MEMORANDUM

TO: Water Resources Commission

FROM: Meg Reeves, Deputy Director

SUBJECT: Water Resources Commission Work Session
October 10, 2002

Informational Report on the IMST's Lowlands Report

I. Issue Statement

On July 15, 2002, the Independent Multidisciplinary Science Team (IMST) issued its report on the Recovery of Wild Salmonids in Western Oregon Lowlands (Lowlands Report). This staff report describes the role of the IMST and the recommendations directed to the Commission and the Department in the Lowlands Report. John Buckhouse, IMST member and OSU professor of rangeland resources, will provide an overview of the findings and recommendations of the report at the Commission work session. *This is an informational report; no Commission action is required.*

II. Background

The IMST was established by the 1997 Oregon Legislature to advise the state on science issues related to the Oregon Plan for Salmon and Watersheds. ORS 541.409 The IMST assesses the best available science as it pertains to salmonid and watershed recovery and the management of natural resources. Based on these assessments, the IMST makes recommendations to Oregon state agencies or other entities, communicating its recommendations largely through written reports. Agencies are required to respond to IMST recommendations within six months after a report is issued, stating how the agency intends to implement the recommendation or why the agency cannot implement the recommendation. ORS 541.409(3). The IMST reviews the scientific adequacy of each response and whether further action or consideration by the agency is warranted. IMST review of agency responses is then forwarded to the Governor and the State Legislature.

III. Discussion

On July 15, 2002, the IMST completed its most recent report, Recovery of Wild Salmonids in Western Oregon Lowlands (Technical Report 2002-1). Department staff provided comments on early drafts of the Lowlands Report, through written comments (Attachment 1) and discussions with IMST members.

The Lowlands Report evaluates the importance of western Oregon lowlands to wild anadromous salmonids and the scientific basis for maintaining and enhancing these ecosystems. An executive summary of the report is provided as Attachment 2. The geographic scope of the report is the lowland portion of Oregon west of the crest of the Cascade Range as shown in Attachment 3. Lowland rivers and streams include those with low channel and valley gradients (<2%) in geologically unconstrained alluvial valleys.

The report provides recommendations for actions that will facilitate recovery of salmonid populations. Recommendations are directed at one or more state agencies or entities that the IMST believes have the ability to implement actions, or to affect changes in management or regulation that are needed for implementation. In making its Lowlands Report recommendations, the IMST did not consider the *current* legal, regulatory, or funding situation under which agencies operate. The IMST encourages agencies to incorporate the recommendations into long-range planning, regardless of existing legal authority and/or funding constraints, and to work toward removing these impediments to implementation.

A. Recommendations of the Lowland Report

The IMST makes 21 recommendations for the protection and restoration of western Oregon lowland ecosystems with five directed to the Department or the Commission (Attachment 4).

The IMST recommends that the Department:

1) Reestablish a more natural hydrograph (timing and magnitude) on an experimental basis in river systems where flow modification is occurring as a result of storage operations, in cooperation with other agencies;

2) Maintain or increase stream flow where water withdrawals and/or impoundments presently limit salmonid distribution, productivity, or migration;

3) Coordinate with the United States Geologic Survey (USGS) to establish and maintain hydrologic gaging stations on stream and river systems critical to salmonid recovery where data are not currently available;

4) Reestablish and maintain natural fish passage for juveniles and adults in lowland stream systems along with the Division of State Lands (DSL), Oregon Department of Fish and Wildlife (ODFW), and Oregon Department of Transportation (ODOT).

In addition to the recommendations to the Department, the IMST recommends that the Water Resources Commission develop and implement a strategic plan for the long-term management of water in western Oregon.

B. Response to IMST Recommendations

The Department is currently formulating its response to the recommendations in the Lowlands Report. As part of its response, the Department proposes to include a response on behalf of the Commission. A draft response would be circulated to the Commission for review prior to its submittal to the IMST by January 2003.

In general, the Department's activities are consistent with the recommendations of the Lowlands Report, including its voluntary programs to promote water use efficiency and streamflow restoration; streamflow gaging program; and Oregon Plan efforts to eliminate fish passage barriers such as push-up dams. However, the IMST recommendation that the Department undertake a pilot program to restore the natural hydrograph in some river systems is problematic. Implementation of this recommendation, even on an experimental basis, could have significant consequences for existing structures in river floodplains and could be contrary to land use planning activities of local jurisdictions. Furthermore, restoring the natural hydrograph on mainstem systems such as the Rogue, Willamette, and Columbia rivers would be largely determined by the federal agencies managing storage facilities.

Under existing laws, the U.S. Army Corps of Engineers (Corps) manages these facilities with input provided by other entities with the U.S. Bureau of Reclamation managing the contracts for stored water. The Department is lead agency for developing state recommendations to the Corps of Engineers for summer operation of the Willamette and Rogue Basin reservoirs. In this advisory capacity, WRD could work with the Corps and other agencies to attain more natural hydrographs via recommendations related to timing of storage and release of water. However, the Department is limited to an advisory role and its recommendations to the Corps are not binding. The Department will consider these jurisdictional issues as well as other budgetary and statutory barriers in formulating its response to this recommendation.

The IMST recommendation for the Commission to develop a long-term water supply plan is equally challenging and crosses multiple jurisdictions. Water supply planning was accomplished, in part, by Commission adoption of basin programs. Basin programs are administrative rules that specify the allowable future uses of water, or classifications, through the analysis of basin-specific data and substantial public involvement. The most contemporary basin program is the Willamette Basin Program adopted in 1992, which covers a majority of the area considered in the Lowlands Report. Other areas considered in the Lowlands Report would be covered by basin programs for the North Coast, South Coast, Mid Coast, Rogue, Umpqua, and Sandy Basins. In addition to applying basin program classifications, the Commission has adopted a Water Allocation Policy which, in most cases, allows new uses of surface water on a direct flow basis only when water is available to support the new use 80% of the time.

Water supply planning occurs through other efforts as well. For example, the Willamette Basin Reservoir Study is a joint project sponsored by the Corps and the Department. The study will address operational changes or modifications in the storage allocation of this reservoir system that would better serve present and future water resource needs in the basin. In addition to this study, the Joint Task Force on Water Supply and Conservation was created by Senate Bill 93 during the 1999 Legislative Session to make recommendations to the legislature regarding future water supply projects. The Task Force has focused on existing programs relating to water supply, the development of water supply and conservation measures, and the role of the Department and other entities in planning for and meeting long-term water supply needs in Oregon. Under the comprehensive statewide land use planning program, municipalities and water delivery organizations also forecast and plan for their water needs on a planning horizon that varies from 20 to 50 years.

The Department's response on behalf of the Commission would summarize the Commission's existing policies and programs for water supply planning in western Oregon and would highlight other legislative, federal, and local water supply planning efforts. The response to the IMST would suggest that implementation of this recommendation build upon existing efforts and may be limited by budgetary and statutory barriers.

IV. Recommendation

The Department is currently formulating its response to the recommendations in the Lowlands Report. As part of its response, the Department proposes to include a response on behalf of the Commission. A draft response would be circulated to the Commission for review prior to its submittal to the IMST by January 2003.

Attachments:

1. Department Response to Draft Lowlands Report
2. Executive Summary of the Final Lowlands Report
3. Location of Western Oregon Lowlands
4. IMST Recommendations to the Department and Commission

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Attachment 2

Recovery of Wild Salmonids in Western Oregon Lowlands

A report of the Independent Multidisciplinary Science Team, Oregon Plan for Salmon and Watersheds

Technical Report 2002-1

July 15, 2002

Members of IMST
John Buckhouse, Department of Rangeland Resources, Oregon State University
Wayne Elmore, Bureau of Land Management, U.S. Department of Interior
Stanley Gregory, Department of Fisheries and Wildlife, Oregon State University
Kathleen Kavanagh, Forest Resources Department, University of Idaho
William Pearcy, College of Oceanic and Atmospheric Sciences, Oregon State University
Carl Schreck, Department of Fisheries and Wildlife, Oregon State University

Citation: Independent Multidisciplinary Science Team. 2002. Recovery of Wild Salmonids in Western Oregon Lowlands. Technical Report 2002-1 to the Oregon Plan for Salmon and Watersheds, Governor's Natural Resources Office, Salem, Oregon.

EXECUTIVE SUMMARY

This report discusses major characteristics of western Oregon's lowland rivers, streams, and estuaries that the IMST finds to be important to wild salmonids. We describe how landscape scale factors – landscape structure, landscape function, disturbance regimes, and landscape scale biological processes – historically supported salmonid populations in western Oregon lowlands. The report also covers human modifications to these ecosystems that impact salmonids. We assess how lowland land use practices may have altered lowland systems so that the landscape's ability to support healthy salmonid populations was reduced. Finally, we discuss how functioning lowland ecosystems might be protected and restored.

The geographic scope of this report is the lowland portion of Oregon west of the crest of the Cascade Range. This area stretches from the lower Columbia River south to the Siskiyou Mountains and includes estuaries, coastal lakes, and alluvial rivers and valleys that provide potential habitat for wild salmonids. In addition to major rivers, this report covers the many small tributaries and streams in western Oregon lowlands.

Science Questions

IMST addresses five science questions in this report. The answers to these questions form the basis for our findings and conclusions, and for specific recommendations to state agencies and entities.

Question 1. How important are western Oregon lowlands and estuaries to the production and recovery of salmonids?

Question 2. How have conditions in western Oregon lowlands changed from conditions prior to EuroAmerican settlement?

Question 3. What is the scientific basis for maintaining and enhancing fish habitat in western Oregon lowland ecosystems with respect to water quantity and flow modifications, fish passage, and water quality?

Question 4. What is the scientific evidence for the importance of vegetation within riparian areas in enhancing ecological processes and functions critical to salmonid recovery in western Oregon lowland ecosystems?

Question 5. What general actions are needed in the western Oregon lowlands to facilitate recovery of salmonid populations?

Overall Findings

Based on our scientific review of the answers to these five questions, the IMST finds that:

- Lowland river systems and estuaries provided diverse and productive habitats for rearing juveniles, spawning adults, and migrating juvenile and adult salmonids.
- Lowland ecosystems of western Oregon have been greatly altered during the past 150 years by human disturbances resulting from a variety of land uses. The basic processes by which water and sediment move from uplands – via streams, rivers, and estuaries – to the ocean have been highly altered.

- Alterations in flow regimes in western Oregon lowland streams have contributed to alterations in water quantity, hydrographs, and channel and floodplain form and function, negatively affecting salmonid habitat.
- Fish ladders, small dams, culverts, tide gates, irrigation diversions, and some fish hatcheries still block salmonid passage in many streams in the western Oregon lowlands.

In general, salmonids need cold, oxygenated, clean, clear water. Excessive temperature, sediment, inorganic and organic nutrients, and anthropogenic chemicals (including pesticides) impair water quality and impact salmonids.

Riparian vegetation provides many important ecological functions to aquatic systems: habitat diversity, organic matter inputs, large wood input, regulation of channel morphology and streamflow, hydrologic connectivity, temperature mediation, sediment interception, and nutrient uptake.

Key elements to a landscape approach to salmonid recovery include (1) considering landscape scale biological processes such as metapopulation structure, (2) landscape scale research, modeling and planning, (3) inventory and assessment, (4) prioritization, (5) monitoring and adaptive management, and (6) selecting projects that maintain and restore landscape scale processes.

Overall Conclusions

The quality and quantity of native salmonid habitat in lowland rivers, streams, and estuaries has been significantly reduced since EuroAmerican settlement. Recovery of wild salmonids requires habitat that is functional across the landscape. For example, management of lowland riparian zones in conjunction with those on adjacent uplands is needed to maintain the dynamics of riparian structure and function across the landscape. Other areas that need to be addressed both within and beyond the boundaries of the western Oregon lowlands include roads and sediment, large wood, fish passage, pesticides, and nutrient inputs to streams. We conclude that management practices must be considered on a large spatial scale, among agencies, and across different land uses.

Protection of intact, functional aquatic habitats should be the first priority for salmonid recovery efforts. Many land use practices in lowlands can be changed to halt and reverse the degradation of streams, floodplains, and salmonid habitat. Restoration of structure and function of lowland systems – including the geomorphic, hydrologic, and biological processes that create and maintain salmonid habitat – can have beneficial effects on salmonids and on lowland ecosystems in general. Because vegetation and large wood within riparian areas contribute important hydrologic and biologic functions to lowland rivers and estuaries, they should receive protection and be restored toward their historic level of function within river networks.

Addressing salmonid recovery in western Oregon lowlands presents tremendous challenges for a number of reasons, including high human population density, diverse land ownership, and significant reduction in salmonid habitat quality. Creative thinking is needed to move forward in the face of these challenges. In particular, solutions that will work across boundaries of land ownership, agencies, and ecosystems are needed.

Recommendations

Based on the findings and conclusions for these five science questions, the IMST makes the following 21 specific recommendations. The aim of these recommendations is to help Oregon move toward effective protection and restoration of aquatic and riparian ecosystems, and toward reestablishing healthy salmonid populations.

Recommendations are directed to one or more agencies or entities that have the ability to implement, or to affect changes in management or regulation that are needed for implementation. It should be noted that the IMST looks beyond an agency's *current* ability to implement the recommendations because current legal, regulatory, or funding situations may need to change. It is the belief of the IMST that if an agency agrees that a recommendation is technically sound and would aid the recovery of salmonid stocks and watersheds, the agency would then determine what impediments might exist to prevent or delay implementation and work toward eliminating those impediments. The Team also assumes that each agency has the knowledge and expertise to determine how best to identify and eliminate impediments to implementation and to determine appropriate time frames and goals needed to meet the intent of the recommendation. In addition, the IMST recognizes that an agency may already have ongoing activities that address a recommendation. Our inclusion of such an "overlapping" recommendation should be seen as reinforcement for needed actions.

In the Recommendations section, each recommendation is accompanied by a brief explanation, illustration of the recommendation's context, and/or possible suggestions for implementation.

Recommendation 1. The Core Team of the Oregon Plan for Salmon and Watersheds should develop and implement a landscape approach to manage salmonid habitat in western Oregon lowlands.

Recommendation 2. The Core Team of the Oregon Plan should develop and implement a statewide riparian policy and plan that provides for proper function and condition of riparian areas in Oregon.

Recommendation 3. The Core Team of the Oregon Plan should develop a statewide policy and plan for the management of large wood in and near streams and estuaries.

Recommendation 4. The Oregon Watershed Enhancement Board (OWEB) should develop strategic priorities for protection and restoration activities in western Oregon lowland streams, rivers, and estuaries to enhance salmonid recovery.

Recommendation 5. The Division of State Lands (DSL) should reconnect main river channels to off-channel areas and floodplains to increase available lowland habitat for salmonids.

Recommendation 6. The Oregon Department of Fish and Wildlife (ODFW) should determine fish abundance and establish fish-habitat relationships in western Oregon lowland rivers, streams, and estuaries.

Recommendation 7. The Oregon Watershed Enhancement Board (OWEB) should implement a long-term systematic monitoring strategy to evaluate the status and trends of salmonid populations, the capacity of habitat to produce salmonids and support diverse salmonid life histories, and the effectiveness of protection and restoration. The

strategy should represent the diversity of land uses and aquatic ecosystems in western Oregon lowlands.

Recommendation 8. The Oregon Department of Agriculture (ODA) and the Department of Environmental Quality (DEQ) should establish the effects that land use activities in western Oregon lowlands have on salmonid populations and habitat quality.

Recommendation 9. The Oregon Department of Agriculture (ODA) should improve the technical strength of their program under the Oregon Plan and expand its scope to address salmonid habitat requirements.

Recommendation 10. The Oregon Water Resources Department (OWRD), in cooperation with other agencies, should reestablish a more natural hydrograph (timing and magnitude) on an experimental basis in river systems where flow modification is occurring as a result of storage operations.

Recommendation 11. The Oregon Water Resources Department (OWRD) should maintain or increase streamflow where water withdrawals and/or impoundments presently limit salmonid distribution, productivity, or migration.

Recommendation 12. The Water Resources Commission should develop and implement a strategic plan for the long-term management of water in western Oregon.

Recommendation 13. The Oregon Water Resources Department (OWRD) should coordinate with the US Geological Survey (USGS) to establish and maintain hydrologic gaging stations on stream and river systems critical to salmonid recovery where data are not currently available.

Recommendation 14. The Oregon Department of Agriculture (ODA) should reduce sedimentation from agricultural practices in western Oregon lowlands.

Recommendation 15. The Oregon Department of Agriculture (ODA) and the Department of Environmental Quality (DEQ) should prevent adverse pesticide impacts on aquatic systems.

Recommendation 16. The Oregon Department of Agriculture (ODA) and the Department of Environmental Quality (DEQ) should prevent adverse eutrophication impacts of aquatic systems.

Recommendation 17. The Oregon State University (OSU) Agriculture Experiment Station (AES) and the OSU Cooperative Extension Service (CES), working with other state agencies involved in research, should increase understanding of how rural land use activities in the western Oregon lowland systems interact with and affect salmonid recovery.

Recommendation 18. The Division of State Lands (DSL), Oregon Water Resources Department (OWRD), Oregon Department of Fish and Wildlife (ODFW), and Oregon Department of Transportation (ODOT) should reestablish and maintain natural fish passage for juveniles and adults in lowland stream systems.

Recommendation 19. The Division of State Lands (DSL) and Oregon Department of Fish and Wildlife (ODFW) should protect and restore hydrologic function and salmonid habitat in freshwater and tidal wetlands.

Recommendation 20. The Department of Land Conservation and Development (DLCD), in conjunction with Oregon Department of Fish and Wildlife (ODFW), should improve and protect salmonid habitat in Oregon's estuaries.

Recommendation 21. The Oregon Department of Fish and Wildlife (ODFW) should prevent loss of salmonids because of water diversion.

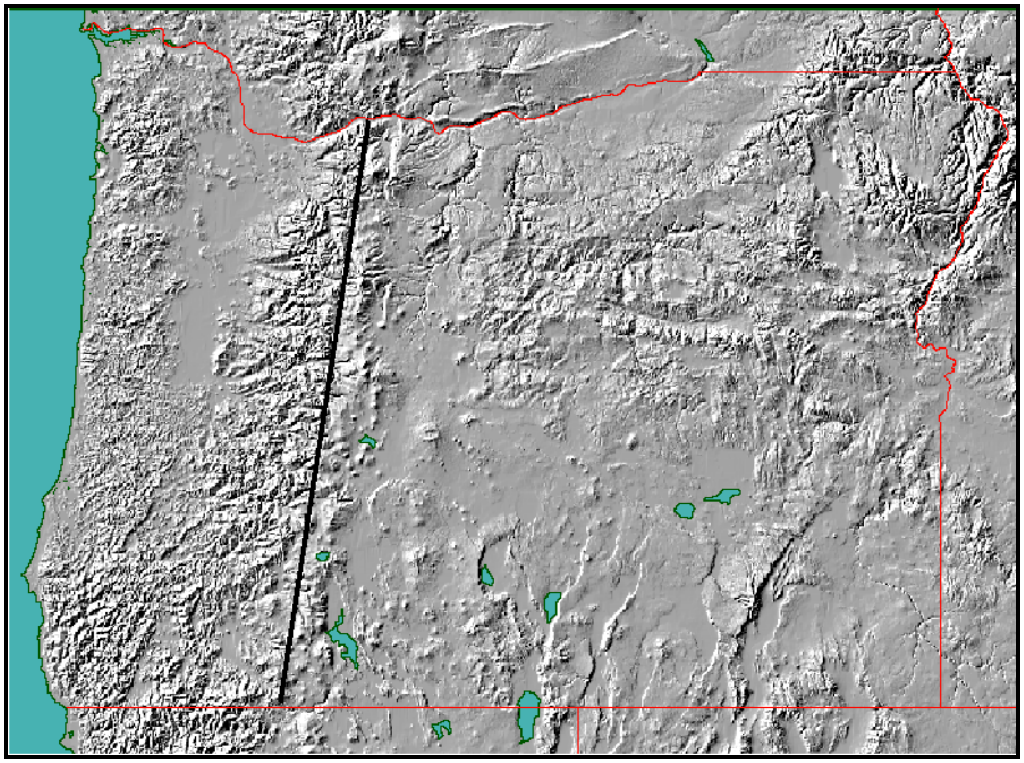

Figure 1. Region of western Oregon covered in this report (left of black line, west of the crest of the Cascade Mountain Range) (after Sterner 2001). (From Lowlands Report, Technical Report 2002-1)

IMST Recommendations to the Department and the Commission Cited From Recovery of Wild Salmonids in Western Oregon Lowlands (Technical Report 2002-1)

Recommendation 10. Water Resources Department (OWRD), in cooperation with other agencies, should reestablish a more natural hydrograph (timing and magnitude) on an experimental basis in river systems where flow modification is occurring as a result of storage operations.

These experiments should be designed to enhance connectivity of rivers with their flood plains and to increase floodplain function. These experiments should be monitored comprehensively to assess effectiveness. This recommendation may require collaboration with the US Army Corps of Engineers, as this federal agency controls the hydrograph, and rule curves are set in federal statute. OWRD needs to analyze the historical data to establish historical hydrographs and their variability. Timing and magnitude of flood flows need to be reestablished (including spring and winter freshets) and emulate natural regimes on rivers where flow modification is occurring. By doing so on highly modified river systems, such as the Rogue, Willamette, and Columbia rivers, connectivity of rivers with their floodplains should be enhanced and floodplain function should increase. Reestablishing natural hydrographs should be approached experimentally and include comprehensive monitoring programs to determine effectiveness. Research should be conducted to better understand the contribution of areas to flow, and timing of flood and base flows.

In many cases, a more natural hydrograph cannot be established due to social and economic constraints or environmental concerns. For example, higher than normal flows are sometimes maintained to minimize problems associated with low dissolved oxygen and high contaminant concentrations in western Oregon's lowland rivers.

Recommendation 11. Water Resources Department (OWRD) should maintain or increase stream flow where water withdrawals and/or impoundments presently limit salmonid distribution, productivity, or migration.

There are several aspects and possible actions related to this recommendation:

- Identify streams where salmonid productivity is limited by stream flow.
- Prioritize streams for flow protection and restoration based on fish and habitat requirements and time of year when flow is most critical.
- Develop strategies to improve water use efficiency and reduce consumptive water use.
- Restore wetlands that will enhance stream flows during low flow conditions.
- Continue to develop ground water studies and watershed hydrological models to evaluate water use and seasonal water availability, including the role irrigation may have in groundwater recharge.

- Determine relationships between groundwater extraction and adjacent streams flows in regions where instream flows are inadequate.
- Incorporate the role and contribution of wetlands into water availability models. For example, compare the historic, current, and potential contribution of wetlands to water availability.
- Coordinate with other agencies to restore wetlands that will enhance streamflows during low flow conditions (see Recommendation 19).

Recommendation 12. The Water Resources Commission should develop and implement a strategic plan for the long-term management of water in western Oregon.

A strategic plan is needed to mitigate current instream water flow deficiencies and to plan for efficient water use over the near and long term. A strategic plan should incorporate key elements of landscape management, including water management at larger spatial scales and over longer periods of time. In developing a strategic plan the Water Resources Commission should consider:

- Identifying a lead agency such as Water Resources Department (OWRD) to coordinate with other state, local, and federal agencies;
- Expanding the geographic scope of areas identified for stream flow restoration;
- Incorporating a landscape approach and sub-watershed salmonid prioritized areas into the process for determining these priorities;
- Incorporating elements listed in Recommendations 10 and 11 into the strategic plan;
- Incorporating projected human population growth and demographics and water needs into the plan; and
- Acknowledging the integration of ground and surface water in the plan.

Recommendation 13. The Water Resources Department (OWRD) should coordinate with USGS to establish and maintain hydrologic gaging stations on stream and river systems critical to salmonid recovery where data are not currently available.

Monitoring stream flow through gaging stations is important for:

- Determining seasonal and long-term trends in stream flow,
- Assessing effectiveness of efforts to restore instream flow,
- Assessing effectiveness of transferring and leasing water rights for instream water uses, and
- Watershed analysis based on historical data.

Recommendation 18. The Division of State Lands (DSL), Water Resources Department (OWRD), Oregon Department of Fish and Wildlife (ODFW), and Oregon Department of Transportation (ODOT) should reestablish and maintain natural fish passage for juveniles and adults in lowland stream systems.

Restricting salmonid access to lowland habitat limits recovery potential. Recently, ODOT and ODFW have surveyed, identified, and prioritized impassable culverts on state (and some county) maintained roads and have begun to address problematic culverts. In addition, other barriers to fish passage need to be addressed.

Accomplishing this recommendation will take several cooperative steps between agencies including:

- ODFW should inventory fish passage impediments including tide gates, road crossing, push up dams, low flows, ineffective fish ladders, and other barriers to passage.
- Develop and maintain an up-to-date, centralized, spatially explicit database of fish passage barriers.
- In areas prioritized for salmonid recovery, barrier free areas that need protecting should be prioritized and tracked.
- Sites that need barrier modification or removal and should continue to be prioritized and tracked.
- DSL, OWRD, ODOT, and ODFW should develop and implement a strategic plan to reach long-term goals of eliminating fish passage barriers and mitigate fish passage impediments that cannot be addressed.
- Monitor the effectiveness of efforts to reestablish fish passage.
- OWEB should include effectiveness monitoring of fish passage remediation efforts in the Oregon Plan Monitoring Program's strategic plan.
- OWEB should encourage culvert assessment on private lands.
- Tide gates should be replaced, modified, or removed to allow fish passage and to emulate historical hydrologic functions in estuaries.