analysis Process

This section describes the specific watershed analysis process that will be employed by ODF through a contractor, and is designed primarily for an audience of ODF staff and the contractor. It includes specifics detailing how each watershed analysis will be conducted, the questions to be answered, the analysis goals to be completed, and the public involvement process. The specific data-collection and analysis methods that will be used to complete the assessment and analysis questions are not detailed here. Some of these specifics are either described in the OWEB watershed assessment manual, or will be determined by ODF and the contractor during the project design and contract administration phase of each watershed analysis project. This section describes each of the three phases of a watershed analysis project, and how they will be conducted. It also contains a checklist and timeline for completion of tasks associated with each watershed analysis project. An expanded checklist is attached in Appendix G.

2) Watershed Analysis Goals

As outlined in Section One, ODF watershed analyses are 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 policy direction from the NWO and SWO FMPs, the analyses focus on those issues that tie most directly to aquatic and riparian conservation and the current management strategies intended to address those issues. The biological and ecological objective of the FMP strategies is to maintain or restore the key ecological functions of aquatic and riparian areas as well as upland areas that directly influence aquatic and riparian areas. The intention of strategies that address aquatic and riparian habitat conditions is to manage for “properly functioning” aquatic systems. 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 overall goal of watershed analysis under the FMP is to identify if properly functioning conditions exist along streams. If the aquatic system is not properly functioning, watershed analysis should identify the limiting factors. If the limiting factors can be remedied through management by ODF then the question to be answered is, “Are the existing strategies under the FMP likely to achieve properly functioning aquatic systems and remedy the limiting factor, or are there other management activities or protection measures that are more likely to remedy the limiting factor?” If the factor cannot be remedied through management by ODF, then the watershed analysis should identify other avenues that can be pursued to help remedy the limiting factor (i.e. work with watershed councils, adjacent landowner, DEQ, ODFW, etc.).

The goals of watershed analysis will be met primarily through the examination of watershed processes. Where a significant portion of the watershed is in ODF ownership and the aquatic system is influenced at a watershed scale by ODF management practices, the examination of watershed processes is appropriate. There will be cases, however, where the percent of ODF ownership in a given watershed will be relatively small, and management activities that occur on that ownership are unlikely to have a significant influence on larger watershed processes. In

these cases ODF intends to achieve the goals of watershed analysis through a site-specific limiting factors approach, conducting the analysis with the same technical approach and rigor. This will still allow for ODF to evaluate the likelihood of achieving properly functioning aquatic systems, but the tools and techniques will be applied to reach-scale evaluations of the parcels. The specific details on how this will occur are determined during the project design phase of each watershed analysis project.

In order to avoid duplicative efforts and remain consistent with the direction in the FMPs, this manual does not employ specific methods to examine upland ecosystem and wildlife habitat issues independent of aquatic and riparian conditions. However, this manual does include the opportunity to include an examination of these issues where it is warranted. During the initial stage of a watershed analysis project, the manual includes a process for the ODF districts and other stakeholders to review the assessment and analysis questions (see “project design” below) and evaluate whether modifications and or additions are needed. Modifications could occur for several reasons, among them are that specific assessment needs of stakeholders are not addressed in the OWEB manual; or that the manual does not address certain watershed-specific analysis needed because of conditions unique to that watershed.

3) Public Involvement

Opportunities for public involvement will take place throughout a watershed analysis project and include the following goals:

- Identify public concerns related to specific watersheds
- Incorporate local knowledge
- Build public awareness of local ODF activities

During project design, ODF will involve interested stakeholders (e.g. local landowners and watershed groups). Meetings will be held with these stakeholders to identify technical issues and incorporate local knowledge. Other involvement could include providing watershed groups and local landowners with drafts of watershed analysis chapters to review for technical content, as well as periodic informational meetings to watershed groups and the interested public. (See Appendix D for an expanded discussion of this topic.)

4) Project Overview

Each project will go through three stages, 1) **Project design** (this includes advertising and awarding the contract), 2) **Contract administration** (made up of an Assessment phase and an Analysis phase, both with review), 3) **Application of Analysis results**. Below are descriptions of each step.

5) Project Design

Project design is a joint exercise by ODF Salem staff, area staff and district staff (the ODF group) 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. The project design phase should begin with the group clarifying the roles and responsibilities of all participants.

After reviewing the standard OWEB and ODF assessment questions and ODF analysis questions listed below, ODF will evaluate whether modifications and or additions are needed for that watershed in order to complete the watershed analysis goals. Modifications to questions during this step could occur because specific assessment or analysis needs are not addressed in the OWEB manual or ODF questions. This may result in questions for a project that differ from the standard questions in the manual.

ODF will then determine what data are needed to answer the assessment and analysis questions. ODF, with contributions from other stakeholders, will assemble relevant data and the ODF group will perform quality control checks to determine whether the available data are sufficient to answer the questions. If data are insufficient to answer OWEB and ODF questions, a determination is made whether to include additional data collection prior to the analysis project, pursue supplementary contracts to gather data, or to acknowledge that data gaps exist and some questions will not be answered. When data gathering is deemed necessary the group will contribute to the design of the method.

ODF expects to reference or summarize part or all of past OWEB watershed assessments when their data is robust enough to be useful in answering the analysis questions. As noted below, it is possible that ODF needs may require that some standard modifications be made to the OWEB components. In all cases, additional work will be needed to answer the ODF assessment questions and perform the ODF analysis.

The scale of the analysis units will be defined. Generally the analysis stage of each project is conducted at the 6th-field HUC scale. The results will be organized by management basins as delineated in the Implementation Plan of the applicable ODF district. Where ODF ownership in a given watershed is relatively small, and management activities that occur on that ownership are unlikely to have a significant influence on larger watershed processes, the analysis will be applied to reach-scale evaluations of the parcels. Modifications to the analysis units (at either the watershed or reach-scale) will occur on a watershed-by-watershed basis as a result of issues and key questions identified in the Project Design phase.

After knowing all of the above information the group can define the deliverables. These definitions will be as specific as possible in terms of units of measure, scale of maps, and acceptable statistics for data. The deliverables will also be defined with enough flexibility to permit the contractor to draw upon their expertise and develop the best product to answer ODF's analysis goals. The ODF group will decide on a review process for the deliverables with a timeline.

When the project design is finalized Salem staff will use it as a basis for writing a request for proposal (RFP). Salem staff will lead the process to advertise for contractors. Through methods such as pre-proposal meetings, the project administrator educates potential contractors to ensure that they are familiar with the objectives and design of the project. Salem staff will lead the selection and awarding process with district involvement. The selection process is outlined in

appendix H. After selection of a contractor, Salem staff will write the contract with district review and award the contract.

6) Contract Administration

A contractor will work through the assessment and analysis phases outlined below to prepare a product that answers the assessment questions and performs the needed analysis. The contract administrator will work closely with the contractor to meet desired objectives. Several times during the project the administrator conducts meetings between resource specialists, district personnel and the contractor to review interim products to ensure quality and applicability. (See Appendix D for an expanded discussion of this topic.)

As stated before, ODF watershed analyses will build off of the OWEB process. To accomplish this, the assessment phase contains Critical Questions from the OWEB watershed manual as well as additional ODF assessment questions. The OWEB questions and the ODF assessment questions are needed in the analysis phase that follows. The analysis phase also has specific ODF analysis questions. These analysis questions focus on four core analysis goals that come directly from the FMP strategies related to aquatic and riparian conservation. They will also give a greater understanding of conditions in the watershed that can be used in the management process. When engaged in a project the contractors should review and use prior documents when possible. For example, in watersheds that have completed OWEB assessments much of the assessment phase is already completed. If after review, the OWEB assessment is robust enough for the ODF analysis questions the contractor will only need to complete the additional ODF assessment questions and ODF analysis.

7. Product Outline

Below is a product outline arranged as an assessment phase and then an analysis phase. Each component has a short description, followed by the OWEB critical questions and by the ODF assessment questions. This is followed by the ODF analysis questions.

7.1) Assessment Phase

Watershed Overview

This chapter will contain a short introduction that describes the purpose and approach of the project. It will then give an overview of the watershed and area. The overview will give descriptions of the following: geographic boundaries of the project; physical features (e.g. Ecoregions, geology, landforms, soils, climate patterns, hydrological systems); biological features (e.g. types and range of native vegetation types on hill slopes and riparian areas, types of fish and wildlife resource issues); social context (e.g. population and demographics, economy, recreation, etc.); and types and range of land uses in the area. Examples of this can be found in the *ODF Trask River Watershed Analysis* and the *ODF Elliot State Forest Watershed Analysis*.

Historical Conditions

The chapter will use a methodology consistent with that described in OWEB component II to describe the historical conditions across the watershed. It is not the intent of this section to define conditions at some single point in the past for ODF to use as a target for the future. 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. Understanding these conditions is helpful when managing for aquatic and riparian species that have adapted to their environment over thousands of years. Historical conditions are described in the context of the dynamic nature of forest environments, with recurring cycles of both disturbance and recovery. The descriptions of watershed conditions through time are based on evidence from written and first-hand accounts, reports, land survey records, resource inventories, maps, drawings, and photographs. The following questions will be answered:

OWEB Critical questions for component II - Historical Assessment

- What were the characteristics of the watershed's resources at the time of the European exploration/settlement?
- What are the historical trends and locations of land use and other management impacts?
- What are the historical accounts of fish populations and distributions?

ODF questions for Historical Assessment

- What are the natural disturbances (floods, windstorms, fires, etc.) and their impact on the aquatic ecosystem prior to and shortly after European settlement, as well as through recent times?
- What is the early management history of the forestland in the watershed (this would include things like descriptions of salvage logging or replanting of burned areas)?

Current Conditions

Current conditions are displayed below by topic.

Stream Channel

The ODF project will combine OWEB component III, channel habitat type, and component VII, channel modification in this section. The Contractor will supply answers and supporting information to the OWEB critical questions below. The supporting information needs to identify the relevance of various channel types in the context of habitat and restoration potential. This will require more ground-truthing, and probably a more intensive ground-truthing protocol, than indicated in OWEB. The OWEB classifications are too regionally generalized for ODF use so some modification of the classifications will take place. When working on the channel modification portion the emphasis will be on ODF lands, but some information on other lands are needed to address effects on anadromous fish runs.

OWEB list of critical questions Component III - Channel Habitat Type Classification

- What is the distribution of CHT's throughout the watershed?
- What is the location of CHT's that are likely to provide specific aquatic habitat features?
- What is the location of areas that may be the most sensitive to changes in the watershed condition?

OWEB list of critical questions Component VII – Channel Modification Assessment

- Where are channel modifications located?
- Where are historic channel disturbances located (for example: splash dams, stream cleaning)?
- What CHT's have been impacted by channel modification?
- What are the types and relative magnitude of the past and current channel modification?

Hydrology & Water Use

The Contractor will supply answers to the critical questions and supporting information to OWEB component IV below. The OWEB methodology is sufficient in most cases. During the project design step the group may decide to explore other flow modification issues. Most questions below are written in the context of streams but it is understood that other water bodies like ponds, springs and wetlands are also included.

OWEB critical questions for Component IV – Hydrology and Water Use

- What land uses are present in your watershed?
- What is the flood history in your watershed?
- Is there a probability that land uses in the basin have a significant effect on peak flows?
- Is there a probability that land uses in the basin have a significant effect on low flows?
- For what beneficial use is water primarily used in your watershed?
- Is water derived from a groundwater or surface water source?
- What type of storage has been constructed in the basin?
- Are there any withdrawals of water for use in another basin (inter-basin transfer)?
- Is any water being imported for use in this basin?
- Are there any illegal uses of water occurring in the basin?
- Do water uses in the basin have an effect on peak flow?
- Do water uses in the basin have an effect on low flow?

Riparian/Wetlands

The Contractor will supply answers and supporting information to the critical questions of OWEB component V and the ODF questions below. The assessment will also include a description of stand characteristics more detailed than that provided in the OWEB methodology. Specific descriptions can be developed during the project design step, but they will be similar to the vegetation classes used in the Elliott report. It will be important to capture the variability in riparian stands, although ODF purposes should be more oriented toward description than hypothesis testing.

OWEB list of critical questions Component V – Riparian/wetlands Assessment

- What are the current conditions of the riparian areas in the watershed?
- How do the current conditions compare to those potentially present or typically present for this Ecoregion?
- How can the current riparian areas be grouped within the watershed to increase our understanding of what areas need protection and what the appropriate restoration/enhancement opportunities might be?
- Where are the wetlands in this watershed?

- What are the general characteristics of wetlands in the watershed?
- What opportunities exist to restore wetlands in the watershed?

ODF questions for Riparian/Wetlands

- What are the locations of debris-flow prone channels?
- What are the current riparian vegetation characteristics on state forests lands within the watershed using methodology similar to the Elliot State Forest Watershed Analysis?
- What riparian areas currently have high, moderate, and low large wood input potential for key conifer pieces (>20-inch conifer)?

Sediment Sources

The Contractor will supply answers and supporting information to the critical questions of OWEB component VI below. The decision to answer the ODF questions below will be made during the project design phase based on information on that specific watershed.

OWEB list of critical questions Component VI – Sediment Sources Assessment

- What are the important current sediment sources in the watershed?
 - To determine this; use information on current slope and road instability, road runoff, surface erosion and other discrete sources.
- What are important future sources of sediment in the watershed?
- Where are erosion problems most severe and qualify as high priority for remedying conditions in the watershed?

ODF questions for Sediment Sources

- What is the distribution of shallow, rapidly moving landslide-prone slopes on state forests lands within the watershed? Map high, moderate and low hazard areas, as defined by the Department of Forestry geotechnical specialists.
- What is the distribution of debris flow-prone channels on state forests lands within the watershed? Map high, moderate and low hazard channels, as defined by the Department of Forestry geotechnical specialists.
- Are there locations with gullies or other active surface erosion areas in the watershed? Map any locations.
- Are there deep-seated, actively or recently actively moving landslides? Map any locations.
- Are there any unusually erosion prone soils on steep slopes in the watershed? Map any locations.
- What is the road length in the basin within 100 feet of streams, by stream type and size? Express this as a percentage of total road length within the watershed, by 6th-field HUCs and management basins. Map the location of these road segments.
- Are road sidecast/fill landslides common? If so, where in the watershed? Map the location of road segments where sidecast/fill landslides occur. For each site show whether it is considered to have a high, moderate, and low risk to the aquatic resource.
- Are road washouts (of stream crossing fills, or diversion of streams down roads) common? If so, where in the watershed? Map the location of road segments where road washouts occur with a high, moderate, and low risk to the aquatic resource.
- Do any recreation trails contribute to sediment or erosion problems? If so, map these locations.

- In what percentage of the road system is the ditch directly connected to streams? Express this as a percentage of total road length within the watershed, by 6th-field HUCs and management basins. Map the location of these road segments.

Water Quality

The Contractor will supply answers and supporting information to the critical questions of OWEB component VIII and the ODF questions below. Most of the questions below are in the context of streams but it is understood that other water bodies like lakes, ponds, springs and wetlands are also considered.

OWEB list of critical questions Component VIII – Water Quality Assessment

- What are the designated beneficial uses of water for the stream segment?
- What are the water quality criteria that apply to the stream reaches?
- Are the stream reaches identified as water quality limited segments on the 303(d) list by the state?
- Are any stream reaches identified as high-quality water or Outstanding Resource Waters?
- Do water quality studies or evaluations indicate that water quality has been degraded or is limiting the beneficial uses?

ODF questions for Water Quality

- What stream temperatures are reasonably achievable? Provide answer by sub-watershed.
- How do the current shade levels along streams compare to historic levels by sub-watershed and stream size?
- How do the current stream temperature levels compare to historic levels by sub-watershed and stream size?
- How do water temperatures compare to other nearby basins with similar flows and geology?

Fish & Fish Habitat

The Contractor will supply answers and supporting information to critical questions of OWEB component IX and the ODF questions below. The use of ODFW habitat surveys, one of many choices in OWEB, should be standard. However, these data should be diligently checked for Quality Control. On occasion, the ODFW data will be supplemented. This module will also include information about amphibians and other aquatic obligate terrestrials. A decision to map the potential distribution and a discussion of needs of sensitive amphibian species will be determined during the project design phase of each project. Where available, this can be supplemented with field-based population and habitat quality data.

OWEB list of critical questions Component IX – Fish and fish habitat assessment

- What fish species are documented in the watershed? Are any of these currently state- or federally listed as endangered, threatened or candidate species? Are there any fish species that historically occurred in the watershed that no longer occur there?
- What is the distribution, relative abundance and population status of salmonid species in the watershed?
- Which salmonid species are native to the watershed, and which have been introduced to the watershed?

- Are there potential interactions between native and introduced species?
- What is the condition of the fish habitat in the watershed (by sub-basin) according to existing habitat data?
- Where are the potential barriers to fish migration?

ODF questions for Fish & Fish Habitat

- What stream reaches have high, moderate, and low levels of key pieces of large wood (>20-inch conifer) in the channel?
- Was there significant historical wood removal in the watershed? Where did this removal occur?
- Did any splash damming occur in the watershed? Where did this splash damming occur? Are the effects still apparent?
- What is the distribution of fish species, by life stage, in the watershed?
- Provide a map of the distribution based on fish surveys documenting fish presence.
- Provide a map of the distribution estimating historical fish presence.
- How many miles of fish-bearing or potentially fish-bearing streams are blocked by culverts, and where are these blockages? Categorize and map blockages as either impeding fish passage or blocking fish passage (consistent with the criteria in the Fish and Fish Habitat component of the OWEB assessment manual), and associated length of stream affected.
- Are sensitive amphibian species present in the watershed? Map distribution (or in some cases, potential distribution) and discuss needs of sensitive amphibian species. Where available, this can be supplemented with field-based population and habitat quality data.

7.2) Analysis phase

The analyses will be conducted at the 6th-field HUC scale for each of the core analysis goals below. The results will be organized by Implementation Plan management basins of the applicable ODF district. The contractor will answer the key analysis questions below along with supporting information. Some analyses will invariably involve interpretation and professional judgement, and these cases should be clearly described. Also, in the supporting information the contractor should give an indication of the confidence/reliability of the results. This can take many forms but should give the reader a level of certainty by providing amounts and type of data supporting the conclusion. For example, the contractor could specify that there is either a ‘high’ or ‘moderate’ confidence in the results of the analysis. Results with a ‘low’ confidence would not be included, but described instead in the context of uncertainty.

Limiting Factors: Identify specific conditions within the watershed that are limiting the achievement of properly functioning conditions of aquatic habitats; and then evaluate whether stream restoration projects or other management activities (for example, those related to slope stability, recreation trails, roads, or upland conditions) are likely to remedy the limiting factor(s).

Key Analysis Questions for Limiting Factors

- Are there sub-basins where the current level of in-stream wood is a limiting factor for achieving properly functioning aquatic systems?

- Are there sub-basins where stream sediment deposition (associated with hillslopes and/or road erosion) is a limiting factor for achieving properly functioning aquatic systems?
- Given the distribution and abundance of fish species, and the stream temperatures that are reasonably achievable, what is the likelihood (rate as high, moderate, low, or unknown) that stream temperatures and/or shade conditions are a limiting factor for achieving properly functioning aquatic systems?
- Are there any other conditions limiting the achievement of properly functioning conditions?
- If limiting factors are identified, what management options and/or stream restoration activities have the potential to remedy the limiting factor, and where specifically should they occur?

This action will examine resource concerns that are directly related to the key functions and processes of aquatic and riparian habitats and determine what, if any, limiting factors exist within the watershed. The overall goal of watershed analysis is to identify if properly functioning aquatic systems exist along streams managed under the FMP. If the aquatic system is not properly functioning, the limiting factors need to be identified. The analysis questions below focus on those factors that are currently understood to be the most relevant in terms of maintaining and recovering properly functioning aquatic systems. Once there is a better understanding of the limiting factors for a specific watershed or parcel of ODF land, the next analysis goal (alternative vegetation management) examines the management measures that are likely to remedy the limiting factor.

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, and if they are not, then identify the alternative vegetation management needed to achieve this condition.

Key Analysis Questions for Alternative Vegetation Management

- Are conditions suitable for development of Aquatic & Riparian properly functioning conditions (PFC) in a reasonable timeframe using current FMP strategies? At the sub-basin scale (6th-field HUCs), map riparian areas in terms of whether there is a high, moderate, or low likelihood that the PFC will develop.
- What sub-basins should be priorities (rank high, medium, and low) for conifer retention to provide in-stream key pieces of large wood from adjacent riparian management areas in order to achieve properly functioning aquatic systems? Identify specific stream reaches and the level of conifer retention that would achieve PFC, or achieve conditions suitable for the development of PFC in a reasonable timeframe.
- What sub-basins should be priorities (rank high, medium, and low) for long term conifer establishment and management to provide future in-stream key pieces of large wood from adjacent riparian management areas in order to achieve properly functioning aquatic systems? Identify specific stream reaches and the alternative vegetation management recommended.

This analysis goal makes a determination about how likely the current FMP strategies are to achieve the properly functioning condition where limiting factors are identified. If it is determined that the current strategies are unlikely to achieve the properly functioning condition, alternative vegetation management measures are to be identified that are more likely to achieve the condition. The answers to the questions above should either provide a basis for continuing with the current strategies, or describe other management options in lieu of the current strategies. The intent is to ensure that management activities and protection measures in and around riparian areas are appropriate given current conditions and the goal of achieving properly functioning conditions.

Slope Stability: Produce a map of the watershed that categorizes landslide hazards into high, moderate, and low hazard categories, as defined by the Department. Identify if the watershed is unusually prone to landslides. If so, identify where these landslides occur and their effect on delivery of wood and sediment to streams, channel scour and aggradation.

Key Analysis Questions for Slope Stability

- Are there landslide-prone hillslopes that pose a high risk of downstream sediment or scour impacts? If so, identify the specific hillslopes and stream reaches, describe why they pose a high risk to streams, and describe how management will affect possible stream sediment or scour impacts?
- What is the relative input of stream sediment from shallow, rapidly moving landslides, deep seated landslides, soil creep and other sediment sources, and has management had a long term effect on sediment production or channel scour?
- What sub-watersheds should be priorities (rank high, medium, and low) for conifer retention? This ranking is based on the ability to provide in-stream key pieces of large wood from debris flow-prone channels delivered by shallow, rapidly moving landslides. Identify specific stream reaches and the level of conifer retention recommended.
- What specific locations should be priorities (rank high, medium, and low) for long term conifer establishment and management? Again, this ranking is based on the ability to provide future in-stream key pieces of large wood from debris flow-prone channels delivered by shallow, rapidly moving landslides. Identify specific stream reaches and the vegetation management recommended.

This analysis goal is intended to provide information that will ensure that landslide and debris-flow events are likely to occur in a way that does not limit the achievement of properly functioning aquatic systems. These analysis questions are not designed to be used in the context of public safety, and the rules and regulations that must be followed under the Forest Practices Act related to public safety. These questions are designed to help ensure that when a landslide or debris flow does occur on State Forests, the material that is delivered to the stream and the impact upon the stream is consistent with what historically occurred under natural disturbance regimes. This includes providing desirable levels of large wood and coarse sediment (cobbles and gravels) that are delivered to fish-bearing streams, and minimizing the amount of fine sediments being delivered. This analysis also is specific to non-road related landslides. Road-related issues are addressed in the next analysis goal.

Roads: Review, and where necessary, improve road system data to provide the district with critical information in a format needed to assist the District in making more effective road management decisions.

Key Analysis Questions for Roads—

- What road issues are the highest priority for repair, and why? What are the specific locations of the road issues?
- What road segments are a high priority for vacation or relocation, and why?
- What stream crossings that impair or block fish migration should be priorities for replacement (rank high, medium, and low), and why?

This analysis goal will be achieved primarily through the road information management system (RIMS) currently under development in State Forests. Once the limiting factors are identified, this analysis goal will identify what road management activities are likely to remedy the limiting factor(s), and where specifically those activities should occur. The answers to the analysis questions above will also provide specific documentation on where the highest priority issues are and will provide a rationale for these priorities. The districts will then be able to utilize this information in their planning processes to help determine how best to utilize their road management resources.

8) Application of Analysis Results

The analyses will be conducted at the 6th-field HUC scale for each of the core analysis goals above. Management basins as delineated in the Implementation Plan of the applicable ODF district will organize the results. The results of the analysis will be presented as follows:

District-specific IP Management Basin “X”

- **Limiting Factors**
Compose a narrative for each 6th-field HUC, or portion of 6th-field HUC, that occurs in this management basin. This narrative will describe the answers to the analysis questions. This narrative will reference the ArcView shape files that contain the complete results of the analysis. There will be one or more separate narratives for “limiting factors” depending on how many 6th field HUCs are in the management basin.
- **Alternative Vegetation Management**
Same as above, but specific to this core analysis goal and associated analysis questions.
- **Slope Stability**
Same as above, but specific to this core analysis goal and associated analysis questions.
- **Roads**
Same as above, but specific to this core analysis goal and associated analysis questions.

It is anticipated that there will be a category of results where specific assessment or analysis questions could not be answered due to information and/or data gaps that could not be addressed through the watershed analysis process. These results will be just as valuable to ODF managers as those analysis results that do include specific answers. The contractors conducting the analysis are encouraged to clarify where the analysis is not conclusive, and include details on what kind of data and/or analysis methodologies would be needed in order to answer those questions. This will be valuable to ODF decision-makers when management decisions require making assumptions, and understanding what will be needed to evaluate those assumptions in the future. These ‘inconclusive’ results will be summarized and organized by core analysis goal topic.

The ‘application of results’ phase of the project will integrate the analysis results into the appropriate ODF planning process and management efforts for State Forests. These results will typically be used during the annual operation plan (AOP) process. When the results warrant it they will be applied to other State Forest planning processes. Upon completion of the contract administration stage of the project, Salem staff, Area staff and District staff will convene to determine how the results will be utilized. The results will generally fall into two categories:

- 1) Identification of important issues and key aquatic-riparian areas in the watershed that need to be addressed in order to manage for properly functioning aquatic systems.
- 2) Identification of information and/or data gaps in the assessment and/or analysis process.

The first category will be addressed through the use of the analysis results organized by management basins. The format of these results will allow the narratives to be added directly to the annual AOP process.

The second category of results may need to be addressed through research and monitoring efforts, or through a future iteration of watershed analyses. Applicable analysis results will be forwarded to the research and monitoring program where they will be reviewed in light of current research and monitoring planning efforts.

9) Checklist

A short checklist is provided here to assist staff and Contractors with project tracking. Additionally, it is useful for providing an overview of the various steps associated with each watershed analysis project. An expanded version is in appendix G “Project Action Plan”. The expanded version lists all actions in a project, the products from each action and all personnel typically assigned to that responsibility. Actual time requirements will vary by project, based on such considerations as project size and data availability. The checklist is followed by an outline of personnel and their typical responsibilities.

	Activity	Lead Responsibility	App. Time required
	PROJECT DESIGN PHASE		
	Conduct all project design meeting(s).	Contract administrator	Within 2 months of start
	Define team members, roles, and responsibilities	Design group	Within 1 st month
	Gather local concerns and knowledge.	Design group	Within 1 st month
	Review assessment and analysis questions ; modify as necessary	Design group	Within 1 st month
	Conduct preparatory data assembly.	Contract Administrator	Within 2 nd month
	Perform data QC.	Design group	Within 2 nd month
	Determine what further data collection is necessary.	Design group	Within 2 nd month
	Determine if data is collected within this project or separately.	Design group	Within 2 nd month
	Prepare and award supplementary data acquisition contracts.	Contract Administrator	Varies
	Identify analysis scale	Design group	Within 2 nd month
	Define deliverables	Design group	Within 2 nd month
	Define review process.	Design group	Within 2 nd month
	Prepare and advertise RFP	Contract Administrator	Within 3 rd month
	Evaluate proposals and select Contractor.	Contract Administrator	Within 3 rd month
	Write and award the contract	Contract Administrator	3 rd or 4 th month
	CONTRACT ADMINISTRATION PHASE		
	Conduct project kick-off meeting, transfer data to Contractor	Contract Administrator	4 th month
	Perform project oversight and logistical duties	Contract Administrator	Life of contract
	Answer assessment and analysis questions, give supporting information and perform analysis.	Contractor	Life of contract
	Conduct collaborative meetings to facilitate contract.	Contract Administrator	Life of contract
	Review draft documents	Review team	Life of contract
	Accept completed products	Contract Administrator	9-12 months from start of contract
	Conduct debrief meetings.	Contract Administrator	10-13 months
	APPLICATION OF RESULTS	ODF staff	During and after contract

10) ODF Roles and Responsibilities

Various factors will affect district involvement and it is expected that the level of district involvement will differ between projects. The process is designed for Salem staff to perform the majority of the work. Generally the district will have a large involvement in the design phase, provide a small amount of miscellaneous support during contract work and then a larger amount of time during the review of products. Because the district has the greatest amount of local knowledge, experience has shown the more a district is involved in the project then the more useful the results are to the district. Below is a list of typical responsibilities for a project.

Salem Watershed Specialist

- Primary overall contact for an individual project as ODF project manager
- Lead project design
- Lead contract writing and awarding
- Lead in administering the contract
- Lead in providing data to contractors
- Lead or assist public presentations with watershed councils or other outside groups
- Contribute to internal ODF discussion about various watershed topics as needed

Salem Watershed Coordinator

- Lead any coordination needed between districts/Salem staff/external entities
- Lead or assist public presentations with watershed councils or other outside groups
- Lead on resolving any across project issues
- Assist on project design
- Lead contract administration in Watershed Specialist's absence
- Assist in administering the contract when needed
- Lead internal ODF discussion about various watershed topics as needed

Salem Operations Manager

- Contribute to internal ODF discussion about various watershed topics as needed
- Provide general oversight both between projects and within a project

District Forester and Assistant District Forester

- Designate primary district contact
- Assist in project design
- Assist in product review
- Lead implementation of any recommendations
- Contribute to internal ODF discussion about various watershed topics as needed
- Provide general oversight within a project

Unit Forester(s)

- Assist in project design
- Assist in product review
- Contribute to internal ODF discussion about various watershed topics as needed

Primary district contact (person designated by the district forester for a project)

- Primary contact on district for all issues on a watershed project
- Assist with designing project
- Assist in providing data to contractors
- Assist in coordination among district personnel during design and review phases
- Assist in public presentations with watershed councils or other outside groups
- Contribute to internal ODF discussion about various watershed topics as needed

District Specialists (e.g. GIS, engineering, planning) will work through primary district contact

- Assist with designing project
- Assist in providing information/data to contractors
- Assist in review phase
- Contribute to internal ODF discussion about various topics as needed

Area and Salem Staff Specialists: (e.g. Geotech, Biologist)

- Assist in designing project
- Assist in providing information/data to contractors
- Assist in review phase
- Contribute to internal ODF discussion about various topics as needed

Section Three

Appendices and Glossary

Glossary

Active channel width: The average width of the stream channel at the normal high water level. The normal high water level is the stage reached during average annual high flow. This high water level mark often corresponds with the edge of streamside terraces; a change in vegetation, soil or litter characteristics; or the uppermost scour limit (bankfull stage) of a channel.

Adaptive management: A scientifically based, systematically structured approach that tests and monitors management plan assumptions, predictions, and actions, and then uses the resulting information to improve management plans or practices. Through the application of adaptive management techniques, the Department of Forestry will continually improve management policies and practices by learning from the outcomes of operational programs. See Oregon Administrative Rules 629-035-0000 to –0110.

Alternative Vegetation Management: Management treatments that vary from those outlined in the current FMP strategies. These would be implemented if analysis determines that after applying the current aquatic and riparian strategies limiting factors are likely to persist.

AOP: Annual Operations Plan. Each ODF district compiles this plan to describe the activities for the next year.

Average high water level: The stage reached during the average annual high-flow period. This level often corresponds with the edge of streamside terraces, marked changes in vegetation, or changes in soil or litter characteristics.

Aquatic obligate species: A species of plant or animal that requires living in water for some stage in its' life cycle. Examples are beaver, cold-water corydalis and various amphibians.

Bog: A wetland that is characterized by the formation of peat soils and that supports specialized plant communities. A bog is a hydrologically closed system without flowing water. It is usually saturated, relatively acidic, and is dominated by ground mosses, especially sphagnum. Bogs are distinguished from other wetlands by the dominance of mosses and the presence of extensive peat deposits.

Channel migration zone (CMZ): An area adjacent to an unconfined stream channel where channel migration is likely to occur during high flow events. The presence of side channels or oxbows, stream-associated wetlands, and low terraces are indicators of these zones. The extent of these areas will be determined through site inspections using professional judgment.

Debris flow: In the forests of Oregon a debris flow occurs when a shallow, rapidly moving landslide liquefies and moves downslope, scouring or partially scouring soils along its path.

FMP: Forest Management Plan - A strategic document that provides management direction for an area. ODF has four FMPs – Northwest Oregon Area, Southwest Oregon Area, Elliott State Forest and Eastern Oregon Area.

Greatest Permanent Value: ORS 629.050 defines greatest permanent value to mean "healthy, productive, and sustainable forest ecosystems that over time and across the landscape provide a full range of social, economic, and environmental benefits to the people of Oregon."

Hydrologic Unit: The United States is divided and sub-divided into successively smaller hydrologic units. The hydrologic units are arranged within each other in six levels from largest to smallest. Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to eight digits. Each unit is a drainage area whose boundaries are defined by hydrographic and topographic criteria that delineate an area of land upstream from a specific point on a river, stream or similar surface waters.

Hydrologic unit code (HUC): The numerical identifier of a specific hydrologic unit consisting of a 2-digit sequence for each specific level within the delineation hierarchy.

4th field watershed (4th field HUC): The fourth field in the hydrologic unit hierarchy. These watersheds represent major river drainages. Examples of fourth field watersheds are the entire Nehalem River or everything draining to Tillamook Bay. (USGS nomenclature = subbasin)

5th field watershed (5th field HUC): The fifth field in the hydrologic unit hierarchy. These watersheds range in size from 40,000- 250,000 acres. Each 5th field must be completely contained in a 4th field. Examples of fifth field watersheds are the Wilson River, North Fork of the Nehalem, Rock Creek of the Siletz. (USGS nomenclature = watershed)

6th field watershed (6th field HUC): The sixth field in the hydrologic unit hierarchy, this is the smallest delineation. These watersheds range in size from 10,000- 40,000 acres. Each 6th field must be completely contained in a 5th field. Examples are Cook Creek in the Nehalem or South Fork of the Trask. (USGS nomenclature = subwatershed)

IP: Implementation Plan – A tactical document that describes how an FMP will be implemented over a ten-year period.

Long-term: Exceeding a 10-year period

OWEB: Oregon Watershed Enhancement Board - An agency that oversees and funds most of the Watershed Council activities in the state. The standard manual for conducting watershed assessments is an OWEB document.

Properly Functioning Conditions: The range of diverse aquatic and riparian conditions over time and space that emulate the habitat conditions that resulted from natural disturbance regimes under which native species evolved. There is no one condition that is properly functioning.

Short-term: Within a 10-year period.

Stream: A channel with a defined bank and bottom that carries flowing surface water during some portion of the year, including associated beaver ponds, oxbows, side channels, and stream-associated wetlands if these features are connected to the stream by surface flow during any portion of the year. Ephemeral overland flow is not a stream since this type of flow does not have a defined channel.

Stream-associated wetland: A wetland that is immediately adjacent to a stream. This includes wetlands that are adjacent to beaver ponds, side channels, or oxbows that are hydrologically connected to the stream channel by surface flow at any time of the year.

Stream reach: A section of stream that is geomorphically distinct, and that can be delineated from other adjacent sections based on channel gradient, form, or other physical parameters.

Soil Creep: A slow, gravity-driven process of downslope movement of soil that is not associated with water entrainment or suspension.

Watershed analysis: A process where data is evaluated and interpreted in order to understand causal linkages between watershed-scale processes. This process informs the design and execution of management plans and activities. ODF watershed analysis projects include the assessment process.

Watershed assessment: A systematic process for compiling and organizing data to summarize and characterize historic conditions and current conditions of a watershed.

Wetland: An area that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The process to determine the presence of wetlands will be consistent with the method described in the 1989 *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (USDI Fish and Wildlife Service et al. 1989).

Appendix A: State Forests Watershed Analysis Background

Purpose Statement

As envisioned by the Oregon Department of Forestry's (ODF) State Forest Program, watershed analysis is an information gathering process used to gain technical insight into physical and biological components and processes of the aquatic and riparian areas in a watershed. This insight facilitates planning and improves management through the use of the adaptive management process. The watershed analysis document provides the public with a ready source of information related to watershed management.

Background

The ODF watershed analysis program has been shaped by two major factors. One factor is the mandates, management needs, and objectives of ODF. The other is the increased statewide emphasis on salmonid habitat and watershed health. The following discussion demonstrates how these factors combined to create a need for an ODF-specific approach to watershed analysis.

ODF policy decisions leading to a watershed analysis program

Development of Forest Management Plans and associated needs for watershed analysis.

ODF manages the land of two different entities within state government: the Board of Forestry and the State Land Board. Oregon statutes direct that Board of Forestry (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 lands managed on behalf of the State Land Board are known as Common School Forest (CSF) Lands. They 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." Like BOF lands, these lands are managed for a full range of social, economic, and environmental benefits.

ODF has prepared Forest Management Plans (FMPs) to facilitate management of these lands. These plans are designed to accommodate a vast array of resources. The FMPs for the Northwest and Southwest Oregon Areas specifically describe watershed analysis as a tool for promoting management objectives. These FMPs are based on an approach called Structure Based Management (SBM). SBM is designed to produce and maintain an array of forest stand structures across the landscape in a functional arrangement that provides for social, economic, and environmental benefits. These include a high level of sustainable timber and revenue, diverse habitats for indigenous species, a landscape level contribution to properly functioning aquatic systems, and a forest that provides for diverse recreational opportunities.

To facilitate aquatic and riparian management, the Northwest and Southwest Oregon FMPs delineate strategies related to watershed assessment and analysis. The strategies of the Northwest Oregon Plan are those most comprehensive, and include the following:

- Develop a watershed assessment and analysis process for state forest lands that is compatible with, but expands upon, the existing OWEB process.
- Conduct watershed analysis on priority watersheds within the initial ten-year implementation period.
- Cooperate with local watershed councils and adjacent landowners.
- Apply the results of watershed analysis and other projects at the appropriate planning level through the adaptive management process.
- Identify potential factors that could be contributing to undesirable aquatic habitat condition, or that could be limiting the recovery of aquatic habitats.
- Identify, design, and implement projects to remedy identified problems.
- Evaluate whether alternative vegetation management is needed to achieve properly functioning aquatic habitat conditions. Use information from assessments to plan alternative management. Monitor management treatments to evaluate achievement of resource objectives.
- Complete a broad level assessment of landslide hazards on state forest land in the planning area (level 1).
- Review and analyze existing road data from state forest land and in some cases collect additional data. 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. This means that the ODF watershed analysis approach needs to be comprehensive enough to accommodate the directives of the NW Oregon Area FMP, while including the flexibility to accommodate the mandates specific to each Area.

Upon adoption of the FMPs, the Board of Forestry issued intent statements related to 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.

Subsequent discussions with the Governor's Office offered further direction for watershed analysis. In a letter to the Board of Forestry, dated January 3, 2001, Governor Kitzhaber stated that a watershed analysis should:

1. consider the condition of forest resources on adjacent lands,
2. give full consideration to scientific information; and
3. be used, as necessary, to make changes to ODF plans.

A subsequent meeting between ODF and the governor's Natural Resource Advisor was held to clarify details related to watershed analysis. The parties at the meeting reiterated the Board of Forestry's commitment to ecosystem and watershed health as important components of a watershed analysis. To provide a reference point for consideration of watershed health, the watershed analyses would include a discussion of reference conditions. Discussion of watershed health would focus on a core set of ecological functions. Additionally, a commitment was expressed to draw upon information gained from other ODF activities and to integrate watershed analysis into the adaptive management process. Finally, it was resolved that the watershed analysis manual would undergo a scientific peer review process.

Statewide influences on the ODF watershed analysis program

Development of the Oregon Plan for Salmon and Watersheds.

For the past decade there has been a growing national and international awareness of a need to address a variety of interrelated natural resource topics. These topics include survival of endangered species, water quality and quantity concerns, protection of various natural processes and impacts of human populations on wild areas. The State of Oregon has been engaged in the discussion of these topics, especially as they pertain to Oregon and its resources.

Spearheaded by the Governor's office, state agencies developed a coordinated approach to address watershed issues. This approach is now known as the Oregon Plan for Salmon and Watersheds (OPSW). During the 1997 legislative session, the Oregon Legislature passed the OPSW into law. The OPSW uses four major strategies to improve watershed conditions: volunteer efforts, regulatory programs, research and monitoring, and adaptive management. It addresses all major land use types; i.e. it has forestry, agriculture and urban components. The OPSW calls for a comprehensive effort by state agencies in coordination with private landowners and community based action to conserve and restore crucial elements of natural systems that support fish, wildlife and people. The agencies involved deal with issues that are interrelated and sometimes overlap spatially. There are also situations where actions in one

geographic area have impacts in another. Appendix A contains a partial list of activities and agencies that share the responsibility for that activity.

At the state level, the Oregon Watershed Enhancement Board (OWEB) is the lead agency organizing inter-ownership watershed work. OWEB administers a grant program that awards more than \$20 million annually for projects that restore, maintain, and enhance the state's watersheds. In addition to the grant program, OWEB provides a variety of services to support watershed restoration in Oregon. These services provide technical skills to landowners and local volunteer groups. OWEB produces manuals on how to undertake restoration projects and coordinates a biennial statewide conference to share ideas and expertise. Its outreach programs teach students and adults about urban and rural watershed issues. OWEB coordinates the collection of data about natural resource conditions throughout Oregon and it monitors the effectiveness of efforts to restore, enhance, and maintain healthy watersheds. Through biennial reports, OWEB reports on the progress of the OPSW.

Most watersheds in the state have a Watershed Council organized under the auspices of OWEB. These councils facilitate interactions among the various stakeholders in a watershed to deal with all issues. The main tasks of a Watershed Council include watershed assessment. Additionally, a watershed council organizes resources and inter-ownership restoration activities. The councils follow the methods and protocols in the OWEB Watershed Assessment Manual to do their assessments.

As envisioned by the OPSW, watershed assessment and subsequent action planning are important steps toward watershed preservation, restoration, and enhancement. While the assessment documents existing conditions, the action plan uses the result of the assessment to identify priority areas and actions for restoration, enhancement, and protection (CSRI 1997). Additionally, the action plan sets out public involvement strategies, recommends strategies to fill data gaps, and identifies funding sources to implement the plan.

ODF is committed to work collaboratively with watershed councils for watershed improvement. Most commonly, this is expressed in the form of technical assistance and/or oversight of restoration projects. Where ODF manages forestland, it also designs, funds, and carries out its own information gathering and restoration projects. In general, ODF plays a more active role in the council in those watersheds where it manages a substantial amount of forestland.

ODF activities in support of the OPSW

ODF is an active participant in the OPSW. As an active participant, it tailors its programs to meet the objectives of the OPSW, while meeting its other management objectives. While the State Forest Program plays an important role in meeting OPSW objectives, that role is complementary to the role of other programs within ODF. Below is an overview of how each ODF program's work supports the OPSW.

- **Public Affairs** – ODF's Public Affairs Office participates in the Oregon Plan Outreach Team. This team was established in 1996 to develop outreach strategies and provide a vehicle for interagency coordination of outreach efforts and resources. Outreach team projects have included development of an Oregon Plan website, an Oregon State Fair display, government and media mailings, promotion of Oregon salmon license plates, the Governor's

Spirit of the Oregon Plan Awards, summer presentations at Silver Falls State Park, and participation in a Watershed Council Outreach Assistance Project.

- **Resource Policy** – The Forest Policy program provides policy-related support to the Board of Forestry and Department Executives. In this role, it conducts studies, obtains and provides natural resources information, and engages in inter-agency coordination and policy development. It provides policy recommendations with the objective of preserving multiple forest values, including those endorsed by the OPSW. It strives to ensure that local jurisdictions, natural resource agencies, and other forest landowners embrace these recommendations.
- **Private and Community Forests** – This program is a recent combination of the Forest Practices Program and Forestry Assistance/Service Forestry Program. This ODF program has the most involvement in the OPSW. It administers or assists in administering programs that support the following OPSW goals: forestland improvement for fish, wildlife and water quality purposes, riparian area protection and improvement; and plays a lead role in OPSW monitoring efforts. Through its diverse activities, it assists landowners in forest, agricultural, and urban settings. Within this program foresters regulate forest management practices on private forestlands, provide technical information to landowners and provide access to programs for financial assistance to landowners. This allows landowners to set and meet goals for timber production while protecting wildlife, water quality and other environmental concerns.
- **Fire Protection** – The Protection from Fire Program provides fire prevention and suppression services to approximately 15.8 million acres of forest and grazing land across the state. These lands are drained by many streams important to salmon migration and rearing. The fire protection afforded to these forestlands is essential to the continued health and vitality of the watersheds from which salmon bearing streams obtain their clean, cool waters.
- **State Forest Program** - The State Forest Program manages approximately 780,000 acres of land in state forests. These lands are concentrated in five forests, the Clatsop, Elliott, Santiam, Sun Pass and Tillamook state forests. There are also a number of smaller tracts, scattered mostly in western Oregon's Coast Range. State Forests represent about three percent of forests in Oregon.

The State Forest Program manages land for multiple benefits. It plans and directs timber harvests, road building, and recreational improvements. It also manages for protection of wildlife, water quality and other environmental and cultural concerns. Activities supporting the OPSW include the management of sediment, riparian vegetation, stream habitat, and in-stream restoration projects.

State Forests are managed adaptively, incorporating new knowledge to adjust management strategies. Adaptive management relies on compilation of information from a variety of sources. A few examples of information sources are monitoring projects, research, forest inventory, wildlife surveys and watershed analysis. Each of these different sources contributes specific information to the whole information gathering system. Watershed analysis focuses on the riparian and aquatic systems and the terrestrial processes that affect those systems and their related resources.

Relation of the State Forest Watershed Analysis Program to the OPSW process

As described in the preceding discussion, each program within ODF works in accordance with the OPSW. Likewise, the State Forest Watershed Analysis Program does this by working cooperatively with other stakeholders, using principles of adaptive management, and conducting analysis with the objective of improving aquatic and riparian condition. As a landowner, however, ODF performs detailed action plans tailored to its own management goals. In a way, this is a natural extension of the watershed assessment and action planning methodology envisioned by the OPSW: the generic, broad-based results of ridgetop to ridgetop assessment are applied to solve complex, owner-specific problems.

Overview of the State Forest planning process

In order to meet both ODF's objectives and those of the OPSW, ODF designed its watershed analysis program to be well integrated with its existing planning process. This section provides an overview of that process, as well as a general vision of the way watershed analysis is integrated into the planning process.

Goals, strategies and management direction are laid out in a three level hierarchy of planning. Each level of planning corresponds to a different time period:

1. Long-term planning covers periods exceeding ten years.
2. Mid-term planning covers periods from one to ten years.
3. Short-term planning covers periods not exceeding one year.

As the time frame decreases, the geographic scope and breadth of policy correspondingly decrease. However, individual management activities are brought into greater definition.

At the long-term level of planning, resources are defined, broad resource goals are set, and strategies are created to meet those goals. Long term planning is conducted through a formal process of public meetings, citizens' advisory committees, and technical advisory committees and includes a scientific peer review process. The Board of Forestry approves long-term plans. The results of long-term planning are generally encapsulated within a Forest Management Plan (FMP).

During mid-term planning, details are provided to implement the goals and strategies determined during long-term planning. Plans produced at this level describe activities to address these goals. Additionally, they provide targets for goal accomplishment. These targets include measurable parameters such as acres thinned or miles of road improved. Plans prepared at this level must be consistent with applicable long-term plans. Mid-term planning is performed by each ODF district and subject to public review. Each plan is adjusted through a process of public meetings, citizens advisory committees, and technical advisory committees. The State Forester must approve mid-term plans. Generally, the results of mid-term planning are encapsulated in an Implementation Plan (IP).

The most specific planning occurs at the short-term level. Short-term plans delineate specific projects such as timber sales, road maintenance, stream enhancement, and trail building. As part of the planning process, these plans examine possible resource concerns arising from these projects. They must be consistent with long- and mid-term planning documents. Short-term

plans are developed by each district and are subject to public review. The district forester is responsible for approving short-term plans. Generally, the results of short-term planning are encapsulated in an Annual Operation Plan (AOP).

The planning documents are starting points for watershed analysis by identifying resource goals, targets, and subjects that are important. However, the watershed analysis document is not a planning document. Instead, watershed analysis provides information that is incorporated into planning activities through the adaptive management process. Adjustments to planning documents and day to day management are made after this process is applied.

Adaptive management

Lands on each district are managed consistent with the local management plans. Generally, these plans provide adaptive resource assessment and management as the conceptual and operational framework for addressing forest management issues. These issues are ecologically, socially, and economically complex. This complexity, along with the unpredictable character of many natural events and our finite understanding of forest ecosystems contributes to uncertainty about the outcomes of forest resource management decisions. Changing social values and goals further increase uncertainty and contribute to controversy.

Adaptive management is a system of making, implementing, and evaluating decisions, which recognizes that ecosystems and society are always changing. It is a systematic, rigorous approach for learning from our actions, improving management, and accommodating change. In the Oregon Administrative Rules 629-035-0000 to -0110 which govern state forest management policy and planning, adaptive management is defined as a scientifically based, systematically structured approach that tests and monitors management plan assumptions, predictions, and actions, and then uses the resulting information to improve management plans or practices. Through the application of adaptive approaches, the Department of Forestry will continually improve management policies and practices by learning from the outcomes of operational programs.

Applicability of existing watershed analysis methods to ODF management needs.

During the design of its watershed analysis approach, ODF consulted a number of other watershed assessment/analysis methodologies. These approaches were designed to meet a range of technical and policy objectives. Although these approaches all provide beneficial information, they have attributes that limit their applicability to the ODF watershed analysis process. A summary of these watershed assessment/analysis methodologies is provided in appendix B.

ODF State Forest Approach to Watershed Analysis

The ODF watershed analysis approach was developed following a long process of identification of management needs, discussions between Salem and district staff, conferences with the Governor's office, and public input. It also involved considerable consultation of existing watershed assessments. The ODF watershed analysis approach reflects each of these influences. It incorporates many of the approaches and techniques of other watershed analysis methodologies. However, many of its components were developed to address conditions specific

to ODF management needs. The following sections show how these needs led to governing principles for the ODF approach, which, in turn resulted in development of a process for watershed analysis.

ODF needs from a watershed analysis methodology

In designing a watershed analysis methodology, it is necessary to define ODF's needs from a watershed analysis. Broadly stated, ODF needs a successfully completed project that is useful for forest management. A product fitting this description has many specific attributes. They include:

- Sufficient structure to ensure consistency between projects.
- Sufficient flexibility to allow for watershed-specific circumstances.
- Cost-effectiveness.
- Compatibility with the OSPW.
- Compatibility with the Forest Management Plans and other ODF planning documents.
- Site-specific detail on certain issues of management interest, including road condition, culvert condition, and landslide susceptibility.
- Manageable time demands upon technical experts and field personnel.
- A timeframe conducive to efficient performance of management activities.
- A framework for peer review.
- Transparency to the public.
- Emphasis upon forest practices and other ODF management concerns.
- Sufficient detail to enable the formation of meaningful conclusions relevant to ODF management practices.
- Sufficient analysis to enable planners and managers to understand the links between management activities and their effects on watershed resources.
- Scientific defensibility.
- A structure conducive to incorporating the results of other in-depth analyses.
- A framework for incorporating analysis results into the adaptive management process.
- A framework for updating the watershed analyses to reflect changes in watershed condition.

The ensuing discussion provides an overview of the principles and procedures that will be used to meet these needs.

Principles

During production of this manual, ODF Salem staff identified specific principles that would guide watershed analysis toward efficient accomplishment of ODF management and planning objectives. Collectively, they represent the concepts that characterize the ODF methodology. They include the following:

1. **Build on existing OWEB watershed assessments.** This maintains consistency with the OPSW. Since most watersheds of ODF interest already have been assessed, it also helps to reduce labor and avoid the risk of duplication of effort. On the rare occasion that an OWEB assessment does not exist, ODF will develop an assessment that is compatible with the OWEB methodology. Ideally, this will be done in partnership with the applicable watershed council.

2. **Incorporate questions from ODF planning process.** The NWOA FMP and the State Forests Monitoring Plan have identified questions to be addressed by watershed analysis. These will be incorporated into a standard set of key questions for application across watershed analyses. Other questions identified through State level planning and district level management will also be included in individual watershed analyses.
3. **Focus on ODF lands, including interactions between ODF land and the surrounding watershed.** Generally speaking, there is a tradeoff between scope of coverage and depth of coverage. For most watersheds, an OWEB assessment exists that provides broad coverage across multiple ownership, but with limited depth. ODF watershed analyses will complement this assessment by exploring management-related issues at a greater depth, but at the expense of spatial extent. ODF will examine issues on surrounding land that affect state forest land, such as the quality of water from upstream sources and fish passage to state forests. Additionally, ODF watershed analysis will address outputs from state forests to surrounding land, including the quality of water leaving state forest land.
4. **Incorporate watershed council input early in the process.** Watershed councils have been identified as an important component of the OPSW. For each watershed analysis, the local watershed council will be invited to assist with identification of supplementary issues, and to provide supplementary watershed information. Council members will also be provided with an opportunity to provide public comment.
5. **Invite neighboring landowners to participate in joint watershed analyses.** Partnerships to perform watershed analyses will potentially result in benefits to greater portions of the watershed. This is particularly true where the partners belong to a similar land use sector (e.g., forestry) and/or have similar management objectives.
6. **Allocate management questions between those that are best answered by watershed analysis and those that are answered by other planning mechanisms.** Although terrestrial issues and socioeconomic questions are important; existing planning mechanisms frequently covers these. For a given watershed, proposed key questions will be examined to determine if they are best answered by the watershed analysis process or through another mechanism. If a question is best addressed through another mechanism, the watershed analysis will refer the reader to the appropriate document, but will not provide in-depth discussion of that particular question. Exceptions will exist where the other document does not address a particular watershed-related aspect of the question.
7. **Develop a standardized set of tools for answering questions.** Both standardization and flexibility are desirable within the watershed analysis process. Thus, a list of core analysis goals will be developed for watershed analysis. This list will depend upon standard protocols developed by other agencies. In some cases, ODF may develop new protocols to answer specific needs. Alternative protocols will be permitted, provided that the use of that protocol will enhance the value of the analysis, and that it will yield meaningful results in the context of other ODF watershed analyses.
8. **Provide linkages between forest management and watershed processes.** Effective management decisions will be promoted if managers are provided with a clear understanding

of the potential effects of their decisions. The watershed analyses will provide a clear description of the links between forest management actions and watershed processes. This will be important when determining appropriate management activities to achieve desired results.

9. **Use technology appropriate to the task.** Oftentimes, methods with low technical demands will yield results as effective as those yielded by highly technical approaches. For example, professional judgment often is as effective as modeling. Each watershed analysis application will be evaluated to determine the appropriate approach. Technical approaches will be identified in the watershed analysis document. The end products of the watershed analysis projects will include GIS-compliant displays of results (i.e. ArcView shape files).
10. **Use local expertise to provide site-specific information.** ODF field personnel provide a wealth of knowledge relative to field conditions. They will be consulted regarding general knowledge of field conditions. Additionally, district personnel will provide information from past field surveys and other past management activities.
11. **Use a sampling approach to determine site-specific conditions.** Because of financial considerations, it is sometimes not feasible to conduct extensive field survey. However, adequate ground-truthing should be performed to enable extrapolation to general conditions.
12. **Conduct pilot projects to refine the watershed analysis process.** ODF conducted two pilot projects; one on the Trask River, the other on the Elliott State Forest. These pilot projects helped ODF to identify the relative merits of potential methodological approaches. Additionally, they helped to identify potential pitfalls in the processes, as well as solutions for addressing these challenges. In turn, the results of the pilot projects helped ODF to refine its watershed analysis process.
13. **Designate specific means to disseminate watershed analysis information.** The local watershed council has been identified as one outlet for watershed analysis information, both in developmental and final stages. Additionally, ODF will post projects on its website, where the general public will have access to this information.
14. **Include a public involvement process.** ODF has a public involvement process for use with watershed analysis projects.
15. **Provide guidelines for applying benchmark conditions to synthesis and discussion.** As is the case with most watershed analyses, the ODF methodology will contain a “historical conditions” chapter. This will include discussion of historical conditions and a range of variability.

The watershed analysis process is intended to address ODF management needs and accomplish these guiding principles. During development of this manual, ODF found it convenient to identify multiple levels of watershed study. Among other purposes, it helped to meld work performed by watershed councils into the type of management-oriented approach that ODF intends to perform. For that reason, ODF identified two levels of examination called, for convenience, assessment and analysis.

Watershed analysis is conducted on both of these levels. At the primary (assessment) level, OWEB protocols and watershed council products will be used to examine the broad range of issues in the watershed. The assessment phase will continue with additional ODF assessment questions. These assessment level products will help in identifying issues that can be affected by ODF management and to define issues for further analysis and to identify data gaps. Following the assessment phase is an analysis phase that will focus on four core analysis goals that tie directly to the NOW FMP strategies related to aquatic and riparian conservation. Section 2 of this manual provides further discussion of these four core analysis goals.

ODF's methods will be compatible with protocols described in the OWEB manual. In most cases, they will supplement these protocols by providing additional detail and depth of information. Thus, ODF will be able to integrate watershed council products, including OWEB-based assessments, into its own analysis process.

In several instances, ODF management objectives will require examination of subjects outside the scope of the OWEB methodology. These subjects may include amphibians and aquatic obligates. In these cases, appropriate protocols will be derived from existing assessment methodologies for that subject. If necessary, ODF may develop new protocols in consultation with technical experts.

Upland Ecosystems & Wildlife Habitat

The examination of upland ecosystem and wildlife habitat issues (i.e. those that are non-aquatic and non-riparian, such as the management of terrestrial animal species of special concern, forest health and rare plants) are currently addressed through a number of existing planning processes within the State Forests program. The following is a list some of these processes:

The Northwest Oregon FMP –

Chapter 2, pages 2-28 to 2-32 – Resource descriptions for terrestrial animals with a complete listing in Appendix E.

Chapter 3 – Lists guiding principles, vision statement and goals for the various resources across the area covered by the FMP. Includes specific as well as implicit discussion of protecting, maintaining, and enhancing native wildlife habitats.

Chapter 4, pages 4-81 to 4-84 – Specific FMP strategies for the management of terrestrial animals.

Implementation Plans – Discusses the legal mandates, the relationship to other plans, and reiterates policies for Threatened and Endangered species. It also summarizes key information on the land covered in the plan. Each district has an overview and then goes into specific information on the physical elements, biological elements, and human uses of the district.

Annual Operation Plans – Give specific information about the activities in a district on a yearly basis. Included in these plans are the steps taken and measures in place to protect the terrestrial components of the landscape.

Habitat Conservation Plan (HCP) – An HCP is in place for Spotted Owls on the Elliott State Forest. It is currently being revised for murrelets and anadromous fish. An HCP is in negotiation for the Northwest Oregon Area and Southwest Oregon Area. All of these HCP's cover the strategies and specific management of terrestrial issues in depth.

Northern Spotted Owl- protection measure and strategies

- 1) State Forest Program NSO Strategies for AOP Development
- 2) Northern Spotted Owl Surveying on State Forest Lands
- 3) Agreement for Conservation of Northern Spotted Owls
- 4) USFWS Review of Northern Spotted Owl Biological Assessments
- 5) Policy guidance for timber sales with more than a 2 year contract duration

Marbled Murrelet protection measures and strategies

- 1) Marbled Murrelet Management Plan for State Forests
- 2) Marbled Murrelet Surveying on State Forest Lands

T&E Species and Sale Planning Species and Sale Planning:

- 1) T and E Assessments and Sale Planning Responsibilities and Timeframes
- 2) Biological Assessments in Sale Planning and Development
- 3) Format for biological information on timber sales
- 4) Use of T and E checklist

ODF sponsored wildlife studies and research:

- 1) NSO Study Key findings and application of results
- 2) Northern Spotted Owl Research Synthesis
- 3) Final Report -NSO telemetry
- 4) Northern Spotted Owl Demography Report
- 5) Characterizing Northern Spotted Owl Habitat on State Forest Lands in the Oregon Coast Range
- 6) Review and Synthesis of NSO Literature (Hunter 2003)
- 7) ESF Murrelet Radar Study 2001
- 8) Marbled Murrelet Literature Review
- 9) Murrelet Habitat Report
- 10) Assessment of Habitat Effectiveness for Wildlife
- 11) Sunpass Pileated Woodpecker Research Proposal

These processes generally include a combination of a site specific and landscape-scale approach toward the adaptive management of upland ecosystem and wildlife habitat issues. During the development of the Forest Management Plans this was determined to be an effective approach for ensuring the maintenance and restoration of species associated with upland environments, where life-cycles and habitat functions are not necessarily restricted by watershed boundaries.

In order to avoid duplicative efforts and remain consistent with the direction given to the watershed assessment and analysis process in the Forest Management Plans, this manual does not employ specific methods to examine upland ecosystem and wildlife habitat issues. However, this manual does include the opportunity to include an examination of these issues where it is warranted. During the project design step of a State Forest Watershed Analysis the manual includes a process for the District(s) and other stakeholders to review the assessment and analysis procedures (see section 2) and evaluate whether modifications and or additions are needed. Modifications could occur because of specific assessment needs of stakeholders that are not addressed in the OWEB manual; and/or watershed-specific analysis that is needed because of conditions unique to that watershed that the manual does not specifically address.

Manual preparation

During production of this manual, ODF kept two objectives in mind. First, the manual needed to address the mandates, management needs, and objectives of ODF. Secondly, the watershed analysis process was to address these issues in a way that is relevant to public needs. For this reason, the manual was prepared using both ODF and public input. The manual preparation process included several activities, such as definition of objectives, project prioritization, and core topic identification. Pilot projects were conducted to better define ODF needs from a watershed analysis. The lessons learned were incorporated into the manual. As the manual neared completion, it underwent technical review. Although these activities are described in the approximate order which they began, they were often performed concurrently:

Identification of objectives

During formulation of the manual, a group of ODF Salem staff reviewed Forest Management Plans, Board of Forestry Intent Statements, and other material to determine the mandates for the watershed analysis program. Based on these reviews, an initial draft was prepared of the watershed manual. This draft was subsequently revised based on discussions with ODF resource specialists. Additionally, discussions were held with ODF district personnel to frame the document in such a way that it was applicable to district activities. This was held through a series of meetings throughout the program development process.

Public discussion of the watershed analysis program.

Public outreach was conducted to improve the design of the watershed manual. This was done through several avenues.

The main avenue for public participation was the State Forest Advisory Committee (SFAC). This group represented a broad range of interests and was considered to provide an effective cross-section of Northwest Oregon stakeholder groups. SFAC meetings were held quarterly, at which time an update was provided on the progress of the manual. These meetings were open to the public and provided opportunity for public comment.

The SFAC examined the watershed manual to ensure that the manual was consistent with ODF management objectives, as stated within the Forest Management Plans and other ODF planning documents. Additionally, it provided a public perspective to watershed management issues.

During the development of this manual, the SFAC delegated preliminary discussion to a subcommittee. This committee provided suggestions for improvement of manual components. The subcommittee discussed four main topics:

1. The purpose of the watershed analysis program;
2. Procedures for public outreach and technical review;
3. Prioritization of watersheds for analysis; and
4. Identification of core topics and key questions for analysis.

A more complete discussion of the public involvement process associated with the manual is given in Appendix D.

Prioritization of watersheds for analysis

In order to ensure efficient use of finances and staffing, watersheds were prioritized for analysis. This was done in a multi-step process. First, all fifth-field watershed containing ODF land were identified. These were subsequently aggregated into project units. These project units were prioritized for analysis based on three criteria:

1. Existing watershed condition
2. Potential influence of ODF activities
3. Legal and policy concerns

The prioritization process is further described in Appendix E.

Selection of core topics

During production of the watershed analysis manual, many useful watershed-related topics were considered. Because of differing levels of information needs, these topics were divided into two levels for analysis: General topics and core topics. General topics were those that provide background and context information. As described by this manual, these topics receive a modified OWEB assessment.

Core topics will receive in-depth analysis. These topics are important because they are specifically addressed by statutory mandates or ODF management documents, or they otherwise provide information for accomplishment of ODF management objectives.

Core topics were identified by application of four criteria: These were:

1. Address issues most relevant to ODF management
2. Address issues relevant to watershed health without duplicating other ODF work
3. Achieve the objectives for watershed analysis stated in the FMPs and/or other ODF planning documents
4. Provide useful input to the adaptive management and monitoring plans.

Pilot projects

Once a preliminary pattern for watershed analysis was set up, two pilot watershed analysis projects were conducted. These projects were designed to test the watershed analysis process and to better refine our needs from watershed analysis. Toward this end, the projects were designed with different approaches and differed in price. After completion of the pilot projects, each project was evaluated for its contributions to the program, as well as challenges encountered during the project. Resource specialists, district personnel, and the contractors gave their impressions of the projects and made suggestions for improvement. Lessons learned from these projects were incorporated into the design of this manual.

Technical review of manual

ODF considered that watershed analysis should provide scientifically supportable connections between management actions and watershed function. Additionally, it was desired that public confidence in the watershed analysis process should be reinforced. Toward these ends, it was considered important to have a thorough technical review process. This was performed through two avenues: internal review by ODF and its partners and an external peer review of the manual.

Internal technical review of the manual was ongoing throughout the course of the manual development project. Salem staff and district staff participated in the review to evaluate the ability of the manual's methods to meet ODF management objectives.

Because it is essential that protocols be technically valid and appropriate for ODF management objectives, ODF uses protocols that have already undergone scientific scrutiny and are generally accepted within the technical community. In certain cases, ODF will need to develop new protocols to address specific key questions. Protocols developed in this manner will be submitted to the appropriate specialists for technical consultation. Following this review, ODF will integrate comments to improve the quality of the protocol.

Peer review was conducted to assess the ability of the manual to provide an adequate methodology for accomplishing ODF management activities. Copies of the draft manual were mailed out to a technical review team consisting of qualified individuals from other agencies. Representatives from OWEB, ODFW, ODEQ and Oregon State University reviewed the draft manual.

Following each level of review, ODF considered the comments given. Based on these comments, ODF made the appropriate adjustments to improve the technical quality of the manual and its ability to achieve ODF management objectives.

A more complete description of the manual's technical review process is given in Appendix D.

Appendix B: Sample Contributions to the Goals and Objectives of the Oregon Plan by State and Federal Agencies

This list is not meant to be exhaustive but is meant to illustrate the context in which ODF and especially the ODF State Forest Program operate.

Activity	Partial list of agencies that share responsibilities
Fishery harvest management (Set seasons, harvest limits, etc.)	Or. Dept. of Fish & Wildlife National Marine Fishery Service
Hatchery production	Or. Dept. of Fish & Wildlife
Water quality	National Environmental Protection Agency Bureau of Land Management U.S. Forest Service Or. Dept. of Environmental Quality Or. Dept. of Transportation Or. Division of State Lands Or. Dept. Water Resources Or. Dept. of Forestry Or. Dept. of Agriculture Or. Dept. of Fish & Wildlife
Water quantity (diversions for irrigation, domestic use and water yield)	Bureau of Land Management U.S. Forest Service Or. Dept. Water Resources Or. Dept. of Environmental Quality Or. Division of State Lands Or. Dept. of Forestry Or. Dept. of Agriculture

Activity	Partial list of agencies that share responsibilities
Habitat protection	Bureau of Land Management U.S. Forest Service Or. Dept. of Environmental Quality Or. Dept. of Transportation Or. Division of State Lands Or. Dept. Water Resources Or. Dept. of Forestry Or. Dept. of Agriculture Or. Dept. of Fish & Wildlife
Habitat alteration (Road building, timber harvest, agricultural operations, dams, irrigation diversions, riprap stream banks, etc.)	U.S. Environmental Protection Agency Bureau of Land Management U.S. Forest Service Army Corps of Engineers Or. Dept. of Environmental Quality Or. Dept. of Transportation Or. Division of State Lands Or. Dept. Water Resources Or. Dept. of Forestry Or. Dept. of Agriculture Or. Dept. of Fish & Wildlife

Activity	Partial list of agencies that share responsibilities
Habitat restoration (Building habitat structures, routing streams to historical channels, etc.)	U.S. Environmental Protection Agency Bureau of Land Management U.S. Forest Service Army Corps of Engineers Or. Watershed Enhancement Board Or. Dept. of Environmental Quality Or. Dept. of Transportation Or. Division of State Lands Or. Dept. Water Resources Or. Dept. of Forestry Or. Dept. of Agriculture Or. Dept. of Fish & Wildlife

Appendix C: Summary of Existing Watershed Analysis Methods

During the design of its watershed analysis approach, ODF consulted a number of other watershed assessment/analysis methodologies. These approaches were designed to meet a range of technical and policy objectives. Although these approaches all provide beneficial information, they have attributes that limit their applicability to the ODF watershed analysis process. The following watershed assessment / analysis methodologies are summarized:

Ecosystem Analysis at the Watershed Scale: Federal guide for watershed analysis. (V. 2.2. U.S Regional Ecosystem Office, 1995)

Washington Forest Practices Standard Methodology for Conducting Watershed Analysis (V. 4.0. Washington Department of Natural Resources, 1997)

Oregon Watershed Enhancement Board Watershed Assessment Manual
(Watershed Professionals Network, 1999)

Methods to Complete Watershed Analysis on Pacific Lumber Lands in Northern California (The Pacific Lumber Company, Scotia, California, 2000)

California North Coast Watershed Assessment Program
(California Resources Agency, 2002: <http://www.ncwatershed.ca.gov/>)

Ecosystem Analysis at the Watershed Scale: Federal guide for watershed analysis.

The federal methodology was developed to address a broad range of issues based on the Northwest Forest Plan. It uses a six-step process to characterize watershed processes and derive management recommendations. The six steps are Watershed characterization, Issue identification, Description of current conditions, Description of reference conditions, Synthesis, and Recommendations. Issues and key questions are identified based on seven core topics: Erosion processes, hydrology, vegetation, stream channel, water quality, species and habitats, and human uses. The primary purpose of this methodology is to provide a framework for watershed analysis. Although optional protocols are being developed, this methodology does not focus on protocols for performing specific modules. Advantages of this methodology include flexibility, as well as coverage of terrestrial and socioeconomic issues generally not addressed by other watershed analysis methodologies. Disadvantages include limited standardization. Additionally, the breadth of coverage can lead to a loss of focus on specific issues of importance⁴. The federal methodology generally addresses more issues than are necessary for ODF management. This is because socioeconomic and terrestrial elements are usually covered through other portions of the planning process.

⁴ It should be noted that this is an observed, unintended, effect of the federal methodology. The methodology itself specifies that the issue identification step is to focus analysis on key ecosystem elements most relevant to management questions and objectives, human values, or resource conditions. Applicability of core questions and level of detail are also given at this step. However, no protocol is given for making these determinations.

Washington Standard Methods for Conducting Watershed Analysis

The Washington methodology uses seven assessment modules to examine how forest practices may affect aquatic systems. Assessment modules include mass wasting, surface erosion, stream channel, hydrologic change, and riparian condition. The methodology provides protocols to structure the collection, organization and interpretation of watershed information for each module. The process includes formation of two teams: an assessment team and a prescription team. The assessment team identifies and evaluates the linkages between hillslope processes (e.g., erosion) and the aquatic system (e.g., sediment deposition in stream channels). The prescription team develops site-specific management prescriptions. Advantages of this methodology include a highly structured process with site specific technical detail. Disadvantages are high cost and the intensive time demands upon technical personnel.

OWEB Manual

The purpose of the OWEB Watershed Assessment Manual (Manual) is to assist watershed councils to understand the function of their watershed and to help prioritize future voluntary restoration projects and monitoring activities. The approach was designed with a similar framework to the Washington methodology, with modules and a watershed condition evaluation serving as the “synthesis” process. Unlike the Washington methodology with its intensive focus on the forest environment, the Manual was designed to provide a summary examination of all land uses. Advantages of the Manual process include that it requires a minimum of technical expertise, and as a result it does not involve detailed field data gathering and modeling. Disadvantages include that it is designed as a broad-scale screening process and thus provides a limited understanding of the links between management and the aquatic system.

Pacific Lumber Adaptation of the Washington Methods

The Pacific Lumber (PALCO) methods follow the Washington module approach with modifications. The goal of the watershed analysis process for PALCO lands is to modify the interim aquatic prescriptions described in their Habitat Conservation Plan (HCP) to reflect site-specific and watershed conditions. Prescriptions that result from watershed analysis are intended to, over time, maintain, trend toward, or achieve properly functioning aquatic habitat conditions as detailed in the July 1997 Draft HCP. As such, they are tailored to the needs of aquatic species and are based on the best and most currently available scientific information. While most of the focus of the analysis is on the effects of aquatic habitat function upon salmonids there is a module that addresses aquatic-dependent amphibians. Advantages and disadvantages of this methodology are similar to those of the Washington methodology.

North Coast California Methods

This program is designed to meet four goals:

1. Develop baseline information about watershed conditions.
2. Guide watershed restoration programs.
3. Guide cooperative interagency, non-profit, and private sector approaches to improve watershed condition through stewardship, easement, and other incentive programs.
4. Improve implementation of laws requiring watershed assessments such as the California Forest Practices Act and the federal Clean Water Act.

The North Coast Program addresses these goals by identifying, at a basin scale, the key limiting factors for salmonid production. This is done by examining how various factors interact to limit habitat and populations. The program provides a process for collecting and analyzing information by specifying a range of methods that can be used. This “toolbox” approach provides a flexible way to answer a set of critical questions designed to characterize current and past watershed conditions. Advantages include the flexibility of the approach as well as its framework for peer review. Disadvantages include the lack of detailed analysis and the lack of emphasis on forest practices.

Appendix D: Public Involvement and Technical Review

Introduction

Public involvement and technical review are two collaborative tools that ODF uses to improve the quality of its products. They are designed to fill complementary niches in the management process. Public involvement is directed toward those individuals and groups that are potentially interested in ODF activities. Its main goal is to gather local input and promote understanding between ODF and the general public. Technical review, on the other hand, is solicited from a group of specialists selected from amongst ODF, its partners and cooperators, and independent contractors. It is performed with the objective of ensuring that ODF products are developed at a technical standard sufficient to ensure their management utility.

ODF's watershed analysis program intends to conduct these processes at both program-wide and project-specific levels. The emphasis at each of these levels will be directed toward a different audience. At the program level, public involvement and technical review will be used to improve the design of the watershed manual. Since this addresses issues and procedures applicable statewide, outreach at this level will involve people who are interested in watershed issues, irrespective of location. Project-specific issues will be heavily influenced by local considerations. Thus, project-specific outreach activities will be directed toward individuals interested in a particular watershed.

Goals and associated procedures for both of these processes are discussed in the remainder of this chapter. Public outreach is discussed first, followed by a discussion of technical collaboration.

Public involvement

The forest management plans describe a set of public involvement guidelines for planning documents. For informational documents, such as watershed analysis reports, the guidance is less clear. However, public involvement techniques should be consistent with the objectives of the public outreach process. The following section describes these goals and associated procedures for public outreach.

Watershed Manual

Goals

Public involvement goals for the watershed manual are oriented to address public interests applicable at a statewide level. They include the following:

Promote public understanding and acceptance of ODF activities

ODF intends to design its watershed manual to facilitate public understanding of its activities, including its watershed analysis program. For this reason, the manual should be readily comprehensible to those members of the public who have a working understanding of watershed issues. Additionally, the manual development process should be transparent and should include

opportunities for public input of local knowledge. It is anticipated that these measures will lead to increased public understanding of and trust in ODF's watershed analysis program.

Make manual relevant to public needs

While ODF's first focus is on management, it is also interested in addressing management-related issues in a way that is relevant to public needs. It is desirable to incorporate topics of public interest consistent with ODF's other goals.

Principles and procedures

Several avenues will be useful to achieve adequate public representation in design of the manual. While current public outreach activities emphasize the use of the State Forests Advisory Committee, input from OWEB was also solicited. The relative roles of these groups are as follows:

State Forests Advisory Committee

In keeping with ODF's goals, the watershed analysis manual should be evaluated by a broad-based group of affected stakeholders. The State Forests Advisory Committee (SFAC) effectively fulfills this function. This group represents a broad range of interests, and can be considered to provide an effective cross-section of Northwest Oregon stakeholder groups. SFAC meetings are open to the public and provide a twenty minute period for public comment. Their location makes them particularly convenient for interested parties living near the Tillamook State Forest.

The SFAC conducts meetings at an interval of 3 months. During these meetings, updates were provided regarding the watershed analysis project, including progress of the manual. The SFAC has chosen to delegate preliminary review authority to a subcommittee. This subcommittee met monthly and provided suggestions for improvement of manual components. ODF, in turn, incorporated these comments insofar as they are consistent with ODF management objectives and the flow of the document. Following completion of this process, ODF submitted manual components to the SFAC for review.

The SFAC examined the watershed manual to ensure that the manual is consistent with ODF management objectives, as stated within the Forest Management Plans and other ODF planning documents. It ensures that, in the view of its members, the watershed analysis manual is likely to inform management decisions in a way to provide the public with greatest permanent value (GPV) for diverse resources. It provides a public perspective to management issues and advises ODF regarding watershed issues of importance to the public. ODF, in turn, incorporates SFAC recommendations in a manner that it views to meet the goals stated in the FMPs and other planning documents.

Oregon Watershed Enhancement Board (OWEB)

Because the ODF watershed analysis program values compatibility with statewide watershed programs, ODF invited an OWEB representative to review the watershed analysis manual. This review took place during the time allotted for peer review. As necessary, work will be coordinated with OWEB to ensure that the watershed analysis is compatible with OWEB programs.

Individual projects

Goals

Goals for individual projects are intended to focus on issues at a local level. They include the following:

Identify public concerns related to specific watersheds

It is important for ODF to understand public concerns early in the watershed analysis process. However, ODF recognizes that these concerns are likely to vary with local conditions. Through public outreach, analysts can identify and address local concerns. They can better understand the factors, issues, or choices that are important to people affected by management activities within a specific watershed.

Incorporate local knowledge

The public can be an important source of local and traditional knowledge about watershed conditions and resources that might be affected by management activities in a watershed. Public outreach can help ensure that such information is considered during the analysis of the effects of management activities.

Build public awareness of local ODF activities

It is important that the public understand ODF activities at the local level. Public outreach techniques can help build this awareness and understanding. Additionally, it can help identify options or alternatives that are likely to meet with community approval.

Over time, a visible commitment to effective public involvement can help build a sense of public trust and credibility in ODF's decision-making process and reduce the possibility that public concerns will lead to costly delays in project approvals and implementation.

Principles and procedures

Identification of affected groups

Adjacent landowners

During the initial phase of the watershed analysis project, adjacent landowners may choose to participate in the project as partners. Generally, partners will contribute financial and in-kind resources toward the production of watershed analysis products. Partners will receive joint ownership and/or authorship of watershed analysis products to a degree commensurate with their contribution to the project, as specified in a memorandum of understanding and/or contract. For the purpose of public involvement, partners will be considered an "internal" source and will receive ongoing access to watershed analysis information and ongoing input into the process.

Other landowners may choose to function as cooperators. While they may provide data or access to land, they are not on-going active participants in the watershed analysis project. Cooperators will receive access to project information on the same schedule as watershed groups. As with watershed groups, cooperators may request presentations regarding the watershed analysis

project. Where possible, it is recommended that these cooperators receive these presentations jointly with watershed groups.

Watershed groups

For each watershed analysis project, potentially interested parties should be identified on a local basis. This can be facilitated by consulting with ODF district personnel to determine a list of locally active watershed groups. ODF district personnel can also provide perspective on the stakeholder representation within each group. Where specific types of stakeholders appear to be under-represented, special efforts can be made to recruit comment from that type of stakeholder. In order to minimize expense, public outreach exercises should take place using local watershed groups to the maximum degree feasible.

Project design phase

Early public input is essential. For that reason, local watershed groups and neighboring landowners should be identified and contacted in the project design phase of the project. The primary purpose of this input is to gain local knowledge and data of a technical nature. As applicable, issues of interest can be incorporated into the statement of work for the Request for Proposal (RFP).

Ongoing public contact during projects

ODF should continue to provide periodic updates to interested watershed groups throughout the project. Details, such as frequency of informational updates and other public participation opportunities, should be adjusted according to interest level. At least one in-depth presentation should be offered over the course of the watershed analysis project.

As determined in the initial phase, ODF will provide opportunities for local groups to provide technical information or local knowledge. Depending upon local circumstances, the following opportunities may be provided:

- Opportunities to provide local information.
- Contribution to resource issue identification
- Examination of draft watershed analysis chapters by representatives of local groups.
- Informational meetings

These activities should be designed in a way that does not delay completion of the watershed analysis. For example, examination of watershed analysis chapters by the local group representatives should be performed concurrently with technical review.

The information received during local group review will be evaluated to determine the appropriate action. In cases where the information will benefit the watershed analysis it will be forwarded to the contractor performing the watershed analysis, together with a recommendation from the ODF contract administrator. At the conclusion of the project, a project wrap-up meeting should be held. This apprises the interested public of the findings of the watershed analysis

project. Depending upon project-specific circumstances, this meeting may be held in connection with a watershed council meeting, or as a stand-alone public meeting.

Technical review

Forest management plans direct that the watershed analysis methodology should possess technical rigor. Subsequent meetings and documentation have established that this rigor should be applied through a “peer review” process. As noted in the following sections, this is most efficiently applied at the program (manual) level. If the manual is technically sound, it follows that individual projects completed according to the manual only need additional technical consultations to account for local conditions. The goals and procedures for completing the watershed manual and individual projects are listed in this section.

Watershed manual

Goals

Goals for technical review of the watershed manual are directed toward ensuring that the overall watershed manual will provide an effective basis for achieving ODF management objectives. They are as follows:

Promote scientific credibility and public confidence

A successful watershed analysis must provide scientifically supportable connections between management actions and watershed function. The use of qualified technical reviewers will help to ensure that the methods proposed by the manual will provide these connections.

Additionally, a thorough technical review will reinforce public confidence in the watershed analysis process. To achieve the highest level of public confidence, technical review should include an external peer review component.

Refine appropriate scope to meet management needs

ODF considers that a successful watershed analysis must provide relevant, understandable, and logical information to managers and policy makers. Managers must be able to use this information to improve actions and plans. This is best facilitated if the scope of the watershed analysis is well fitted to management objectives. While the scope should be broad enough to address all necessary issues, it should not be redundant with other aspects of the ODF adaptive management process. Additionally, the scope must be flexible enough to address the variation in management needs between ODF districts. Technical review will help to ensure that the scope is well suited for meeting management objectives.

Principles and procedures

Given the above goals, there is a role for several levels of technical collaboration for the watershed manual. These include internal review by ODF and its partners, review of individual protocols, and a peer review of the entire process. The nature and timing of each of these processes is described below:

Internal review

Internal technical review of the manual was ongoing throughout the course of the manual development project. Salem staff and district staff participated in the review to evaluate the ability of the manual's methods to meet ODF management objectives. Dialogue between both groups was essential to ensure that these objectives were met.

External review of protocols

It is essential that protocols be technically valid and appropriate for ODF management objectives. Toward that end, ODF will incorporate protocols that have already undergone scientific scrutiny and are generally accepted within the technical community. Examples include ODFW methodologies for survey of fish habitats and population.

For some core topics, protocols may not exist. In these cases, ODF will develop specific protocols to address these core topics. Protocols developed in this manner will be submitted to the appropriate specialists for technical consultation. These specialists generally will consist of scientists from agencies governing the affected resource. Independent scientific specialists may also be consulted. Following this review, ODF will integrate comments to improve the quality of the protocol.

Peer review of manual

Peer review will be conducted to assess the ability of the manual to provide an adequate methodology for accomplishing ODF management activities. This review will be performed within a one-month period following assembly of the draft manual. Copies of the draft manual will be mailed out to a technical review team consisting of 3-5 technically competent individuals. These individuals could come from many possible backgrounds. Examples include agency personnel, private contractors, and university professors. In order to coordinate with other state watershed restoration programs, it is recommended that one member of the technical review team should come from OWEB.

Following each level of review, ODF will consider the comments given. Based on these comments the appropriate adjustments will be made to improve the technical quality of the manual and its ability to achieve ODF management objectives. As necessary, ODF personnel will correspond with the technical specialists to clarify uncertain points.

Individual Projects

Goals

Goals for the technical collaboration on individual projects will be oriented toward ensuring accuracy, completeness and local applicability of information provided in the analyses. Specific goals include the following:

Check for accuracy

Watershed analysis documents should be accurate. Technical specialists with local background are able to clarify and correct points in a document that pertain to their specialty.

Provide supplementary information

Technical specialists can strengthen individual projects by contributing additional information pertaining to their fields of expertise.

Provide local expertise

Each watershed analysis should provide an accurate perspective on local issues. This is enhanced when resident technical specialists are available to provide insights on these issues.

Principles and procedures

Given the above objectives, individual projects would best be handled through a two-pronged approach that emphasizes internal oversight, complemented by informal technical consultations. These roles are described below:

Internal technical oversight

Technical oversight at the project level will mostly be handled internally by ODF personnel. District staff will provide local knowledge and local technical expertise, while Salem staff will ensure that watershed analysis products meet the standards and objectives of the overall program. As part of this, Salem staff will work to ensure that watershed analysis products are compatible statewide.

During the watershed analysis project, ODF personnel will consult with their contractors to obtain technical input from the contractor. It is essential that ODF make full use of the expertise provided by the contractor. At the same time, ODF must evaluate the degree to which this expertise is being applied toward ODF management objectives, and offer direction to ensure that technical methods are appropriate those objectives.

For those watershed analyses where ODF has taken on partners, those partners will take on similar review roles to those of ODF personnel. It is anticipated that there will be substantial duplication of reviewer expertise in these cases. It is recommended that this be retained, rather than streamlined, because of differences in management direction between ODF and its partners.

During the initial phase of the watershed analysis, districts will be contacted to identify their specific technical needs. At this time, a provisional list of internal reviewers will be drawn up and gaps in expertise will be identified. Reviewers to fill those gaps will also be identified. It is likely that some reviewers will come from other state agencies, although the list of reviewers need not be restricted to those agencies. Reviewers should be able to provide local expertise.

Internal review will be ongoing as deliverables are received. Reviewers should receive sufficient time to conduct the review, given other workload tasks. This time will vary depending upon the project and the particular deliverable. As a general guideline, it is recommended that the review period encompass a three week cycle. This includes approximately ten working days for

reviewers to conduct the review and return their comments, and five days for the contract administrator to reconcile comments and refer them to the contractor.

Internal review will be conducted to ensure that the watershed analysis products are accurate, of high quality, and meet ODF management objectives. It is anticipated that district personnel will focus on those aspects that deal with their immediate management needs, while Salem staff will focus on overall quality control and compatibility with other products of the watershed analysis program.

External technical consultations

In some fields, ODF may not have the necessary breadth of technical expertise on staff. In these cases, ODF will identify the gaps in expertise and identify the appropriate reviewers to fill those gaps. Most commonly, these experts will consist of personnel from another agency, such as ODFW fish biologists. Technical consultation will be held with these experts to ensure that the information is correct and to provide local expertise and supplementary information.

External technical consultations will be conducted to ensure that generalized information is accurate from a local perspective and to provide supplementary data for inclusion in the watershed analysis. It is anticipated that much of the focus of technical consultations will be derived from a local perspective.

Appendix E: Prioritizing Watershed Analysis Projects

The order of ODF watershed analysis will be based on existing conditions, degree of potential influences, and identified contractual and resource concerns. Three hierarchical screens are used to assess these criteria for each watershed. The first screen quantifies overall watershed conditions. The second screen modifies the order by considering the potential influence of ODF operations in terms of percent ownership and management activity. The third screen qualitatively filters the prioritization order by considering identified areas of concern such as habitat conservation areas and ODFW streamflow restoration basins.

Level 1 Description

The first screen quantifies overall watershed conditions in terms of the amount of threatened and endangered fish species, Northern spotted owl nest sites, Marbled murrelet sightings, road density, debris flow hazards, and 303d stream quality listing. Geographic information systems (GIS) are used to analyze watershed conditions based on these habitat conditions since much of the necessary data is created and maintained by ODF and other state agencies in GIS format. The ranking formula attempts to:

1. Remove the overall size of a watershed from affecting it's ranking relative to another watershed.
2. Set each attribute score equally so that one species or condition does not count more than another does. (This can be modified to emphasize certain factors if needed).
3. Normalize scores so that locations, distances, and acreage can be compared.

Certain drawbacks exist that affect the final scoring. Data does not exist for every part of the state where ODF owns land. This is especially true for eastside watersheds. In the scoring method this may suggest fewer habitat concerns in those areas. The completion of habitat surveys also may reflect interest in specific areas and not generalized sampling from across whole habitat areas.

Level 2 Description

The second screening process assesses the potential influence of ODF management activities in each watershed. The primary considerations are the percent of ODF ownership within each watershed and the level of management activity on those lands. The goal of the second screen is to ensure that the priority rating is moderated by the magnitude of influence by ODF operations in the watershed.

Level 3 Description

The third screening process takes the previous priority factoring and qualitatively modifies the priority list by identifying areas such as ODF habitat conservation areas, Salmon anchor habitat areas, and ODFW streamflow restoration basins. This allows for areas with contractual concerns and/or specific management interest areas to meet operational and legal requirements sooner.

Appendix F: Northwest Oregon Forest Management Plan: Basic Concepts for Aquatic and Riparian Conservation

This appendix is taken directly from the Northwest Oregon Area Forest Management Plan. The wording is virtually identical in the Southwest Oregon Forest Management Plan.



Basic Concepts for Aquatic and Riparian Conservation

For northwest Oregon state forests, riparian and aquatic habitats will be managed to maintain or restore key functions and processes of aquatic and riparian systems. Since streams are tightly linked to the landscapes they flow through, riparian and aquatic conditions depend upon the interrelated components of the entire landscape. For this reason, this plan uses a blended approach that applies the concepts of landscape ecology to manage riparian and aquatic habitats at both the landscape level and through site-specific prescription. This type of two-tiered approach was cited by the Independent Multidisciplinary Science Team (IMST) as necessary to achieve a high likelihood of restoring and maintaining properly functioning aquatic systems (Independent Multidisciplinary Science Team 1999).

The structural components in a landscape include the physical habitat occupied by salmonids and other organisms, along with the structures and processes that maintain the integrity of that habitat. Functional interactions include the flows of energy and materials within the ecosystem. Landscapes are dynamic: both structure and function change across time and space. Even with change, stability is ensured as long as ecosystem structure and function are maintained within certain bounds and all required components remain within the landscape (Independent Multidisciplinary Science Team 1999).

The key concepts for aquatic and riparian conservation are:

- Management for proper functioning of aquatic systems.
- The blended approach — a combination of landscape level and site specific strategies.
- Use of watershed assessment and analysis to refine strategies and plan management activities during plan implementation.

Aquatic-Riparian Concept 1: Management for Proper Functioning of Aquatic Systems

The functioning of natural riparian and aquatic areas depends on the interaction of three components: vegetation, landform and soils, and hydrology. Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high waterflows, reducing erosion and improving water quality; filter sediment, capture bedload and aid floodplain development; improve flood-water retention and ground-water recharge; stabilize streambanks; develop ponds and channels of sufficient depth and duration to provide fish habitat; and support biodiversity. (USDI Bureau of Land Management 1993, revised 1995) In determining what constitutes “properly functioning aquatic systems,” the overall approach in this plan is based on the following key concepts:

- 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. Rather, providing diverse aquatic and riparian conditions over time and space would more closely emulate the natural disturbance regimes under which native species evolved.

The biological and ecological objective of the strategies in this plan 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.

Riparian Area Management

Riparian area management to contribute to properly functioning aquatic habitats must occur through two major approaches: 1) management towards a desired future condition in specific riparian areas; and 2) management to support targeted functions and processes in specific riparian areas.

Certain RMAs should be managed for conditions associated with mature forests. This is based on the assumption that the vegetative conditions associated with these conditions support a majority of the functions and processes of properly functioning aquatic habitats. Other RMAs should be managed in a manner that supports the maintenance or restoration of identified aquatic functions and processes. A more detailed explanation of these approaches is presented later in this chapter, under the heading, “Aquatic and Riparian Strategies.”

Key Terms

Active channel width — The average width of the stream channel at the normal high water level. The normal high water level is the stage reached during average annual high flow. This high water level mark often corresponds with the edge of streamside terraces; a change in vegetation, soil or litter characteristics; or the uppermost scour limit (bankfull stage) of a channel.

Average high water level — The stage reached during the average annual high flow period. This level often corresponds with the edge of streamside terraces, marked changes in vegetation, or changes in soil or litter characteristics.

Bog — A wetland that is characterized by the formation of peat soils and that supports specialized plant communities. A bog is a hydrologically closed system without flowing water. It is usually saturated, relatively acidic, and is dominated by ground mosses, especially sphagnum. Bogs are distinguished from other wetlands by the dominance of mosses and the presence of extensive peat deposits.

Channel migration zone (CMZ) — An area adjacent to an unconfined stream channel where channel migration is likely to occur during high flow events. The presence of side channels or oxbows, stream-associated wetlands, and low terraces are indicators of these zones. The extent of these areas will be determined through site inspections using professional judgment.

Inner gorge — An area next to a stream or river where the adjacent slope is significantly steeper than the gradient of the surrounding hillsides. In the absence of an on-site inspection and determination by a Department of Forestry geotechnical specialist or other qualified person, these areas are defined as having a slope gradient adjacent to the stream of 70 percent (35 degrees) or greater, and where the height of the slope break is at least 15 feet (measured vertically) above the elevation of the channel.

Stream — A channel that carries flowing surface water during some portion of the year, including associated beaver ponds, oxbows, side channels, and stream-associated wetlands if these features are connected to the stream by surface flow during any portion of the year. Ephemeral overland flow is not a stream since this type of flow does not have a defined channel.

Management strategies within riparian areas should be consistent with achieving or maintaining the desired conditions specified for the water body. For areas that do not meet the desired condition, management strategies should be designed to move the stand towards these conditions in a timely manner. Riparian areas that meet the desired conditions should be maintained in that state with limited or no management activity.

Key Terms

Stream-associated wetland — A wetland that is immediately adjacent to a stream. This includes wetlands that are adjacent to beaver ponds, side channels, or oxbows that are hydrologically connected to the stream channel by surface flow at any time of the year.

Stream reach — A section of stream that is geomorphically distinct, and that can be delineated from other adjacent sections based on channel gradient, form, or other physical parameters.

Wetland — An area that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The process to determine the presence of wetlands will be consistent with the method described in the 1989 *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (USDI Fish and Wildlife Service et al. 1989).

Desired Conditions

Fish-bearing streams (Type F) and large/medium non-fish-bearing streams (Type N) — The goal of management along fish-bearing streams and larger non-fish-bearing streams is to grow and retain vegetation so that, over time, riparian and aquatic habitat conditions become similar to those associated with mature forest stands. For sites conducive to conifer production, these are generally the conditions associated with conifer stands of approximately 80 to 200 years of age or older. For sites where hardwoods are expected to be the natural plant community, mature hardwood stands are the desired condition. This plant community is often more common on riparian sites because of the presence of saturated soils (high water table), or due to the effects of periodic floods. Mature forest conditions should support a relatively high proportion of the functions and processes associated with properly functioning aquatic habitats.

Small non-fish-bearing streams (Type N) — Along small non-fish-bearing streams, the overall goal of riparian vegetation management is to grow and retain vegetation sufficient to support the functions and processes identified as important within the various streams, and to contribute to achieving properly functioning conditions in downstream fish-bearing waters. The functions of these streams will be maintained by the influence and contributions of adjacent stands managed to meet the landscape-level stand structure desired conditions, and by vegetation retained in riparian areas during harvest activities. Management strategies should be designed and implemented in a manner that maintains water quality, supplements wildlife habitat, and contributes to the overall supply of instream large wood within a watershed.

This plan recognizes that a variety of small Type N streams exist across the forest landscape, and that these streams may differ in their physical characteristics, dominant functional processes, and contribution to watershed-level processes. As a result, the strategies for these Type N streams should vary according to which functions and processes are dominant within an individual

stream. Riparian vegetation retention should be designed to maintain or restores these dominant functions. The following section summarizes the key functions and processes that are considered important for different small Type N streams.

- **Perennial streams** — These streams are characterized in terms of function by their potential ability to influence water temperature in downstream reaches. Steeper gradient streams may also periodically transport large woody debris and coarse sediments to downstream reaches. Fine sediment and leaf litter (nutrient) storage processes are somewhat limited in the steeper streams due to their natural hydrologic ability to transport smaller materials. The presence of large wood may enhance nutrient storage processes, and substantially affects the morphology of steep channels primarily through the storage of coarse sediments. These streams are also often recognized as providing important habitats for certain sensitive amphibian species.

Lower gradient perennial streams generally lack the hydrologic force necessary to transport large woody debris or coarse sediments, but they possess the ability to transport fine sediments during normal storm events. These streams are often the sites where large wood and coarse sediments “settle out” and are stored during flood events. Fine sediment and leaf litter (nutrient) storage processes are dominant in these streams during most times of the year. The presence of large wood enhances these processes, and can directly influence channel morphology in non-confined reaches.

Riparian vegetation on these streams plays a key role in protecting stream bank stability, providing leaf litter input, and to maintaining water temperature to provide cool water sources to downstream reaches. Water temperature protection should be focused in the downstream portions of these streams where the greatest influence on fish-bearing stream temperatures is most likely to occur. Vegetation retention should also be prioritized on reaches (emphasis areas) that may support amphibians. Management should be designed to provide a source of large durable wood for recruitment to these channels. In steeper streams, the wood will function as localized sites to sort and store coarse sediments, and as a potential supply of large wood for downstream reaches during periodic transport events. In all channel types, large wood enhances fine sediment and leaf litter (nutrient) storage and routing processes. Instream material to support these processes is provided by adjacent riparian stands, and may be delivered from steeper, upstream reaches.

- **Seasonal high energy streams**— The presence of a relatively wide active channel on these seasonally flowing streams indicates that periodic high flows can be a prevalent channel-forming feature. The relatively steep gradient, in combination with the potential for high flows, indicates a capacity for these streams to potentially transport coarse sediment and large wood. Where the influence of large wood is lacking, segments of these channels are often observed to have scoured to a bedrock-dominated form. With large wood, these channels commonly exhibit a stepped profile as a result of coarse sediment storage. The presence of large wood can substantially affect the morphology of these channels. Fine sediment and leaf litter (nutrient) storage processes are somewhat limited due to the natural hydrologic ability of these streams to transport smaller materials. Large wood transport events are assumed to be limited to infrequent high flow events and debris flows. The lack of perennial flow minimizes the influence of these streams on water temperature in downstream fish-bearing reaches.

Management along these streams should be designed to focus on providing a source of large, durable woody debris to maintain a stepped profile channel form, and to create habitat beneficial to aquatic species. The wood will function as sites to sort and store coarse sediments within the stream, and to provide a large wood supply for downstream reaches during periodic transport events. Large wood in these streams will also function to trap smaller materials, which will enhance the storage and processing of leaf litter (nutrients). Riparian vegetation should also be managed to protect stream bank stability, and provide leaf litter input. Since these streams do not flow perennially, management has little potential to affect water temperature in downstream reaches, or moderate near-channel riparian micro-climate.

- **Seasonal potential debris flow track reaches**— The physical setting and characteristics of these streams indicates a high probability of large wood delivery to downstream fish-bearing waters should slope failure events occur. The morphology of these channels is conducive to transporting large wood during debris flows. The presence of high risk sites near these channels indicates a potential that debris flow events could occur. During these events, it is assumed that vegetation retained along the debris flow track will either reduce the energy of the event and cause the materials to become temporarily stored within the channel, or become entrained within the debris wedge for delivery to downstream reaches. Management should focus on maintaining vegetation that has a high probability of interacting with debris flows along this track. The emphasis should be on maintaining large trees that can provide the functional habitat-forming elements of these natural disturbance events.

The presence of vegetation along these channels supports stream functions and processes during the period when debris flow events do not occur. Riparian vegetation provides nutrient (leaf litter) input. Large wood recruited to these channels sorts and stores coarse sediments, and influences channel morphology. This material also enhances nutrient storage and processing functions. The lack of perennial flow minimizes potential influences on summer water temperature in downstream fish-bearing reaches.

- **Other seasonal streams**— Individually, these streams are assumed to have limited overall influence on watershed-level aquatic conditions due to their small size, flow pattern, and morphological characteristics. Their small size and seasonal flow pattern limits their individual potential to influence downstream water temperatures. The size, morphology, and physical setting of these streams also indicate a lower probability that large wood transport to downstream reaches is a significant function. The major functions of these waters are assumed to be the recruitment, routing, and processing of leaf litter, and transport, sorting, and storage of fine sediments.

It is assumed that individually, these streams have a less significant contribution to watershed-level functions and processes that support properly functioning aquatic habitats. Management along these streams should primarily be designed to maintain some of the functions associated with leaf litter and sediment storage and routing processes. Tree retention and understory vegetation growth near these waters provides leaf litter to the stream, and large wood input. In-channel large wood from retained trees and snags enhances the processes of leaf litter and fine sediment storage, routing, and processing. Although the site-specific vegetation retention standards may be less than on other streams, the majority of

these streams should be maintained in a forested condition for significant time periods. It is assumed that developing forest stands will contribute components that will support the functions and processes of these streams. The assumptions concerning these streams will need to be tested over time through watershed assessments, monitoring, and research.

Aquatic-Riparian Concept 2: The Blended Approach — a Landscape-Level Approach Combined with Site-Specific Strategies

Aquatic ecosystems interact closely with the surrounding terrestrial systems, both at the landscape scale and at the scale of stream reaches and riparian zones. Therefore, the health of the aquatic system depends upon forest management practices that recognize, maintain, and enhance the functions and processes that compose these terrestrial-aquatic interactions at a variety of scales.

Historical Conditions, Disturbance Regimes, and Riparian and Aquatic Habitats

Conditions over the landscape are dynamic, not static. Aquatic and riparian habitats in northwest Oregon have always represented a continually shifting mosaic of disturbed and undisturbed habitats. Every stream would undergo periods when habitat conditions were of better quality for specific species and times when habitat conditions were of lower quality for those species. At any particular point in time, some streams offered better habitat conditions for specific species than others. (Independent Multidisciplinary Science Team 1999)

Historically, forest stands in northwest Oregon ranged from dense mature or old growth conifer forests, to sparsely forested open conditions created by fire, floods, wind, or other disturbance factors. It is estimated that from 1850 to 1920, approximately 50 to 70 percent of forest stands in the Oregon Coast Range were in the mature or old-growth stages, defined as greater than 100 years of age (Teensma et al. 1991). More recent modeling efforts have estimated that historic levels of old growth ranged from 30 to 70 percent at the province scale. At smaller scales the variability was even greater, ranging from 15 to 85 percent of the landscape at any point in time (Wimberly et al. 2000). Streamside forests probably had similar proportions of old and young forests, although the proportion of hardwood stands and young stands may have been higher near large streams due to more frequent disturbances, including floods, debris flows, beaver activity, and related competition with shrub species. The riparian areas of smaller streams were more likely to be dominated by conifer stands. During those same years, 1850 to 1920, instream habitat conditions probably also varied in response to periodic catastrophic disturbances and variations in forest conditions across a watershed. Overall, however, mature forest conditions probably dominated the landscape.

It is becoming increasingly evident that riparian and aquatic ecosystems are maintained over the long term by periodic upland and hydrologic disturbances. As just one example, wildfires left burned forests with many structural elements such as snags and fallen trees, many of which were ultimately delivered to stream channels through landslides or other mechanisms. Natural disturbances such as wildfires, windstorms, and floods have affected and created Oregon's forests for millennia. Native flora and fauna evolved with these disturbance events. There is considerable debate about the frequency and magnitude of these events, and it appears that forest disturbance frequencies vary considerably throughout Oregon's forests, based on location, climate, and ecosystem. The typical disturbance pattern in an area is known as the disturbance regime.

In the past, forest managers often did not recognize the structural needs of the streams and forests and the processes that created these structures. In the rehabilitation of the Tillamook Burn, salvage logging was done before new trees were planted. Many snags were removed that, if left, would have provided large woody debris to the streams over time. Similarly, historic timber harvest did not attempt to maintain large conifers and fallen trees in riparian and aquatic habitats. Finally, due to concerns about fish passage and floods, woody debris was deliberately removed from stream channels. Thus, past management activities have contributed to the very low levels of large woody debris currently in most stream channels on western Oregon state forests.

More specific assessment efforts are necessary to accurately describe the current conditions of riparian and aquatic habitats, including the levels of structural components such as large woody debris and large streamside conifers. This information will be the basis for site-specific prescriptions that use both active and passive management strategies to produce the desired conditions. While active management can potentially produce the desired results several decades sooner than passive management, it also has some short-term risk. Prescriptions must balance the benefits and risks based on site-specific conditions.

Thus, in developing a set of strategies to restore and maintain properly functioning aquatic systems, it is necessary to apply principles of landscape ecology to manage habitat at both the site-specific and landscape level. This type of a blended approach seeks to emulate disturbance patterns in both upslope and riparian areas (Independent Multidisciplinary Science Team 1999)

Aquatic-Riparian Concept 3: Watershed Assessment and Analysis

Watershed assessment and analysis must be a critical process in refining and planning management activities related to implementation of this forest management plan. With a greater understanding of the interrelated processes occurring in watersheds, plans and activities can be better structured, potential consequences better anticipated, and communication and resource understanding improved.

There is a need on state forest lands to employ a goal-driven process to characterize the watershed features of its management basins. These features include the riparian, aquatic, terrestrial, and cultural conditions, processes, and interactions that affect the overall watershed character and response to management activities. In order to assess these components so that they provide insight into management effects and resource potential, a relatively high-level assessment must be applied to key watersheds.

Important goals for developing and implementing a watershed assessment and analysis process on these state forest lands are to:

1. Collect data on and evaluate baseline condition assumptions by:
 - Identifying and assessing the condition of limiting factors.
 - Determining if the riparian and aquatic strategies are addressing the appropriate process and function concerns within the watershed.
2. Provide information for the refinement of district implementation plans.
3. Contribute watershed-level information to a comprehensive review of forest management plan goals and strategies.

Successful implementation of watershed assessment and analysis can provide qualitative and quantitative information useful to managers as they develop plans and set objectives for their management basins. Watershed analysis is a tool to guide management and policy decisions to the best possible sustainable use of a watershed's resources, and to assure that the broader goals of restoring and/or maintaining watershed health and providing for properly functioning aquatic systems are achieved.

Coordination with other watershed users is a critical step in a successful watershed assessment and analysis. Not only is the extent of land use activities identified, but also important information is gathered about reference condition, current use, issue prioritization, and future expectations. Watershed assessments and analyses should be coordinated with adjoining private and federal landowners wherever possible, as well as with the broader public.

To be successful, a watershed assessment and analysis must provide relevant, understandable, and logical information to managers and policy makers. Managers and policy makers must be able to use this information to improve actions and plans. Prioritization of analysis issues and data collection should be directed to this goal. To be most effective, information from watershed assessments and recommendations from watershed analysis should be processed through the adaptive management framework and processes developed for implementation of this plan, so that proposed changes are implemented in a timely way, and review and approval take place at the appropriate levels.



Aquatic and Riparian Strategies

This section presents the integrated strategies for aquatic and riparian areas. Detailed site-specific strategies focused on the habitats occupied by species of concern may be found in the proposed *Western Oregon State Forests Habitat Conservation Plan*.

The landscape level component of the blended approach consists of the landscape management strategies described earlier in this chapter. Over time, the application of these strategies is intended to create forest conditions on the landscape that will more closely emulate historic conditions and processes relative to aquatic systems.

The second component of this blended approach is a set of more site-specific or prescriptive strategies designed to protect key resource elements or provide for specific functional elements not necessarily addressed by the landscape strategies.

Finally, critical to the evaluation and refinement of both the landscape level and site-specific approaches is watershed assessment and analysis. Watershed analysis is a strategy designed to collect and synthesize key watershed information that will be used to further evaluate the two components of this blended approach.

In addition to the landscape management strategies, the strategies for aquatic and riparian resources include:

1. Implement watershed assessment and analysis.
2. Apply management standards for aquatic and riparian management areas.
3. Restore aquatic habitats.
4. Apply alternative vegetation treatment to achieve habitat objectives in riparian areas.
5. Apply specific strategies to other aquatic habitats: wetlands, lakes, ponds, estuaries, bogs, seeps, and springs.
6. Slope stability management.
7. Forest road management.

Aquatic and Riparian Strategy 1

Implement watershed assessment and analysis.

Watershed assessment and analysis will be used during plan implementation to collect needed information at both watershed and site-specific levels, and to synthesize that information into recommendations for appropriate changes to goals and strategies. Information from watershed assessments and other inventory and assessment projects will be used in an adaptive management framework to accomplish plan objectives.

Aquatic and Riparian Strategy 1a. Develop a comprehensive watershed assessment and analysis process for state forest lands that is consistent with, but more rigorous than, the existing Oregon Watershed Enhancement Board (OWEB) process.

The Department of Forestry will develop watershed assessment protocols suited to its management needs, using the existing OWEB manual and protocols as a foundation. It is anticipated that this will involve development of more rigorous information collection protocols for specific “modules” based on information needs related to specific management strategies in the plan. The Department of Forestry’s assessment process will facilitate coordinated activities with other landowners in watersheds that have a significant percentage in state forest lands.

Aquatic and Riparian Strategy 1b. Conduct watershed assessments and analyses on priority watersheds on state forest lands within the planning area, within the initial ten-year implementation period following plan adoption.

The Department of Forestry will be assessing watersheds at the fifth field level. This is the scale in the USGS (U.S. Geological Survey) spatial hierarchy smaller than a sub-basin and larger than a sub-watershed. On state forest lands, a fifth field watershed ranges in size from 5,000 acres to 50,000 acres depending on the region and river system. The scale of fifth field watersheds was chosen because it:

- is used by other state and federal agencies in Oregon
- currently has the finest scale, yet most comprehensive, set of GIS data available
- appears to facilitate data collection that is neither too general nor too specific for management objectives

In most cases, the fifth field watersheds overlap with the district management basins. In other instances, these scales do not overlap. In these cases, watershed assessment and analysis will be completed at the smaller sub-watershed or drainage level and then aggregated to provide complementary information with other district watershed analyses.

Watersheds will be prioritized for assessment and analysis based on the following criteria (not in order of importance):

- percent of state lands ownership
- watershed size

- potential resource impact
- presence of highly sensitive resources or key anchor habitat areas
- public involvement and interest
- presence of interested cooperators

It is anticipated that following completion of protocol development under Aquatic and Riparian Strategy 1a, watershed assessments could be completed at a rate of two fifth-field watersheds per fiscal year, given available funding. Under this scenario, key North Coast watersheds could be completed within the first five years following plan adoption, with a broader goal of completing all assessments within the initial ten-year implementation period.

Aquatic and Riparian Strategy 1c. Cooperate with local watershed councils and adjacent landowners, to assure that watershed assessments on Department of Forestry lands consider conditions and limiting factors on other lands to the greatest extent possible.

Coordination with other watershed users is a critical step in a successful watershed assessment and analysis. Not only is the extent of land use activities identified, but also important information is gathered about reference condition, current use, issue prioritization, and future expectations. Watershed assessments and analyses will be coordinated with adjoining private and federal landowners as well as the broader public. To the greatest extent possible, local watershed councils will be engaged to assist with conducting assessments.

Many watersheds containing state forest lands have already been the subject of assessment efforts by watershed councils and other entities. In addition, information relevant to specific assessment modules has been collected by the Department of Forestry in recent years. Examples are aquatic habitat and fish presence survey efforts, and road hazard assessment efforts. These previous information collection outputs will be incorporated into refined protocols and supplemented where necessary to meet management needs.

Aquatic and Riparian Strategy 1d. Analyze information collected through watershed assessments and other inventory and assessment projects, and effectively apply the results at the appropriate planning level through the adaptive management process.

Integration of watershed assessment results, both with assessments of nearby watersheds and with other relevant ecosystem information, is critical. The Department of Forestry will develop an interdisciplinary approach to integrating assessment information as part of the protocols established under Strategy 1a. Data collected will be compatible, on similar scales, and collected with appropriate indicators to complement other module information.

Using the adaptive management framework described in Chapter 5, implementation of this plan will be adjusted and improved based on the results of these integrated assessments. Depending on their significance and scope, necessary adjustments will be made through changes to specific standards and practices, revisions to annual operations plans, formal updates to district implementation plans, or amendments to the broader strategies of this forest management plan.

Aquatic and Riparian Strategy 2

Apply management standards for aquatic and riparian areas. Establish and maintain riparian management areas adjacent to all streams, in accordance with the standards described in the proposed *Western Oregon State Forests Habitat Conservation Plan*, and Appendix J of this plan.

More site-specific prescriptive standards for aquatic and riparian areas constitute a key piece of the second tier of the balanced approach, and will guide forest management activities to achieve properly functioning aquatic and riparian habitat conditions over time. All management actions will be consistent with these standards.

The standards will be applied until the adaptive management process results in identification of alternative strategies or standards that better meet the objectives for aquatic and riparian habitats. As new information and a better understanding of the watershed functions and processes become available, this knowledge will be integrated into the management of riparian and aquatic habitat.

The management standards include specific provisions for establishing riparian management areas and describe how management is to occur within these areas.

Riparian management areas will be established immediately adjacent to waterways for the purpose of protecting aquatic and riparian resources, and maintaining the functions and ecological processes of the waterways. Within these areas, special management considerations and operational restrictions will be applied, and the protection of aquatic resources will be a high priority.

The width of riparian management areas will vary by the type and classification of the water body. These widths were developed by considering the functions and processes to be achieved or maintained by management activities. The width of a riparian management area (RMA) is measured horizontally beginning at the average high water level of the water body, or the edge of stream-associated wetland, side channel, or channel migration zone (whichever is farthest from the waterway), and extending toward the uplands. The width of these areas will be expanded, if necessary, to fully encompass certain sensitive sites such as inner gorge areas, or other special sites noted in the management prescriptions.

Riparian management area widths are intended to be averages applied over the length of a management site. The actual extent of a specific RMA can be varied to tailor vegetation retention to site-specific conditions, or to address special resource considerations. For example, an RMA boundary will be expanded where a potentially unstable slope adjacent to a stream could deliver materials to the stream. The intent of this action is to increase the potential for large wood delivery should a disturbance event occur. Variations in RMA design will always be completed in a manner consistent with the management objectives for the specific aquatic or riparian area.

See “Basic Concepts for Aquatic and Riparian Areas” earlier in this chapter for related discussion and definitions of terms used in this strategy. See Appendix J for the specific management standards that will be applied in these areas.

Guidelines: The Four Zones of a Stream Riparian Management Area

Riparian management areas established along streams will contain four zones. The purposes and differences between these four zones are defined below.

Aquatic zone — The aquatic zone is the area that includes the stream channel(s) and associated aquatic habitat features. This zone includes beaver ponds, stream-associated wetlands, side channels, and the channel migration zone. The other zones of a riparian management area are established upslope from the outer edge of these features.

Stream bank zone — The stream bank zone is the land closest to the stream, including the stream banks. Most riparian functions are supported to some extent by vegetation in this zone, including providing aquatic shade, the delivery of down wood and organic inputs (leaves and tree litter) to the stream and riparian area, stabilizing the stream bank, contributing to floodplain functions, and influencing sediment routing processes.

- The stream bank zone is defined as the area within 25 feet of the outer edge of the aquatic zone for all streams. This zone exists on both sides of a stream.

Inner RMA zone — The inner RMA zone is the next area away from the stream, adjacent to the stream bank zone. Vegetation within this zone contributes substantially to desired riparian functions, including providing aquatic shade, delivering a high proportion of the potential large wood available, and contributing organic inputs to the stream. Vegetation within this area also provides some protection to certain aspects of riparian micro-climate. Because vegetation in this zone has a relatively greater role in supporting riparian functions and processes, a high priority is being placed on management actions in this area.

- The inner RMA zone extends from 25 feet (the outer edge of the stream bank zone) to 100 feet from the stream. This zone exists on both sides of a stream.

Outer RMA zone — The outer RMA zone is the portion of the riparian management area farthest away from the stream. Vegetation within this zone may still contribute to certain riparian functions and processes, but to a lesser extent than the two zones closest to the stream. The primary functions provided by vegetation in this area include additional contributions of large wood to the riparian zone and stream channel, and the protection of riparian micro-climate. In some cases, the outer zone may also partially buffer the two inner zones from certain disturbance events such as windthrow.

- The outer RMA zone extends from the edge of the inner zone at 100 feet out to 170 feet from the stream. This zone exists on both sides of a stream.

Guidelines: Stream Classification

Determination of the applicable management standards for riparian areas is based on a stream classification system. Streams are grouped into two major categories based on the primary beneficial uses of the stream. Streams are further classified according to size, based on average annual flow. Flow pattern (perennial and seasonal) is also considered for small non-fish-bearing waters. This classification system is generally consistent with the method used for administration

of the Oregon Forest Practices Act, as described in the Department of Forestry's Forest Practice Technical Note FP1 — Water Classification (Oregon Department of Forestry 1994b).

Beneficial Use Classifications

Streams, and other aquatic habitats, are classified into two major groups based on the presence or absence of certain fish species. The following definitions will be applied in classifying streams.

Fish-bearing (Type F) — Waters that are inhabited at any time of the year by anadromous or game fish species, or by fish species that are listed as threatened or endangered under either federal or state Endangered Species Acts.

Non-fish-bearing (Type N) — Waters that are not fish-bearing (see previous definition).

Stream Size Classifications

Streams are further classified by size, based on estimated average annual flow. The following definitions apply to these size categories.

- **Small** — Average annual flow of 2 cfs (cubic feet per second) or less.
- **Medium** — Average annual flow greater than 2 cfs, but less than 10 cfs.
- **Large** — Average annual flow of 10 cfs or greater.

Flow Pattern Classifications

Small non-fish-bearing (Type N) streams are also classified according to the flow pattern exhibited in normal water years. For the purposes of this plan, the following definitions will be used.

- **Perennial Type N streams** — streams that are expected to have summer surface flow after July 15.
- **Seasonal Type N streams** — streams that only flow during portions of the year; these streams are not expected to have summer surface flow after July 15.

Some seasonal non-fish-bearing streams are further classified as:

- **Seasonal high energy streams** — Seasonal streams with physical conditions that favor the periodic transport of coarse sediments and woody materials during high flow events. For the purposes of this plan, and in the absence of specific geomorphologic identification, stream reaches with an average gradient exceeding 15 percent, and an active channel width of five (5) feet or more will be defined as seasonal high energy streams.
- **Potential debris flow track reaches** — Potential debris flow track reaches are reaches on seasonal Type N streams that have been determined to have a high probability of delivering woody debris to a Type F stream.

Oregon Department of Forestry field staff will make the determination of the probability that a reach will deliver woody debris to a Type F stream, using the following criteria:

1. The seasonal stream reach must terminate at or below a high risk site. High risk sites include:

- a. Active landslides (slopes with tension cracks, unvegetated soil scarps, or jackstrawed trees caused by slope movement).
 - b. Slopes steeper than 80 percent, excluding competent rock outcrops.
 - c. Headwalls or draws steeper than 70 percent.
 - d. Abrupt slope breaks, where the lower slope is the steeper and exceeds 70 percent, except where the steeper slope is a competent rock outcrop.
 - e. Incised channels (hill slopes adjacent to the channel and steeper than the upland slope) with slopes steeper than 60 percent.
 - f. Any other site determined to be of marginal stability by a Department of Forestry geotechnical specialist.
2. The path of a potential debris flow and the likelihood that a debris flow will reach a Type F stream. If any one of the following three conditions is present along the path from the high risk site to the Type F stream, then a debris flow is likely to stop and the stream reach would be determined to have a low probability of woody debris delivery:
- a. The presence of a channel junction that is 70 degrees or more, provided the channel downstream of the junction is less than 35 percent gradient.
 - b. The presence of a stream reach which is less than 6 percent gradient for at least 300 feet.
 - c. An average slope from the high risk site along the potential landslide path to the stream that is less than 20 percent.

Aquatic and Riparian Strategy 3

Restore aquatic habitats.

The aquatic habitat restoration strategies are intended to eliminate human-induced conditions on the forest that may contribute to aquatic habitat deficiencies, or that may limit the timely recovery of desired aquatic habitat conditions. The restoration strategies will promote aquatic habitat conditions that will support the short-term survival needs of depressed salmonids, in order to reduce the potential for further declines in these populations. Also, these strategies will make it more likely that properly functioning aquatic habitat conditions will be attained in a timely manner. Finally, these strategies will encourage forest conditions that will support the ecological processes necessary to naturally create and maintain complex aquatic habitats on a self-sustaining basis.

This approach addresses aquatic habitat restoration on a more comprehensive basis than is currently done, and uses both short-term and long-term management actions. These strategies will improve levels of aquatic function in the short term (to meet the immediate habitat needs of depressed species and place aquatic habitats on a trajectory toward desired conditions), while at the same time actions are carried out to restore the ecological processes and functions that create and maintain self-sustaining habitats over the long term. The following strategies and actions will be implemented as part of the aquatic habitat restoration strategy.

Aquatic and Riparian Strategy 3a. Complete assessments to identify potential factors that could be contributing to undesirable aquatic habitat conditions, or that could be limiting the recovery of aquatic habitats.

This strategy will be implemented primarily through the watershed assessment and analysis strategies described earlier. Road inventories and risk assessments, aquatic habitat inventories, and riparian vegetation surveys will be key sources of information.

Aquatic and Riparian Strategy 3b. Identify, design, and implement projects to remedy identified problems in a timely manner.

- Aquatic habitat restoration projects will be designed with the intent of mimicking natural processes. The use of “engineered” or “constructed habitat” approaches to stream enhancement will be minimized.
- Projects will be designed and implemented using a multidisciplinary approach, and with direct consultation with the Oregon Department of Fish and Wildlife.
- Project planning and design will consider habitat conditions, stream processes, and the disturbance regime at both the watershed and site-specific scale.
- Projects will be designed and implemented consistent with the natural dynamics and geomorphology of the site, and with the recognition that introduction of materials will cause changes to the stream channel.

- A priority will be placed on projects that supplement natural “legacy” elements (large woody debris) that are lacking due to previous disturbance events, and/or management activities.
- Projects will be designed to create conditions and introduce materials sufficient to enhance or re-establish natural physical and biological processes. An emphasis will be placed on projects that re-introduce large “key” pieces of woody debris to stream channels in natural configurations.
- Wood placement activities will utilize materials that are expected to be relatively “stable” yet functional in these dynamic stream systems. The intent is to maximize the functional attributes of large woody material, and minimize potential conflicts with public safety in downstream reaches. Reliance on artificial “anchoring” methods (such as cables) will be minimized, and will only be used in cases of significant concern for public safety.
- Projects will be implemented in a manner that minimizes the potential for negative effects to riparian areas.
- “Constructed” habitat projects will only be used where these efforts are deemed necessary to support the continued survival or recovery of depressed salmonid species. These projects (when deemed necessary) will only be placed in areas where the created habitat type would be expected to occur naturally.

Aquatic and Riparian Strategy 4

Apply alternative vegetation treatment to achieve habitat objectives.

The term “alternative vegetation treatment” refers to the application of silvicultural tools and management techniques in riparian management areas, using standards that differ from general riparian management standards, for the purpose of changing the vegetative community to better achieve the plan’s aquatic and riparian habitat objectives.

Potential projects include silvicultural treatments such as the conversion of hardwood stands to conifer species, selective removal of hardwoods from mixed-species stands and the establishment of shade-tolerant conifer seedlings, the creation of gaps in hardwood stands to establish conifer seedlings (shade-intolerant and shade-tolerant), or other similar practices not specifically described in the management standards for riparian areas.

The alternative vegetation treatment strategies will apply alternative silvicultural approaches in riparian areas where basin-level stand conditions are inconsistent with achieving properly functioning aquatic habitat conditions in a timely manner. These strategies will be implemented in a way that maintains diverse riparian plant communities (heterogeneity) at the landscape and basin scales, and that minimizes the potential for adverse effects to aquatic resources, including depressed salmonid populations.

Aquatic and Riparian Strategy 4a. Complete basin-level assessments to evaluate whether alternative vegetation treatments are needed to achieve properly functioning aquatic habitat conditions in a timely manner. Where appropriate, use the information from the assessments to plan alternative vegetation treatments.

This strategy will be implemented primarily through the watershed assessment and analysis strategies described earlier.

Aquatic and Riparian Strategy 4b. Alternative vegetation treatment projects will be planned using a multi-disciplinary approach involving a variety of resource specialists.

These projects will be designed with the involvement of resource specialists from the Oregon Department of Forestry and the Oregon Department of Fish and Wildlife. The specialists involved in a given project will vary according to the resources and physical conditions present at the site.

Aquatic and Riparian Strategy 4c. Alternative vegetation treatment projects will be monitored and evaluated over time to assure that the objectives are being achieved, and undesirable effects are being minimized. The results of these evaluations will be incorporated into these management activities in an adaptive management context.

The plan recognizes that these treatments are experimental actions, and that over time managers will gain additional knowledge and experience through monitoring and research. This knowledge will be applied in an adaptive management context, in order to more successfully meet the multiple resource objectives for riparian and aquatic habitats.

Aquatic and Riparian Strategy 5

Apply specific strategies to other aquatic habitats.

The northwest Oregon state forests contain other aquatic habitats besides streams, such as wetlands, lakes, ponds, bogs, seeps, and springs. The management objectives for these waters are generally similar to the objectives for streams, but the specific prescriptions are sometimes different. The following strategies apply to these other aquatic habitats.

Establish and maintain riparian management areas adjacent to other aquatic habitat areas in accordance with the standards described in the proposed *Western Oregon State Forests Habitat Conservation Plan*, and Appendix J of this plan.

These waters support diverse plant and animal communities, are connected to other waters in a basin, and play a significant role in the hydrologic patterns and functions of watersheds. Some species have evolved with specific adaptations to, or dependence on, the conditions found in and near these other aquatic habitats. These areas can also be sensitive to land management activities.

The strategies for other aquatic habitats will maintain the productivity of these habitats, protect the integrity of these sites and maintain hydrologic functions, provide suitable habitats for fish and wildlife dependent on these unique habitats, and contribute to habitat conditions needed for maintaining other native wildlife species of concern.

Aquatic and Riparian Strategy 6: Slope Stability

Landslides and other geologic processes can have dramatic effects on watersheds, including aquatic and riparian areas. The integrated strategies include the following strategies to address concerns about landslides and slope stability.

The objective in relation to landslides and slope stability management is to ensure a high probability of restoring and maintaining riparian and aquatic habitats through restoration of properly functioning landslide processes. This will be accomplished through application of risk-based management principles and Best Management Practices. Minimizing road-related landslides and chronic erosion (sedimentation to streams) is fundamental to this objective. Hazard assessment and risk-based management for in-unit slides, and ensuring that large wood is available in the track of potential debris slides and torrents, will promote properly functioning conditions for future aquatic habitat inputs. Monitoring and hazard assessment, combined with adaptive management, will provide assurance that this objective is realized.

Management Strategies and Standards

The Department of Forestry will use a three-level approach to manage slope stability concerns in forest planning and operations on state forest lands in the planning area (Michael 1997, Prellwitz 1985). This approach is described in more detail in the proposed *Western Oregon State Forests Habitat Conservation Plan*.

Aquatic and Riparian Strategy 6a. Through the watershed assessment process developed under Aquatic and Riparian Strategy 1, complete a broad level assessment of landslide hazards on state forest lands in the planning area (Level 1).

The methods and procedures will be consistent with, but more intensive than the protocols described in the *Oregon Watershed Assessment Manual* (July 1999). Department of Forestry geotechnical specialists will take a lead role in developing assessment methods and procedures. The assessments will be used to assign risk levels to state forest lands within each watershed as follows:

- **High Hazard Area** — Areas that are likely to contain sites with relatively high probability of failure.
- **Moderate Hazard Area** — Areas that may contain sites with relatively high probability of failure.
- **Low Hazard Area** — Areas with a low chance of containing sites with relatively high probability of failure

Aquatic and Riparian Strategy 6b. During district implementation planning and annual operations planning, utilize geotechnical specialist expertise in evaluating alternatives that can minimize, mitigate for, or avoid risk in high and moderate hazard areas (Level 2).

Aquatic and Riparian Strategy 6c. During project planning and design, utilize geotechnical specialist expertise in designing operations that will minimize, mitigate for, or avoid identified risks (Level 3).

Geotechnical specialist input will be used in all aspects, when alternatives are being considered for proposed operations. Districts will coordinate geotechnical specialist review and input at these levels and will be responsible for subsequent evaluation of alternatives and selection of the course of action.

Site-specific geotechnical evaluation will be used as follows:

Road alternatives will receive Level II, site-specific geotechnical evaluation, when the forest engineer needs this input to compare risk of alternative roads (i.e., mid-slope road to ridge-top road with longer span logging).

Annual Operations Plans (AOP) — Geotechnical specialist will provide initial hazard and risk assessment for timber harvesting and road construction operations in the AOP, early enough in the process to allow for proper consideration of alternatives (boundary changes, leave tree placement, etc.), in order to achieve the best decision for the resource. Districts are responsible for requesting this review, and the geotechnical specialist is responsible for input. For timber harvesting and road construction operations the following process will be used:

- Operations in high hazard level areas (ones that are likely to contain sites with relatively high probability of failure) will be evaluated by the geotechnical specialist during the annual operations plan review for specific sites that will require on the ground assessment for risk (likelihood of delivery to aquatic system).
- Operations in moderate hazard level areas (ones that may contain sites with moderately high probability of failure) will be investigated during operations planning field work by district personnel, to locate high risk sites. If high risk sites are identified during fieldwork, the geotechnical specialist will be consulted and the site treated the same as high hazard sites.
- Operations in low hazard level areas (ones with a low chance of containing sites with high probability of failure) will not be expected to have any further geotechnical input. If high risk sites are identified during fieldwork, the geotechnical specialist will be consulted and the site treated the same as high hazard sites.

The effect of the forest operation on the landslide potential (probability of failure or landslide rate) will be judged based on slope, landform, underlying rock material, and type of operation (road building, clearcut, partial cut, thinning, etc).

Risk Findings:

If the risk is low (minimal or no likelihood of delivery to aquatic system), then no management modification will be recommended.

If the risk is moderate (potential to deliver but likelihood is low) then there will be further assessment of the condition and significance of the aquatic resource. If the aquatic resource is already significantly degraded or identified as part of a salmonid emphasis area, then the

geotechnical specialist will develop recommendations for modifying the harvest operation. Otherwise, no modifications to the operation will be made.

If the risk is high (likely to deliver to the aquatic system) then the geotechnical specialist will develop recommendations for avoiding, mitigating, or minimizing the risk. This will include an evaluation of the potential debris chute or run-out channel, consistent with the criteria provided for identification of debris flow track reaches in the riparian management area strategies.

If the risk is high and the logistics of the harvest layout (topography and geometry) will allow simple boundary changes, then the potential initiation site (hazard) will be excluded from the operation area.

Aquatic and Riparian Strategy 7: Forest Roads Management

The *Forest Roads Manual* (Oregon Department of Forestry 2000b) contains specific processes, procedures, and standards for road system management. It also describes the roles and responsibilities of the various resource specialists and land managers involved in road system management.

The road system will be managed to keep as much forest land in a natural, productive condition as possible; prevent water quality problems and associated impacts on aquatic and riparian resources; minimize disruption of natural drainage patterns; provide for adequate fish passage where roads cross fish-bearing streams; and minimize exacerbation of natural mass-wasting processes.

The construction and use of forest roads is an integral part of actively managing state forest lands. Roads provide the essential access for forest management activities, fire protection, and a variety of recreational uses. However, roads can be a major source of erosion and sedimentation on forests. Proper road system planning, design, construction, and maintenance will prevent or minimize water quality problems and associated impacts on aquatic resources, and significantly extend the useful life of a forest road. Quality information on the status and condition of existing roads is also essential to an effective maintenance and improvement program designed to meet the objectives stated above.

For the Department of Forestry transportation system, the vision is a road network that will provide efficient, effective access for all the necessary activities taking place in the forest. The transportation system will be actively managed to protect all forest resources. The road network will be kept to a minimum needed to achieve forest management objectives. Barriers to fish passage created by road crossings will be eliminated. Roads will be constructed in the best locations for carrying out anticipated activities, and the standard for forest roads will be a suitable match for the terrain and type of access needed. The roads will be effectively maintained to prevent degradation to other forest resources. Unnecessary roads will be closed or abandoned and, where appropriate, the land they occupied will be returned to active forest management. Adaptive resource management processes will be used to modify future practices as managers gain additional knowledge of resource needs and protection, and learn more appropriate methods for meeting the objectives of this plan.

The four primary areas of road system management are listed below and addressed in detail in the Department of Forestry's *Forest Roads Manual* (Oregon Department of Forestry 2000b).

- Transportation planning
- Road design, construction, and improvement (including drainage systems)
- Road maintenance
- Road closure

Aquatic and Riparian Strategy 7a. Through the watershed assessment process developed under Aquatic and Riparian Strategy 1, complete a comprehensive inventory of existing roads on state forest lands in the planning area.

All districts in the planning area have already conducted comprehensive road hazard inventories to a common standard specified through Oregon Plan protocols. The information from this inventory is being used to identify priority restoration and improvement projects related to the forest roads system.

It is anticipated that through the process of developing comprehensive watershed assessment protocols for state forest land, as described in Aquatic and Riparian strategy 1a, additional information needs may be identified. Any additional information needed would be collected through the application of the identified protocol and incorporated into the subsequent analysis and revision to district level plans.

Aquatic and Riparian Strategy 7b. Through development and updating of district implementation plans, apply the processes and standards for transportation planning described in the *Forest Roads Manual*.

Initial district implementation plans will not contain all of the transportation planning elements described in the *Forest Roads Manual*. Following completion of watershed assessments, and as district implementation plans are subsequently revised and updated, the complete transportation planning process will be applied.

Aquatic and Riparian Strategy 7c. Forest road design, construction, improvement, and maintenance will be carried out in accordance with the processes and standards described in the *Forest Roads Manual*.

Aquatic and Riparian Strategy 7d. Identify and prioritize roads for closure and/or abandonment using information gained from the comprehensive forest roads inventory, and in accordance with the standards described in *Forest Roads Manual*.

Adaptive Management Measures for Aquatic and Riparian Strategies

Key Working Hypothesis:

- Active management through a combination of landscape level strategies and site specific standards will result in maintaining and restoring properly functioning aquatic and riparian habitats.

Key Assumptions/Questions to be Addressed through Monitoring:

- Aquatic and riparian systems in the planning area were historically subjected to random disturbance events at a variety of scales that resulted in a wide range of riparian stand conditions adjacent to aquatic areas at any given point in time.
- The combination of the landscape management strategies and the aquatic and riparian strategies will provide an array and frequency of riparian stand conditions across the landscape through time that provides for properly functioning conditions.
- In riparian areas where mature forest condition is the desired future condition, and young stands currently predominate, active management is more likely to restore properly functioning conditions in a timely manner than more passive approaches.
- Active management of stands in riparian areas will supplement natural elements, particularly large woody debris, that are lacking due to previous disturbance events, and/or management activities.
- Compliance with management standards for forest road design, construction, improvement and maintenance will minimize road-related landslides and sediment loading to streams.
- Application of the three level hazard and risk evaluation process described, will minimize the occurrence of management related landslides, and restore properly functioning conditions in relation to natural landslide events.

Appendix G: Expanded Project Action Plan (Draft)

PROJECT DESIGN PHASE				
Action	Product	Personnel	Timeframe	Comments
Conduct project design meetings	Designed project	Contract administrator will lead process	Within 3 months of start	Several meetings will be necessary.
Define roles & responsibilities	All tasks will have personnel assigned	Design group	Within 1st month of start	Design group typically made up of contract administrator, watershed coordinator, ADF or DF, management Unit Forester, District Engineer, District contact, District GIS person, District Planner, and other specialists as needed.
Review assessment and analysis questions	Final form for all questions and analysis to be performed.	Design group	Within 1st month of start	Each question will be reviewed in the context of that watershed. A decision will be made to accept the default wording or modify it to meet watershed specific needs.
Gather local concerns and knowledge	A list of local concerns and a data base of information	Contract administrator will lead process with district contact involved	Within 1st month of start	Administrator will solicit input and conduct meetings with the local watershed council and the District to gather local information and concerns
Assemble known data sets	Collection of documents and data	Design group	Within 3 months of start	Salem staff and the Districts should already have most of the data sets
Perform QC on data	Data sets that are of acceptable quality and format suitable for answering assessment and analysis questions	Design group	Within 3 months of start	The group will agree on which data sets to use then review the data sets for currency and completeness. Where possible the accuracy of the data will be checked.
Determine if further data collection is necessary	A decision as to whether additional data collection is necessary	Design group	Within 3 months of start	Group will make decisions based on the questions to be answered with the data that is available
Determine if data will be collected within this contract or a separate contract	Decision by group	Design group	Within 3 months of start	If new data is necessary, the group will make the decision to collect in this project or another. If data is to be collected in another project then contract administrator will make arrangements in another process.
Identify analysis scale	Base unit for analysis	Design group	Within 3 months of start	This will set the boundaries of how the analysis is divided. Examples are management basins or 6th field HUC or 5th field HUC, etc.
Define deliverables	Define the form and format of products the Contractor will deliver to ODF in fulfillment of the contract.	Design group	Within 3 months of start	This will define what documents are needed, how those documents should be structured, what maps are needed, what should be on those maps, which software for electronic data layers, etc. Also include such things as units of measure, map scales, acceptable statistical error, etc.

PROJECT DESIGN PHASE				
Action	Product	Personnel	Timeframe	Comments
Define review process	An agreed upon review schedule	Design group	Within 3 months of start	A schedule of when deliverable will be reviewed, who will review each deliverable and what form the review will take.
Prepare RFP	A finished Request For Proposal based on project as designed	Contract Administrator will lead with watershed coordinator assisting	Within 3 months of start	Write RFP, have it reviewed internally and send to Procurement Unit for DAS and DOJ review (if needed)
Advertise for contractors and conduct pre-proposal meeting	Proposals from which to choose	Contract Administrator will lead with watershed coordinator assisting	Within 3 months of start	Distribute RFP to mailing list. Send to Procurement Contract Specialist to post on DAS website. Schedule and conduct pre-proposal meeting for interested contractors
Evaluate proposals and select Contractor	Selected contractor	Contract Administrator, evaluation committee	Within 3 months of start	Evaluation committee made up of Contract Administrator, Watershed Coordinator, District Contact and other as designated will perform contractor selection process as outlined in Appendix H.
Write and award contract	Awarded contract	Contract Administrator	Within 3 months of start	Write contract, have it reviewed internally and send to Procurement Unit for DAS and DOJ review (if needed)
Perform public presentations		Contract Administrator and or Watershed Coordinator	As needed	At least one update meeting with watershed council

CONTRACT ADMINISTRATION PHASE				
Action	Product	Personnel	Timeframe	Comments
Conduct project kick off meeting with Contractor	Transfer of data and associated information. Gain a common understanding of future process and expectations	Contract Administrator	Within 2 weeks of signing contract	These data can be books, reports, maps, etc. as well as electronic files or even addresses for the contractor to contact.
Answer assessment and analysis questions, give supporting information, perform analysis	Watershed Analysis Report	Contractor	Over the life of the contract	The contractor will work closely with the contract administrator during this task. Contract time span set during project design step and/or contract awarding.
Perform logistical tasks associated with contract support		Contract Administrator, district contact	Over the life of the contract	Miscellaneous support
Administer contract	Project objectives met	Contract Administrator	Over the life of the contract	Ensure project objectives met in a timely manner.
Conduct collaboration meetings between district and Contractor	Improvements to project report	Contract Administrator	At intervals during the contract	
Review deliverables	Comments on deliverables	Contract Administrator, review team	At intervals during the contract	
Conduct debrief meetings	Information to improve process and/or future projects	Contract Administrator	At the end of the contract	Debrief meetings will be held with both the contractor and the District.

APPLICATION OF RESULTS				
Action	Product	Personnel	Timeframe	Comments
Apply results to management	Improved information for use during planning and management	ODF staff	Varies with information	
Public wrap-up meeting	Information to public to improve understanding of ODF management	Contract Administrator	At the end of the project	Usually a presentation to the watershed council

Appendix H: Selection of Contractor

PROCESS FOR SELECTION

The completed project design will be used as a basis for a Request For Proposal (RFP). Each RFP should include a section listing the questions chosen during the project design step. The contract administrator will work closely with the Procurement Unit during the writing and review of the RFP. Each RFP is required to be reviewed by the Procurement Contract Specialist. If the resulting contract is projected to be greater than \$75,000 then the Department of Justice (DOJ) and Department of Administrative Services (DAS) both need to review and give approval. The RFPs will be mailed out to interested contractors and given to ODF's purchasing section to be placed on the state advertising website. Most projects should also be presented in "pre-proposal meeting". The purpose of this meeting is to explain proposal requirements and to answer questions that prospective proposers might have. Attendance at this meeting is encouraged but not required.

While contractors are preparing proposals an ODF evaluation committee is picked. The contract administrator chairs this committee. It is typically made up of 3 or 4 people. The contract administrator, Watershed Coordinator, District representative and one other staff member with applicable skills. When the submittal deadline is reached and all proposals have been received, they are evaluated on a pass/fail basis against the minimum qualifications identified in the RFP. Those proposals that do not meet the minimum qualification will be rejected. Those proposals that meet the minimum qualifications will be distributed to the evaluation committee for evaluation on the desirable features of the proposal. The committee has the option of requiring a formal presentation by the proposers if it will aid the review process. The committee will make the final selection based upon criteria established in the RFP.

A sample RFP is included below but each project can change this criteria and point value. After the committee has reviewed the proposals they will convene and compare the scores. Some discussion can take place between reviewers at this meeting to ensure that each has a complete understanding of the proposal. The scores for each criterion are summed and the contractor with the highest score will receive the tentative award. The final award is dependent on fulfillment of the documentation, bonding, insurance, etc. When writing the contract the administrator will again work closely with the Procurement Unit. If the contract amount is greater than \$75,000 then both DOJ and DAS are required to sign in addition to the ODF signatures.

Sample REQUEST FOR PROPOSAL (RFP)

1.1 For a Watershed Analysis for the XXX River

1. General Overview

1.1 Statement of Purpose:

The State of Oregon ("State") through its Oregon Department of Forestry ("ODF") is seeking proposals for conducting a Watershed Assessment/Analysis on the XXX River Project. Attached

for your review are the specifications for a professional services contract (“Contract”) that ODF will enter into to accomplish this work.

Watershed Analysis as envisioned by ODF is comprised of an assessment phase and an analysis phase. Both phases will be incorporated into and result in a Watershed Analysis Report. The completion deadlines for the stages of the report are as follows:

Completion of Draft XXX	AAA 14, 2002
Completion of Draft YYY	BBB 23, 2003
Completion of Final Report	CCC 4, 2003

Please review the following specifications and submit your proposal to the ODF by **5:00 PM**, February 30, 2002. Proposals should be mailed to Connie Fir, Oregon Department of Forestry, 2600 State Street, Salem, Or, 97310.

Pre-Proposal Meeting:

There will be a voluntary pre-proposal meeting at ODF in Salem on August 23, 2002 at 10:00 AM. The purpose of the meeting is to explain proposal requirements and to answer any questions that a “Proposer” might have. Attendance is encouraged, but not required.

1.2 Administrative Background:

The XXX River watershed is managed by ODF under a Forest Management Plan approved in January 2001. This plan provides direction for the management of state forestlands and may use information from a watershed analysis to provide input and support for that process.

1.3 Project Overview:

This RFP is to conduct a Watershed Analysis that will document the current condition of watershed resources and provide data in order to manage for properly functioning aquatic systems. Information gained from this process will be integrated into the appropriate ODF planning process or management activity.

The assessment phase compiles existing data and, where necessary, gathers and organizes new data. This phase will give supporting information and answer to the listed assessment questions.

The analysis phase provides for evaluation and interpretation of gathered data. This phase will give supporting information and answers to the listed analysis questions. The intent is to understand watershed scale processes and to provide information to managers for use in carrying out activities that support management objectives.

2. Services to be Provided

2.1 Statement of Work:

The successful Proposer (“Contractor”) will write a Watershed Report based on the critical questions from an Oregon Watershed Enhancement Board (“OWEB”) assessment, additional ODF assessment questions and ODF analysis questions. (see Attachment C. – list of questions).

A. Tasks:

1. Provide results in both paper and electronic versions. The electronic version shall include all elements provide in the paper format including maps, graphs, and tables. To that end the Contractor shall:

- a) Compile data needed to answer assessment questions. (ODF will supply most of this data)
- b) Coordinate data gathering with all pertinent local, county, State and Federal agencies and watershed associations.
- c) Analyze data gathered and answer analysis questions.
- d) Write a Watershed Report whose format is substantially similar to the attached sample table of contents.

2.2 Timeline and Deliverables [sample]

A. Provide a draft products for review (as determined for each project).

- 1. Products:** Draft information/report.
- 2. Schedule:** Delivered XXX 30, 2002.

B. Make revisions to final draft in consultation with ODF and submit final Watershed Report.

- 1. Products:** Provide final Watershed Document.
- 2. Schedule:** Delivered YYY 28, 2003.

2.3 Format:

The Watershed Analysis Report will provide information following a format substantially similar to the sample table of contents (Attachment).

3. PROPOSAL REQUIREMENTS

3.0 REQUIREMENTS

Every proposal must reply to each item listed in 3.1 to 3.6. Responses must be in the same order listed below. Proposals should be prepared providing a concise description of Proposer's ability to meet requirements of this Request for Proposal (RFP). Emphasis should be on completeness and clarity.

3.1 STATEMENT OF THE PROJECT

This section of the proposal shall provide a statement of the scope and the purpose of the Project in the Proposer's own words. The statement shall demonstrate the Proposer's complete understanding of the issues to be addressed.

3.2 STATEMENT OF WORK

A. Written plan of Work Schedule and Expected Completion Dates.

Including but not limited to:

- a. Name of Project Leader and field coordinator with credentials.
- b. Time frame for starting/finishing.
- c. Organization and supervision of Project staff.
- d. Describe the instruments, programs, and technical approaches that will be used.

This section must outline, in as specific a format as possible, what the Proposer will do and how it will be done. Each task should be described in detail: what will be done, when, in what sequence, who will be involved, and what will be the result.

3.3 EXPERIENCE OF THE PROPOSER AND PROJECT STAFF

A. This section of the proposal shall describe the Proposer's history, capabilities and organization;

B. Identify the Proposer's strengths and weaknesses, and any special capabilities the Proposer offers;

C. Describe the Proposer's experience and successes with projects of similar size, type, and complexity. The references should include name, address, telephone number, a description of each project to which the reference relates, date that project was completed, and the relationship of the person referenced to that project conducted. References should be able to attest to Proposer's history in meeting schedules, submitting valid estimates, cooperating with the contracting agency, and performing quality work.

D. Provide a project organization chart showing proposed staffing for this Project. The proposal should also include resumes of the professional staff that will be part of the Project team. Resumes should describe the experience, education, accomplishments, and any special qualifications applicable to contract performance.

3.4 MANAGEMENT PLAN

This section of the proposal shall provide evidence that adequate managerial effort, supporting staff, equipment, resources, and space will be committed to the timely and successful completion of the Project.

3.5 COST & PRICE ANALYSIS

The information required in this section is needed to support the reasonableness of Item 3.6, "Quotation," and is for internal use.

The budget must be displayed in a format similar to that outlined below as appropriate, budget items should reference the tasks described in Item 2.0, "Services to be Provided."

A. Listing of Hourly Fees: Provide a list of hourly rates for the tasks specified in this RFP. These rates would be used for any additional work, should both the ODF and the Contractor agree that unforeseen circumstances encountered during the project require that additional work be performed beyond that shown in this RFP and written amendment documenting such agreement is signed by ODF and Contractor after all necessary approvals have been obtained.

B. Total Budget

3.6 QUOTATION

A. The Proposer will provide a quotation, in a separate sealed envelope, of all the fees charged for the Project, including those listed in Item 3.5, "Hourly Fees." The quotation must be in the following format:

Quotation:

Writing all drafts and the final Watershed Document

TOTAL COST = \$###.##

1.2 4. SELECTION OF CONTRACTOR

4.0 PROCESS FOR SELECTION

An "Evaluation Committee" will review the proposals and select from the Proposers up to ten (10) finalists. The finalists may be invited to make a formal presentation of their proposal to the Evaluation Committee.

The minimum qualifications identified below will be evaluated on a pass/fail basis. Those proposals that do not meet the minimum qualification will be rejected. Those proposals that meet the minimum qualifications will be evaluated on the desirable features of the proposal.

The screening and selection will be based upon the following criteria:

A. Minimum Qualifications

The proposal must demonstrate understanding of the Project.

The Proposer must have experience in managing at least one project of similar size and scope. Newly established Proposers with few or no prior contracts must demonstrate that their staff has experience in managing at least one project contract of similar size and scope.

The Proposer or at least one staff member must have a college degree in a Natural Resources field; or, be able to demonstrate experience in performing similar watershed projects.

The Proposer must be able to obtain and maintain \$500,000 Commercial General Liability and \$500,000 Automobile Liability Insurance during the contracting period.

B. Criteria for Selection

Presentations of the highest-ranking finalists (from the screening above) may be scheduled to aid the Evaluation Committee with its review. The Evaluation Committee will make the final selection based upon the following criteria:

Field Techniques and Logistics (0-30 points)

The proposal will be evaluated to assess the Proposer's approach to accomplishing the activities set forth in the Statement of Work. This approach must clearly outline the specific procedures to be used and activities to be performed, including scheduling field surveys, quality control, training, and the coordinating of the use of equipment. (Reference Item 2.0, "Services to be Provided").

Experience of Contractor and Key Project Staff (0-20 points)

The proposal will be evaluated to assess the experience of the Proposer and project staff in carrying out the required technical work. (Reference Item 3.3, "Experience of the Proposer and Project Staff").

Management Capability (0-20 points)

The proposal will be evaluated to assess the management capabilities of the Proposer. The Proposer must show that adequate managerial effort, supporting staff, equipment, resources, and space will be committed to the timely and successful completion of the Project. The Proposer must have a good history in meeting schedules, cooperating with previous clients, and performing quality work including writing and providing high quality reports. (Reference Item 3.4, "Management Plan.")

Cost (0-30 points)

The proposal will be evaluated to assess the Proposer's costs. Cost points will be awarded based upon total price as calculated in Item 3.6, "Quotation." Each proposal will be awarded a percentage of points based on the percentage of the proposal price to the lowest proposal price. The formula is: $\text{Lowest price} \div \text{proposal price} \times \text{point value} = \text{points awarded}$

4.1 AWARD NOTICE

An announcement of tentative award will be made to all Proposers submitting a proposal in response to this RFP. A final award, however, will be contingent upon successful negotiation of a final contract within fourteen (14) calendar days of the announcement of tentative award.

5. REQUEST FOR PROPOSAL (RFP) REQUIREMENTS

5.0 SUBMITTAL REQUIREMENTS

- A. **Date, Time and Location:** Interested Proposers must submit their proposals by 5:00 p.m. on February 30, 2002. Submittals shall be mailed or delivered to:

Connie Fir
Oregon Department of Forestry
2600 State Street
Salem, Or, 97310.
Telephone: (503) 945-XXXX

NO FACSIMILE (FAX) TRANSMITTED PROPOSALS WILL BE ACCEPTED.

- B. **Late submissions:** A proposal shall be rejected if received any time after 5:00 p.m., PDT, February 30, 2002. Proposals received after the specified time WILL NOT be given further consideration.
- C. **Number and Form:** Proposers shall submit five (5) copies of their proposals to the above location. The proposals shall be tabulated in separate sections. All materials shall be in 8 1/2" by 11" format, bound vertically (11" side). No more than two (2) copies (in separate binders) of public relations brochures, annual reports, photos of projects and other like material not specifically requested should be submitted.
- D. **Proposal Certification Statement:** A proposal certification statement (Attachment A) shall be filled out and signed, and accompany each proposal. The certification shall bind the Proposer to perform the service for the fees stated in its proposal and to complete the Project within the scheduled dates proposed. Failure to submit a signed proposal certification form will result in rejection of a Proposers proposal.
- E. **Modification or Withdrawal of Proposal:** Before the date and time designated for receipt of proposals, any proposal may be modified or withdrawn by notice to the party receiving proposals at the place designated for receipt of proposals. Such notice shall be in writing over the signature of the Proposer and shall be delivered on or before the date and time set for receipt of proposals.
- F. **Written Questions:** Questions regarding the information contained in the RFP must be submitted to the designated RFP contact, Connie Fir, Oregon Department of Forestry, 2600 State Street, Salem, Or, 97310. Email: Cfir@odf.state.or.us) by five (5) working days before date and time set for receipt of proposals. All questions must be submitted in writing, or by email, and received by the specified date and time.

G. **Addenda to RFP:** In the event it becomes necessary to revise any part of the RFP, addenda will be provided to all Proposers who received the original RFP.

5.1 TYPE OF CONTRACT

Any contract entered into because of this RFP will be (i) a PROFESSIONAL SERVICES CONTRACT (“Contract”) and (ii) the most advantageous to the State, price and other factors considered. The Contract, which the selected Contractor will be required to execute, is included for Proposer’s reference as an attachment to this document (ATTACHMENT B).

5.2 REJECTION OF PROPOSALS

The ODF reserves the right to reject any and all proposals received as a result of this RFP, and, if doing so would be in the public interest, to cancel this solicitation. ODF reserves the right to accept a proposal or proposals in whole or in part. The selected Contractor will be held to the terms submitted in its proposal, but may be required to reduce costs depending upon services which ODF may determine to be unnecessary or for which ODF decides to assume responsibility. Failure to meet these obligations will result in cancellation of any pending apparent successful Proposer.

5.3 ACCEPTANCE OF PROPOSAL CONTENT

The contents of this RFP and the proposal of the selected Contractor will become part of the Contract. Failure of the successful Proposer to accept these obligations may result in cancellation of the award.

5.4 PRIME CONTRACTOR RESPONSIBILITIES

The selected Contractor will be required to assume responsibility for all products and services offered in its proposal whether or not it produces or performs them. Further, ODF will consider the selected Contractor to be the sole contact with regard to contractual matters.

5.5 CONTRACT PAYMENT SCHEDULE

Payment for any Contract entered into as a result of this RFP will be made according to a delivery schedule developed under the Contract. The delivery schedule will be based upon the deliverable completed at a given time, less 15%, which will be held until satisfactory completion of the Contract. Payment for the final Watershed Report will be made upon satisfactory completion of the Project.

5.6 PENALTIES

The Contractor may be penalized for not completing deliverables on time. When a deliverable is not completed [this is optional for each contract]

5.7 NEWS RELEASE

News releases pertaining to this RFP or the project to which it relates will not be made without prior written approval by the ODF, and then only in coordination with the ODF.

5.8 DISCLOSURE OF PROPOSAL CONTENTS

After contract award, a summary of total price information for all submissions will be available to those Proposers participating in this RFP. After contract award, proposals are public records and will be available to the public upon request.

5.9 DURATION OF PROPOSAL

Proposals must be signed by an official authorized to bind the Proposer to its provisions. For the RFP, the proposal must remain valid for at least 60 days after the deadline date for proposals. The proposal must INCLUDE A STATEMENT that it will remain valid for a minimum of 60 days.

5.10 INVESTIGATION OF REFERENCES

The Department of Forestry reserves the right to investigate the references and past performance of any Proposer with respect to its successful performance of similar services, compliance with the RFP and contractual obligations, and its lawful payment of suppliers, sub-contractors, and workers. ODF may postpone award or execution of the Contract after the announcement of the apparent successful Proposer in order to complete its investigation. ODF reserves the right to reject any proposal at any time prior to execution of a Contract.

5.11 COMPLIANCE WITH ALL GOVERNMENT REGULATIONS

Contractor shall comply with all federal, State and local laws, codes, regulations and ordinances applicable to the Work performed under the Contract. Failure to comply with such requirements shall constitute a breach of contract and shall be grounds for contract cancellation. Damage or costs resulting from noncompliance shall solely be the responsibility of the Contractor.

5.12 AWARD TO FOREIGN CONTRACTOR

If the amount of the Contract exceeds \$10,000 and if Contractor is not domiciled in or registered to do business in the State of Oregon, Contractor shall promptly provide the Oregon Department of Revenue all information required by that Department relative to the Contract. ODF shall withhold payment under the Contract until Contractor has met this requirement.

5.13 PAYMENT OF CONTRACTOR'S OBLIGATIONS

Contractor agrees to make payment promptly, as due, to all persons furnishing services, equipment, or supplies to Contractor for the performance of Work under the Contract. If Contractor fails, neglects or refuses to pay such claims as they become due, the State, after ascertaining that claims are just, due and payable, may pay the claims and charge the amount of the payment against funds due or to become due the Contractor under the Contract. Payment of claims in this manner shall not relieve Contractor with respect to any unpaid claims.

5.14 PAYMENT FOR MEDICAL CARE

Contractor agrees to make payment promptly, as due, to any person, co-partnership, association or corporation furnishing medical, surgical, hospital or other needed medical care to Contractor's employees. Such payment shall be made from all sums which Contractor has collected or deducted from the wages of employees pursuant to any law, contract or agreement for the purpose of providing or paying for such services.

5.15 REMEDIES

The Contract shall be governed by and construed in accordance with the laws of the State of Oregon as interpreted by the Oregon courts, and any litigation arising out of the Contract shall be conducted in the Marion County courts of the State of Oregon.

5.16 AMENDMENTS

The ODF acting through the State of Oregon Department of Administrative Services ("DAS") reserves the right to amend the resulting Contract from this RFP. Amendments could include but not limited to, changes in the Statement of Work, extension of time and consideration changes for the Contractor. All amendments shall be in writing and signed by all approving parties before the amendment becomes effective. Only DAS has the final authority to execute changes, notices or amendments to Contract.

5.17 PROTEST PROCEDURES

- A. Solicitation Protest: Proposers must submit in writing any protest or request for change of particular solicitation provisions, specifications, or contract terms and conditions to ODF no later than 7 days prior to the closing of the solicitation. Protest shall include reasons for the protest and any proposed changes to the solicitations, provisions, specifications, or contract terms and conditions. ODF will not consider a solicitation protest submitted after the deadline.

- B. Selection Protest: A Proposer who claims to have been adversely affected or aggrieved by the selection of a competing Proposer shall have seven calendar days after receiving notification of intent to award to submit a written protest. To be adversely affect or aggrieved, the Proposer must demonstrate that all higher-ranked Proposers were ineligible for selection. ODF shall not consider a protest after the deadline established in this section.

Sample Contract

STATE OF OREGON PERSONAL/PROFESSIONAL SERVICES CONTRACT

This "Contract" is between the State of Oregon ("State"), acting by and through its Oregon Department of Forestry, hereafter called "Agency", and XXX Inc., hereafter called "Contractor". Agency's Contract Administrator for this Contract is Connie Fir.

1. Effective Date and Duration. This Contract shall become effective on the date this Contract has been signed by every party hereto and, when required, approved by State's Department of Administrative Services and Department of Justice. Unless terminated or extended, this Contract shall expire when Agency accepts Contractor's completed performance or on February 30, 2001 whichever date occurs first. Expiration shall not extinguish or prejudice Agency's right to enforce this Contract with respect to any breach of a Contractor warranty or any default or defect in Contractor's performance that has not been cured.

2. Statement of Work. The statement of work (the "Work"), including the delivery schedule for such Work, is contained in Exhibit A attached hereto and incorporated by reference into this Contract. Contractor agrees to perform the Work in accordance with the terms and conditions of this Contract.

3. Consideration.

a. Agency agrees to pay Contractor the sum of \$ XXX.00 for accomplishing the Work required by this Contract. The maximum, not-to-exceed compensation payable to Contractor under this Contract, which includes any allowable expenses, is \$ XXX.00.

b. Interim payments to Contractor shall be made only in accordance with the schedule and requirements in Exhibit A.

4. Contract Documents. This Contract consists of the following documents which are listed in descending order of precedence: this Contract less all exhibits, attached Exhibit A, Exhibit B which is Agency's RFP for this Contract and the various attachments to it, Exhibit C which is Contractor's proposal to the RFP that was accepted by Agency. All attached Exhibits are hereby incorporated by reference.

5. Independent Contractor; Responsibility for Taxes and Withholding.

a. Contractor shall perform all required Work as an independent contractor. Although the Agency reserves the right (i) to determine (and modify) the delivery schedule for the Work to be performed and (ii) to evaluate the quality of the completed performance, Agency cannot and will not control the means or manner of Contractor's performance. Contractor is responsible for determining the appropriate means and manner of performing the Work.

b. If Contractor is currently performing work for the State or the federal government, Contractor by signature to this Contract declares and certifies that: Contractor's Work to be performed under this Contract creates no potential or actual conflict of interest as defined by ORS 244 and no rules or regulations of Contractor's employing agency (State or federal) would not prohibit Contractor's Work under this Contract. Contractor is not an "officer", "employee", or "agent" of the Agency, as those terms are used in ORS 30.265.

c. Contractor shall be responsible for all federal or state taxes, or both, applicable to compensation or payments paid to Contractor under this Contract and, unless Contractor is subject to backup withholding, Agency will not withhold from such compensation or payments any amount(s) to cover Contractor's federal or state, or both tax obligations. Contractor is not eligible for any social security, unemployment insurance or workers' compensation benefits from compensation or payments paid to Contractor under this Contract, except as a self-employed individual.

6. Subcontracts and Assignment; Successors and Assigns.

a. Contractor shall not enter into any subcontracts for any of the Work required by this Contract, or assign or transfer any of its interest in this Contract, without Agency's prior written consent. In addition to any other provisions Agency may require, Contractor shall include in any permitted subcontract under this Contract a requirement that the subcontractor be bound by Sections 6, 10, 11, 15, and 17 of this Contract as if the subcontractor were the Contractor. Agency's consent to any subcontract shall not relieve Contractor of any of its duties or obligations under this Contract.

b. The provisions of this Contract shall be binding upon and shall inure to the benefit of the parties hereto, and their respective successors and permitted assigns, if any.

7. No Third Party Beneficiaries. Agency and Contractor are the only parties to this Contract and are the only parties entitled to enforce its terms. Nothing in this Contract gives, is intended to give, or shall be construed to give or provide any benefit or right, whether directly, indirectly or otherwise, to third persons unless such third persons are individually identified by name herein and expressly described as intended beneficiaries of the terms of this Contract.

8. Funds Available and Authorized; Payments.

a. Contractor shall not be compensated for work performed under this Contract by any other agency or department of the State. Agency has sufficient funds currently available and authorized for expenditure to finance the costs of this Contract within

Agency's biennial appropriation or limitation. Contractor understands and agrees that Agency's payment of amounts under this Contract attributable to Work performed after the last day of the current biennium is contingent on Agency receiving from the Oregon Legislative Assembly appropriations, limitations, or other expenditure authority sufficient to allow Agency, in the exercise of its reasonable administrative discretion, to continue to make payments under this Contract.

- b. Agency will only pay for completed Work that is accepted by Agency.

9. Representations and Warranties.

- a. **Contractor's Representations and Warranties.** Contractor represents and warrants to Agency that (i) Contractor has the power and authority to enter into and perform this Contract, (ii) this Contract, when executed and delivered, shall be a valid and binding obligation of Contractor enforceable in accordance with its terms, (iii) the Work under this Contract shall be performed in a good and workmanlike manner and in accordance with the highest professional standards, (iv) Contractor shall, at all times during the term of this Contract, be qualified, professionally competent, and duly licensed to perform the Work, (v) all computer hardware and software delivered under this Contract, if any, will, individually and in combination, correctly process, sequence, and calculate all date and date related data for all dates prior to, through and after January 1, 2000, and (vi) any software products delivered under this Contract, if any, that process date or date related data shall recognize, store and transmit date data in a format which explicitly and unambiguously specifies the correct century.
- b. **Contractor's Limitation of Liability.** Contractor's liability with respect to this Section 9 shall not exceed twice the total Contract consideration paid to Contractor pursuant to Section 3 above, including any extensions or amendments or both.
- c. **Warranties Cumulative.** The warranties set forth in this Section 9 are in addition to, and not in lieu of, any other warranties provided.

10. Ownership of Work Product. All work product of Contractor that results from this Contract (the "Work Product") is the exclusive property of Agency. Agency and Contractor intend that such Work Product be deemed "work made for hire" of which Agency shall be deemed the author. If for any reason the Work Product is not deemed "work made for hire", Contractor hereby irrevocably assigns to Agency all of its right, title, and interest in and to any and all of the Work Product, whether arising from copyright, patent, trademark, trade secret, or any other State or federal intellectual property law or doctrine. Contractor shall execute such further documents and instruments as Agency may reasonably request in order to fully vest such rights in Agency. Contractor forever waives any and all rights relating to the Work Product, including without limitation, any and all rights arising under 17 USC §106A or any other rights of identification of authorship or rights of approval, restriction or limitation on use or subsequent modifications.

11. Indemnity.

- a. **Contractor's Indemnity.** Contractor shall indemnify and hold harmless the State, Agency, and their agents, officials and employees from any and all claims, demands, suits, actions, proceedings, losses, liabilities, damages, awards and costs of every kind and description (including reasonable attorneys' fees and expenses at trial, on appeal and in connection with any petition for review), which may be brought or made against the State, Agency, or their agents, officials or employees and arising out of or related to (i) any personal injury, death or property damage caused by any alleged act, omission, error, fault, mistake or negligence of Contractor, its employees, agents, or representatives in connection with or incident to Contractor's performance under or related to this Contract, (ii) any act or omission by Contractor that constitutes a material breach of this Contract, including without limitation any breach of warranty, or (iii) the infringement of any [United States] patent, copyright, trade secret or other proprietary right of any third party by delivery or use of Work Product (each, an "Indemnifiable Loss").
- b. **Notification.** Agency shall promptly notify Contractor in writing of any action, claim or demand of which Agency becomes aware and which Agency reasonably expects to result in an Indemnifiable Loss. Contractor's obligation under this Section 11 shall not extend to any Indemnifiable Loss primarily caused by: (i) the negligence or willful misconduct of the State, Agency, or their agents, officials or employees or (ii) Agency's modification of Contractor's Work Product without Contractor's approval and in a manner inconsistent with the purpose or proper usage of such Work Product as evidenced by the Work.
- c. **Control of Defense of Claims.** Contractor shall assume the defense of and pay the costs and expenses incidental to any claim for which it has an indemnity obligation under this Section 11 a., including attorney's fees and litigation expenses of the State, Agency, and their agents, officials and employees. Contractor shall have control of the defense and settlement thereof, but neither Contractor nor any attorney engaged by Contractor shall defend the claim in the name of the State or any agency of the State, nor purport to act as legal representative of the State or any of its agencies, without the prior written consent of the Oregon Attorney General. Further, the State, acting by and through its Department of Justice, may assume its own defense, including that of its officers, employees and agents, at any time when in the State's sole discretion it determines that (i) proposed counsel is prohibited from the particular representation contemplated; (ii) counsel is not adequately defending the interests of the State and/or its officers, employees and agents; (iii) important governmental interests are at stake; or (iv) the best interests of the State are served thereby. Contractor's obligation to pay for all costs and expenses shall include those incurred by the State in assuming its own defense and/or that of and its officers, employees, and agents under (i) and (ii) in this Section 11 c.

12. Insurance. Contractor shall provide insurance as indicated on Attachment A, attached hereto and by this reference made a part hereof.

13. Termination.

- a. Parties' Right to Terminate For Convenience.** This Contract may be terminated at any time by mutual written consent of the parties.
- b. Agency's Right To Terminate For Convenience.** Agency may, at its sole discretion, terminate this Contract, in whole or in part, upon 30 days notice to Contractor.
- c. Agency's Right to Terminate For Cause.** Agency may terminate this Contract, in whole or in part, immediately upon notice to Contractor, or at such later date as Agency may establish in such notice, upon the occurrence of any of the following events:
 - (i) Agency fails to receive funding, or appropriations, limitations or other expenditure authority at levels sufficient to pay for Contractor's Work;
 - (ii) Federal or State laws, regulations or guidelines are modified or interpreted in such a way that either the Work under this Contract is prohibited or Agency is prohibited from paying for such Work from the planned funding source;
 - (iii) Contractor no longer holds any license or certificate that is required to perform the Work; or
 - (iv) Contractor commits any material breach or default of any covenant, warranty, obligation or agreement under this Contract, fails to perform the Work under this Contract within the time specified herein or any extension thereof, or so fails to pursue the Work as to endanger Contractor's performance under this Contract in accordance with its terms, and such breach, default or failure is not cured within 10 business days after delivery of Agency's notice, or such longer period as Agency may specify in such notice, to cure.
- d. Contractor's Right to Terminate for Cause.** Contractor may terminate this Contract upon 30 days' notice to Agency if Agency fails to pay Contractor pursuant to the terms of this Contract and Agency fails to cure within 30 business days after receipt of Contractor's notice, or such longer period of cure as Contractor may specify in such notice.
- e. Remedies**
 - (i) In the event of termination pursuant to Sections 13 a, 13 b, 13 c. (i), 13 c. (ii) or 13 d, Contractor's sole remedy shall be a claim for the sum designated for accomplishing the Work multiplied by the percentage of Work completed and accepted by Agency, less previous amounts paid and any claim(s) which State has against Contractor. If previous amounts paid to Contractor exceed the amount due to Contractor under this subsection, Contractor shall pay any excess to Agency upon demand.
 - (ii) In the event of termination pursuant to Section 13 c. (iii) or 13 c. (iv), Agency shall have any remedy available to it in law or equity. If it is determined for any reason that Contractor was not in default under Section 13 c. (iii) or 13 c. (iv), the rights and obligations of the parties shall be the same as if the Contract was terminated pursuant to Section 13 b.
- f. Contractor's Tender Upon Termination.** Upon receiving a notice of termination of this Contract, Contractor shall immediately cease all activities under this Contract, unless Agency expressly directs otherwise in such notice of termination. Upon termination of this Contract, Contractor shall deliver to Agency all documents, information, works-in-progress and other property that are or would be deliverables had the Contract been completed. Upon Agency's request, Contractor shall surrender to anyone Agency designates, all documents, research or objects or other tangible things needed to complete the Work.

14. Limitation of Liabilities. EXCEPT FOR LIABILITY ARISING UNDER OR RELATED TO SECTIONS 9 or 13 e. (iv), or both, NEITHER PARTY SHALL BE LIABLE FOR (i) ANY INDIRECT, INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES UNDER THIS CONTRACT OR (ii) ANY DAMAGES OF ANY SORT ARISING SOLELY FROM THE TERMINATION OF THIS CONTRACT IN ACCORDANCE WITH ITS TERMS.

15. Records Maintenance; Access. Contractor shall maintain all fiscal records relating to this Contract in accordance with generally accepted accounting principles. In addition, Contractor shall maintain any other records pertinent to this Contract in such a manner as to clearly document Contractor's performance. Contractor acknowledges and agrees that Agency and the Oregon Secretary of State's Office and the federal government and their duly authorized representatives shall have access to such fiscal records and other books, documents, papers, plans and writings of Contractor that are pertinent to this Contract to perform examinations and audits and make excerpts and transcripts. Contractor shall retain and keep accessible all such fiscal records, books, documents, papers, plans, and writings for a minimum of three (3) years, or such longer period as may be required by applicable law, following final payment and termination of this Contract, or until the conclusion of any audit, controversy or litigation arising out of or related to this Contract, whichever date is later.

16. Compliance with Applicable Law. Contractor shall comply with all federal, State and local laws, regulations, executive orders and ordinances applicable to the Work under this Contract. Without limiting the generality of the foregoing, Contractor expressly agrees to comply with: (i) Title VI of Civil Rights Act of 1964; (ii) Section V of the Rehabilitation Act of 1973; (iii) the Americans with Disabilities Act of 1990 and ORS 659.425; (iv) all regulations and administrative rules established pursuant to the foregoing laws; and (v) all other applicable requirements of federal and State civil rights and rehabilitation statutes, rules and regulations. Agency's performance under this Contract is conditioned upon Contractor's compliance with the provisions of ORS 279.312, 279.314, 279.316, 279.320, and 279.555, which are incorporated by reference herein.

17. Foreign Contractor. If Contractor is not domiciled in or registered to do business in the State, Contractor shall promptly provide to the Oregon Department of Revenue and the Oregon Secretary of State Corporation Division all information required by those agencies relative to this Contract. Contractor shall demonstrate its legal capacity to perform the Work under this Contract in the State prior to entering into this Contract.

18. Force Majeure. Neither Agency nor Contractor shall be held responsible for delay or default caused by fire, riot, acts of God, or war where such cause was beyond the reasonable control of Agency or Contractor, respectively. Contractor shall, however, make all reasonable efforts to remove or eliminate such a cause of delay or default and shall, upon the cessation of the cause, diligently pursue performance of its obligations under this Contract.

19. Survival. All rights and obligations shall cease upon termination or expiration of this Contract, except for the rights and obligations set forth in Sections 1, 9, 10, 11, 13, 14, 15, 19 and 26.

20. Time is of the Essence. Contractor agrees that time is of the essence under this Contract.

21. Notice. Except as otherwise expressly provided in this Contract, any communications between the parties hereto or notices to be given hereunder shall be given in writing by personal delivery, facsimile, or mailing the same, postage prepaid, to Contractor or Agency at the address or number set forth on the signature page of this Contract, or to such other addresses or numbers as either party may hereafter indicate pursuant to this Section 21. Any communication or notice so addressed and mailed shall be deemed to be given five (5) days after mailing. Any communication or notice delivered by facsimile shall be deemed to be given when receipt of the transmission is generated by the transmitting machine. To be effective against Agency, such facsimile transmission must be confirmed by telephone notice to Agency's Contract Administrator. Any communication or notice by personal delivery shall be deemed to be given when actually delivered.

22. Severability. The parties agree that if any term or provision of this Contract is declared by a court of competent jurisdiction to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Contract did not contain the particular term or provision held to be invalid.

23. Counterparts. This Contract may be executed in several counterparts, all of which when taken together shall constitute one agreement binding on all parties, notwithstanding that all parties are not signatories to the same counterpart. Each copy of the Contract so executed shall constitute an original.

24. Department of Administrative Services Approval. Department of Administrative Services, and in certain cases Department of Justice, approval is required before any work may begin under this Contract or an amendment to this Contract.

25. Disclosure of Social Security Number. Contractor must provide Contractor's Social Security number unless Contractor provides a federal tax ID number. This number is requested pursuant to ORS 305.385, OAR 125-20-410(3) and OAR 150-305.100. Social Security numbers provided pursuant to this authority will be used for the administration of state, federal and local tax laws.

26. Governing Law; Venue; Consent to Jurisdiction. This Contract shall be governed by and construed in accordance with the laws of the State of Oregon without regard to principles of conflicts of law. Any claim, action, suit or proceeding (collectively, "Claim") between Agency (and/or any other agency or department of the State of Oregon) and Contractor that arises from or relates to this Contract shall be brought and conducted solely and exclusively within the Circuit Court of Marion County for the State of Oregon; provided, however, if a Claim must be brought in a federal forum, then it shall be brought and conducted solely and exclusively within the United States District Court for the District of Oregon. CONTRACTOR, BY EXECUTION OF THIS CONTRACT, HEREBY CONSENTS TO THE IN PERSONAM JURISDICTION OF SAID COURTS.

27. Year 2000 Compliance Notice. In the event Contractor learns or has reason to believe that Agency's computer hardware or software environment fails to use a date format that explicitly specifies century in any date data, Contractor shall promptly advise Agency of such failure.

28. Merger Clause; Waiver. This Contract and attached exhibits constitute the entire agreement between the parties on the subject matter hereof. There are no understandings, agreements, or representations, oral or written, not specified herein regarding this Contract. No waiver, consent, modification or change of terms of this Contract shall bind either party unless in writing and signed by both parties and all necessary State approvals have been obtained. Such waiver, consent, modification or change, if made, shall be effective only in the specific instance and for the specific purpose given. The failure of Agency to enforce any provision of this Contract shall not constitute a waiver by Agency of that or any other provision.

CONTRACTOR, BY EXECUTION OF THIS CONTRACT, HEREBY ACKNOWLEDGES THAT CONTRACTOR HAS READ THIS CONTRACT, UNDERSTANDS IT, AND AGREES TO BE BOUND BY ITS TERMS AND CONDITIONS.

CONTRACTOR DATA AND CERTIFICATION

Name (tax filing): _____

Address: _____

Citizenship, if applicable: Non-resident alien Yes No

Business Designation (check one):

Corporation Partnership Limited Partnership Limited Liability Company Limited Liability Partnership

Sole Proprietorship Other _____

Federal Tax ID#: _____ - _____ **or SSN#:** _____ - _____ - _____

Above payment information must be provided prior to Contract approval. This information will be reported to the Internal Revenue Service (IRS) under the name and taxpayer identification submitted. (See IRS 1099 for additional instructions regarding taxpayer ID numbers.) Information not matching IRS records could subject Contractor to 31 percent backup withholding.

Certification: The individual signing on behalf of Contractor hereby certifies and swears under penalty of perjury: (a) the number shown on this form is Contractor's correct taxpayer identification; (b) Contractor is not subject to backup withholding because (i) Contractor is exempt from backup withholding, (ii) Contractor has not been notified by the IRS that Contractor is subject to backup withholding as a result of a failure to report all interest or dividends, or (iii) the IRS has notified Contractor that Contractor is no longer subject to backup withholding; (c) s/he is authorized to act on behalf of Contractor, s/he has authority and knowledge regarding Contractor's payment of taxes, and to the best of her/his knowledge, Contractor is not in violation of any Oregon tax laws; (d) Contractor is an independent contractor as defined in ORS 670.600; and (e) the above Contractor data is true and accurate.

CONTRACTORS: YOU WILL NOT BE PAID FOR SERVICES RENDERED PRIOR TO NECESSARY STATE APPROVALS

CONTRACTOR

By: _____ Title: _____ Date: _____

Facsimile number: _____

AGENCY

Authorized Signature: _____ Title: _____ Date: _____

Mailing Address: _____ Contract Number: _____
Facsimile _____

Approved by the Department of Administrative Services: _____
Authorized Signature Date

Other Required Signature: _____
Other DAS Division or Agency Name/Title DAS or Other Agency Signature Date

Approved as to Legal Sufficiency by the Attorney General's Office _____

ATTACHMENT A

PERSONAL SERVICE CONTRACT

OAR 150-305.385(6)-(B) For purposes of this certificate, ‘Oregon tax laws’ means the state inheritance tax, gift tax, personal income tax, withholding tax, corporation income and excise taxes, amusement device tax, timber taxes, cigarette tax, other tobacco tax, 9-1-1 emergency communications tax, the homeowners and renters property tax relief program and local taxes administered by the Department of Revenue (Multnomah County Business Income Tax, Lane Transit District Tax, Tri-Metropolitan Transit District Employer Payroll Tax, and Tri-Metropolitan Transit District Self-Employment Tax).

INSURANCE

During the term of this Contract Contractor shall maintain in force at its own expense, each insurance noted below:

(Agency must check boxes for #2, #3, & #4 as to whether insurance is required or not.)

1. **Required by Agency of contractors with one or more workers, as defined by ORS 656.027.**

Workers' Compensation: All employers, including Contractor, that employ subject workers who work under this contract in the State of Oregon shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. Contractor shall ensure that each of its subcontractors complies with these requirements.

2. **Required by Agency** **Not required by Agency.**

Professional Liability insurance with a combined single limit, or the equivalent, of not less than \$200,000, \$500,000, \$1,000,000, or \$2,000,000 each claim, incident or occurrence This is to cover damages caused by error, omission or negligent acts related to the professional services to be provided under this Contract.

3. **Required by Agency** **Not required by Agency.**

General Liability insurance with a combined single limit, or the equivalent, of not less than \$200,000, \$500,000, \$1,000,000, or \$2,000,000 each occurrence for Bodily Injury and Property Damage. It shall include contractual liability coverage for the indemnity provided under this Contract. It shall provide that the State of Oregon, Department of Forestry (Agency) and their divisions, officers and employees are Additional Insureds but only with respect to the Contractor's services to be provided under this Contract;

4. **Required by Agency** **Not required by Agency.**

Automobile Liability insurance with a combined single limit, or the equivalent, of not less than Oregon Financial Responsibility Law (ORS 806.060), \$200,000, \$500,000, or \$1,000,000 each accident for Bodily Injury and Property Damage, including coverage for owned, hired or non-owned vehicles, as applicable.

5. **Notice of cancellation or change.** There shall be no cancellation, material change, reduction of limits or intent not to renew the insurance coverage(s) without 30 days prior written notice from the Contractor or its insurer(s) to Department of Forestry (Agency);
6. **Certificates of insurance.** As evidence of the insurance coverages required by this Contract, the Contractor shall furnish acceptable insurance certificates to Department of Forestry (Agency) prior to commencing the work. The certificate will specify all of the parties who are Additional Insureds. Insuring companies or entities are subject to State acceptance. If requested, complete copies of insurance policies, trust agreements, etc. shall be provided to the State. The Contractor shall be financially responsible for all pertinent deductibles, self-insured retentions and/or self-insurance.

Appendix I: Requirements for GIS Products in ODF Watershed Analysis Projects

Oregon Department of Forestry is engaging in Watershed Analysis projects on State forest lands. These projects compile existing data and, where necessary, gather and organize new data to summarize historic and current conditions of the Watershed. The data is then evaluated and interpreted to understand watershed scale processes. As part of the project maps, database files and GIS analysis will be used and produced. Quality control during design of the project is a large concern. This appendix lays out the requirements and specifications for those products.

- All projects will provide results in both paper and electronic versions. The electronic version shall include all elements provided in the paper format including maps, graphs, and tables.
- Electronic GIS data will be in ERSI shapefile format. Version number will be decided during the project design phase.
- The spatial locations of data will be in Oregon Lambert Projection NAD 83.
- The methods and processes for collecting the data should be thoroughly documented in meta-data. An example of meta-data format is attached.

Data formats for certain GIS layers are defined in the ODF data dictionary and the ODF GIS home page listed below. When other GIS layers are produced for a project they should follow similar formats. Any new formats will either be designed beforehand during the project design phase or in close collaboration with the contractor during the project. Any shapefile created by the contractor as part of the final product should be designed in close collaboration with ODF so as to ensure compatibility with ODF data formats.

Link to ODF data dictionary.

http://www.odf.state.or.us/divisions/management/state_forests/GIS/meta/CoreData.PDF

Link to ODF GIS home page

http://www.odf.state.or.us/divisions/management/state_forests/gishome.asp?id=3030105