Oregon Aquatic Habitat

Restoration and Enhancement Guide

THE OREGON PLAN *for* *Salmon and Watersheds*

May 1999

OREGON AQUATIC HABITAT RESTORATION AND ENHANCEMENT GUIDE

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Under the Oregon Plan for Salmon and Watersheds

Introduction

Aquatic habitat restoration activities are key to the success of the Oregon Plan for Salmon and Watersheds (OPSW). The Oregon Plan Steelhead Supplement states:

> *"In a broad context, the Oregon Plan, including the Healthy Streams partnership and this Supplement, is all about habitat restoration."*

In the broad context of the OPSW, habitat restoration includes a multitude of activities. These activities address the watershed functions needed to support healthy watersheds. Water quality, water quantity, improving channel complexity[1], flood plain interaction and the quality of riparian vegetation are important for watershed health. Some measures are directly targeted at restoring stream channels by upgrading culverts to expand the amount of stream miles that can support fish. Other measures reintroduce structure to stream channels that have been simplified due to past management practices and/or disturbance events. Measures are also included that address riparian and upland restoration needs.

This handbook is designed to facilitate and encourage habitat restoration across all landuses and ownerships. The guide allows for a range of restoration activities. This restoration guide is one of several documents available for planning restoration activities under the OPSW. However, under Executive Order 99-01, the guidelines in this handbook establish the criteria for all restoration activities funded or authorized by state agencies. This guide, in conjunction with the Watershed Assessment, Watershed Restoration Plan guidelines and the OPSW Monitoring Plan, will facilitate restoration activities at the watershed scale.

Purpose of the guide:

1. To provide information as part of the OPSW to watershed councils, landowners and other interests to help them develop effective restoration projects across all landuses and ownerships.

2. To define aquatic restoration and to identify and encourage aquatic habitat restoration techniques that restore salmonids.

3. To define standards and priorities that will be considered for approving State funded or authorized restoration projects.

4. To identify state and federal regulatory requirements and available assistance for completing restoration projects.

[1] Please refer to the glossary in Appendix B for a definition of terms.

Compliance with these state guidelines does not provide compliance with the federal Endangered Species Act (ESA). Parties conducting restoration projects within ESA listed Evolutionarily Significant Units (ESUs) are subject to all federal requirements within ESA listed ESUs. Landowners/operators considering restoration or enhancement activities in such areas may want to seek advice from the National Marine Fisheries Service (NMFS) and/or the U.S. Fish and Wildlife Service (USFWS).

This guide is organized by sections as follows:

Section 1 – Overview of Restoration Activities

A description and definition of habitat restoration; a description of how this guide is a part of the OPSW comprehensive strategy for watershed restoration and enhancement; a table of restoration activities included in this guide.

Section 2 – Detailed Description of Each Restoration Activity

A description of the restoration activity; available guidance and/or questions to be evaluated on site-specific bases; a listing of regulatory requirements, technical references and assistance. Copies of all listed references can be obtained from the Governor's Watershed Enhancement Board.

Section 3 – Overview of Agency Regulatory Functions and Sources of Assistance

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Section 1

Overview of Restoration Activities

Habitat restoration is a term with many different meanings. The OPSW encourages a range of approaches with preference for activities that mimic or help restore natural processes. However, the plan also recognizes that activities of a short-term nature should be implemented to provide improved levels of function in the interim while longer-range natural processes become effective. In addition, activities may occur within developed areas where no reasonable expectation of returning to a natural condition exists. For the purposes of this guide, habitat restoration activities refer to actions that:

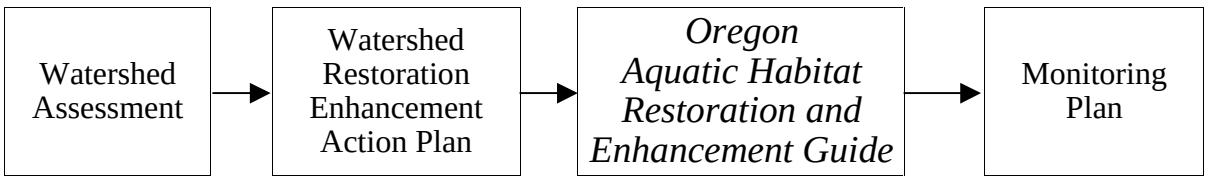
1. Change the trend of aquatic habitat function from one of a diminishing ability to support salmonids and other organisms to one that supports a complex, self-sustaining system. Such systems provide high quality habitat and ecological capacity for salmonids and other species; or

2. Correct or improve conditions caused by past management and/or disturbance events; or

3. Maximize beneficial habitat in the short term where watershed degradation has been extensive and natural processes will need substantial time to restore habitat; or

4. Create beneficial habitat and restore stream function to the fullest extent possible within developed areas where no reasonable expectation of returning to natural conditions exists.

Oregon is engaged in a novel effort to systematically evaluate watershed conditions across ownerships. The state is also developing a comprehensive strategy of restoration and enhancement activities and establishing restoration priorities. This guide is designed to provide guidance at the site scale. The framework for this guide within the OPSW is illustrated below.



- Evaluate and document existing conditions in the watershed.
- Document historic conditions.
- Summarize issues related to watershed function.

- Identify basin scale priorities
- Identify priority activities and necessary or appropriate sequence of activities.
- Identify limitations based on historic alterations

- Identifies critical questions for project implementation
- Provides links to technical guidance
- Identifies regulatory requirement
- Lists agencies offering technical assistance

- Goal – Identifies conditions projects will address
- Objectives – Specific items project will address
- Performance Standards – Measurement of each objective
- Monitoring – Method of measuring each performance standard

The restoration activities contained within this guide are listed in the following table. The table denotes whether a state agency permit or notification is required or not and the page number within the guide where the activity is described. The restoration activities are grouped by *upslope, riparian/wetlands, and in-channel* watershed function categories. Section 2 contains the following for each restoration activity:

- ***Activity Description*** – a description of the restoration activity.
- ***Regulatory Requirements*** – a listing of permits or notifications that must be provided to proceed with the activity.
- ***Guidance and/or Considerations*** – key questions and information where appropriate that must be considered when designing the activity.
- ***Technical Assistance*** – agencies and publications available for technical assistance and information.

Section 2 – Activity Guidelines

Upslope Watershed Function

Correcting Road/Stream Crossing Problems

Activity Description

Road-stream crossings have caused serious losses of fish habitat due to improperly designed or placed culverts. The blocking or hindering of upstream migration at road crossings has many adverse effects, including:

- The loss of spawning habitat available to adult anadromous salmonids;
- The loss of habitat available to juvenile anadromous and resident fish for feeding and predator avoidance;
- The loss of genetic diversity in resident fish in upstream reaches;
- The loss of nutrients from anadromous spawning adult carcasses;
- Changes in fish community assemblages upstream of blockages;
- Prevention of the re-colonization of headwater areas by resident fish after periodic losses or evacuations caused by extreme flood or drought events.
- In addition, improperly sized or placed culverts can cause catastrophic or chronic sediment inputs into streams.

Information on how to design road/stream crossings that provide for fish passage can be found in the *Oregon Road/Stream Crossing Restoration Guide* (ORSCRG) and from the ODFW Fish Passage Coordinator.

Regulatory Requirement - Yes

> ODF - On forestland a *Notification of Operation* must be filed with the department. Additionally, an approved written plan must be submitted to the Department.
>
> DSL - On non-forest land, a DSL permit is required if the activity occurs in a stream listed as Essential Salmonid Habitat (ESH), a State Scenic Waterway, or if it involves **more than** 50 cubic yards of disturbance. In streams listed as ESH, a permit is not required if the activity is part of ongoing farm maintenance or operation(s) and is **less than** 50 cubic yards of disturbance; however, a permit is required for new activity such as a new road crossing or as part of an ongoing farm operation with **more than** 50 cubic yards of disturbance.

When planning an activity such as culvert replacement, the ODFW publication* "Oregon Guidelines for Timing of In-water Work to Protect Fish and Wildlife Resources"** ***must be followed.

Guidance and/or Considerations

When planning a culvert replacement the following should be considered:

1. Does the affected stream section support native fish habitat, or have fish historically inhabited the area upstream of the culvert? Information on fish presence can be obtained from local ODF and ODFW district offices.

2. Does the existing structure block native fish passage?

3. Does the crossing blockage separate an introduced species (such as Brook Trout) from a native species (such as Bull Trout)? Consult ODFW or USFWS for information in areas where such changes in blockage may result in unintended detrimental consequences.

4. Is fish passage blocked by other road-related problems downstream of the intended culvert replacement site? Do culverts nearby or downstream have a higher priority for replacement? Information on prioritizing culverts for replacement is contained in the ORSCRG.

5. Is the culvert going to be installed during "in-water work periods"? Information on these periods can be obtained from the publication listed above.

6. Does the proposed culvert size and design meet the criteria in the ORSCRG?

Technical Assistance

Publications:

- Oregon Road/Stream Crossing Restoration Guide: Summer 1998 Draft
- ODFW, Oregon Guidelines For Timing of In-Water Work To Protect fish and Wildlife Resources

Agencies:

ODF, ODFW, DSL, ODA

Road Re-Construction/Obliteration Activities to Improve or Protect Habitat

Activity Description

In the context of restoration, road re-construction and obliteration are activities designed to decrease the risk of road failure and reduce chronic sediment input from roads across all land uses. New road construction, in contrast, is not considered restoration. Road reconstruction and obliteration activities that meet the following criteria will generally have little difficulty receiving approval: they are located in upslope areas away from streams; their goal is reducing road-related landslide risk or chronic sediment input; they are completed in accordance with current ODF requirements.

Regulatory Requirement – Yes

DSL - For non-forest operations a DSL permit may be required.

ODF - For forest operations a *Notification of Operation* must be submitted.

Local Government – Some counties may have ordinances regulating road re-construction.

Guidance and/or Considerations

When planning a road re-construction activity, the following should be considered:

1. Is the road at risk for sidecast-related landslides[1] entering waters of the state?

2. Does the road currently deliver muddy drainage waters to streams?

3. Does the activity involve removing or improving a stream crossing culvert or bridge? If so, refer to the Correcting Road/Stream Crossing guidelines on page 7.

Technical Assistance

Publications:

- Oregon Road/Stream Crossing Restoration Guide: Summer 1998 Draft.
- Forest Road Hazard Inventory Protocol (Oregon Department of Forestry).
- Oregon Forest Practice Rules and Statutes, Division 625 Road Construction and Maintenance Rules.

Agencies:

ODF, ODFW, ODA, USFS

[1] See glossary in Appendix B.

Upslope Erosion Control

Erosion control projects are useful for improving aquatic habitat by controlling the movement of sediment, nutrients, and other pollutants into surface water bodies. They also help maintain or improve the stability of streambanks and stream channels.

Erosion control projects present a low to moderate risk of negatively impacting aquatic habitat, depending on their scope, location and design. Such projects are strongly encouraged for improving water quality. Some level of erosion control will be required of agricultural activities in basins where sediment is an issue and 1010 plans are developed. **Erosion control projects completed to ameliorate or mitigate upland development are not considered restoration in the context of this guide**. Below are some examples of erosion control projects:

Water and Sediment Control Basins

Activity Description

Water and sediment control basins are typically used to contain runoff and wastewater long enough to remove sediment or help reduce concentrations of other pollutants. These basins can be very effective in reducing such pollutants before the impaired waters discharge to surface waters or infiltrate to groundwater. Sediment basins designed as wetlands can have the additional benefit of reducing nutrients, especially nitrogen. These constructed wetlands also store sediment and reduce microorganisms from nearby surface waters. When properly designed and placed, water and sediment basins present a low risk of negative impact to aquatic habitat. Improper design and usage can cause adverse impacts by introducing a large quantity of sediment and/or other pollutants into a water body, and by destabilizing streambanks and channels.

Regulatory Requirements - Yes

> WRD – A permit is required if water will be retained in the basin after a high-water event has passed and a future beneficial use of the retained water will be for any purpose including, but not limited to, irrigation, domestic, recreation, fish habitat, or aesthetics. Approval of engineering plans and specifications will be required if the planned retention structure is10 feet or higher and impounds 9.2 acre-feet or more of water.
>
> DEQ - The quality of the water discharged from the basin must meet Oregon Department of Environmental Quality (DEQ) water quality standards, and could be regulated by the ODA (Oregon Department of Agriculture) if a 1010 plan is in effect. DOGAMI (Department of Geology and Mineral Industries) has regulatory authority over basins that receive water from mining and mine reclamation projects.

Guidance and/or Considerations

1. Is the basin of appropriate size to contain the necessary volume of water? Will sufficient retention time in the basin allow the settling of fine sediments and/or the digestion process of other pollutants? Are sediment-adhered particles (e.g., phosphorus, metals, etc.) settling, or denitrification occurring, in an anoxic environment?[2] Is the potential for increased flows from storm events accounted for?

[2] The accumulation of metals, or the breakdown of nitrates and nitrogen in water with insufficient available oxygen can result in water quality impairment that is lethal to fish and other organisms.

2. Has an appropriate location for the basin been chosen? Basins should not be placed within stream channels. In general, they are most effective in catching artificially channeled or concentrated flow. Placing a basin too close to streambanks, cliffs, cutslopes, or roads can destabilize these features, leading to increased erosion. Also, make sure the discharge line from the basin (if there is one) is designed to avoid gullying or other erosion.

3. Excavated basins are generally preferable to built-up, dammed structures because excavated structures are inherently more stable. Engineering plans and specifications for dams constructed 10 feet or more in height and impounding 9.2 acre-feet or more of water must be approved by the WRD.

4. Will the basin be designed with maintenance and cleaning in mind? Will equipment be available to clean out the basin?

5. If the basin is designed as a wetland, will the quality of the incoming water be detrimental to the bioactivity of the wetland? Will maintenance activities disturb the biota of the wetland? Constructed wetlands involve many other factors that need to be considered. These are addressed in technical guidelines available from the agencies listed below.

Technical Assistance

Agencies:
NRCS, DSL, WRD, DEQ, ODA

Windbreaks

Activity Description

Windbreaks have a very low negative impact potential and can be readily utilized by landowners without requiring extensive or detailed information on overall basin conditions. They provide benefits by reducing both erosion and deposition of material in aquatic habitat. Windbreaks normally consist of tree and shrub rows. Tree and shrub windbreaks planted in riparian areas can be part of a habitat enhancement plan if native vegetation is used.

Regulatory Requirements - None

Guidance and/or Considerations

1. Does the proposed location for the activity support the windbreak method? For example, if you are planting trees or shrubs, will these trees or shrubs grow well enough to provide an adequate windbreak in the proposed location?

2. Will the windbreak be of adequate size (height and width) to achieve the desired result?

3. Were native plants considered?

Technical Assistance

Agencies:
NRCS, ODA, SWCD

Upland Terracing

Activity Description

Terraces usually follow the slope's contour and interrupt the flow of water and sediment down a long slope. As water flows down a hill, terraces serve as small dams to intercept water and guide it to an outlet. Two basic types of terraces–"storage terraces" and "gradient terraces"--are commonly used. Storage terraces collect and store water until it can infiltrate into the ground or be released through a stable outlet. Gradient terraces are designed as a channel to slow runoff water and carry it to a stable outlet like a grassed waterway.

Regulatory Requirements - None

Guidance and/or Considerations

1. Will other conservation practices be used in conjunction with terraces to prevent sedimentation?

2. Will ongoing maintenance be included in the project design? In order to function properly, terraces need:
    - removal of captured sediment to maintain required water-holding capacity;
    - repair of embankments, which have eroded or have excessive settlement;
    - repair of damaged intakes;
    - removal of sediment build-up and trash from intakes;
    - control of rodents or burrowing animals, weeds, brush and trees;
    - re-seeding and fertilizing to maintain good vegetative cover.

Technical Assistance

Publications:

- Regehr, D.L., D.L. Devlin, and P.L. Barnes. 1996. Using Vegetative Filter Strips in Crop Fields. Kansas State University Cooperative Extension Service Bulletin MF-2224. Manhattan, Kansas. 4 pages.

Agencies:

ODA, NRCS, local SWCD

Planting Unproductive Areas

Activity Description

Long-term grass, legume, tree or shrub plantings can be established in areas of low production or excessive erosion. The vegetation provides surface cover that stops raindrop splash and slows water flow, thereby reducing soil erosion. A vegetated area improves water quality by reducing the amount of sediment, nutrients and chemicals running off farmland. Such projects protect dams, terrace backslopes or gullied areas, for example, where vegetation may otherwise be difficult to establish.

Regulatory Requirements - None

Guidance and/or Considerations

1. Is the intended planting area of adequate size to provide protection?

2. Are proper soil conservation practices installed above the planting area?

3. Can the area be stabilized with other conservation methods?

4. Is the vegetation suitable and native to the site?

5. Can livestock be excluded for the first year after planting? Can overgrazing be prevented after permanent cover is established? Will the area be fenced if needed?

6. Will livestock be permanently excluded from extremely steep slopes.

7. Will periodic burning occur in planted area? Native or warm season grasses can benefit from periodic burning, which stimulates growth by reducing and removing competing plant growth.

8. How will new plantings be protected from wildlife? Will the protection measures cause more harm than good to aquatic functions, such as hindering the construction and maintenance of beaver dams that provide juvenile fish rearing habitat?

Technical Assistance

Publications:

- Norman, D. K., P.J. Wampler, A.H. Throop, E.F. Schnitzer, and J.M. Roloff. 1997. Best Management Practices for Reclaiming Surface Mines in Washington and Oregon. Washington State Dept. Of Natural Resources Open File Report 96-2.
- Sattell, R. (Ed). 1998. Using Cover Crops in Oregon. Oregon State University Cooperative Extension Service Bulletin EM 8704. 50 pages.

Agencies:

ODA, NRCS, local SWCD

Estuarine and Freshwater Wetland Projects

Activity Description

Wetlands, both estuarine and freshwater, are essential to salmon and healthy watersheds. The natural resource values and functions that wetlands provide have been lost over the years due to human activity. Restoration, construction or enhancement of estuarine or freshwater wetlands is designed to replace these lost functions.

Breaching or removing dikes is one restoration method for estuarine systems and some freshwater systems. When a dike is breached, water is allowed to reflood an area previously protected either from tidal inundation or from high flow inundation. Native wetland plants often recolonize these areas from buried seed sources.

Another method for improving tidal wetlands involves removing, permanently opening, or otherwise altering tide gates. Tide gate alteration can restore wetland hydrology to a diked site making it usable by outmigrating salmonids and other water – dependent species without the chance of entrapping them behind the gates.

Wetlands can also be restored by removal of existing fill material and allowing natural recolonization to take place. Wetland sites that have been filled should readily transform back to a more "natural" state if the site hydrology is intact.

Creating wetlands on sites where they were never historically present may have greater problems than restoration of wetland sites that were drained.

Management of beavers to create and maintain natural freshwater wetlands with their dams should be considered. The approach should only be used in appropriate reaches of smaller streams or side channels of larger streams (see Beaver Management Activity).

Regulatory Requirement - Yes

DSL - General Authorization Wetland Enhancement/Restoration

Guidance and/or Considerations

Considerations before attempting any wetland restoration activity include:

1. How will the estuarine or wetland restoration activity fit in with other restoration activities in the watershed? Is this activity part of a watershed approach to restoration Should other activities that have a more direct benefit for improving salmonids be considered before wetland restoration?

2. Have hydrologic and hydraulic regimes been addressed? The answer to this question is crucial, especially for wetland construction activities.[3]

[3] The "hydrologic regime" refers to the capacity of a wetland, or a successfully created wetland, to retain standing water and/or saturate soils at or near the surface long enough during the growing season that anaerobic (lack of oxygen) conditions develop in the soils. This condition supports the growth of hydrophytic (water loving)

3. Will there be adequate water exchange and/or positive grade slopes to prevent stranding of fish and other aquatic species. For estuarine systems, will there be full tidal connection?

4. Has the site been tested for soil slumping or compaction? Has the soil salinity been tested?

5. Have adjacent upland areas been included in the site (as a buffer)?

6. Has a monitoring plan been developed? A plan should have goals, measurable objectives and success criteria.

7. Has a survey of plant communities within the estuary been completed? Do sufficient sources of plants in the estuary or neighboring freshwater wetlands support natural recolonization? If planting is proposed for enhancement activities, will the planted species be compatible with vegetation already in the estuary or freshwater wetland? Or will the planted vegetation be forced out by natural recruitment and the planting effort prove ineffective?

Technical Assistance

Publications:

- Kentula, Mary, et. al. - An Approach to Improving Decision Making in Wetland Restoration and Creation United States Environmental Protection Agency (EPA)
- Marble, Anne D. - A Guide to Wetland Functional Design
- Stream Corridor Restoration: Principles, Process and Practices, October 1998. Federal Interagency Stream Working Group
- Interagency Federal Guidance on Wetland Restoration, Creation, and Enhancement, March 1999 Draft. Interagency Workgroup on Wetland Restoration.

Agencies:

DSL, NRCS, USFWS, ODFW, National Estuary Program (NEP), ACOE

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vegetation. The “hydraulic regime” refers to how the water flows through the site, during tidal exchange or storm freshets, for example. Examples of methods to insure that sites stay wet or water logged include: impounding water, plugging drainage, compacting soil to slow drainage through the soil layers, determining the groundwater elevation and excavating to that depth or below, and introducing or diverting new sources of water to the site.

Livestock Grazing Restoration Activities Overview

Livestock grazing is commonplace in many areas where restoration activities may occur. Consequently, the success of many restoration projects may be influenced by the methods used to manage livestock.

Restoration activities listed in these guidelines that are directly related to livestock management include grazing management plans, riparian fencing, water gap development, and livestock water developments. Livestock management should also be considered when efforts to establish plant species are involved with other restoration activities.

1. Grazing management plans are used to specify how livestock are managed in a landscape setting. These plans can also specify how the placement and timing of restoration projects will relate to livestock management.

2. Riparian fencing is used to isolate particular portions of the landscape for special treatment in the livestock grazing plan. Partitioning the landscape into smaller units provides more control over the location and timed distribution of livestock.

3. Watergaps control livestock access to streams to very limited places while protecting larger areas of sensitive streambank. Ideally, water gap placements are planned to complement the livestock grazing plan and any restoration projects.

4. Placing livestock watering facilities away from streams redirects watering activities from sensitive areas near streams to less environmentally sensitive areas.

Although these activities can constitute separate projects, they can also be used in concert to provide better livestock distribution and protect sensitive areas. Local site conditions such as soil moisture, season plant growth, and climate patterns will vary at each location. Livestock grazing impacts can be assumed to vary in a similar way. Each restoration project will encounter unique site characteristics that will change over time and vary in geographic location. Therefore, livestock grazing management should respond to these variations and be tailored, to the degree possible, to individual sites.

Grazing Management Plans

Activity Description

Properly designed livestock grazing management systems will consider sensitive areas such as watersheds containing salmon populations or other sensitive habitats. Livestock must be managed to minimize their influences where aquatic restoration projects are planned. Proper livestock grazing is based largely on the location and timing of grazing and the amount of time animals spend in a particular grazing unit or pasture. Well designed grazing plans can account for the physiological needs of plants and the biophysical characteristics of the landscape. Such grazing plans specify the grazing area (pastures) and how each pasture is used.

Specifications will include the number of livestock (intensity); class of livestock (cows, yearlings, ewes, etc.); type of livestock (cattle, sheep, horses, etc.); season of use; amount of time spent in the grazing area (duration); and the number of times each grazing area will be used during the grazing cycle (frequency).

Understanding the grazing behavior of each class and type of livestock is useful in deciding how livestock will be managed for landscape use. Such plans should include enough grazing areas in the management unit to allow flexibility in how each area is used. Depending on the site-specific conditions, this flexibility should include the capability to rest a grazing area for an extended period of time. This rest may be needed to allow the restoration project to develop or address the time-specific needs of aquatic species.

Regulatory Requirements

Livestock grazing activities on non-federal land will be developed using basin and farm plan guidelines in Senate Bill (SB) 1010[4]. Livestock grazing activities on U.S. Forest Service land are presently guided by the Clean Water Act through forest plans for each National Forest.

Livestock grazing activities on Bureau of Land Management administered land is presently guided by the Clean Water Act through planning documents such as *Allotment Management Plans*.

Guidance and/or Considerations

1. Will site specific objectives and recovery time tables be considered when developing a grazing management plan?

2. What site specific monitoring methods and benchmarks will be used to monitor the restoration project's effectiveness for riparian vegetation recovery under the grazing management plan? This is important for measuring project effectiveness. Examples of appropriate monitoring methods and benchmarks include: photopoints taken at the same locations and season over time, stubble height, line or point transects that measure bare ground, and browse transects[5] that key on the development of desirable vegetation.

3. Have the landscape characteristics (topography, climate, soils, streams, etc.) of the management unit been considered? Such characteristics strongly influence livestock grazing behavior.

4. Are the number of grazing areas (pastures) within the management unit sufficient to provide adequate rotation time? Not providing enough time for livestock away from riparian areas may negatively impact the restoration effort.

5. Have the total number of grazing areas containing riparian or aquatic systems been identified in order to control the concentration of livestock activity at sensitive sites?

6. Have grazing schedules and the amount of time needed to develop the planned restoration activity been examined in order to minimize potential timing conflicts?

7. Has the option of totally excluding livestock from riparian areas through fencing or other means been considered?

8. Has adequate time for a grazing system's impacts on the habitat restoration effort been considered? Often two or more years are needed before effects of the project are observable.

9. Will ecosystem restoration occur as part of the grazing plan?

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[4] Please refer to the Appendix C for agency contacts and information
[5] Please refer to the glossary in Appendix B.

Technical Assistance

Publications:

- USDI Bureau of Land Management (Montana State Office). 1998. Successful Strategies for Grazing Cattle in Riparian Zones. Riparian Technical Bulletin No. 4. 48 pages.
- Bedell, Thomas E., Michael M. Borman (Ed). 1997. Watershed Management Guide for the Interior Northwest. Oregon State University Cooperative Extension Service Bulletin EM 8436. 84 pages.
- Livestock Grazing Supplement to the Oregon Aquatic Habitat and Ehancement Guide, April 1999. Oregon Department of Agriculture and Oregon Department of Fish and Wildlife.

Agencies:

ODA, Local SWCD, DEQ, USFS, BLM

Riparian Vegetation Planting and/or Fencing

Description

Riparian planting, along with fencing or other grazing management strategies, can help to restore watershed functions such as temperature control, bank stability, fine sediment control, natural channel morphology, and large woody debris recruitment[6]. These types of projects generally present a low risk of negative impact and can accelerate the recovery of riparian function. Landowners should be aware that channels within valleys do migrate over time and **riparian fencing projects must consider long-term channel migration**. Subsequent attempts to tame the stream with bank stabilization techniques would not be viewed as restoration projects.

Regulatory Requirements - None

Guidance and/or Considerations

1. Have the causes of vegetation removal been identified and addressed? In some areas, such as arid regions of the state, once the causes of vegetation removal have been addressed, the possibility that suitable revegetation will occur naturally should be considered.

2. If livestock grazing occurs, will fencing, off-channel watering or other grazing management strategies be used to protect planted vegetation?

3. How will riparian vegetation planting be protected from wildlife? For example, in the case of cedar tree plantings, *vexar tubing* may be necessary to protect seedlings from deer browse. Will the protection measures cause more harm than good to aquatic functions, such as hindering the construction and maintenance of beaver dams that provide juvenile fish rearing habitat?

4. Is the vegetation suitable for the site and is the vegetation indigenous to the site? For instance, for low gradient streams with clay soils, some willow species will likely not thrive. In this case sedges would be more appropriate.

5. Is the site suitable for establishing a forested riparian area?

6. If a fence is installed, does it protect enough riparian area to restore riparian and stream functions and give the stream channel room to meander over time? Is fencing the best option for this situation? The distance needed between a fence and a stream to help restore ecological function is highly variable, depending on stream order, floodplain width, channel morphology, and the stream's natural rate of meander over time. For example, where the streambank is composed of a rock wall or other natural hardened surface the fence may be placed close to the normal high water area. However, a stream with a wider flood-prone area, or one that shows active erosion, will require greater set back widths in order to allow natural revegetation and prevent the stream from undercutting the fence. Streams exhibiting vertical cut backs will often heal on their own. Such streams typically slump at a 2:1 slope. Therefore, a good rule of thumb for these conditions is:

    - Fence setback = (bank height x 2) + minimum 10 feet

[6] Please refer to the glossary in Appendix B for a definitions of terms.

This rule allows some continued erosion while the stream has a chance to reestablish native vegetation for bank stability. In other cases, such as in steep canyons where the flood-prone area meets the canyon wall, it may be practical to locate the fence where livestock are prevented from entering these areas.

Technical Assistance

Publications:

- Fencing, BLM Handbook H-1741-1
- ODFW fencing guidelines

Agencies:

NRCS, ODA, SWCD, ODFW, BLM, USFS, ODF

Water Gap Development

Activity Description

Water gaps are areas along streams designated for livestock watering. They provide livestock with access to water and limit the impact of livestock on riparian areas. Water gaps generally consist of fencing or swing gates along streambanks, which limit the amount of streambank and channel area accessible to livestock. Water gaps may or may not prevent livestock from crossing a stream, but they always prevent movement up- and downstream. Some water gaps may have the access points armored with rock or other material to minimize streambank damage.

Regulatory Requirements - None

Guidance and/or Considerations

1. Has consideration for historic watering sites been given? Generally, sites historically used by livestock are preferred over developing new sites.

2. Will the proposed location for the water gap be stable over time? Water gaps should never be built on cutbanks or unstable slopes. Water gaps can also be moved over time if signs of streambank damage become apparent.

3. Is the fencing or other physical barrier that defines the water gap removable, so it can be moved to prevent damage from high streamflow? If not, is it durable enough to withstand high streamflows?

Technical Assistance

Publications:

- Clawson, J.E. 1993. The use of off-stream water developments and various water gap configurations to modify the watering behavior of grazing cattle. M.S. Thesis. Oregon State University, Corvallis, OR.
- ODFW Fencing Guidelines

Agencies:

NRCS, ODA, Local SWCD, BLM

Livestock Water Development

Activity Description

The location of livestock water developments directly influences the distribution of livestock. Many techniques can be used to provide water sources away from streams. These sources are intended to move livestock away from riparian management areas. Water development projects benefit habitat restoration by protecting streambank morphology[7], reducing the level of nutrient and sediment loads in surface water, and protecting riparian vegetation. Developments include three basic types:

- Mechanical: examples include nose pumps (animal activated); electrical pumps including solar powered; and hydraulic ram pumps. Perennial streams are the typical water source, but wells and springs can also be used.

- Troughs and ponds: examples include systems that are primarily gravity fed through pipelines from streams or through physical blocking of stream channels. Perennial or intermittent streams are the typical water source. These developments may have an intermediate storage facility (above or below ground tank).

- Spring developments: these systems are usually composed of a spring box, a pipeline that is usually above ground, and a containment facility (usually a metal trough). The water source is a spring or seep.

Regulatory Requirements - Yes

> WRD – A water right is not required if the following two criteria are met:1) the water is diverted through an enclosed delivery system equipped with either an automatic shut-off valve or an enclosed system for returning water to the stream; 2) the operation is located on land where livestock would otherwise have access to the stream.
>
> ODFW - In cases of water sources that must be screened, ODFW fish screening requirements must be followed.

Guidance and/or Considerations

1. Are livestock watering facilities being considered for restoration purposes? The development of such facilities generally will not require water rights.

2. Has consideration been given to providing adequate fish screening (using ODFW Fish Passage Guidelines) if the water source is a fish-bearing stream,?

3. Will a spring originating on the landowner's property be the source for the development? A landowner's use of water flowing from a spring that does not, under natural conditions, form a channel and flow off the property from where it originates at any time is exempt from water right permitting requirements.

4. Will the storage facilities be located away from the water source? Will the return flow of water from a storage facility be evaluated for possible increased temperatures if the likelihood of impacting stream temperatures exists?

[7] Please refer to the glossary in Appendix B.

5. If springs or ponds are used for a source, will they be protected from livestock to avoid impacts to native fish and wildlife?

Technical Assistance

Publications:

- USDI Bureau of Land Management (Montana State Office). 1998. Successful Strategies for Grazing Cattle in Riparian Zones. Riparian Technical Bulletin No. 4. 48 pages.
- Bedell, Thomas E., Michael M. Borman (Ed). 1997. Watershed Management Guide for the Interior Northwest. Oregon State University Cooperative Extension Service Bulletin EM 8436. 84 pages.

Agencies:

WRD, ODA, SWCD, ODFW, NRCS, BLM

Riparian Brush and Weed Control

Activity Description

Undesirable vegetation has invaded riparian areas, stream channels, lakes and wetlands as a result of previous disturbance(s) and the introduction of exotic plant species. Many brush and weed species, such as Himalaya berry, have originated from foreign countries. These introduced plants, free from the natural enemies found in their homelands, have gained a competitive advantage over native plants. Introducing such vegetation into riparian areas has resulted in brush and weed conditions where conifers, hardwoods or other desirable vegetation would naturally occur. Brush and weed removal are encouraged in brush-dominated riparian areas where the goal of establishing desired vegetation in a timely fashion is not otherwise possible. For such activities to be considered restoration, their intent must be to establish or release desired vegetation. Refer to the "Riparian Conifer Restoration" activity in this handbook for regulatory requirements, guidance and/or considerations on sites dominated by hardwoods that otherwise would be dominated by conifer.

Several methods exist for the eradication and maintenance of brush and weeds. These include:

- Mechanical
- Chemical
- Prescribed fire
- Manual
- Mulching
- Biological

The effectiveness of these methods, their impacts to the site, and their costs vary. A site-specific evaluation must be completed to determine the most effective method to eradicate and control undesirable vegetation. Combinations of one or more methods may provide the most effective approach.

Regulatory Requirements

State and federal regulatory requirements exist for brush and weed eradication within riparian areas. Which requirement should be followed will depend upon the vegetation to be eradicated and/or the method(s) used. Hardwoods removed for commercial value must meet the requirements of Oregon's Forest Practice Act administered by ODF. Hardwoods and/or brush removed with no commercial value must be removed in accordance with the Clean Water Act. In this situation permits may not be required. However, negative impacts to water quality caused by brush removal could be a violation of water quality standards enforced by DEQ.

Brush and weed eradication and maintenance methods that involve the application of chemicals are regulated by ODA through product label requirements and in some cases record keeping requirements. On forestland, resource protection provisions require filing a *Notification of Operation* and an approved written plan with ODF. On non-farm or forest land, removal of riparian vegetation may be subject to local government comprehensive plan regulations.

Guidance and/or Considerations

1. Will eradication of the current vegetation cause water quality impairments such as siltation or water temperature increases?

2. If the eradication of the current vegetation will cause short-term impairment to water quality, will the long-term benefits out weigh them? If so describe how.

3. Is the replacement vegetation suitable for the site and is that vegetation indigenous to the site? For instance, for low gradient streams with clay soils, some willow species will likely not thrive. In this case sedges would be more appropriate.

4. What eradication or release methods will be used?

5. Will methods be identified and used to ensure that the desired vegetation will grow free from competing vegetation?

6. How will desirable vegetation be protected from wildlife? Will the protection measures cause more harm than good to aquatic functions, such as hindering the construction and maintenance of beaver dams that provide juvenile fish rearing habitat?

Technical Assistance

Publications:

- Pacific Northwest Weed Control Handbook; OSU Extension
- Forest Vegetation Management Without Herbicides; Proceedings of a Workshop February 18 - 19, 1992, Forest Research Lab, College of Forestry, Oregon State University

Agencies:

ODF, ODA, Local SWCD, DEQ

Riparian Conifer Restoration

Activity Description

Riparian conifer restoration consists of removing hardwoods or undesirable vegetation near the stream where conifers were historically dominant or likely to become established and then replanting conifer for the long-term recruitment of large wood.

Regulatory Requirement - Yes

> ODF - Riparian conifer restoration that involves a commercial activity is regulated by the Oregon Department of Forestry. Landowners/operators involved in a forest operation are required to file a notification to the state forester and provide an approved written plan.

Guidance and/or Considerations

Pursuant to the Forest Practices Act, a riparian conifer restoration activity that involves a commercial forest operation may be applied only if all of the following criteria are met for the site:

1. Is the live conifer basal area in the riparian management area below half the standard target of the Forest Practices Act water protection rules?

2. Is the site a "conifer site"[8]capable of growing conifers?

3. Is the Riparian Management Area (RMA) dominated by hardwoods or undesirable vegetation?

4. Is the stream in western Oregon?

Riparian conifer restoration assumes that many streamside areas have been impacted by previous disturbance(s) where hardwood or brush conditions now exist and that such sites naturally would have been conifer dominated. Before beginning a riparian conifer restoration activity, it is important to properly identify the potential for successful conifer conversion at the proposed site and provide evidence that future large wood supplies within the watershed are limited. In addition, identifying whether a prospective stream reach with hardwood dominated riparian areas is best suited for hardwoods is important. These types of riparian areas support beavers that create good habitat for juvenile coho salmon or other fish and wildlife by building dam pools.

Riparian conifer restoration activities cannot be conducted at sites where:

1. Future large wood supplies within the watershed are sufficient.

2. Conifer regeneration is not likely or would require extraordinary efforts (such as areas with many beavers).

3. Topography and soil conditions indicate that hardwood trees are normally dominant, such as riparian areas and floodplain terraces associated with large streams where naturally occurring cottonwood and Oregon ash dominate.

4. Portions of streams experience peak flows of frequency and intensity that result in streambank disturbances which prevent conifers from achieving mature conditions (often

[8] For guidance on determining whether a site meets "conifer site" criteria, please refer to the OPSW management measure ODF 8S. See "Technical Assistance" at the end of this section.

indicated by riparian areas with scattered big leaf maple and brush).

Technical Assistance

Publications:

- Guidance on riparian conifer restoration and the process for gaining approval for such projects is contained within Oregon Department of Forestry (ODF) *Forest Practices Act Hardwood Conversion* rule alternative. The OPSW contains voluntary guidance for additional review of riparian conifer restoration activities. For more details on this subject please refer to Oregon Department of Forestry (ODF) Guidance contained in the OPSW management measure ODF 8S.

Agencies:

ODF, ODFW, USFS

Conservation Programs and Easements

Activity Description

Conservation programs and easements are designed to protect or re-establish aquatic habitat by restricting the commercial use or development of a parcel of property. A conservation easement is a recorded deed restriction that preserves undeveloped property and limits its development. The owner still owns and maintains the land as in the past, but the development rights and the right to enforce the easement belong to a nonprofit land trust or a government agency (see below). In exchange, the owner receives income and estate tax deductions equal to the value of the property's foregone development potential. Tax laws may allow additional exclusions of the remaining value of the property from the taxable estate. The easement stays with the land in perpetuity. Easements can be written to allow some limited development and land use, such as grazing. The level of restriction is determined by the landowner. The non-profit organizations listed under "Technical Assistance" (below), and the U.S. Fish and Wildlife Service, can accept conservation easements.

Several federal agencies offer programs that provide incentive payments to landowners, such as conservation easements and restoration contracts, through enrolling lands for conservation on a non-permanent basis. The Conservation Reserve Program (CRP), administered by the Farm Service Agency (FSA), encourages farmers to enroll erodible cropland into a reserve by paying the farmer for the reserved land. The CRP generally offers contracts of 10 to 15 years but also has authority to use easements in certain situations. Cost share may be available for restoration activities.

The Conservation Reserve Enhancement Program (CREP), also administered by the FSA, is a joint federal and state conservation program that targets significant environmental effects related to agriculture. The CREP enhances the CRP by offering additional rental payments and cost share for restoration. In Oregon, the CREP targets farmland adjacent to streams that provide habitat for salmon and trout which are listed, or proposed for listing, under the Endangered Species Act. The program is limited to 100,000 acres of eligible land.

The NRCS Wetlands Reserve Program offers conservation easements and restoration funding (see section 4 for more information). The U.S. Fish and Wildlife Service "Partners for Fish and Wildlife Program" provides up to $25,000 cost-share for restoration projects on land set aside for fish and wildlife habitat for at least 10 years.

Donation of land during the landowner's lifetime or as part of an estate may have tax benefits. The non-profit organizations listed under "Technical Assistance," (see below) as well as the U.S. Fish and Wildlife Service, Oregon Parks and Recreation Department, and local parks agencies may accept donations of land. These organizations may also have funds to purchase lands that have high conservation value. Donated lands need not have conservation value, as they can be sold to obtain funds for other land purchases.

Information on these and numerous other programs is available through the *For the Sake of the Salmon* website listed under Technical Assistance.

Regulatory Requirement

> Federal agencies conduct analysis and public review for land acquisition and restoration under the National Environmental Policy Act. State and federal permits required for restoration are described throughout this document.

Guidance and/or Considerations

1. Is the landowner willing to work with multiple parties to secure conservation easements or other state and federal incentives? Meeting a landowner's conservation and financial objectives for a piece of property may involve partnerships with one or more non-profit organizations and state and federal agencies. Tools such as conservation easements, land transfers and restoration may be combined to achieve these objectives.

2. Has the prospective landowner contacted the local watershed council and/or the SWCD regarding these and other restoration opportunities? In a given area, a watershed council or SWCD is a good place to identify land conservation opportunities in the context of watershed restoration goals.

3. Has the landowner considered that the improved condition of his/her land through non-permanent conservation programs may warrant maintaining the conservation practices on a more permanent basis? Landowners may reap significant benefits through tax incentives and restoration opportunities to improve the value of his/her land. Such landowners may then find more permanent conservation programs attractive.

4. Are the targeted lands in low-gradient areas, especially riparian areas, wetlands, floodplains, and tributary confluences? These lands have a high priority for conservation because they are especially productive aquatic habitats and help attenuate flood flows.

5. Conserving riparian lands and wetlands may provide landowners with benefits in addition to direct monetary payments. Reducing erosion and preventing property loss (through improved riparian function), increasing productivity on adjacent land (by re-establishing the water table), improving the quality of runoff entering the stream (possibly reducing the need for upland treatment), and reducing the need for pesticides on conserved land and adjacent farmland are some potential benefits.

Technical Assistance

Publications:

- Small, Stephen J. "Preserving Family Lands: Essential Tax Strategies for the Landowner" (Provides detailed strategies for using conservation easements to reduce taxes.) Order by calling 1-617-357-1644

Web Sites:

- *For the Sake of the Salmon*, Watershed Restoration Funding, www.4sos.org/homepage/watershed/funding.html.

Agencies:

Farm Service Agency – CRP and CREP, 503-692-3688
Natural Resource Conservation Service – CRP, CREP, WEP, 503-414-3085
USFWS

- Conservation easements, land donation or purchase, 503-231-6206
- Partners for Fish and Wildlife Program, 503-231-6179

Non-Profit Organizations:

Oregon Joint Venture: 503-697-3889
Oregon Nature Conservancy: 503-230-1221
The Trust for Public Land: 503-228-6620
The Wetlands Conservancy: 503-691-1394
Deschutes Basin Land Trust (Bend): 541-330-0017
Greenbelt Land Trust (Corvallis): 541-752-9609
McKenzie River Trust (Eugene): 541-345-2799
North Coast Land Conservancy (Astoria): 503-325-4059
Southern Oregon Land Conservancy (Ashland): 541-535-7750
Three Rivers Land Conservancy (Lake Oswego): 503-699-9825

In-channel Watershed Function

Beaver Management for Improving In-Channel and Wetland Habitat

Activity Description

The construction and maintenance of dams by beavers is a natural process benefiting coho salmon and other fish and wildlife species by creating beneficial pool and wetland habitat in many stream reaches. Management of beavers, such as closing specified areas to trapping, or transplanting beavers to establish new colonies, can be a stream habitat restoration activity. ODFW has the authority to regulate the trapping, hunting, and transplanting of beavers. Some areas of the state have been closed to beaver trapping partly on the basis of maintaining or restoring fish habitat.

Culvert and road modifications that accommodate beaver, placing in-stream or riparian structures to help beavers construct dams, and avoiding human development in beaver habitat (roads, buildings, plantations, or crops), can work in concert to increase natural benefits from beavers. ODFW has increased efforts to inform trappers, landowners, and interested entities on the benefits beavers can provide fish and wildlife habitat. Also available from ODFW is information on the potential for damage that beavers can cause to roads, crops, and property in specific situations, and the appropriate action needed from trappers, landowners, and others to address these situations. The goal is to maintain or improve the distribution and amount of beaver pond habitat without creating unacceptable risks of damage to other public and private resources.

Regulatory Requirement - Yes

> ODFW – Anyone who traps beaver must obtain a permit from a local ODFW wildlife biologist prior to the activity occurring. ODFW must be consulted and agree to any transportation or relocation of any beaver in the state.

Guidance and/or Considerations

1. Does the stream reach have appropriate size, gradient, and riparian vegetation to support beaver dam construction and maintenance?

2. Is a lack of rearing-pools limiting fish production? Will additional beaver dam pools cover up spawning areas and further limit fish production?

3. If beavers are already present, are they numerous enough and distributed well enough to maintain habitat benefits including dams that survive through the winter?

4. Will structure, such as larger pieces of wood, be placed in the stream to increase beaver dam durability in the winter?

5. Can the riparian area be improved to increase and sustain beaver dam construction?

6. How will the risk of losing habitat benefits as a result of beaver removal from legal and illegal trapping or hunting be addressed?

7. How will risks of plugged culverts, flooded roads, and damage to private crops and property be addressed? What non-lethal alternatives for damage control will be used? Examples include using tree and culvert protection devices, replacing culverts with bridges, and establishing greater setbacks for roads, buildings, and crops (including tree plantations). If

the project involves transplanting beavers, the area of potential damage should include lands several miles upstream and downstream from the receiving site.

8. If transplanting of beavers is proposed, what impact will removal have on the source area if beaver dams are also desired in the source area?

Technical Assistance

Publications:

- ODFW brochure: Beaver - Nature's Fish Habitat Contractor

Agencies:

ODFW

Instream Water Right Transfers and Leases

Activity Description

Under state law, water is allocated under the principle of "first in time, first in right." The first person to file for and obtain a water right on a stream is the last person to be denied water in times of low streamflows. Using this system, watermasters employed by WRD may stop the use of water by the newest water right holders in order to insure that the older users receive the water to which they are entitled. In some areas, by the end of the summer only enough water is available for uses first established in the 1800s.

Not until the 1950s was attention given to maintaining instream flows to protect fish, water quality, and recreation. By then, many of the state's streams were fully appropriated and not enough water remained to protect instream values. Legislative action in 1987 authorized WRD to issue water rights for instream uses that protect important public values. However, these instream water rights are junior to all prior uses and are frequently not met.

Restoration of streamflows may require establishing instream water rights which are senior to other uses of water. This can be accomplished by donating or purchasing out-of-stream rights and converting these rights to instream uses. In addition, instream water rights may be established through the allocation of conserved water.

Instream water rights established through lease or transfer retain the priority date of the originating water right. The priority date of an instream water right established through the allocation of conserved water can either be the same as, or one minute junior to, the originating water right. The Oregon Water Trust, a non-profit organization, and other groups can acquire out-of-stream water rights for conversion to instream rights.

Under the OPSW, WRD and ODFW have cooperatively established streamflow restoration priorities for coastal basin areas. WRD is working to identify restoration priorities for Columbia River tributaries.

Regulatory Requirements – Yes

> WRD – An instream water right may only be established after review and approval by WRD. Four legal mechanisms are available to change rights for out-of-stream uses into instream water rights:
>
> - Short-term lease
> - Short-term transfer
> - Transfer
> - Allocation of conserved water

Guidance and/or Considerations

1. Is low streamflow the limiting condition to recovery of aquatic-dependent habitat? Frequently, the loss of habitat is a result of other factors. For example, if the riparian condition is poor, the stream channel may be so wide and shallow and water temperatures so high that increases in flow may not materially improve habitat.

2. Will the conversion of an out-of-stream right to an instream water right yield increased streamflows during critical low flow periods? Can the converted water right be protected instream? Factors which affect the extent to which an instream water right will increase

streamflows include the relative priority dates of the water rights, the amounts of water allowed under the rights, and the location of the rights. Assistance in determining whether the right will yield increased streamflows can be obtained from the local WRD watermaster.

3. Will other water right holders be injured by converting an out-of-stream water right to an instream right? Under state law, WRD cannot allow a water right transfer, lease or allocation of conserved water if doing so would result in injury to an existing water right either junior or senior to the water right being converted. Injury determinations can be extremely complex. Assistance in assessing the potential for injury can be attained from WRD.

4. Has the area been designated a high priority for streamflow restoration under the OPSW?

Technical Assistance

Publications:

- Oregon Water Resources Department. April 1998. Using Oregon's Instream Leasing Program, Salem, OR.
- Oregon Water Resources Department. April 1998. Using the Allocation of Conserved Water Program, Salem, OR.
- Landry, Clay. 1998 Saving Our Streams Through Water Markets: A Practical Guide. Political Economy Research Center, Bozeman, MT.

Website:

- Streamflow Restoration Priorities
  http://www.dfw.state.or.us/hed/FlowRestore/index.html

Agencies

WRD, ODFW, Oregon Water Trust

Whole Channel Alterations

Activity Description

Moving, relocating, or reclaiming stream channels can involve significant alteration of channel form, removal of barriers to channel migration, and the introduction of new materials designed to enhance interactions between the channel and floodplain. Whole channel alteration often occurs after mining or large construction projects have ended to recreate stream habitat. Such alteration goes by various names, including stream reach restoration or stream channel restoration.

Whole channel alterations include restoring meanders in broad flood plain streams, realigning and moving stream channels, re-watering historic channels, dredging and re-sculpting stream channels, and creating or reconnecting side channels or removing side channels along stream reaches. Whole channel alterations may incorporate many of the other activities discussed in this guide such as bank stabilization, large wood placement and habitat construction. These types of projects, while possibly beneficial, also pose significant environmental risk and require careful consideration and regulatory scrutiny.

Regulatory Requirements - Yes

DSL - Permit; General Authorization for Fish Enhancement or Fill/Removal permit.
COE – Section 404 Permit

Considerations

1. Is the targeted stream reach too altered, or degraded, to recover naturally? Will the targeted stream recover with the aid of other techniques described in this guide? Full stream channel changes have the potential to recreate productive habitat in such areas. Selection of appropriate stream segments and adequate project design are critical to the success of these projects. Have the historical causes for the current condition of the channel, an analysis of the feasibility of the project, and assessment of all potential results of such a change been considered?

2. Has an adequate watershed assessment been completed indicating that whole channel changes are appropriate? Have other problems identified in the watershed assessment (water quality, fish passage, etc.) been addressed prior to, or in concurrence with, reach level restoration projects?

3. Is a full analysis of the hydrologic impact on ground and surface waters included in the planning for whole channel changes? Will an assessment of geomorphic processes across the valley floor and upslope areas be completed? Will the potential impact to channel and valley conditions upstream and downstream from the project area be included?

4. Are the principals involved in the proposed project qualified to analyze the geomophological dynamics of the stream? Channel changes or channel engineering has been conducted in the past based on relatively simple analysis of current and "desired" channel conditions by people unfamiliar with stream morphology dynamics. Such analysis is not adequate for projects funded under the OPSW.

Guidance

Altering whole channel habitat and floodplain function involves more than changes to the habitat's physical characteristics. An interdisciplinary team should be involved in the planning of any project because understanding channel geomorphology, hydraulics, riparian plant communities, wildlife habitat, and land use issues are needed. Where multiple landowners or interested parties are involved, the social and economic impacts of the project also should be considered.

Whole channel alterations will be among the most expensive undertaken. Relatively few opportunities to apply this approach under the OPSW are expected.

Each project should be considered as an experiment. A well-documented plan to monitor impacts on the channel, riparian community, and floodplain should be included in any project proposal. Since whole channel alteration usually involves habitat construction and other activities listed in this guide, the guidance for them should be adhered to as well.

Technical Assistance

Publications:

- Stream Corridor Restoration: Principles, Process and Practices, October 1998. Federal Interagency Stream Working Group.

Agencies:

ODFW, DSL, NRCS, USFS

Habitat Construction Projects

Activity Description

Habitat construction projects refer to activities that actively create habitat in the short term by directly altering the bed and banks of the stream. These projects can create desired habitat elements (such as deep pools or alcoves) immediately, as opposed to waiting for the watershed to recover such habitats slowly over time. However, these projects are generally temporary in nature.

Most habitat construction projects are designed to be rigid and unchanging over time. Because of this, these projects may interfere with the natural recovery process. For these reasons, general caution should be applied before proceeding with a habitat construction project. Some construction projects, such as anchored large wood and debris jam structures, attempt to imitate natural habitat elements and provide a jumpstart to help initiate natural stream recovery processes. Anchoring or hard-fixing habitat structures prevents the structure from drifting and/or interacting with the stream channel and/or floodplain at different flow levels. Added planning must be incorporated in the design phase to fully understand how the structure will perform in different flow regimes. Examples of construction projects include:

- Artificially anchored log, rootwad, and/or boulder structures.
- Pool construction.
- Alcove and side channel excavation.
- Miscellaneous "engineered" structures such as full spanning log or rock weirs, upstream and downstream "V" type structures and deflectors.
- Debris jam structures that rely on large rock, rebar and cable.

Building "alcoves" refers to creating new slack water areas in or connected with the stream by filling and removing soil from the stream and streambanks. Artificially anchored log, rootwad, and/or boulder structures refer to stabilizing wood and/or boulders with cable, jute rope, glue or rebar so they are fixed in position with little ability for movement or adjustment to the stream channel.

Regulatory Requirement - Yes

> DSL – Placement activities that are not conducted as part of a forest operation on non-federal lands must apply for, and receive, the DSL general authorization for fish enhancement or a Removal/Fill Permit.
>
> ODF – Placement activities conducted as part of a forest operation on non-federal lands must follow forest practice rules and regulations for notification and approved written plans.
>
> ODFW – In-Water Blasting Permit.

Guidance and/or Considerations

Wood and/or boulder placement projects that rely on the size of the material for stability, rather than anchoring with cables, are preferable because they tend to mimic natural habitat elements and stream processes better than anchored structures (see "Large Wood Placement" projects and "Boulder Placement" projects in this guide). Artificially anchoring instream structures in large streams (bankfull width >30 feet) is sometimes necessary because of the difficulty of acquiring and transporting adequate sizes of large woody material. Artificially anchoring structures may be

necessary in severely degraded stream reaches (i.e. bedrock dominated channels, deeply incised channels, artificially constrained reaches, etc.). Artificially anchoring structures could also be desirable based on potential impacts to downstream properties or facilities from alternative practices.

In some specific situations, such as urban streams or where the project may cause damage to private property or roads, it may be desirable to improve fish habitat conditions without trying to recreate natural stream conditions and processes. Habitat construction projects are likely to be the most appropriate option in these instances

Some key considerations for habitat construction projects include:

1. Is the lack of habitat to be constructed a contributing factor to the decline of the stream fisheries in the reach? Sometimes other factors such as high stream temperature or fish passage blockage may be a leading factor in the decline of fish. The habitat construction project would be of little consequence in these situations. Stream temperature information can be obtained from DEQ and information about fish passage and other limiting factors can be obtained from the local ODFW biologist.

2. Is this stream deficient in the habitat component that is being constructed? For instance, if pools are being constructed, are pools lacking in the stream? Expected occurrences of pools are variable with stream gradient, geology, and other characteristics.

3. Does the cause of the particular habitat deficiency make the habitat construction project necessary? Has the deficiency been clearly identified and addressed? Is upslope and riparian management in place to complement the project over time?

4. Is the proposed habitat construction project the optimal way to address degraded habitat conditions, or would alternative projects like riparian planting or large wood placement work?

5. Is the habitat construction project designed to mimic habitat elements that would naturally occur in this stream reach? For example, alcoves typically do not occur along streams in steep narrow valleys, but often occur along low gradient meandering streams associated with small springs or tributaries. High gradient reaches on large streams generally do not retain much instream large wood. Low gradient meadow streams rarely contain boulders. Projects that do not mimic natural habitat characteristics may provide temporary benefits but often do not provide long-term benefits.

6. Do the benefits of the habitat construction project outweigh the risks that the project poses? For streams that are in relatively good condition (e.g. large wood, pools, cover and other habitat components), does the construction project actually risk degrading habitat if it fails?

7. Will this project be self-maintaining through time? High flood flows and sediment transport often modify or destroy projects which are not designed to mimic naturally occurring habitat elements. For example, pool blasting and excavation is not recommended because they tend to be short lived. If the project is not self-maintaining is there a maintenance plan?

8. Do potential problems with adjacent landowners exist? Do downstream bridges and structures exist, or other stream uses present that may affect project design?

9. If standing trees will be used for the project, has proper consideration been given for their selection? For example, retained trees required on active forest operations for wildlife “leave trees” or riparian protection rule requirements cannot be removed. In general, live trees from

riparian areas require careful considerations when used in restoration projects. Trees leaning over the channel or immediately adjacent to the channel should not be used in habitat construction projects, because they are likely to enter the channel naturally anyway. Generally, for these activities, it is preferable if the trees can come from outside of the riparian area. Standing dead trees (snags) and downed wood near the stream in most situations should not be used. In addition, to minimize impacts to habitat function for wildlife, avoid taking trees with large limbs, hollow cavities, or broken or split tops.

Technical Assistance

Agencies:
ODFW, DSL, USFS

Large Wood Placement

Activity Description

Large wood (LW) placement activities improve fish habitat by replacing a critical habitat element reduced through past management practices such as stream clearing activities and splash dams. Introduced wood should be placed in the active channel and/or floodplain to mimic naturally occurring wood. LW placement projects referred to in this section are defined:

- by the size (length and diameter) of wood;
- as whole trees with limbs, and trees or logs with the rootwad attached for stability.

Large wood projects described in this section are expected to be unanchored, rather than anchored with cables. Unanchored wood will provide stability to the channel and provide a multitude of habitats in a wide range of streamflow levels. Projects which rely on cabling or boulders to stabilize introduced LW are described under Habitat Construction Projects.

LW placement activities are temporary enhancement measures designed to reload the stream channel and/or floodplain with large wood until the adjacent riparian and upslope areas begin to contribute these materials through natural processes. Placement activities should only be conducted in streams currently lacking in LW when such streams would otherwise naturally have wood. LW placement activities should be associated with accepted riparian and/or upslope restoration activities such as riparian vegetation planting to provide long-term sources of LW.

Regulatory Requirement - Yes

ODF - LW activities conducted as part of a forest operation on non-federal lands must follow forest practice rules and regulations for notification and approved written plans.

DSL - LW activities that are not conducted as part of a forest operation on non-federal lands must apply for and receive the DSL general authorization for fish enhancement.

Guidance and/or Considerations

The goal of LW placement is to load the stream with wood that can reconfigure to a limited degree and work with the natural stream flow to create pools, store gravel, and provide cover. LW placement projects tend to develop habitat over time rather than constructing the habitat directly. Wood placement projects that rely on the size of wood for stability, rather than anchoring with cables, are preferable.

In order to be considered a LW placement project, the wood length must be

1. at least two times the bankfull stream width (1.5 times the bankfull width for wood with rootwad attached);

2. meet diameter requirements and stream size and slope requirements outlined in the ODF and ODFW Large Wood Placement Guidance.

Some key considerations include:

1. Would this stream segment normally be expected to have LW? Is the stream segment expected to be responsive to wood inputs? Some meadow-based systems should not be expected to have large wood. High gradient reaches on large streams in many cases cannot

hold wood. Streams that naturally lack wood, or that are too steep or confined to be responsive to wood inputs, should not be candidates for wood placement.

2. Is the lack of wood a major contributing factor to the decline of the stream's fisheries in this reach? Have the causes of LW depletion been identified and addressed? Sometimes other factors such as high stream temperature or a fish passage blockage may be a more important factor in the decline of fish. The addition of wood is of little consequence in these circumstances. Stream temperature information can be obtained from DEQ and information about fish passage and other limiting factors can be obtained from the local ODFW biologist.

3. Is management for large wood recruitment in the upslope and riparian areas prescribed so that LW will be naturally recruited into the stream over time? Will the channel's bank stability and sediment dynamics stabilize as a result of the upslope and riparian prescriptions? In agricultural areas, a water quality management plan should be in the planning stages, or developed, that allows for riparian buffer areas to recruit wood as well as best management practices on the fields to protect against erosion.

4. Is the candidate stream reach currently depleted for LW compared to what can be expected? This can be examined by comparison with ODFW's "Aquatic Inventory Project Habitat" benchmark values. To be considered depleted, the reach should have less than 45 pieces of large wood (i.e. 6 inches or greater in diameter and 10 feet or greater in length) and/or less than 6 key pieces (i.e. at least 24 inches in diameter and greater length than the average bankfull channel width of the stream reach) per 1000 feet of stream. Wood loading for a given stream reach can be measured in the field or possibly obtained from the Aquatic Habitat Inventory surveys from ODFW. To give some perspective, the vast majority of stream reaches in state and private forestland in Oregon are considered LW "depleted." Please note, for many stream types such as natural meadows, rangelands, and large high gradient streams, wood loadings should be expected to be lower than these bench mark values.

5. Is the LW placement designed to mimic naturally occurring large wood? For example, in many instances structures that utilize 2 to 4 large key pieces with smaller materials intermixed provide better stability and habitat complexity as opposed to a single large piece.

6. Does the large wood to be placed meet or exceed the length and diameter required for stream width and gradient as specified in the ODF and ODFW guidelines?

7. If standing trees will be used for LW placement, has proper consideration been given for their selection? For example, retained trees required on active forest operations for wildlife "leave trees" or riparian protection rule requirements cannot be removed. In general, live trees from riparian areas require careful considerations when used in LW placement projects. Preferably the trees can be obtained from outside the riparian area. Standing dead trees (snags) and downed wood near the stream in most situations should not be used. In addition, to minimize impacts to habitat function for wildlife, avoid taking trees with large limbs, hollow cavities, or broken or split tops.

Technical Assistance

Publications:

- ODF and ODFW Large Wood Placement Guidelines
- ODFW Aquatic Inventory Project Habitat Benchmarks

Agencies:

ODFW, ODF, Local SWCD, USFS

Instream Boulder Placement

Activity Description

In those streams where boulders were artificially removed for management reasons such as channel cleaning, replacing boulders may be helpful. Boulder placement activities should only be conducted in channels where boulders would naturally be expected. Placed boulders should have similar configurations and characteristics to boulders that would exist in the stream naturally.

Regulatory Requirement - Yes

> ODF – Placement activities conducted as part of a forest operation on non-federal lands must follow forest practice rules and regulations for notification and approved written plans.
>
> DSL – Placement activities that are not conducted as part of a forest operation on non-federal lands must apply for and receive the DSL general authorization for fish enhancement.

Guidance and/or Considerations

The goal of placing boulders is to introduce structural materials that can reconfigure through natural stream fluctuations to help create pools, store gravel, and provide cover. Boulder placement projects tend to develop habitat over time rather than construct the habitat directly. Boulder placement projects that rely on the size of boulders for stability, rather than cable anchoring for stability, are preferable. Achieving this goal depends upon the availability of adequate sized rock, existing stream conditions, and downstream landowner and facilities concerns. Projects which rely on cabling or other anchoring devices to stabilize introduced boulders should receive more careful consideration.

The minimum boulder size for use in instream boulder placement should be at least one cubic yard (3'x3'x3'). Smaller sizes should be used only if a shear stress analysis of the stream reach shows that a smaller boulder would be stable at high flows.

Some key considerations for placing boulders include:

1. Would this stream segment normally be expected to contain boulders? Will the stream segment be responsive to boulder inputs? For instance, some meadow-based systems would not be expected to have boulders.

2. Is the lack of boulder-related habitat a major contributing factor to the decline of fish presence in the stream reach? Other factors, such as high stream temperatures or fish passage blockages, may be more important to the decline of fish. In these circumstances, the addition of boulders is of little or no benefit. Boulders may actually increase stream temperatures in such circumstances. Stream temperature information can be obtained from DEQ and information about fish passage and other limiting factors can be obtained from the local Oregon Department of Fish and Wildlife (ODFW) biologist.

3. Is the boulder placement project designed to mimic naturally occurring boulder groupings?

Technical Assistance

Agencies:

> ODFW, ODF, Local SWCD

Fish Passage Structures

Activity Description

Numerous streams contain small dams or other artificial barriers installed over the last century with inadequate natural fish passage (excluding road crossings, which are covered under "Correcting Road/Stream Crossing Problems"). If such structures have the potential to hinder or block the free movement of native fish up- or downstream, state law requires that fish passage (which may involve a fishway or fish ladder) be maintained (ORS 498.351 and 509.605). If a dam or artificial barrier must be retained, a sound technical design for fish passage must be developed. Removing the passage barrier should also be considered. Although fish passage facilities have been established over natural barriers in the past, ODFW's policy for the last decade has been to leave natural barriers in place (with rare exception) to protect unique populations of fish that have evolved in isolation above such barriers.

Regulatory Requirements – Yes

DSL – Permit to construct fish passage structure; General Authorization for Fish Enhancement or Removal/Fill permit

ODFW - 1) a determination that fish are present and that fish passage must be maintained; 2) an approval of a proposed fishway design, if one is required; and 3) a determination that the fishway, once constructed, is adequate and operated in an appropriate manner.

Guidance and/or Considerations

When fish passage facilities are planned or constructed around an in-channel barrier (temporary or permanent), the local ODFW District Fish Biologist should be contacted to:

- Determine what species of fish are present.
- Review passage structure designs, giving consideration to all native species.
- Obtain sources of technical assistance.

Technical assistance for the design of fish passage structures can also be obtained from the ODFW Fish Passage Coordinator (Portland Headquarters office).

Technical Assistance

Publications:

- Bates, K. 1992. Fishway Design Guidelines for Pacific Salmon – all aspects of fish passage and fishway design

Agencies:
ODFW, NMFS

Alternatives to Push-up Dams

Activity Description

Push-up dams are seasonal irrigation structures built to divert water for primarily agricultural purposes. These dams are usually constructed with on-site materials (usually a mix of boulders, cobble, gravel, and soils). Push up dams may:

- cause erosion;
- increase water temperatures;
- change stream channel characteristics;
- act as fish passage barriers;
- degrade water quality; and
- disrupt and destroy spawning and riparian habitat.

Proposed alternatives to push-up dams include:

1. "Infiltration gallery"[9] or other surface-to-hydraulically-connected ground water transfer.

2. "Point of diversion"[10] transfers including combining two or more diversions at one location.

3. Conversion from a gravity diversion to pumps.

Regulatory Requirement - Yes

> WRD – Approval of a point-of-diversion transfer will be required if the location of the diversion is changed. A transfer from surface water to hydraulically connected ground water will be required if an infiltration gallery or well is constructed.
>
> DSL – DSL permits may be required.

Guidance and/or Considerations

Alternatives to push-up dams are extremely site specific and can be very technical to apply. Alternatives require considerable coordination between several state agencies (DSL, ODFW, WRD and DEQ), federal agencies (BOR, NRCS and NMFS) and specialists with backgrounds in hydraulic engineering and geomorphology. Specific environmental questions such alternatives may need to address include:

1. Has fish passage and habitat-migration around the structure been assured?

2. Have impacts on spawning and rearing habitat been addressed? No loss of spawning or rearing habitat can occur.

3. Have water quality-temperature and sedimentation concerns been addressed?

4. Has the amount of water quantity in the stream been increased?

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[9] Please refer to the glossary in Appendix B
[10] Please refer to the glossary in Appendix B

5. Have long-term streambank stability and channel morphology influences been addressed? For example if a hardened surface is created at the point of diversion what effects will it have downstream on bank stability and channel morphology?

6. Has a long-term maintenance plan been developed and funded?

Technical Assistance

Publications:

- Pamphlet: Push-up Structures & Watershed Health, GWEB

Agencies:

WRD, ODFW, DSL, BOR, NRCS, Local SWCD

Salmonid Carcass Placement

Activity Description

When the number of spawning salmon that return to a stream is significantly below historical levels, research shows that natural salmon production can benefit from placing hatchery carcasses into streams as food and nutrient sources. Carcasses alone are not as helpful to juveniles as live spawning adults because redd construction dislodges insects and salmon eggs from the gravel, providing food for juveniles. However, carcasses provide nutrients to boost growth and survival when:

- juveniles feed directly on carcass tissue;
- they feed on organisms that consume carcass tissue; or
- they feed on organisms that incorporate nutrients derived from decomposition of carcasses within and adjacent to streams.

Juvenile salmonids may be specifically adapted to benefit from trace elements in adult salmonid tissues obtained in the ocean. Increased growth and survival of juveniles should result in more abundant, larger and healthier smolts that have higher survival rates in the ocean. Increasing the number of migrating smolts can increase the abundance of returning adults. Carcass placement should not be considered a long-term strategy to maintain salmon populations. It is simply a short-term technique to help boost critically low adult escapements back to self-sustaining levels.

ODFW is currently placing spawned salmon and steelhead carcasses from some hatcheries into spawning areas of selected streams during the normal spawning season. Carcass placement occurs under a permit issued by DEQ that includes monitoring requirements. Volunteers are helping to distribute the carcasses along the streams and monitor results. ODFW and DEQ solicit recommendations from any interested parties for when and where hatchery carcasses should be placed in a stream to help compensate for low numbers of naturally spawning salmonids.

Regulatory Requirement – Yes

> DEQ – The Federal Clean Water Act and ORS 468B.050 require a permit for discharge of pollutants, including hatchery salmon and steelhead carcasses. ODFW has a National Pollutant Discharge Elimination System (NPDES) permit from DEQ to place carcasses from its hatcheries in selected streams of Oregon with the help of other organizations and volunteers, as modified and described in annual Memorandums of Agreement between DEQ and ODFW. An ODFW fish pathologist must approve hatchery carcass placement from each hatchery. Such approval is based on a minimum sample of fish tested for fish pathogens and an overall evaluation of the risk of spreading fish diseases.

Guidance and/or Considerations

1. Are the current number of spawners per mile substantially below historic levels for the proposed area of carcass placement? Are proposed numbers or pounds of carcasses to be placed in the range of historic densities per stream mile?

2. Is the proposed placement location above or within known spawning areas for the species? Is the proposed placement timing consistent with spawning timing for the species?

3. How will the carcass placement be distributed along the stream to simulate the distribution of naturally spawned fish?

4. Is the source of hatchery carcasses in the same watershed or river basin as the proposed placement location? Have the carcasses been approved for placement by an ODFW fish pathologist?

5. Have landowners and managers agreed to placing carcasses in a stream traversing their land? Have landowners or managers, with land downstream of the proposed placement site, been notified of the program and the possibility that hatchery carcasses may wash onto their land? Have these landowners agreed to the placement plan?

Technical Assistance

Publications:

- 1997 NPDES Permit and annual Memorandums of Agreement between ODFW and DEQ for placement of hatchery carcasses in Oregon streams.

Agencies:

ODFW, DEQ

Artificial Bank Stabilization

Activity Description

As with all structural work in a stream or river channel, serious consideration should be given to the need for any repair (stabilization) of the bank. Some situations exist where artificially stabilizing a riverbank may be necessary for various biological reasons. In most situations, leaving the bank alone or considering projects such as riparian planting are better alternatives. Often the streambank damage is actually caused by some larger watershed condition or some avoidable human-caused problem. Sometimes the symptom is repaired without recognition or investigation of the underlying "problem." Often applying such a band-aid does not improve the root problem: sometimes it makes the root problem worse. Until recently, engineers designing bank protections and funding communities gave little thought to the needs of fish and wildlife. Streambank erosion *is* a natural process.

In most cases bank stabilization is conducted to protect property from erosion rather than addressing concerns regarding excess sediment. For this reason, bank stability projects generally will not be considered restoration.

Several techniques for bank stabilization are available including bioengineering, bank sloping, in-stream barbs and riprapping. Many bank stabilization approaches use various combinations of these four methods. Following is a general description of each. Techniques that incorporate vegetation are preferred.

- "Bioengineering" uses some of the natural functions of vegetation and the rooting qualities of certain types of vegetation to mechanically reinforce soil particles. Woody vegetation can also act as a buttressing agent or infrastructure upon which other materials can be used for stabilization when it is embedded in the soil.

- "Bank sloping" pulls back the bank's side slope to reduce the shear stress and erosion from the hydraulic forces of the stream.

- "Instream barbs" use hard material (i.e. large rock or wood) constructed at a specific angle relative to the direction of the stream flow. These structures either direct flow at the bottom of the channel away from the bank, roughen the channel to reduce the stream's energy, or provide an area for the stream to deposit sediment. Generally a barb (or series of barbs), when installed, will do all three.

- "Riprapping" places angular, erosion resistant rock along a bank in such a way that the rocks lock together to provide an erosion resistant wall. This technique used alone is not considered restoration.

Other approaches can be used that provide resistance to the erosive forces of moving water similar to the four approaches listed above. For further information, consult one of the technical publications listed below.

Regulatory Requirement - Yes

DSL - General Authorization Permit or Removal/Fill Permit for Erosion Control

Guidance and/or Considerations

1. Is the proposed bank stabilization project the optimal way to address bank erosion or would alternative projects like riparian planting and fencing work as well to address bank stability?

2. Are sediment levels excessive within the stream reach/watershed and contributing to the decline of stream productivity? Other factors such as high stream temperature, lack of large wood, or a fish passage blockage may contribute more to the decline of fish. A bank stability project in such situations would provide little benefit. Stream temperature information can be obtained from DEQ and information about fish passage and other limiting factors can be obtained from the local ODFW biologist.

3. Are the materials used for bank stabilization similar to materials found in the bank naturally? For instance, boulder rip-rap in a meadow system creates a hard point over time that the stream will migrate away from as it meanders. Does the project include site-appropriate plant species, or shrubs or trees, as part of the structural materials in order to ameliorate the overall impacts?

4. Is this project self maintaining through time? If not, has a maintenance plan been developed?

5. Do the benefits of the bank stabilization project outweigh the ecological risks that the project poses? The degree of risk is high because these types of projects impede natural processes, and if the project fails it may actually degrade habitat. To explore this issue, advanced analysis of the stream reach and its needs must be undertaken.

Technical Assistance

Publications:

- Stream Corridor Restoration: Principles, Processes and Practices, October 1998. Federal Interagency Stream Restoration Working Group.
- General Authorization Guidelines for Erosion Control (DSL)

Agencies:

NRCS, Local SWCD, ODFW

Developing Total Maximum Daily Loads for Water Quality Limited Streams

Activity Description

The federal Clean Water Act requires each state to submit a list of waterbodies not meeting water quality standards to the U.S. Environmental Protection Agency every two years. Once a stream is placed on the list, the state must develop a plan to improve water quality. This plan is referred to as a *Total Maximum Daily Load,* or "TMDL."

TMDLs:
- determine how much pollution a river can handle from all sources and
- then allocate the amount a particular pollutant will be allowed to enter the water.

Key components of the final TMDL plan may include "SB 1010 plans" for agricultural land (see "Grazing Management Plans" in this Guide), the Forest Practices Act BMPs (see Appendix C) for state and private forest lands, federal water quality management plans for federal lands, and discharge permit modifications for industries and cities.

Regulatory Requirements – Yes

EPA – Federal law requires that waters on the 303(d) list be prioritized. Those higher on the priority list are deemed to be in more urgent need of TMDLs or equivalent measures. However, watershed stewards are encouraged to address water quality problems on any waterbody on the list as soon as possible, regardless of how it may be prioritized. Finalized TMDL plans must be submitted for EPA approval.

Guidance and/or Consideration

1. Is the targeted stream listed on DEQ's "303(d) list" of water quality impaired streams? If so, a TMDL will need to be developed.

2. Has the local DEQ field staff been contacted for information and guidance?

Development of TMDLs involves the following steps:

1. Determine the maximum amount of pollutants from surface runoff sources (including natural background) and pipe outflows that may enter the stream.. This total calculation must include a margin of safety in the event that the process used to calculate the total pollutant amounts was not accurate. In such situations, the safety margin provides assurance that water quality will still be restored under the plan. This step usually involves data collection and some type of watershed modeling to identify the maximum pollution contributed.

2. Work with watershed councils and the public to allocate the maximum allowable load among the various pollutant contributors so once these allocations are met water quality standards will no longer be violated. Standards may be defined by the Forest Practices Act, Agricultural Management Plans, National Pollution Discharge Elimination Permits for point source facilities, and other federal and local plans and ordinances.

3. Submit a finalized TMDL plan to the U.S. EPA for approval. Once a TMDL plan is approved, the allowable pollutant loads become the mechanism for meeting water quality standards in the targeted watershed or stream.

4. The TMDL must include information that defends the total allocation and must be accompanied by an implementation plan that outlines how the TMDL allocations will be met.

Technical Assistance

Publications:

- Oregon's Approved 1998 Section 303(d) List of Water Quality Limited Waterbodies. DEQ Guidance for Developing Water Quality Management Plans that will Function as TMDLs for Nonpoint Sources.

Agencies:

DEQ, with the help of all other land management and resource management agencies, and community-based advisory committees.

Section 3

Overview of Agency Regulatory Functions In Regard to Restoration And Sources of Assistance With Regulatory Requirements

Oregon Division of State Lands (DSL)

The Oregon Division of State Lands is the lead state agency regulating "fill and removal" activities for stream or watershed restoration. DSL works in conjunction with the US Army Corps of Engineers (ACOE) in regulating fill and removal activities in waters of the state. This jurisdiction extends to the bankfull stage, mean high water or high tide line, or to the line of non-aquatic vegetation - whichever is higher. However if the activity involves filling or removing less than 50 cubic yards and is not in Essential Salmonid Habitat or in a State Scenic Waterway, DSL does not have jurisdiction.

The purpose of the Fill and Removal Law is to ensure that Oregon's water resources are conserved, protected and managed for the benefit of present and future generations. To accomplish this purpose, DSL (in conjunction with the ACOE) reviews fill and removal permit applications and determines whether to issue or deny permits. Blank DSL/ACOE Joint Applications are available at: The Division of State Lands, 775 Summer St. NE, Salem, OR 97310, also at the DSL field office, 20300 Empire Ave., #B-1 Bend, OR 97701. Blank joint applications are also available at district ODFW offices and Soil and Water Conservation District (SWCD) offices. In its review, DSL obtains the views of affected property owners, agencies and interest groups.

DSL's policy is to work with applicants to assist in designing worthwhile projects which will have a minimum effect on water resources and adjacent properties. In general, the process to obtain a standard fill and removal permit takes 45 to 90 days to process, including review by resource agencies and interested/affected parties. Expedited processes for stream enhancement activities as well as erosion control and road building projects are also available. These expedited processes decrease the review time to facilitate habitat enhancement projects. In order to meet the requirements of the streamlined process, the project must be found to "not adversely affect state or federal endangered species or their critical habitat" among other requirements.

The streamlined DSL permitting processes are established by OAR 141-89-005 (General Authorization for Fish Habitat Enhancement), OAR 141-89-0010 (General Authorization for Erosion Control), OAR 141-89-0015 (General Authorization for Road Construction) and OAR 141-89-0020 (General Authorization for Wetland Restoration and Enhancement). These processes require the review, and in some situations, the signature of an ODFW representative, a local planning department representative, a local SWCD representative, and a DSL representative. A streamlined or expedited permit can be issued or denied within 15 working days of receipt of application.

Oregon Department of Forestry (ODF)

The ODF administers the Oregon Forest Practices Act (FPA) on private, state and local government lands. "Forest practices" refers to the way in which forest operations are conducted on these lands. These operations can involve a number of activities including harvesting, reforestation, road construction, application of chemicals and slash disposal.

Forest operations are mostly exempted by ORS 196.905(2) from the DSL fill and removal permit requirement except for fill or removal that would occur in navigable waters. Additional DSL permit requirements exist for forest operations that fill or remove materials within state scenic waterways. Restoration activities associated with a forest operation are regulated by ODF through the FPA. Restoration projects connected to a forest operation require that the activity be described in a written plan approved by ODF. An approved written plan for "Large Wood placement" projects must meet the standards contained in "A Guide to Placing Large Wood in Streams" (ODF/ODFW 1995).

While most restoration activities directly connected to forest operations are exempt from DSL fill and removal permit requirements, they are not exempt from the Scenic Waterways Program. To the extent that enhancement activities, including instream activities, affect "related adjacent lands" (above the ordinary high water), review and "clearance" of a proposed enhancement project must be obtained from the Oregon Parks and Recreation District (OPRD). Since nearly all restoration activities will affect "related adjacent lands," OPRD review and clearance should be planned for all restoration activities within or adjacent to State Scenic Waterways.

Oregon Department of Fish and Wildlife (ODFW)

In relation to stream habitat restoration work, ODFW's main role is to provide technical advice on how to design and implement projects that are the most beneficial to fish and other wildlife associated with aquatic and riparian environments. ODFW is mandated by the Oregon Legislature through the Wildlife Policy (ORS 496.012) and Food Fish Management Policy (ORS 506.109) to manage fishery resources, prevent the serious depletion of any indigenous species and to provide the optimum recreational, commercial, and aesthetic benefits for present and future generations of citizens.

The agency has direct authority related to physical alteration of stream habitat under Oregon legislative statutes. These statutes require the provision of a fish passage that meets criteria set by ODFW at any artificial obstruction placed across a stream. They require all water diversions to be screened where the possibility of diverting game fish exists. State statutes also require permission from ODFW prior to any use of explosives in streams. However, other state agencies with authority to issue permits or approve plans to alter streams and adjacent landscapes, such as Department of Forestry and Division of State Lands, have adopted rules requiring consultation with ODFW prior to such approval or issuance of permits. As part of this consultation, ODFW has set guidelines for the allowable time period when in-water work can be conducted, (Oregon Guidelines For Timing of In-Water Work To Protect Fish and Wildlife Resources), such as, in-channel habitat restoration work. ODFW can grant waivers to allow work outside these guidelines.

Dams constructed and maintained by beavers create pool and wetland habitats. This is a natural process benefiting fish and other wildlife in many stream reaches. Management of beavers, such as closing specified areas to trapping or transplanting beavers to other areas, can be a stream habitat restoration activity, and ODFW has the authority to regulate the trapping, hunting, and transplanting of beavers.

The placement of hatchery salmon and steelhead carcasses in stream reaches where they have naturally occurred during years with high numbers of returning wild spawners is also an important restoration activity. While DEQ has overall authority to control distribution of hatchery carcasses based on risks to water quality, ODFW has authority to control distribution of carcasses based on risks associated with any fish disease in these carcasses.

Oregon Department of Environmental Quality (DEQ)

The DEQ is the state agency responsible for protecting, restoring, and enhancing Oregon's public water for a wide range of uses. DEQ and the Environmental Quality Commission set water quality standards to protect "beneficial uses" such as salmonid habitat, drinking water supplies, and recreational activities. DEQ works with other agencies that oversee forestry, agriculture, and urban activities to protect watersheds. Examples of DEQ's watershed protection activities include coordinated watershed enhancement and protection projects, education to land managers and the general public, projects that demonstrate good land management practices, and the enforcement of standards and regulations.

DEQ also has programs to work directly with aquatic habitat restoration. These include review of 401 certification, water quality monitoring and assessment, development of water quality management plans to restore water quality (TMDLs), and providing technical and financial assistance for restoration activities.

DEQ evaluates Section 404 removal/fill applications permitted by the Army Corps of Engineers for water quality certification . In general, this pollution prevention program is designed to protect water quality and beneficial uses from construction or other activities which may impact state waters. Impacts can be temporary, continuing, and/or cumulative.

It should be noted that the 401 certification program, as a counterpart to the National Pollution Discharge Elimination System point source permitting program, has the potential to protect water quality from non-point source pollution in areas where no other permitting programs presently exist. Activities can be certified, certified with conditions, denied, or waived through the 401 certification process.

Project types evaluated include: wetland fills; channel dredging; bank stabilization; pipeline trenches; roads and bridge construction; survey activities; outfall construction; boat ramps, pilings and other structures; emergency watershed protection including restoration projects that may involve any of the listed activities. Many of the federal dredge and fill permits which DEQ evaluates for 401 certification are handled jointly through the Oregon Division of State Lands (DSL) and the US Army Corps of Engineers (ACOE).

Under the Clean Water Act, DEQ is required to identify streams and lakes that have water quality impairments and to develop management plans that will address these water quality problems. Known as TMDLs (total maximum daily loads), these plans identify the total amount of pollutants that can be introduced into the waterbody without causing pollution. TMDLs then allocate allowable amounts of this pollutant that various contributors in a watershed can discharge. TMDLs then identify how these allocations will be met. TMDLs are extensive efforts involving agencies, industries and other stakeholders in the watershed. The plans must eventually be approved by the US EPA. They then become part of the water quality standards for that basin.

Assistance is offered to watershed councils and other interested parties from DEQ staff for monitoring, developing watershed restoration plans, and providing assistance in the preparation of grant applications to fund projects. DEQ is involved with two major funding sources for the OPSW, GWEB funds and EPA 319 funds. DEQ staff provide assistance to the GWEB program, helping to develop goals and reviewing projects and oversees the distribution of federal section 319 funds to address nonpoint pollution sources (see Section 4, "Grants and Assistance"). DEQ Healthy Streams Partnership personnel provide assistance to watershed councils in developing and submitting proposals for both 319 and GWEB funding sources.

Water quality monitoring is essential for identifying water quality problems and for tracking changes over time. In support of the OPSWand local watershed councils, DEQ and other state agencies plan and conduct monitoring programs to assess progress in meeting TMDL targets required under Section 303(d) of the Clean Water Act, and to determine general trends in watershed health.

Oregon Department of Agriculture (ODA)

The Oregon Department of Agriculture provides financial and administrative support to local Soil and Water Conservation Districts (SWCDs). The ODA is also responsible for statewide oversight of Confined Animal Feeding Operations (CAFOs) and for guiding the development of Agriculture Water Quality Management Area plans (SB 1010) in water quality limited basins. Implementation of the SB 1010 plans will be coordinated by the SWCDs acting as the local management agency for the ODA.

The SWCDs and ODA work in partnership with the USDA Natural Resource Conservation Service and the Cooperative Extension Service to provide valuable education, research, demonstration projects, technical assistance and regulatory guidance on erosion control, livestock operations, vegetation management, water conservation, pesticide and fertilizer application and other agricultural activities related to water quality.

Oregon Water Resources Department (WRD)

The Oregon Water Resources Department is the primary agency responsible for administering Oregon's water code. The water code is based on the doctrine of prior appropriation, which provides a structured, legal mechanism for the management of streamflows and water use. In theory, the doctrine is simple. In water-short times, the appropriator with the oldest - most "senior" - water right can demand the full allocation of water specified under the right regardless of the needs of the other users. If there is water in excess of the needs of this senior right holder, the person with the next oldest priority date can take as much as necessary to satisfy needs under that right, and so on down the line until all needs are met, or until no water is available. Junior water right holders are protected by laws that prohibit senior users from making changes in use that harm junior users. The primary responsibility for enforcing this water law resides with the WRD watermasters and their county assistants.

WRD also is responsible for determining if new water rights should be issued for domestic, municipal, agricultural, industrial, or other out-of-stream uses. Since 1987, instream uses including fishery, water quality and recreational uses can also obtain water rights. These new rights are the responsibility of WRD, as well. Before issuing a new water right, the application must undergo a thorough technical and public interest review. A positive technical review must show: 1) that there is water available for a given month at least 80 percent of the time (4 out of 5 years on average), including instream water rights and pending applications; 2) that there are no statutory restrictions against the use; 3) that the use conforms with all rules of WRD; and 4) that the use will not impair or be detrimental to the public interest.

Even though a water right is attached to the land on which it was established, water cannot be used in any manner in which the right holder desires. The water can only be used for the purpose identified in the water right in an amount up to that specified in the right. In addition, water must be used beneficially and without waste. The water right holder must file a transfer application with WRD to change a point of diversion, point of appropriation, the type of use, the place of use, or any combination of these. Applications to transfer water rights are reviewed by WRD to ensure that other water right holders are not injured by the proposed change.

Department of Land Conservation and Development (DLCD)

DLCD has no *direct* regulatory authority over habitat restoration. Instead, Oregon's Statewide Planning Goals, which are administered by DLCD, govern comprehensive planning and land use decisions by local governments and state agencies. Two specific references address restoration sites and restoration activities in the Goals. In order to determine how the goals may affect a

restoration project, project sponsors need to check with the planning office for the jurisdiction in which the project takes place. For estuarine projects, check with the county planning office.

- The Goal 5 Administrative Rules relating to riparian corridors provide an incentive, in very limited cases, for restoring riparian vegetation. Specifically, authorization to reduce the required riparian setback "upon a demonstration that equal or better protection for identified resources will be ensured through restoration of riparian areas, enhanced buffer treatment, or similar measures." OAR 660-20-090(8)(e) may be granted to a local program if the intent is to protect significant riparian corridors adjacent to streams with at least 1000 cubic feet per second average annual flow.

- Goal 16: *Estuarine Resources* relates to development of estuary management plans by local governments. In part, the objective is to restore estuarine functions where appropriate. The goal directs state and federal agencies to "assist local government in identifying areas for restoration." Estuary management plans are in effect for all of Oregon's estuaries. Those plans which provide for some level of estuary development include potential sites reserved for *mitigation* (see below), but none of the plans specifically identifies sites for restoration. DLCD, with the assistance of the National Ocean Service and other interested parties, is developing a database of sites suitable for estuarine restoration in selected estuaries; the database is expected to be available late in the year 2000.

Both Goals 16: *Estuarine Resources* and 17: *Coastal Shorelands* contain provisions related to *mitigation*. In the context of the Statewide Planning Goals, *mitigation* refers to enhancement or restoration of a site in conjunction with a specific estuarine development activity in tidal marshes. Goal 17 requires estuary management plans to designate shoreland areas for potential mitigation and to protect those sites from preemptory uses. Therefore, mitigation typically produces no net ecological benefit. In some cases, restoration of a designated mitigation site cannot occur in the absence of the development activity being mitigated.

Local Government

Local governments in Oregon have a broad range of authorities and responsibilities which could apply to restoration projects. These include land use planning, storm drain system planning and maintenance, flood management, road system operation and maintenance, and water and sewer system operation and maintenance. Administration of local authorities will be almost unique from jurisdiction to jurisdiction. Restoration projects that occur under one or more authority may need to be reviewed by planning or engineering officials for the jurisdiction in which the project is located.

Federal Regulatory Processes

Endangered Species Act (ESA) - Any activity that has a federal connection, i.e., permitted, funded or authorized by a federal agency in whole or in part, is required to consult with NMFS/USFWS if the action takes place in an area where fish or their habitat are listed under the ESA and the action is determined to affect the species or its habitat. If a project is conducted on federal land or by a federal agency, NMFS/USFWS will consult.

Project Review Process

Projects that have a federal connection (e.g. either administered through a federal agency or occurring on federal land) and are determined to have some effect on listed species or their habitat undergo *Section 7* informal consultation (Section 7 of the ESA deals with Federal Actions and Consultations). Typically a *Biological Assessment* (BA) is prepared and submitted to support the action agency's determination. If NMFS/USFWS agrees with the action agency's determination a letter of concurrence is issued, and the project then goes forward. Projects are

elevated to formal consultation if a determination shows the likelihood of an adverse impact. Once an adequate BA is received the informal consultation process normally takes between 30 and 90 days.

Projects that are found to have an adverse effect on listed species or their habitat undergo Section 7 formal consultation. Again a BA is prepared by the action agency. Once the BA is found to be acceptable (i.e. it contains all the needed information) NMFS and/or USFWS prepares a *Biological Opinion* concluding in agreement or disagreement with the action agency's determination. Depending on the outcome of the Biological Opinion the project may be modified and implemented. This process normally takes 145 days.

If a species is listed under the Federal ESA as "threatened" (as in the case of the coastal coho Southern Oregon/Northern California, or "SONC" Evolutionarily Significant Unit) then a "4(d) rule" may be promulgated. There is a 4(d) rule for SONC coho (62 FR 38479, July 18, 1997). Under section 4(d) of the ESA, the Secretary of Interior or Commerce is required to adopt such regulations as he deems necessary and advisable for the conservation of species listed as threatened. This rule allows NMFS to provide exceptions from Section 9 take prohibitions (Section 9 of the ESA deals with prohibited acts).

If a species is listed under the Federal ESA as "endangered" (as in the case of the Umpqua cutthroat trout), there are no provisions for a 4(d) rule or its exceptions from Section 9 take. In order to get approval for incidental or direct take of listed species, the permitting and planning process described in Sections 7 (described above) or 10 of the ESA must be undertaken (Section 10 deals with Exceptions and Permits). The most familiar of these processes is the Habitat Conservation Plan. There are also incidental take permits and conservation plans associated with programs such as the Umpqua recreational fishery.

The following two Web sites provide information regarding current listings:

- www.fws.gov/r9endspp/statl-r1.html
- www.nwr.noaa.gov/1salmon/salmesa/index.htm

National Marine Fisheries Service (NMFS)

The National Oceanic and Atmospheric Administration (NOAA) is located within the U.S. Department of Commerce. Its mission is to conserve and wisely manage the Nation's coastal and marine resources.

The NOAA line office most directly involved with the OPSW is the National Marine Fisheries Service (NMFS), which is charged with stewardship of living marine resources through conservation, management, and promoting the health of the targeted species' environment. The principal authorities under which NMFS operates are *the Magnuson Fishery Conservation and Management Act, the Endangered Species Act, the Marine Mammal Protection Act, and the Fish and Wildlife Coordination Act*. Under the *Magnuson Act*, NMFS regulates fisheries within the U.S. exclusive economic zone. Under the *Endangered Species Act,* NMFS is responsible for the conservation of most marine mammals and marine and certain anadromous fish species. Management and conservation plans for the resources under NMFS' authority are developed through extensive discussions with state, tribal, and other Federal government agencies, as well as with fishers, processors, marketers, public interest groups, universities, and international science and management organizations.

NMFS contributes to the OPSW through financial and technical assistance to state and private entities. NMFS has provided funding for watershed coordinator positions, the "Hire the Fisher" program, *For Sake of Salmon*, several watershed workshops, and on-going financial support of some watershed council planning activities. NMFS also funded $1.96 million through the *Mitchell Act* to construct and replace irrigation diversion screening and fishways and to maintain existing screens and fishways in Oregon. To ensure efficient fish passage into Willamette Basin, NMFS has provided $4.8 million to repair the flood-damaged Willamette Falls fishway. (A total of $8.2 million will have been spent when construction is complete in 2002). Additional monies are also provided to state and federal fish hatcheries. NMFS also provides both biological and engineering technical support through interaction with watershed councils and state and federal agencies via the Regional Ecosystem Office, National Estuary Program, implementation of the ESA, section 404 permit review under the *Clean Water Act*, Section 10 under the *ESA* and the licensing/relicensing process conducted by the Federal Energy Regulatory Commission.

Section 9 of the ESA prohibits "take" of endangered species. In some cases, "take" of threatened species is also prohibited. "Take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect. "Harm" may include habitat modification or degradation that actually kills or injures a listed species by significantly impairing essential behavioral patterns such as breeding, spawning, rearing, migrating, feeding, or sheltering. Any act that causes habitat degradation that actually kills or inures a species listed as endangered is prohibited by the ESA, and where the listing agency has prohibited "take" by rule for threatened species, such actions are also prohibited.

Acceptable levels of incidental take may be allowed under the authorities of ESA Sections 4(d), 7(b) (federal consultation, discussed above), or 10(a)(incidental take permit associated with a conservation plan). Certain types of take may selectively be allowed for threatened species under a 4(d) rule, through defined exceptions. NMFS expects its 4(d) regulations for threatened species to identify those habitat restoration actions that may proceed without a Section 10 permit prior to completion of a watershed plan, and to provide an exception for actions in accord with an adequate watershed plan once watershed assessment and planning is complete.

Any entity engaged in restoration activities is strongly encouraged to contact NMFS, the USFWS or ODFW to get assistance in determining whether listed species occur in the project area. NMFS will work with the project managers to identify ways to avoid take and/or reduce adverse impacts to listed species or their habitats. If take is likely to be unavoidable, then the project managers should apply for an incidental take permit from NMFS, unless the action comes within an exception provided in a 4(d) rule for threatened salmonids. A project that is the subject of a completed consultation because of its federal connection may also gain an exception.

United States Fish and Wildlife Service (USFWS)

The mission of the U.S. Fish and Wildlife Service is to work with others to conserve, protect, and enhance fish and wildlife and their habitats. The Service implements the ESA for plants, animals, and migratory birds; and administers the National Wildlife Refuges and National Fish Hatcheries. (Marine and anadromous fishes, and most marine mammals are not the charge of the USFWS. See the NMFS discussion above). USFWS contributes to the OPSW through technical and financial assistance to watershed councils, conservation planning for at-risk species, Northwest Forest Plan implementation, land acquisition restoration for National Wildlife Refuges, response to contaminant spills and hazard waste sites, assessment of impacts to water quality, and outreach and education.

The Service administers restoration programs on non-federal lands. The Jobs-in-the-Woods Program supports watershed and aquatic habitat restoration in communities affected by

reductions in timber harvest on federal lands due to the Northwest Forest Plan. The "Partners for Fish and Wildlife Program" emphasizes environmental restoration and education in the Portland metropolitan area. In addition, where possible, the Service develops conservation agreements with private landowners to protect and restore the habitats of at-risk species.

The project design criteria in Appendix E is provided by the Service to inform restoration project sponsors of situations in which incidental take of, or adverse effects to, state and federal threatened, endangered, candidate and proposed species may occur. Additional information on the distribution and habitats of these species may be obtained from the Service. Project sponsors are encouraged to contact ODFW or the Service to determine whether such species occur in proposed project areas and identify ways to avoid take or adverse effects. Potential ways to benefit these species can also be explored. Take of a federally listed threatened or endangered fish or wildlife species is prohibited by section 9 of the ESA. If take of such species is likely to be unavoidable, project sponsors should apply for an incidental take permit from the Service.

Army Corps of Engineers (ACOE)

The Army Corps of Engineers is the lead federal agency in regulating fill and dredging activities in waters of the United States. Such waters include navigable coastal and inland waters including lakes, rivers, streams and their tributaries, interstate waters and their tributaries, and wetlands adjacent to navigable and interstate waters. Isolated wetlands and lakes, and intermittent streams are also regulated by ACOE if their degradation could adversely affect interstate commerce. ACOE works closely with DSL in regulating fill and removal activities in Oregon through its 404 permitting process. Section 404 of the Clean Water Act governs disposal of dredged or fill materials in US waters. Joint DSL/ACOE 404 applications are available from DSL, district ODFW offices and SWCD offices. Anyone planning to work in US waters must first obtain a permit from ACOE. A permit must be found to be in the public interest, and a variety of factors are considered in making permit decisions.

Assistance with Regulatory Requirements

Both local watershed councils and SWCDs can provide assistance to landowners to identify regulatory requirements and agencies depending on the type of restoration project contemplated. Councils and SWCDs have no regulatory authority of their own. A list of these entities is provided in Appendix C.

Soil and Water Conservation Districts

There are 45 Soil and Water Conservation Districts (SWCD) in Oregon (see Appendix C for list). A locally elected board provides SWCD leadership in each district. SWCDs are well positioned to assist landowners with design and implementation of restoration projects, particularly on agricultural lands. SWCDs have access to the technical resources of the Natural Resources Conservation Service. In addition most SWCDs have watershed technical specialists on staff. Some districts also have staff who can assist with grant writing a and who can direct landowners to numerous incentive programs available to help fund restoration work on private lands. SWCDs can apply for grants on behalf of landowners. SWCD staff can also assist landowners with the necessary permit or other regulatory requirements associated with projects. SWCDs have no regulatory authority related to restoration projects.

Local Watershed Councils

There are 85 local watershed councils in Oregon (see Appendix C for list). Each council consists of landowners and stakeholders in the watershed. Councils assess watershed conditions, develop watershed action plans, monitor watershed conditions for baseline data and effectiveness

monitoring. Watershed Councils also conduct outreach and education activities. Most councils work with technical advisory committees who can provide assistance to landowners or can contact other agency personnel to provide that assistance. This assistance can be used to design and implement appropriate projects. Council staff can assist landowners with grant writing or apply for grants on behalf of landowners. Councils can also assist landowners in identifying incentive programs available to the landowners as well as assisting with permitting and other regulatory requirements associated with projects. Councils have no regulatory authority related to restoration projects.

Other Agency Assistance Available

While the agencies identified above have regulatory requirements associated with projects in these guidelines, several other agencies may be able to provide information, or management, technical or financial assistance. Below is a list of these agencies.

Federal
Bureau of Land Management
Forest Service
Bureau of Reclamation
Natural Resources Conservation Service
Farm Service Agency
Bonneville Power Administration/Northwest Power Planning Council
Environmental Protection Agency
National Park Service
Bureau of Indian Services

State
Department of Geology and Mineral Industries
Economic Development Department
Department of Transportation
Marine Board
Department of Parks and Recreation
OSU Extension Service
Oregon State Police, Fish and Wildlife Division
State Service Center/GIS

Check the blue pages in your local phone book for the office nearest you or contact the local watershed council or soil and water conservation district nearest you for further information.

Section 4

Grants and Assistance

Numerous grants and resources are available to help individuals and groups fund watershed restoration projects. Many of these resources are funded through state and federal monies. Private foundations and conservation groups offer additional funding opportunities.

Funding programs and grant opportunities can change rapidly, so it's impossible to list all potential sources. The publication, *Public Funding Sources for Landowner Assistance*, available from GWEB, contains a wealth of information about public funding sources. Another good source of funding information is *Funding Sources for Grassroots River and Watershed Groups in the Northwest 1997*, available from River Network at 503-241-3506. In addition, the United Way of Columbia-Willamette (503-226-9348) publishes the *Guide to Oregon Foundations*.

For the Sake of the Salmon, a private/public group based in Portland, maintains a website http://www.4sos.org that also contains information on potential funding sources. They publish a weekly electronic newsletter that contains current information on funding opportunities for watershed councils, as well. Some of these programs are summarized below:

Governor's Watershed Enhancement Board (GWEB)
GWEB provides grants for a wide range of watershed activities including watershed council support, watershed assessment and monitoring, watershed action plan development, watershed restoration project design and implementation and watershed education and outreach projects. Grant amounts vary from a few hundred dollars to over $100,000 for large projects. For information on grant deadlines and criteria, or to receive an application, contact GWEB directly at 503-378-3589.

Under Executive Order 99-01 the guidelines presented in this handbook will be applied to all restoration activities funded or authorized by state agencies. This includes all GWEB grants for restoration projects.

Fish Restoration and Enhancement Program (R&E Program)
The R&E Program, administered by ODFW, provides funding for projects designed to benefit sport or commercial fisheries, including projects which enhance natural fish production. Any public or private non-profit organization may apply. Enrollment is year round with proposals reviewed in January, April, July, and October.

As provided in Executive Order 99-01, all restoration projects funded by the R&E Program must meet the guidelines identified in this handbook.

Conservation Reserve Enhancement Program (CREP)
The CREP provides financial incentives to agricultural landowners who establish practices beneficial to fish and wildlife on agricultural land adjacent to streams. Up to $250 million in

federal and state funds are available in Oregon for this program. Enrollment is continuous and interested landowners should contact their local Soil and Water Conservation District (SWCD) for enrollment information.

Challenge Cost-Share Programs (CCS)
The U.S. Forest Service provides funds and technical expertise for cooperative projects to improve aquatic habitat, fishing opportunities, and environmental education. Forest Service CCS funds must be matched by contributions of money, labor, equipment, or materials from conservation groups, private enterprises, individuals, schools, or other public agencies. Projects often involve landowners adjacent to National Forest lands and/or volunteers from local groups.

Projects range from a few hundred dollars to several thousand dollars. Proposals are submitted by local Forest Service offices in October.

Wetlands Reserve Program (WRP)
The WRP, administered by the Natural Resource Conservation Service (NRCS), offers easements (with payments of 100 percent of agricultural value or established area cap, WRP also pays 100 percent of restoration costs); 30-year contracts (payment is 75 percent of agricultural value or established area cap; also pays 75 percent of restoration costs); and restoration cost-share agreements (pays 75 percent of restoration costs). Almost any former or degraded wetland is eligible as long as it is restorable and will provide wildlife benefits.

Federal Section 319 Funds
DEQ oversees the distribution of federal 319 grant funds. These cost-share grant funds are available to address non-point sources of pollution. The program's main goal is to fund projects that can serve as demonstrations of pollution management practices. 319 funds also provide support to evaluate these projects and fund publication of both the methods and their success. Past projects have included evaluating erosion mitigation measures from forest roads and determining the effects of riparian shade on stream temperatures. Future projects will include the evaluation of forest and agricultural management practices on water quality. DEQ Healthy Streams personnel assist watershed councils across the state with applications. Proposals should be submitted in the spring time; contact DEQ for details, as the schedule varies from year to year.

Section 5

Monitoring and Reporting

Monitoring

Monitoring is a key component of all watershed restoration projects. With the wide variety of stream conditions and projects being implemented, restoration activities under the OPSW will inevitably experience some successes, some failures, and some projects where results are uncertain. Evaluating which projects or methods worked and which were unsuccessful will allow everyone to learn from past projects. Monitoring restoration projects will allow those involved to improve the effectiveness of future projects and avoid making the same mistakes over and over.

Project monitoring can be anything from a brief, annual "walk through" of the project area, to intensive, research-level surveys of habitat changes and fish population response. The level and intensity of monitoring should generally reflect the cost of the project, the degree of change anticipated, and whether the project is a relatively common or largely experimental approach. Regardless of the intensity of the monitoring effort, documentation of the monitoring results is crucial.

Creating a series of photo points and maintaining a photographic record is one of the most effective, efficient, and low cost techniques to monitor changes in habitat, vegetation, and stream conditions over time.

Restoration Reporting

A fundamental component of the OPSW is the voluntary actions of private citizens and landowners, working in partnership with federal, state, and local groups, to improve aquatic habitat and water quality conditions in Oregon. The *Oregon Plan Watershed Restoration Inventory* provides a level of accountability for voluntary commitments made under the OPSW and helps standardize the documentation of restoration projects throughout the state. The inventory will also help answer questions regarding the effectiveness of current watershed restoration approaches, both in accomplishing restoration goals and in cost-effectiveness.

Any restoration project receiving GWEB or R & E funds must submit an "Oregon Plan Watershed Restoration Reporting Form" (Appendix D) upon completion of the project as a stipulation of either grant agreement. However, GWEB and R & E funded restoration projects are only part of the picture. Oregon would like to demonstrate the full scope of restoration efforts throughout the state. Therefore, the Oregon Plan Watershed Restoration Reporting Form should be completed for all restoration projects in Oregon by landowners, operators, agencies, watershed councils, Soil and Water Conservation District staff, and other restoration practitioners.

Restoration projects completed by Federal agencies should be reported on the Interagency Restoration Database System so they can be included in the State inventory.

Appendix A - List of Acronyms

- BA - Biological Assessment
- BLM – United States Bureau of Land Management
- BOR – United States Bureau of Reclamation
- CAFOs - Confined Animal Feeding Operation
- COE - United States Army Corps of Engineers
- DEQ – Oregon Department of Environmental Quality
- DOGAMI - Department of Geology and Mineral Industries
- DSL - Division of State Lands
- EPA - United States Environmental Protection Agency
- ESA - Endangered Species Act
- ESH - Essential Salmonid Habitat
- ESU - Evolutionarily Significant Unit
- FEMA - Federal Emergency Management Agency
- FOTG – Field Office Technical Guidance
- FPA - Forest Practices Act
- GWEB - Governor's Watershed Enhancement Board
- LW – Large Wood
- LWD - Large Woody Debris
- MOA - Memorandum of Agreement
- NEP - National Estuary Program
- NFIP - National Flood Insurance Program
- NMFS - National Marine Fisheries Service
- NPDES - National Pollution Discharge Elimination System
- NRCS - Natural Resources Conservation Service
- ODA - Oregon Department of Agriculture
- ODF - Oregon Department of Forestry
- ODFW - Oregon Department of Fish and Wildlife
- OPRD - Oregon Parks and Recreation District
- OPSW - Oregon Plan for Salmon and Watersheds
- ORS - Oregon Revised Statute
- ORSCRG - Oregon Road/Stream Crossing Restoration Guide: Summer 1998 Draft
- RMA - Riparian Management Area
- SB - Senate Bill
- SONC - Southern Oregon/Northern California Coastal Coho Evolutionarily Significant Unit
- STEP - Salmon Trout Enhancement Program
- SWCD - Soil and Water Conservation District
- USDA - United States Department of Agriculture
- USFS - United States Forest Service
- USFWS - United States Fish and Wildlife Service
- WDFW - Washington Department of Fish and Wildlife
- WRD - Oregon Water Resources Department

Appendix B - Glossary

Alcove - depressional or pool area off main channel of stream or area that does not receive all of the stream's energy

Ameliorate - make better, more tolerable, improve

Anadromous - to run upriver from the sea to spawn and/or go from freshwater to saltwater

Aquatic Habitat Enhancement - to improve existing conditions that are necessary for aquatic species to live, grow and reproduce

Aquatic Habitat Restoration - to return existing conditions back to what they would be in a natural system

Bankfull Stream Width - stage or elevation at which water overflows the natural banks of streams and begins to flood the upland, also known as the 2-year event level (see also Ordinary High Water)

Biota - animal and plant life of a particular region considered as a total ecological entity

Browse transects - transects or macroplots established within riparian pasture key areas to measure the degree of use by livestock.

Buttress - reinforce, support or prop up

Channel complexity - the mix of in-channel features important to the survival, growth, migration, and reproduction of salmonids.

Channel Geomorphology - form or shape a stream will take due to factors such as: watershed size, hydrology, slope, soil type, vegetation and other factors

Community Assemblages - individual species that typically will be found together in close proximity

Conifer - needle-leafed tree, such as a Douglas fir

Embankment - raised structure along a water body to hold back water

Estuarine - area where freshwater of a river or wetland meets and mixes with the saltwater of ocean tides

Exotic species - not native to a particular area

Genetic Diversity - differing genetic characteristics within an individual species or population

Hardwoods - deciduous trees, such as Cottonwood or Alder trees

Hydraulic Regime - energy pattern or conditions in a liquid environment

Hydrologic Regime - properties, distribution and interaction of water or liquid on the surface of the land or underlying soil

Indigenous - native to the area

Infiltration Gallery - water collection system for irrigation that collects water by percolation rather than hydraulic head pressure

Intermittent Stream - stream that flows at some, but not all periods of the year

Legume - vegetation that has roots that fix nitrogen in the soil, plants such as alfalfa and clover are legumes

Mitigate - replacement of values or functions lost when a particular activity is undertaken

Monitoring - the act of scrutinizing or checking systematically an object or activity

Natural Recolonization - when species naturally return to an area where they were locally extinct

Natural Recruitment - species that survive through natural selection, from birth to the age of reproduction

Navigable Waters - waters that are subject to the ebb and flow of the tide and/or presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce

Ordinary High Water - stage or elevation at which water overflows the natural banks of streams and begins to flood the upland, also known as the 2-year event level (see also bankfull stream width)

Perennial Stream - stream that flows during all portions of the year

Point of Diversion Transfer - re-location of an in-stream diversion for irrigation purposes

Riparian - land immediately adjacent to a water resource, generally streams or rivers, sometimes is subject to occasional flooding

Sedge - a grass-like herb with inconspicuous flowers, stems are generally 3-sided and solid - not hollow

Sidecast materials - excavated material from road construction placed in steep locations that could slide impacting waters of the state.

Streambank morphology - shape of the streambank.

Subsidence - reducing to a lower level

Temporal and Spatial Distribution - distribution over time and space (area)

Vexar Tubing - A plastic mesh tube used to protect tree seedlings from wildlife. Usually slid over the seedling at the time of planting.

Watershed Assessment - an analysis that evaluates resources and the cumulative effects of land management practices on a watershed or basin

Weir - small dam or diversion to raise or divert the flow of water

Wetland - those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions

Appendix C - Agency Contact List

Oregon Department of Fish and Wildlife

ODFW contacts for habitat and land use issues that affect Oregon's native fish:

LOCAL HABITAT RESTORATION BIOLOGISTS:

Habitat Biologists (by general area)

Clackamas, Sandy, Metro	Art Martin (Clackamas)	(503) 657-2000 x 233
Columbia Tributaries, Scappoose down	Michael Weston (Tillamook)	(503) 842-2741
Coos/Coquille	Randy Smith (Charleston)	(541) 888-5515
Deschutes, Hood, & Mid-Columbia	Ray Hartlerode (The Dalles)	(541) 296-8026
Deschutes (Upper) & Central Oregon	Mark Manion (Bend)	(541) 388-6363
Grande Ronde Basin & Baker Co.	Vance McGowan (La Grande)	(541) 963-2138
John Day Basin	Jeff Neal (John Day)	(541) 575-0561
Klamath & South Central Oregon	John Zauner (Klamath Falls)	(541) 883-5732
Mid Coast	John Spangler (Newport)	(541) 867-4741
North Coast	Michelle Long (Tillamook)	(503) 842-2741
South Coast	Howard Crombie (Gold Beach)	(541) 247-7605
Southeast Oregon	Curtis Edwards (Lakeview)	(541) 947-2950
Umatilla & Walla Walla	Troy Laws (Pendleton)	(541) 276-2344
Umpqua/Smith	Dave Harris (Roseburg)	(541) 440-3353
Upper Rogue	Jerry Vogt (Central Point)	(541) 826-8774
Wallowa & Imnaha	Bill Knox (Enterprise)	(541) 426-3279
Willamette/Tualatin	Art Martin (Clackamas)	(503) 657-2000 x 233
Willamette, Mid	Mark Lacey (Corvallis)	(541) 757-4186
Willamette, Upper	Dawn Kori Nearing (Springfield)	(541) 726-3515

Watershed Council Liaisons (by general area)

Clackamas, Sandy, Metro	Dick Caldwell (Clackamas)	(503) 657-2000 x 235
Columbia Tributaries below Westport	Rick Klumph (Tillamook)	(503) 842-2741
Coos/Coquille	Jim Muck (Charleston)	(541) 888-5515
Deschutes, Hood, & Mid-Columbia	Steve Pribyl (The Dalles)	(541) 296-4268
Deschutes (Upper) & Central Oregon	Steve Marx (Bend)	(541) 388-6363
Grande Ronde Basin & Baker Co.	Jeff Zakel (La Grande)	(541) 963-2138
John Day Basin	Tim Unterwegner (John Day)	(541) 575-1167
Klamath & South Central Oregon	Roger Smith (Klamath Falls)	(541) 883-5732
Mid Coast	Mary Holbert(Newport)	(541) 867-4741
North Coast	Rick Klumph (Tillamook)	(503) 842-2741
South Coast	Howard Crombie (Gold Beach)	(541) 247-7605
Southeast Oregon	Wayne Bowers (Hines)	(541) 573-6582
Umatilla & Walla Walla	Jon Germond (Pendleton)	(541) 276-2344
Umpqua & Smith	Dave Loomis (Roseburg)	(541) 440-3353
Upper Rogue	Alan Ritchey (Central Point)	(541) 826-8774
Wallowa & Imnaha	Brad Smith (Enterprise)	(541) 426-3279
Willamette/Tualatin	Greg Robart (Clackamas)	(503) 657-2000 x 241
Willamette, Mid	Gary Galovich (Corvallis)	(541) 757-4186
Willamette, Upper	Mark Wade (Springfield)	(541) 726-3515

Oregon Department of Fish and Wildlife (Continued)

STEP Biologists (by general area)

Clackamas, Sandy, Metro	Dick Caldwell (Clackamas)	(503) 657-2000 x 235
Columbia Tributaries below Westport	John Casteel (Tillamook)	(503) 842-2741
Coos/Coquille	Tom Rumreich (Charleston)	(541) 888-5515
Eastern Oregon	Ken Cannon (Bend)	(541) 388-6363
Mid Coast	Tony Stein (Newport)	(541) 867-4741
North Coast	John Casteel (Tillamook)	(503) 842-2741
South Coast	Clayton Barber (Gold Beach)	(541) 247-7605
Umpqua/Smith	Laura Jackson (Roseburg)	(541) 440-3353
Upper Rogue	Chuck Fustish (Central Point)	(541) 826-8774
Willamette/Tualatin	Dick Caldwell (Clackamas)	657-2000 x 235
Willamette, Mid	Gary Galovich (Corvallis)	(541) 757-4186
Willamette, Upper	Dawn Kori Nearing (Springfield)	(541) 726-3515

Fish Biologists (by general area)

Clackamas, Sandy, Metro	Don Bennett (Clackamas)	(503) 657-2000 x 235
	Dave Liscia (Clackamas)	(503) 657-2000 x 232
Columbia Tributaries below Westport	Rick Klumph (Tillamook)	(503) 842-2741
	Joe Sheahan (Astoria)	(503) 338-0106
Coos/Coquille	Paul Reimers (Charleston)	(541) 888-5515
	Reese Bender (Charleston)	(541) 888-5515
Deschutes, Hood, & Mid-Columbia	Jim Newton (The Dalles)	(541) 296-4268
	Steve Pribyl (The Dalles)	(541) 296-4268
Deschutes (Upper) & Central Oregon	Steve Marx (Bend)	(541) 388-6363
	Brett Hodgson (Prineville)	(541) 447-5111
Grande Ronde Basin & Baker Co.	Jeff Zakel (La Grande)	(541) 963-2138
	Tim Walters (La Grande)	(541) 963-2138
John Day Basin	Tim Unterwegner (John Day)	(541) 575-1167
	Mike Gray (John Day)	(541) 575-1167
Klamath & South Central Oregon	Roger Smith (Klamath Falls)	(541) 883-5732
	Rhine Messmer (Klamath Falls)	(541) 883-5732
Mid Coast	Bob Buckman (Newport)	(541) 867-4741
	George Westfall (Newport)	(541) 867-4741
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	Dave Liscia (Clackamas)	(503) 657-2000 x 232
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	Steve Mamoyac (Corvallis)	(541) 757-4186
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Oregon Department of Fish and Wildlife (Continued)

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Forest Practices Act
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Oregon Department of Fish and Wildlife (Continued)

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Aquatic Habitat Inventory Data	Kim Jones (Corvallis)	(541) 757-4263
Beaver Issues	Larry Cooper (Ptld.)	(503) 872-5260 x 5347
Fish Passage - Columbia River Dams	Ron Boyce (Ptld.)	(503) 872-5252 x 5403
Hydro Dams	Stephanie Burchfield (Ptld.)	(503) 872-5255 x 5580
All Other Dams, Roads, etc.	Al Mirati (Ptld.)	(503) 872-5252 x 5590
Fish Screening - Western Oregon	Bernie Kepshire (Corvallis)	(541) 757-4186
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Restoration & Enhancement Program	Charlie Corrarino (Ptld.)	(503) 872-5252 x 5431
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Volunteer Coordinator (Clackamas)	Kathy Shinn	(503) 657-2000 x 228
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Oregon Department of Forestry

For more information about the Oregon Forest Practices Act or the Forest Practice Rules, please contact your local Oregon Department of Forestry district office listed below or the headquarters office at 2600 State Street, Salem, Oregon 97310, (503) 945-7470.

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3701 W 13th, The Dalles 97058 ..... (541) 296-4626
400 NW 9th, John Day 97845 ..... (541) 575-1139
3400 Greensprings Drive, Klamath Falls 97601 ..... (541) 883-5681
2290 4th Street, Lakeview 97630 ..... (541) 947-3311
611 20th Street, La Grande 98750 ..... (541) 963-3168
1055 Airport Road, Pendleton 97801 ..... (541) 276-3491
802 West Hwy 82, Wallowa 97885 ..... (541) 886-2881

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405 E Street, Columbia City 97108 ..... (503) 397-2636
4907 East 3rd Street, Tillamook 97141 ..... (503) 842-2545
14995 South Hwy 211, Molalla 97038 ..... (503) 829-2216
22965 North Fork Road SE, Lyons 97358 ..... (541) 859-2151
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For current Oregon forest practice rule information, connect to the
Oregon Department of Forestry's Forest Practices Program
World Wide Web page at:
http://www.odf.state.or.us/forprac.htm

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Locally Organized Watershed Councils In Oregon *(10-Mar-99)*

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Locally Organized Watershed Councils In Oregon (Continued)

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Locally Organized Watershed Councils In Oregon (Continued)

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Soil And Water Conservation Districts (Continued)

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APPENDIX D – The Oregon Plan
1998 Watershed Restoration Project Reporting Form

General Directions

NOTE:

- Fill out this form for ALL watershed restoration projects, NOT just GWEB funded projects.
- You DO NOT need to fill out ALL pages of this form. Only fill out the FIRST PAGE and the SECTION(S) that apply to your project.
- DO NOT report more than once! Check with your project partners to make sure project has not already been reported. If you are updating a previously reported project, only report NEW information.
- ATTACH A MAP to your project form.

WHY REPORT?

All over Oregon, people are involved in restoration projects to help improve the condition of their watersheds. These restoration projects are a vital component of the Oregon Plan aimed at improving aquatic habitat and water quality conditions throughout the state. We are asking private landowners, government agencies, watershed councils, SWCD's and other groups to participate in this inventory so that we can report on and assess Oregon's cumulative restoration effort. The inventory will allow us to provide information to local groups for restoration planning, and improve our restoration efforts statewide.

PROJECTS TO REPORT

Habitat restoration projects included in this inventory must:

- involve activities designed to **restore aquatic, riparian, estuarine, wetland, upland, or overall watershed conditions or functions**.
- be **completed or in-progress; DO NOT report planned projects.**
- be an activity **above and beyond normal maintenance or management procedures** in cases such as road and culvert improvements, erosion control, and so on.

FILLING OUT PROJECT REPORTING FORMS

The form generally takes 20-30 minutes to complete. Fill out the first page of the attached reporting form for ALL restoration projects. Then fill out the section(s) of the form that apply to your project:

Section A: **Instream** Activity
Section B: **Riparian** Activity
Section C: **Wetland** Activity
Section D: **Upland and Grazing** Activity
Section E: **Road** Activity
Section F: **Project Monitoring** Activity

For multi-year projects, use a different form for each year.

The survey form is designed for **site-level** information to establish w*hat type* of restoration work was done and *where* it was done. Therefore, YOU MUST INCLUDE A MAP (for example, photocopy of 1:24,000 scale topographic map or Oregon Department of Forestry map) with each form. Indicate on the map the location of restoration activities. Label each location with the activity type.

RETURN TO ADDRESS BELOW:

1. **THE FIRST PAGE OF FORM**
2. **THE SECTION(S) THAT APPLY TO YOUR PROJECT**
3. **A PROJECT LOCATION MAP**

Sussanne Maleki
Governor's Watershed Enhancement Board
28655 Hwy 34
Corvallis, OR 97333
Phone: 541/757-4263 ext. # 233
Fax: 541/757-4102
e-mail: malekis@ccmail.orst.edu

or contact Bobbi Riggers at ext # 235
e-mail: riggerbo@ccmail.orst.edu

The 1998 Oregon Plan Watershed Restoration Reporting Form is available on the web at http://oregon-plan.org under *Status/Monitoring*. Thank you for your participation!

The Oregon Plan
1998 Watershed Restoration Reporting Form

Read the General Directions. Answer questions that apply to your project. You must include a map of the project.

1) DATE_____ 2) YOUR NAME & AFFILIATION _____
PHONE NUMBER_____

Participant Information

3) Under **'tech'**, check (✕) the individual or organization that provided technical support. Under **'funding amount'** indicate participants' cash (C$) or inkind (I$) contributions to the project. I$ = estimated value of *donated* materials, labor & equipment

landowner name	contact person	phone number	tech	funding amount	
			☐	C$	I$

project coordinator	affiliation	phone number	tech	funding amount	
			☐	C$	I$

WHO ELSE PARTICIPATED in project? Under organization name, list grant programs, watershed councils, local, state, or federal agencies, SWCDs, conservation or sporting groups, job or volunteer programs, other private landowners, etc.

organization name	contact person	phone number	tech	funding amount	
			☐	C$	I$
			☐	C$	I$
			☐	C$	I$
			☐	C$	I$
			☐	C$	I$

Watershed Information

4) STREAM NAME_____ STREAM CLASS: ☐fish bearing ☐non-fish bearing
TRIBUTARY OF: _____ BASIN _____

5) PROJECT LOCATION: T._____ R._____ Sec. _____ (include map) COUNTY _____

6) LAND USE: *check* the dominant land uses in the watershed, and *circle* the land use type where project activities are located

___forest	___shrub	___urban residential	___wetland
___grazing/pasture	___row crop agriculture	___rural residential	___other (specify)
___ungrazed grasslands	___urban industrial/commercial	___recreation/conservation	_____

Restoration Project Information

7) PROJECT NAME or ID #: _____ ☐this is an UPDATE of a project reported earlier

-- If this is a GWEB funded project, indicate GWEB Grant # _____

8) PROJECT DATES: Start _____ Completion _____ (do not report planned projects)

9) TOTAL COST: CASH $_____ INKIND $_____

10) Does this project intend to benefit specific fish or wildlife SPECIES? ☐Yes ☐No If yes, which ones? _____
_____

11) Did project result from a WATERSHED ASSESSMENT/ACTION PLAN? ☐Yes ☐No
If YES: Name _____ Conducted by_____Year_____

If NO: *How* and *why* was project *location* and *activity* chosen? _____
_____

12) Will the EFFECTIVENESS of the restoration project be MONITORED? ☐Yes ☐No If YES, fill out Section F

Send to: Sussanne Maleki, GWEB, 28655 Hwy 34, Corvallis, OR 97333 ph (541) 757-4263 ext #233 fax (541) 757-4102 e-mail: malekis@ucs.orst.edu

The Oregon Plan
1998 Watershed Restoration Reporting Form

Section A: INSTREAM Activity

PROJECT GOALS: *to improve/increase stream*

___structure & complexity	___fish passage	___off-channel habitat	___cool water habitat
___interaction w/ floodplain	___spawning habitat	___over-winter habitat	___slow water habitat
___stream flow	___rearing habitat	___summer habitat	___refuge cover
___gravel recruitment	___increase pools	___streambank stabilization	___other _ _____

STREAM GRADIENT: _____%
STREAM WIDTH (bankfull): _____ft
(average wetted width): _____ft

STREAM DOMINANT SUBSTRATE (indicate %):

___% sand	___% gravel (pea to baseball)	___% boulder (bowling ball or bigger)
___% silt/fines	___% cobble (baseball to bowling ball)	___% bedrock

TOTAL MILES of stream treated: miles _____ DSL Permit Number: _____

ACTIVITY	SIZE, AMOUNT, TYPE	DESCRIPTION of Treatment	COST
☐ **Large Woody Debris (LWD) placement** stream bankfull width where logs placed was _____ ft	Log length _____ ft (range) Log diameter_____ in (range) ____# of logs used ____# of structures ☐ conifer ☐ hardwood ☐ rootwads intact? ☐ branches intact?	☐ logs allowed to set up naturally? ☐ wedged against bank or riparian trees? ☐ anchored with cable? ☐ with rebar? ☐ anchored with boulders? ☐ placed with additional rootwads? ☐ associated with forestry operation? ☐ other? _____ placed using: _____	Cash $_____ In-Kind $_____
☐ **weirs** ☐ **deflectors** (do not duplicate LWD)	**indicate number and type of structures, and materials used:**		Cash $_____ In-Kind $_____
☐ **off-channel habitat**	**indicate #, type (side channel, alcove, off-channel pond), size, and tributary or spring input:**		Cash $_____ In-Kind $_____
☐ **fish barrier removal** have the target fish species historically inhabited the area upstream of the barrier? ☐Yes ☐No	**ONLY REPORT PROJECTS THAT PROVIDE BOTH JUVENILE AND ADULT PASSAGE** ____# culverts replaced w/ bridge ____# fish ladders installed ____# culverts removed-not replaced ____# fish ladders improved ____# culverts upgraded (specify)_____ ____# push-up dams permanently removed; replaced with_____ ____miles of habitat opened- previously *inaccessible* for both adults and juveniles ____miles of habitat opened- prev. *inaccessible* for juveniles, *accessible* for adults ____miles of habitat prev. *accessible* for adults and juveniles- access improved **If you do not have habitat mile information, consult local ODFW office.**		Cash $_____ In-Kind $_____
☐ **other (specify)**			Cash $_____ In-Kind $_____
☐ **other (specify)**			Cash $_____ In-Kind $_____

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-Attach a Project Map-

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Section B: RIPARIAN Activity

PROJECT GOALS:

to increase
___future LWD recruitment to stream
___future stream shading
___streambank stabilization/protection
___nutrient (plant material) input to stream
___other _____

to decrease
___erosion/stream sedimentation
___run-off contaminant input
___stream temperature
___livestock access to stream

STREAM GRADIENT: _____%
STREAM WIDTH (bankfull): _____ft
(average wetted width): _____ft

stream profile

ACTIVITY	LENGTH & WIDTH of riparian area treated	One side or both sides of stream?	DESCRIPTION of Treatment	COST
☐ **conifer planting** (if part of hardwood conversion, report below)	L_____miles W_____feet	☐ one side ☐ both sides	# and species of conifers planted:	Cash $_____ In-Kind $_____
☐ **hardwood planting**	L_____miles W_____feet	☐ one side ☐ both sides	# and species of hardwoods planted:	Cash $_____ In-Kind $_____
☐ **fencing** (* width = setback from stream)	L_____miles W*_____ft	☐ one side ☐ both sides	type of fence:	Cash $_____ In-Kind $_____
☐ **hardwood conversion** ☐ ODF 8	(in conversion block only) L_____feet W_____feet	☐ one side ☐ both sides	# and species of conifers planted:	Cash $_____ In-Kind $_____
☐ **other (specify)**	L_____miles W_____ft	☐ one side ☐ both sides		Cash $_____ In-Kind $_____
Retaining conifers in excess of Forest Practices Act Water Protection Rule requirements during harvest				
☐ **ODF 62** no harvest in RMA	L_____miles W_____feet	☐ one side ☐ both sides	Stream Type: ☐N ☐F Stream Size: ☐small ☐medium ☐ large	Cash $_____ In-Kind $_____
☐ **ODF 19** max 25% harvest of excess basal area	L_____miles W_____feet	☐ one side ☐ both sides	Stream Type: ☐N ☐F Stream Size: ☐small ☐medium ☐ large	Cash $_____ In-Kind $_____
☐ **ODF 22** ☐**a** ☐**b** ☐**c** re-allocate in-unit leave trees	L_____miles W_____feet	☐ one side ☐ both sides	Stream Type: ☐N ☐F Stream Size: ☐small ☐medium ☐ large	Cash $_____ In-Kind $_____
☐ **ODF 20** retain snags/wood along small N streams	L_____miles W_____feet	☐ one side ☐ both sides	Stream Type: ☐N ☐F Stream Size: ☐small ☐medium ☐ large	Cash $_____ In-Kind $_____

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Section C: WETLAND Activity

DSL Permit Number: _____

PROJECT GOALS:

improve flood control (water detention or storage) by increasing:
____storage capacity of wetland
____tree or shrub cover

improve water quality by increasing:
____vegetation to filter runoff
____vegetation to provide shade
____net area of wetland

improve wildlife habitat by increasing:
____vegetation for food, cover or nesting
____water to stream during low flows
____the number of wetland types at site (i.e., meadow, forest, open water)
____net area of wetland
____connection to adjacent natural area
____recruitment of downed woody material
____fish habitat: *specify* rearing, winter, summer, etc. _____
____other _____

Is project site protected by a CONSERVATION EASEMENT? ☐Yes ☐No

Project site is CONNECTED TO: ___stream or river ___lake or reservoir ___no other water body ___ocean or estuary ___other fresh waters

Land/wetland type in project area BEFORE RESTORATION:
____acres of non-wetland
____acres of agricultural wetland
____acres of grass/herb meadow wetland
____acres of shrub or forest wetland
____acres of open water wetland (>6ft. deep)

CONDITIONS AFTER RESTORATION

ACTIVITY	**DESCRIPTION** of treatment	**COST**
Filled or drained wetland returned to: ____acres of grass/herb meadow wetland ____acres of shrub or forest wetland ____acres of open water wetland (>6ft. deep)		Cash $_____ In-Kind $_____
Non-wetland created into: ____acres of grass/herb meadow wetland ____acres of shrub or forest wetland ____acres of open water wetland (>6ft. deep)		Cash $_____ In-Kind $_____
Existing wetland improved: ____acres of grass/herb meadow wetland ____acres of shrub or forest wetland ____acres of open water wetland (>6ft. deep)		Cash $_____ In-Kind $_____

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Section D: UPLAND and GRAZING MANAGEMENT Activity

(for Road Activity, go to Section E)

PROJECT GOALS:

to increase or improve

___upslope soil stability
___streambank stability
___LWD recruitment to stream
___ future shading to stream
___native plant species composition
___upland water storage capacity
___ stream flow by_____cu ft/sec

to decrease

___erosion/stream sedimentation
___run-off contaminant input to stream
___stream temperature
___livestock access to stream

___other_____

If activity was reported in Section B: RIPARIAN Activity, do not repeat here

ACTIVITY	**DESCRIPTION** of Treatment	**COST**
☐ **off-channel livestock watering**		Cash $_____ In-Kind $_____
☐ **livestock exclusion/fencing**	length of fence ___miles avg. setback from stream ___ft ☐ one side ☐ both sides of stream? description:	Cash $_____ In-Kind $_____
☐ **water gap development**		Cash $_____ In-Kind $_____
☐ **other grazing management (specify)**		Cash $_____ In-Kind $_____
☐ **upland erosion control (specify)**		Cash $_____ In-Kind $_____
☐ **irrigation improvements (specify)**		Cash $_____ In-Kind $_____
☐ **other (specify)**		Cash $_____ In-Kind $_____
☐ **other (specify)**		Cash $_____ In-Kind $_____

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Section E: ROAD Activity

Note: Report road projects designed to decrease risk of road failure, reduce chronic sediment input from roads, or restore fish passage. **Do not report** new road construction or routine road maintenance, including: surface grading, berm removal, spot rocking, essential ditch cleaning, culvert cleaning, pulling back actively sliding sidecast, or replacing failing culverts. **Summarize** road activity by area **no larger than** 4th or 5th field HUC (e.g., Siletz, Alsea, etc.)**.** Include a **map.**

PROJECT GOALS:

to increase or improve	*to decrease*
___upslope stability	___erosion/stream sedimentation
___fish passage	___run-off contaminant input to stream
___road/upslope drainage	___road access ___road density

___other_____

ROAD INVENTORY =_____***miles surveyed***

IMPROVEMENT ACTIONS COMPLETED

A. Stream Crossings ***(if fish passage improvement reported in Section A: INSTREAM Activity, do not repeat here)***

1. Fish Passage Improvements **that provide Juvenile Passage**
   a) ___# of blocked structures removed and not replaced
   b) ___# of culverts replaced with bridge
   c) ___# of culverts replaced w/corrugated pipe
   d) ___# of structures added to allow side channel access
   e) ___# of structures with baffles installed
   f) ___# of culverts with outlet weirs installed
2. Peak Flow Passage Improvement
   a) ___# of log fills removed
   b) ___# of structures replaced to meet 50+ year flow requirements
   c) ___# of structures modified by improving inlet condition
   d) ___# of stream crossings modified to reduce washout/diversion

Have the target fish species historically inhabited the area upstream of the barrier? ☐Yes ☐No

____miles of habitat opened that were previously *inaccessible* for both adults and juveniles

____miles of habitat opened that were previously *inaccessible* for juveniles, *accessible* for adults

____miles of habitat that were previously *accessible* for both juveniles and adults- access improved

B. Surface Drainage

1. ___# of cross-drains added above stream crossings
2. ___# of stations of quality hard road rocking prior to haul
3. ___# of stations of rocking down-cutting ditch
4. ___# of culverts with outlet erosion protection added
5. ___# of culverts added at midslope sites
6. ___# of large landslides stabilized

C. Sidecast

1. ___# of stations of pull back (see Note above)
2. ___# of stations of drainage diverted away from cracks

Summarize Activities: Do Not Double Count

___***Total*** # of culverts/structures improved

___***Total*** # of stations improved

1 Station = 100 ft

D. Road Relocation or Vacating

1. ___# of stations relocated outside RMA or stream banks
2. ___# of stations vacated under administrative rule (OAR 629-625-650) **does not include simple closures**
3. ___# of stations relocated to reduce washout potential
4. ___# of stations effectively closed to public use

E. Other Activities: _____

_____

F. COST: Cash $_____ In-kind $_____

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-Attach a Project Map-

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Section F: Project Monitoring Activity

How will the progress and effectiveness of the restoration project be evaluated?

Monitoring Objectives: _____

_____

_____

Monitoring Implemented By Whom:

Monitoring Cost per Year: **$** _____ Amount Spent to Date: **$** _____

Monitoring Type	Monitoring Method/Protocol Used	Pre-Treatment		Post-Treatment	
		Frequency	Duration	Frequency	Duration
Physical Measures					
☐ instream habitat					
☐ -channel morphology					
☐ -substrate					
☐ -woody debris					
☐ -other					
☐ riparian vegetation					
☐ upland vegetation					
☐ other					
Biological Measures					
☐ adult fish sampling					
☐ juvenile fish sampling					
☐ macroinvertebrates					
☐ other					
Water Quality Measures					
☐ temperature					
☐ suspended sediment					
☐ dissolved oxygen					
☐ chemistry					
☐ fecal coliform					
☐ other					
Other Measures					
☐ fish passage effectiveness					
☐					
☐					
☐					

Briefly describe results to date**:** _____

_____

_____

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-Attach a Project Map-

APPENDIX E – U.S. Fish and Wildlife Service Restoration Project Design Criteria for Oregon and Federal Threatened, Endangered, Candidate or Proposed Species, as of July 1998.

PROJECT DESIGN CRITERIA

The U.S. Fish and Wildlife Service (Service) is providing these project design criteria to inform restoration project sponsors of situations in which incidental take of or adverse effects on species of concern (state and federal threatened, endangered, candidate and proposed species) may be possible. Additional information on the distribution and habitats of these species may be obtained from the Service. Project sponsors are encouraged to contact Oregon Department of Fish and Wildlife (ODFW) or the Service to determine whether such species occur in project areas, and to identify ways to avoid take or adverse effects, and possibly to benefit these species. Take of a federally listed threatened or endangered fish or wildlife species is prohibited by section 9 of the ESA; if take of such a species is likely to be unavoidable, project sponsors should apply for an incidental take permit from the Service.

PLANTS

Applegate's Milk-Vetch

1. Restoration activities should only occur in habitats containing this species when adverse impacts are minimized or eliminated, and activities would result in long-term benefits to this plant. Any restoration projects conducted within or near the species habitat area should be designed in a manner that will potentially benefit the species.
2. If this species is likely to be present, botanical surveys should be conducted to determine the presence or absence of the species at each project location. The optimal survey period for this species is from June to early August.

Bradshaw's Lomatium

1. Restoration activities should only occur in habitats containing this species when adverse impacts are minimized or eliminated and activities would result in long-term benefits to this plant. Any restoration projects conducted within or near the species habitat area should be designed in a manner that will potentially benefit the species.
2. If this species is likely to be present, botanical surveys should be conducted to determine the presence or absence of the species at each project location. The optimal survey period for this species is during April to mid-May.

Cook's Lomatium

1. Restoration activities should only occur in habitats containing this species when adverse impacts are minimized or eliminated and activities would result in long-term benefits to this plant. Any restoration projects conducted within or near the species habitat area should be designed in a manner that will potentially benefit the species.
2. If this species is likely to be present, botanical surveys should be conducted to determine the presence or absence of the species at each project location. The optimal survey period for this species is in mid-March through April and varies depending on spring moisture patterns.

Gentner's Fritillary

1. Restoration activities should only occur in habitats containing this species when adverse impacts are minimized or eliminated and activities would result in long-term benefits to this plant. Any restoration projects conducted within or near the species habitat area should be designed in a manner that will potentially benefit the species.
2. If this species is likely to be present, botanical surveys should be conducted to determine the presence or absence of the species at each project location. The optimal survey period for this species is from April through June.

Howell's Spectacular Thelypody

1. Restoration activities should only occur in habitats containing this species when adverse impacts are minimized or eliminated and activities would result in long-term benefits to this plant. Any restoration projects conducted within or near the species habitat area should be designed in a manner that will potentially benefit the species.
2. If this species is likely to be present, botanical surveys should be conducted to determine the presence or absence of the species at each project location. The optimal survey period for this species is from June through July.

Kincaid's Lupine

1. Restoration activities should only occur in habitats containing this species when adverse impacts are minimized or eliminated and activities would result in long-term benefits to this plant. Any restoration projects conducted within or near the species habitat area should be designed in a manner that will potentially benefit the species.
2. If this species is likely to be present, botanical surveys should be conducted to determine the presence or absence of the species at each project location. The optimal survey period for this species is from May through July.

Large-flowered Wooly Meadowfoam

1. Restoration activities should only occur in habitats containing this species when adverse impacts are minimized or eliminated and activities would result in long-term benefits to this plant. Any restoration projects conducted within or near the species habitat area should be designed in a manner that will potentially benefit the species.
2. If this species is likely to be present, botanical surveys should be conducted to determine the presence or absence of the species at each project location. The optimal survey period for this species is mid-March through April and varies depending on spring moisture patterns.

MacFarlane's four o'clock

1. Restoration activities should only occur in habitats containing this species when adverse impacts are minimized or eliminated and activities would result in long-term benefits to this plant. Any restoration projects conducted within or near the species habitat area should be designed in a manner that will potentially benefit the species.
2. If this species is likely to be present, botanical surveys should be conducted to determine the presence or absence of the species at each project location. The optimal survey period for this species is from May through June.

McDonald's Rock-cress

1. Restoration activities should only occur in habitats containing this species when adverse impacts are minimized or eliminated and activities would result in long-term benefits to this plant. Any restoration projects conducted within or near the species habitat area should be designed in a manner that will potentially benefit the species.
2. If this species is likely to be present, botanical surveys should be conducted to determine the presence or absence of the species at each project location. The optimal survey period for this species is mid-March through May (S. Vrilakas, pers. comm).

Nelson's Checkermallow

1. Restoration activities should only occur in habitats containing this species when adverse impacts are minimized or eliminated and activities would result in long-term benefits to this plant. Any restoration projects conducted within or near the species habitat area should be designed in a manner that will potentially benefit the species.
2. If this species is likely to be present, botanical surveys should be conducted to determine the presence or absence of the species at each project location. The optimal survey period for this species is in June and July.

Rough Popcornflower

1. Restoration activities should only occur in habitats containing this species when adverse impacts are minimized or eliminated and activities would result in long-term benefits to this plant. Any restoration projects conducted within or near the species habitat area should be designed in a manner that will potentially benefit the species.
2. If this species is likely to be present, botanical surveys should be conducted to determine the presence or absence of the species at each project location. The optimal survey period for this species is in mid-June to early July.

Umpqua Mariposa Lily

1. Restoration activities should only occur in habitats containing this species when adverse impacts are minimized or eliminated and activities would result in long-term benefits to this plant. Any restoration projects conducted within or near the species habitat area should be designed in a manner that will potentially benefit the species.
2. If this species is likely to be present, botanical surveys should be conducted to determine the presence or absence of the species at each project location. The optimal survey period for this species is during June and July.

Western Lily

1. Restoration activities should only occur in habitats containing this species when adverse impacts are minimized or eliminated and activities would result in long-term benefits to this plant. Any restoration projects conducted within or near the species habitat area should be designed in a manner that will potentially benefit the species.
2. If this species is likely to be present, botanical surveys should be conducted to determine the presence or absence of the species at each project location. The optimal survey period for this species is in late June - July.

Willamette Daisy

1. Restoration activities should only occur in habitats containing this species when adverse impacts are minimized or eliminated and activities would result in long-term benefits to this plant. Any restoration projects conducted within or near the species habitat area should be designed in a manner that will potentially benefit the species.
2. If this species is likely to be present, botanical surveys should be conducted to determine the presence or absence of the species at each project location. The optimal survey period for this species is from mid-June to early July.

FISH

Threatened, endangered, candidate or proposed fish species in Oregon include: Borax Lake chub, bull trout, chinook salmon, chum salmon, coho salmon, Foskett speckled dace, Hutton Tui chub, Lahontan cutthroat trout, Lost River and Shortnose suckers, Oregon chub, sea-run cutthroat trout, steelhead trout, and Warner sucker. The following project design criteria apply to these fish species.

1. Projects should adhere to the current ODFW timing restrictions for instream construction activities (by stream reach); in reaches where this conflicts with the needs for resident listed fish, ODFW should be contacted for a waiver to the timing restrictions.
2. Projects should comply with Oregon and National Marine Fisheries Service (NMFS) aquatic habitat restoration guidelines. Close coordination with NMFS and/or ODFW at a project specific level will insure compliance with the intent of the Oregon Plan for Salmon and Watersheds.
3. The implementation of best management practices (BMPs) listed in Attachment 1 will eliminate or reduce adverse impacts to the fish and their habitat and will help maintain appropriate water quality to promote the survival of all life stages.
4. Surveys should be conducted for Lost River, Shortnose and Warner suckers and for Oregon chub within the range of these species prior to initiating activity; where these species are present, project sponsors should work with the Service to minimize impacts to them.

AMPHIBIANS

Columbia Spotted Frog

1. Projects should adhere to the established ODFW timing restrictions for instream construction activities (i.e., by stream reach).
2. The implementation of BMPs listed in Attachment 1 will eliminate or reduce adverse impacts to the spotted frog and will maintain appropriate water quality to promote the survival of all life stages.
3. Spotted frog surveys should be conducted at each project site where a known population occurs within 2 kilometers upstream or downstream from the project site. Surveys should be conducted three times at 2 to 3 week intervals starting one week after snow and/or ice melt.
4. Modifications to the project should be made, as necessary, to eliminate or reduce adverse impacts if survey results indicate the presence of the species at or near the project site.

Oregon Spotted Frog

1. Projects should adhere to the established ODFW timing restrictions for instream construction activities (i.e., by stream reach).
2. The implementation of BMPs listed in Attachment 1 of this assessment will eliminate or reduce adverse impacts to the spotted frog and will maintain appropriate water quality to promote the survival of all life stages.
3. A spotted frog survey should be conducted at each project site where a known population occurs within 2 kilometers upstream or downstream from the project site. Surveys should be conducted three times at 2 to 3 week intervals starting one week after snow and/or ice melt.
4. Modifications to the project should be made, as necessary, to eliminate or reduce adverse impacts if survey results indicate the presence of the species at or near the project site.

INVERTEBRATES

Fender's Blue Butterfly

1. Restoration activities should only occur in habitats containing this species when adverse impacts are minimized or eliminated and result in long-term benefits to this species. Any restoration projects conducted within or near the species habitat area should be designed in a manner that will potentially benefit the species.
2. If this species is likely to be present in the project area, a botanical survey should be conducted to determine the presence or absence of Kincaid's lupine at each project location. The optimal survey period is May to June.
3. Surveys for Fender's Blue should be conducted during May to June on any proposed project site that supports Kincaid's lupine.

Oregon Silverspot Butterfly

1. Restoration activities should only occur in habitats containing this species when adverse impacts are minimized or eliminated and result in long-term benefits to this species. Any restoration projects conducted within or near the species habitat area should be designed in a manner that will potentially benefit the species.
2. If this species is likely to be present in the project area, a botanical survey should be conducted to determine the presence or absence of western blue violet at each project location. The optimal survey period is April to May.
3. Surveys for Oregon silverspot should be conducted during late July to early September on any proposed project site that supports western blue violet.
4. For all coastal project sites, only native, noninvasive plant species will be used to revegetate disturbed areas.

Vernal Pool Fairy Shrimp

1. Restoration activities should only occur in habitats containing this species when adverse impacts are minimized or eliminated and result in long-term benefits to this species. Any restoration projects conducted within or near the species habitat area should be designed in a manner that will potentially benefit the species.
2. All projects in or adjacent to vernal pools should avoid disrupting the impermeable, sub-surface soil layer, movement of soils that could result in depositing soils in pools, or the use of any herbicides or pesticides.
3. Care should be taken to avoid travelling through the wetted portions of vernal pools

BIRDS

Aleutian Canada Goose

Where project sites are located within ¼ mile of active resting and foraging sites in the coastal areas of Tillamook, Coos and Curry Counties, work activities producing noise above ambient levels should not occur during the birds' normal wintering and migration period, from October 1 to April 30.

American Peregrine Falcon

For projects within a ¼ mile non-line-of-site or ½ mile line-of-site of a known peregrine nest, no noise-producing work activities (i.e., above local ambient conditions) should occur from January 1 - August 15.

Brown Pelican

Work activities producing noise above ambient levels should not occur within ¼ mile of known pelican roosting/resting areas along the coast.

Marbled Murrelet

1. For projects located in within a ¼ mile of suitable occupied or unsurveyed habitat, (a) no work should occur at the project location from April 1 - August 5, and (b) work activities between August 6 - September 15 should begin no earlier than two hours after sunrise and conclude no later than two hours before sunset.
2. If projects are following in-stream work windows and the above condition would not allow the project to take place, the seasonal restriction for murrelets may be waived, but the daily restriction should be followed for the entire nesting season (April 1-September 15). Also, the activity should be scheduled as late in the murrelet nesting season as possible.

Northern Bald Eagle

1. For any project located within a ¼ mile or within sight and within ½ mile of a known eagle nest, no noise-producing work activities (i.e., above local ambient conditions) should occur at the project site from January 1 - September 1.
2. Work activities producing noise above local ambient conditions should not be allowed to occur within ¼ mile of occupied roost sites or key foraging areas during periods of bald eagle use.

Northern Spotted Owl

1. For projects located in or within a ¼ mile of an occupied spotted owl site or activity center, or suitable unsurveyed habitat, noise-producing work activities (i.e., above local ambient conditions) should be suspended at the project location during the nesting season (March 1 - June 30.)
2. If projects are following in-stream work windows and the above condition would not allow the project to take place, the seasonal restriction for spotted owls may be waived. However, the activity should be scheduled as late in the owl nesting season as possible.

Western Snowy Plover

1. To ensure that impacts to incubating plovers and their nests are avoided, work in or adjacent to known current nesting habitat, as identified by the Oregon Department of Wildlife, the Oregon Natural Heritage Program, or the US Fish and Wildlife Service, should not occur during the nesting season (March 15 - September 30). Work in or adjacent to potential or historical nesting habitat should occur during the nesting season only if a survey, consisting of at least three visits within the week prior to initiation of work, determines that plovers are not using the site or adjacent areas. Plover habitat is typified by open coastal beaches, dunes, dry mud flats, sand spits at river outlets, or open sand bars along river estuaries. For the purposes of this condition, "work" includes personnel and equipment access routes.
2. To ensure that impacts to brooding plovers and their chicks are avoided: For projects proposed within two miles of known current nesting areas and linked to such nesting areas by contiguous plover habitat, and that are planned to be implemented during the chick rearing period of the nesting season (April 10 - September 30), a site specific plan should be developed to ensure that any plover broods entering the project site are not harmed or disturbed. Such plans should specify regular communication with nest area monitors regarding the status of nests and brood movement, and should invoke temporal restrictions if it appears that broods are moving into or adjacent to the project area. Plans should be approved by Service plover specialists before work is conducted. For the purposes of this condition, "work" includes personnel and equipment access route.
3. Appropriate efforts should be made not to attract potential avian or mammalian predators to the project location (e.g., the elimination of human-introduced food sources by removal of such food or use of covered and maintained garbage facilities and the proper disposal of organic waste materials generated by restoration activities).
4. Plans for planting near nest sites should be coordinated with plover specialists (e.g., from Oregon Department of Wildlife, the Oregon Natural Heritage Program, or the Service). Such plantings should only be for the restoration of native beach and dune plant communities, and avoid the planting of non-native vegetation or over-dense native vegetation near nest sites that could serve as predator cover.

MAMMALS

Columbian White-Tailed Deer

1. Where construction activities are planned in habitat of this species, a pre-construction meeting should be conducted to inform contractors about construction guidelines in Columbia white-tailed deer habitat.
    a. Care should be taken during times of limited visibility (e.g., sunset through sunrise) when driving in or near occupied Columbian white-tailed deer habitat. If deer are observed, vehicle speed should be reduced to account for the actions of the visible deer as well as the likelihood that other deer are nearby.
    b. Harrassment of adults or juveniles (such as chasing by dogs, shooting at, or automobile interaction) should be avoided near project locations.

North American Lynx

1. The assistance of ODFW and Service biologists knowledgeable about the life-history needs of the lynx, should be solicited to insure that project design and specifications meet standards favorable to the species.
2. If tree thinning is prescribed in potential lynx habitat as a means to mimic a desirable seral stage, prescriptions should be designed in a manner that will minimize the effect to potential prey populations.

aquatic habitat guide.doc/Jaz B