

4 Inventory and Assessment of Conservation Efforts

4.1 Background

According to the Northwest Power Conservation Council, subbasin plans must include a summary of the following:

“fish and wildlife protection, restoration and artificial production activities and programs ...that have occurred over the last five years or are about to be implemented. The information should include programs and projects as well as locally developed regulations and ordinances that provide fish, wildlife and habitat protections. Compiling this information will help demonstrate: 1) current management directions, 2) existing and imminent protections, and 3) current strategies implemented through specific projects. The inventory will have its greatest value when it is reviewed in conjunction with the limiting factors resulting from the assessment. This review should help to identify gaps between actions taken and actions needed – ‘gap analysis’...”

The Willamette Basin’s size, natural complexity, and diversity of institutions and the committed nature of its residents makes an inventory and assessment of this nature very difficult. It may therefore be helpful to first provide an overview of the major roles of the various sectors at work in the basin.

At the local level, the Willamette Basin includes 10 counties, about 100 incorporated cities, nearly 30 watershed councils, 11 soil and water conservation districts (SWCDs), and four regional governments. Most of these manage programs that require or promote environmental safeguards, including riparian ordinances and improvements, erosion controls, effluent treatment, stormwater control, open space protection, fish passage improvements, watershed assessments, and action plans.

At the state level, the Oregon Department of Fish and Wildlife oversees hatchery programs and harvest controls, promulgates wild fish and wildlife policies, sponsors landowner incentives programs, conducts research, and manages a number of wildlife areas. The Oregon Department of Environmental Quality regulates point and nonpoint pollution throughout the basin, monitors water quality, and sponsors research on water quality issues. The Oregon Department of Forestry regulates timber harvest activities and their environmental impacts through the Oregon Forest Practices Act. The Oregon Parks and Recreation Department manages the Willamette Greenway and other properties throughout the basin to assure conservation benefits. The Oregon Division of State Lands manages the state-owned beds and banks of most streams in the Basin, and oversees regulations controlling in-stream and wetland activities. The Oregon Department of Geology and Mineral Industries regulates aggregate mining in the Willamette and promotes sound reclamation. And the Oregon Department of Agriculture oversees cooperative development of farm water quality management plans and assists SWCDs.

At the federal level, the U.S. Forest Service and Bureau of Land Management manage major portions of the basin and provide substantial fish and wildlife protections through the Northwest Forest Plan and a host of other programs. The U.S. Fish and Wildlife Service manages a system of Willamette Valley refuges, oversees species recovery programs, advises other agencies on

program impacts on listed species, and sponsors a number of landowner incentive programs. NOAA Fisheries manages the recovery planning process for listed salmon and steelhead, advises other agencies on program impacts on those species, and conducts research on salmonid life histories and needs. The U.S. Army Corps of Engineers operates the flood-control system in the basin, sponsors numerous environmental restoration programs, and conducts research on impacts of dam operations and other activities on the environment. The U.S. Environmental Protection Agency oversees implementation of the Clean Water Act, advises and assists state agencies and others on how to control environmental impacts, and conducts research on the cause of environmental problems in the basin.

There is also substantial activity on the part of the university community (research, extension, and other forms of education and outreach), utilities (dam relicensing, energy and water conservation, green power, research, and mitigation), and a host of nongovernmental entities (land trusts, conservation organizations).

In short, there are so many “players” working under so many different statutes and missions, across so large a landscape, that this evaluation of conservation effort should be viewed as a reconnaissance of the conservation terrain, not a topographic survey.

4.2 WRI Approach to Evaluation of Conservation Efforts

WRI approached its evaluation with the understanding that it would not be possible under the time and budget allotted to generate a definitive and precise exposition of everything that has occurred over the last 5 years down to the project level. Rather, an emphasis was placed on understanding the “drivers” behind conservation activities, with a de-emphasis on generating lists of projects.

Consequently, WRI attempted to sample the extent and kinds of conservation efforts and gain an understanding of them through discussions with a wide range of experts.

Specifically, WRI commissioned an inventory of “nonlocal” plans, policies, and programs in the spring of 2003. The inventory was based on surveys of agencies and organizations, combined with independent research. The result was a major “sweep” of more than 800 plans, studies, programs, policies, and, in some cases, projects (see Appendix L). The “return” on this effort was so large that it made refinement challenging—consequently, the information is sorted only in a first-order sense (by source [state, federal, etc.] and then by major topic [fish, wildlife, water quality, etc.]). WRI believes that the information warrants additional organization and review—something that can occur only at a later date.

WRI also identified specific local measures in areas of concentrated analysis (for example, in the Clackamas and McKenzie rivers), and the City of Portland commissioned a detailed inventory of activities in its region. In addition, WRI surveyed ODFW district biologists to get a sense of what important conservation measures were at work in their areas.

Lastly, WRI commissioned a survey of local governments and groups to understand what they were doing in terms of conservation and why. Eighty surveys were distributed and 32 were returned.

In the succeeding sections, this evaluation will consider the following:

- Conservation efforts now having significant impacts
- Conservation efforts expected to have significant impacts in the near future
- Assessment of conservation efforts

For purposes of this evaluation, “efforts” refers to policies, plans, programs, or projects. Significance was identified through professional judgment of numerous conservation practitioners in the Willamette Basin in meetings and personal interviews.

It should also be noted that this “inventory” was not intended to characterize research, analysis, or monitoring efforts. These are generally characterized in the research, monitoring, and evaluation section of Chapter 5. However, many of the conservation efforts described below are supported by a considerable body of research effort that includes some of the most sophisticated and thorough in the Columbia Basin, including: the Pacific Northwest Ecosystem Research Consortium’s Willamette River Basin Alternative Futures study (as documented in the *Willamette River Basin Planning Atlas*); monitoring and assessment efforts under the Northwest Forest Plan; research programs of ODFW; the monitoring program of the Oregon Plan for Salmon and Watersheds and the Oregon Forestry Department’s Forest Practices Act monitoring; the monitoring and research of DEQ, especially the data compilation and modeling involved in the total maximum daily load and Portland Harbor efforts; and the work of the NOAA Fisheries Technical Recovery Team.

4.3 Overview of Conservation Efforts Now Having Significant Impacts

Of the literally hundreds of plans and programs in the Willamette Basin that affect fish and wildlife habitat, a number stand out by virtue of their impacts on the environment and on actions which affect the environment. These are listed and described in Appendix M and summarized below.

4.3.1 State and Federal Approaches

Plans and programs for at-risk species represent key conservation efforts in the basin. These are administered by both federal and state agencies, but programs for species listed under the federal Endangered Species Act arguably have more impact. The definition of “species take” applies more broadly, and consequences of illegal take can be severe. The consultation process that occurs between all federal agencies and the two federal agencies in charge of threatened and endangered species protection (U.S. Fish and Wildlife Service and NOAA Fisheries) can be painstaking and result in greatly restricted permitting by other agencies. Recovery plans resulting from listing are the principal means for reestablishing viable species populations and represent critical conservation pathways in the Willamette Basin.

The ESA requires that recovery plans contain objective, measurable goals for delisting; a comprehensive list of the actions necessary to achieve the delisting goals; and an estimate of the cost and time required to carry out those actions. Recovery plans will address all salmonid species within a series of discrete geographic areas or domains. In 2000, NOAA Fisheries established a Technical Recovery Team for the Willamette-Lower Columbia domain to do the following:

- Identify population and ESU delisting goals
- Characterize habitat/fish abundance relationships
- Identify the factors for decline and limiting factors for each ESU
- Identify the early actions that are important for recovery
- Identify research, evaluation, and monitoring needs
- Serve as science advisors to groups charged with developing measures to achieve recovery

TRTs will identify recovery goals for all listed ESUs. Recovery goals must, at a minimum, restore listed ESUs to levels at which they are no longer threatened and can therefore be delisted under the ESA (NOAA Fisheries, Recovery Planning Web site).

Species management policies and plans are also common and important in the Willamette. ODFW's recently adopted Native Fish Conservation Policy promises to have far-reaching impacts in terms of protecting and reestablishing declining fish populations. ODFW's management of fish populations and habitat within the Willamette Basin is guided by the objectives and priorities initially set forth in the 1980 *Willamette Basin Fish Management Plan* and subsequent revisions. One of the priorities of the initial plan was the preparation of a fish management plan for each subbasin. Ten subbasin plans have been completed, and separate plans have also been prepared for major reservoirs and lakes, and for spring Chinook salmon throughout the basin. Additionally, ODFW has completed statewide species management plans for coho salmon, steelhead, trout, and warm-water game fish. These plans were intended to guide the development of localized plans for river basins and subbasins (Altman et al., 1997).

In addition to fish management plans, ODFW has prepared production plans for anadromous fish for the Willamette Basin and 11 subbasins: Clackamas, Coast Range, Coast Fork Willamette, Long Tom, McKenzie, Middle Fork Willamette, Molalla and Pudding, Sandy, Santiam and Calapooia, Tualatin, and main stem Willamette. These plans identify salmon and steelhead production objectives and strategies relating to the Northwest Power and Conservation Council's Fish and Wildlife Program. The plans address natural production, hatchery production, and harvest. (Altman et al., 1997)

ODFW has also developed hatchery management plans to ensure that propagation of nonnative salmonids does not interfere with the health and viability of native salmonids. In addition, ODFW's Wildlife Diversity Program is important for "non-game" fish and wildlife. One of ODFW's most significant programs in the basin is its Willamette Mitigation Program, which designs and undertakes specific on-the-ground actions to address fish and wildlife habitat losses caused by major federal dams in the basin.

Water quality programs administered by EPA and DEQ and carried out at the local level are also critically important conservation efforts. Thousands of point-source discharges are carefully controlled under DEQ permits. Nearly all of the basin's cities now have to comply with stormwater management regulations to cut down on runoff pollution. The Oregon Department of Agriculture and its local partners (SWCDs, watershed councils, landowners) have completed nine watershed-based sets of agricultural water quality management plans and rules—essentially all of the Willamette Basin. Portland is spending more than \$1 billion to correct its combined sewerage overflow problems, even as the City of Portland, EPA, DEQ, and many others prepare for what could be a more than \$200 cleanup of the Portland Harbor Superfund site.

The Oregon Forest Practices Act administered by the Oregon Forestry Department has a powerful impact on fish and wildlife habitat on nonfederal forestlands in the Willamette Basin. It requires a suite of protections, ranging from riparian protection to limits on clearcut size to requirements for road design and maintenance to landslide-prone area protection. The Northwest Forest Plan applies on federal forestlands in the basin and is managed primarily by the U.S. Forest Service and BLM. The plan is an integrated, comprehensive approach for ecosystem management. The plan's aquatic conservation strategy seeks to restore and maintain the ecological health of watersheds (and the aquatic ecosystems contained within them).

The U.S. Army Corps of Engineers operate the 13-dam flood control system in the Willamette Basin. The operation of this system has tremendous impacts on the basin's fish and wildlife. Each year, the Corps is advised by state and federal agencies on how to balance competing needs for the water it stores and releases. Water releases in the summer have essentially doubled the natural flow of the Willamette, substantially diluting pollution. Recently, the Corps has moved to earlier release of some stored water to mimic spring-time peak flows thought to benefit migrating juvenile salmon. The Corps is also in the process of remediating water temperature problems caused by the manner in which water is released from dams in the McKenzie system.

There are also substantial streamside and stream channel protections throughout the basin. In the forested uplands, the Northwest Forest Plan and state Forest Practices Act provide a range of protection for riparian areas in terms of forest management activities. In the lowlands, the permitting requirements created by state and federal removal-fill laws have been substantially braced by the consultation requirements of the Endangered Species Act.

Oregon's Removal-Fill Law (ORS 196.795-990) requires any person or organization who plans to remove or put (fill) material in waters of the state to obtain a permit from the Division of State Lands. The law, enacted in 1967, seeks to protect public navigation, fishery and recreational uses of the "waters of the state"—"natural waterways including all tidal and nontidal bays, intermittent streams, constantly flowing streams, lakes, wetlands and other bodies of water in this state, navigable and nonnavigable, including that portion of the Pacific Ocean that is in the boundaries of this state." Permits are required for: projects requiring the removal or fill of 50 cubic yards or more, or of any material in a stream designated as essential salmon habitat (with some agricultural and small mining exemptions) or as a state scenic waterway (Oregon Division of State Lands Web site: <http://www.oregonstatelands.us/r-fintro.htm>).

The Division of State Lands also implements the 1989 Wetlands Conservation Act, including administering the Statewide Wetlands Inventory and National Wetlands Inventory. DSL also works closely with local governments and the Department of Land Conservation and Development (DLCD) in assisting with local wetlands inventories as required by statewide land use planning Goals 5 (Natural Resources), 16 (Estuaries) and 17 (Coastal Shorelands) (Oregon Division of State Lands Web site: <http://www.oregonstatelands.us/wetlandsintro.htm>).

In summary, there has long been a substantial body of law and regulation involving in-channel disturbance and wetland activities. Because there is often a federal connection, or nexus, in these areas, by virtue of the ESA, most of these permits must undergo additional scrutiny by either NOAA Fisheries or the U.S. Fish and Wildlife Service.

The Oregon Plan for Salmon and Watersheds in combination with the activities of the Oregon Watershed Enhancement Board provides a planning and funding framework for watershed

restoration, salmon recovery, and water quality improvements. Plan components include: (1) Coordination of efforts by all parties; (2) development of watershed action plans with relevance and ownership at the local level; (3) monitoring progress; and (4) making appropriate corrective changes in the future. The Willamette Restoration Strategy is the Willamette Basin Supplement to the Oregon Plan and includes 27 critical actions and 4 key recommendations for improving habitat in the basin. The Strategy groups over 200 state and agency protection measures under detailed courses of action to address water quality, water supply, habitat, and institutions. The Oregon Watershed Enhancement Board administers a grant program that awards more than \$20 million annually to support voluntary efforts by Oregonians participating in the Oregon Plan, as well as monitoring effectiveness of watershed actions, coordinating the collection of data on natural resource conditions, and reports on the progress of the Oregon Plan.

Another very active area relating to habitat improvement is fish passage. Fish passage projects include improving road-stream crossings (for example, by fixing or removing culverts), improving passage at small-to-moderate sized dams; and screening water intakes. As a state policy, upstream and downstream passage is required at all artificial obstructions in those Oregon waters in which migratory native fish are currently or have historically been present. ODFW maintains a statewide inventory of artificial obstructions. Since 1994, the Oregon Forest Practices Act has required juvenile fish passage be provided on all fish-bearing streams. The U.S. Forest Service and Bureau of Land Management also maintain fish passage inventories and implement improvements, as do state and federal transportation agencies. Most counties and large cities are also addressing fish passage problems. FERC's relicensing requirements has also triggered major passage improvements in Willamette Basin hydroelectric dams in the Clackamas and McKenzie Basins and at Willamette Falls.

Surveys of county and state highways conducted in the late 1990s found hundreds of culverts that were assumed to at least partially block fish passage. The Willamette Basin in its entirety was found to have 938 problem culverts—one of the highest numbers of any basin in the state (Oregon Department of Forestry and Oregon Department of Environmental Quality, 2002).

4.3.2 Local Approaches

The Willamette Basin is characterized by a high level of involvement and commitment to conservation at the local level. So high, in fact, that accounting for all local efforts is impossible, and any comprehensive description must necessarily be of a summary nature. The section summarizes and illustrates a number of, but not all, local conservation activities.

To gain insight into how local efforts are protecting fish and wildlife habitat, a survey was sent out to 80 contacts in local communities and county governments throughout the Willamette Basin. The survey requested responses to a suite of questions that focused on land use planning and public works. Thirty-two respondents (40 percent) representing twenty communities, three counties and three other local jurisdictional entities (Metro, Clean Water Services and one SWCD) responded to the survey. In addition, information was obtained through internet searches, secondary sources to cross-reference and support the responses obtained directly through the surveys, and a few phone interviews.

Following are some notable conclusions from this survey include:

- A majority of respondents (55 percent) have inventoried streams within their jurisdictions and instituted some type of riparian management protections.
- Wetlands are protected by 40 percent of the respondents; 43 percent restrict development activities (grading, excavation, etc.) in wetlands within their jurisdictions and see wetlands as providing benefits to wildlife habitat, groundwater recharge and stormwater retention.
- Forty percent have “considered” using a stream’s “channel migration zone” for planning and resource protection.
- Forty-six percent have reviewed their road maintenance programs to minimize impacts to fish and wildlife.
- Sixty percent have adopted erosion control standards for new construction.
- Forty percent have completed a comprehensive Stormwater Management Plan, and 46 percent have identified ways to reduce stormwater run-off.
- Forty-three percent have development standards that limit impervious surface development in new construction.
- Forty-three percent have made changes to their wastewater treatment to better support sensitive species (mostly temperature reduction efforts).

The entire survey report may be found in Appendix N.

A particularly intense array of conservation activities has been built through the efforts of the Willamette Basin’s watershed groups, including watershed councils and soil and water conservation districts (see Table 4-1). There are 26 watershed councils in the Willamette Basin—18 of which have organized under ORS 541.360. (In addition, a new watershed council began forming in the Oregon City area in 2004.) According to this state law, a watershed council is "a voluntary local organization designated by a local government group convened by a county governing body to address the goal of sustaining natural resource and watershed protection and enhancement within a watershed." Legislative guidelines provide that a watershed council be a voluntary, local group; and that it represent a balance of interested and affected persons within the watershed. Watershed councils prepare watershed assessments, develop actions plans, and convene a broad spectrum of interests to implement the action plans.

There are also 11 soil and water conservation districts in the basin that work closely with the agricultural community to promote and assist with land and water stewardship. SWCDs develop annual work programs that set out resource objectives, collaborate with watershed councils, and have a lead role in agricultural water quality management planning.

Table 4-1: Watershed Groups in the Willamette Basin

| Watershed Councils | | Soil and Water Conservation Districts |
|--------------------------|----------------------------|---------------------------------------|
| Calapooia WSC | Mid Fk Willamette Council | Benton SWCD |
| Clackamas RBC | Mohawk WSC | Clackamas Co. SWCD |
| Claggett Cr WSC | N Santiam WSC | Columbia SWCD |
| Coast Fk Willamette WSC | Pedee/Ritner Crk WSC | East Lane SWCD |
| Columbia Slough WSC | Pringle Cr WSC | East Multnomah SWCD |
| Fairview Crk WSC | Pudding River WSC | Linn SWCD |
| Glenn & Gibson Creek WSC | Rickreall WSC | Marion SWCD |
| Johnson Cr WSC | Salem/Keizer Area Councils | Polk SWCD |
| Long Tom WSC | Scappoose Bay WSC | Washington Co. SWCD |
| Lost Cr Ws Group | South Santiam WSC | West Multnomah SWCD |
| Luckiamute WSC | Tryon Cr WSC | Yamhill SWCD |
| Mary's River WSC | Tualatin WSC | |
| Mckenzie WSC | Yamhill WSC | |

4.3.2.1 Examples of Geographically Concentrated Efforts

A number of local conservation efforts rise to significance by virtue of their geographic concentration. Concentrated efforts are more likely to benefit fish and wildlife in a local area while increasing the level of inter-organizational collaboration. Because these endeavors are locally-based, they occur mostly in the lowland areas of the basin. Accordingly, this section does not attempt to characterize efforts in the higher elevations. A number of these local, geographically significant endeavors are described in Table 4-2 and summarized below.

Lower Willamette Basin/Portland-Metro Area. The lower basin stands out as an area of intense conservation activities. The City of Portland lists nearly 50 separate activities and programs in a recently completed inventory (Appendix O) of its activities relating to the protection of fish and wildlife habitat. Among the more prominent are: Portland's Endangered Species Act program; Willamette River Habitat Restoration and Enhancement Program; River Renaissance; Healthy Streams; Clean River Plan; CSO Abatement Program; Sustainable Stormwater Program; integrated pest management; and a host of watershed analyses. The number, breadth, and depth of programs administered by the City is noteworthy, not only in the region, but nationally.

Metro, the Portland area's elected regional government, manages a number of programs with significant fish and wildlife benefits. Its Open Space program was funded in 1995 through a voter-approved measure to issue \$135 million in bonds to acquire and protect roughly 6,000 acres of natural area. Metro is also developing a fish and wildlife habitat protection plan that will conserve, protect, and restore urban streams, waterways and upland areas that provide important

Table 4-2: Examples of Geographically Concentrated Conservation Efforts

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| Portland-Metro area: Portland CPR | |
| Metro Natural Resources Planning and Open Space Protection | <p>Metro is a regional government working in the Multnomah, Washington, and Clackamas County area. It has at least two major program areas with substantial impacts on fish and wildlife habitat: natural resources planning and open space protection.</p> <p><i>Natural Resources Planning</i></p> <p>Metro's work in developing a fish and wildlife habitat protection plan integrates community needs for a strong economy and healthy habitat. The Metro Council and its local partners are conducting a three-step planning process to conserve, protect, and restore urban streams, waterways and upland areas that provide important fish and wildlife habitat. (The Metro Council has already completed water quality and flood management standards under its Water Quality and Floodplain Protection Plan.)</p> <p>State land-use planning laws and broad citizen concern guide this fish and wildlife work. The three steps are:</p> <ol style="list-style-type: none"> 1. Conduct an inventory and map regionally significant fish and wildlife habitat (completed—in 2002, the Metro Council approved the inventory of regionally significant fish and wildlife habitat); 2. Analyze the economic, social, environmental and energy impacts of protecting – or not protecting – fish and wildlife habitat (in progress) <p>This step is divided into two phases: Phase one resulted in a report that describes the regionwide tradeoffs of allowing, limiting, or prohibiting land uses that negatively impact habitat areas. The Metro Council approved this regional analysis in 2003 and also provided direction for the second phase: evaluation of six regulatory program options and additional non-regulatory options to achieve habitat protection. Tradeoffs will be evaluated and compared for the Metro Council as it considers where to protect habitat in its final evaluation decision scheduled for 2004.</p> <ol style="list-style-type: none"> 3. Develop a Regional Fish and Wildlife Habitat Protection Program (next step). The Metro Council will determine the appropriate combination of implementation methods that will be part of an effective habitat protection program, which may include education, incentives, land acquisition, restoration and regulations. A final decision on a habitat protection program is expected in December 2004. <p><i>Open Space Protection</i></p> <p>In 1992, the Metro Council adopted the Metropolitan Greenspaces Master Plan, which lays out a vision for a unique regional system of parks, natural areas, greenways and trails for fish, wildlife and people. The plan identifies 57 urban natural areas and 34 trail and greenway corridors that define green infrastructure for the Portland metropolitan region. The plan is being implemented by local park providers, schools, businesses and citizen groups through a combination of open space acquisition, land-use standards, incentives and stewardship. Voters approved Metro's Open Spaces Program in 1995, giving it authority to issue more than \$135 million in bonds primarily for acquiring land. A recent evaluation found that Metro has effectively achieved its 6,000-acre open space acquisition goal.</p> |

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| City of Portland | <p>The City has developed a remarkably strong and broad approach to fish and wildlife conservation. It is currently formulating a <i>Framework for Integrated Management of Watershed and River Health</i>. The Framework describes how the City will achieve watershed health in its urban watersheds based on a scientific foundation. In preparing the Framework, the City has completed an inventory (see Appendix O) that lists 47 separate programs and activities where the City undertakes actions to protect fish and wildlife, including: Endangered Species Act (ESA) Program, Willamette River Habitat Restoration and Enhancement Projects, Lower Willamette River Fish Research, Johnson Creek Restoration Plan, Assessment of City of Portland Activities for Potential to Affect Steelhead, ESA Section 7 Streamlining Agreement, Fish-Friendly Maintenance Practices Manual, Salmon Safe Certification for Portland Parks, River Renaissance, Watershed Planning and Analysis, Willamette River Greenway Plan, Healthy Portland Streams Project, Clean River Plan, Upper Tryon Creek Corridor Assessment, Preservation and Restoration of Natural Areas, Columbia and Willamette River Natural Resource Inventories, Natural Resources Inventories and Management Plans, Natural Resource Program, Ross Island Lands Transfer, Johnson Creek Culvert Replacements, Transportation System Planning, National Pollution Discharge Elimination System (NPDES) Stormwater Permits, Combined Sewer Overflow (CSO) Abatement Program, Stormwater Management Manual, Structural Controls, Sustainable Stormwater Program, Industrial Stormwater Program, Environmental Systems Program, Stormwater Advisory Committee, Wastewater Treatment Plants, Illicit Discharge Control Program, Industrial Pretreatment Program, Spill Protection and Citizen Response Section, Underground Injection Control (UIC) Program, Erosion Control Program, Integrated Pest Management Program, Watershed Revegetation Program, Urban Forestry Program, Parking Lot Landscaping, Environmental Zoning Review, Site Development Review Process, Development Standards Review, Building Code Review, Community Watershed Stewardship Program, Watershed Health Public Education and Outreach, Public Education and Outreach about Stormwater, Office of Sustainable Development</p> |
| Clean Water Service's Healthy Streams Plan | <p>Clean Water Services has developed the Healthy Streams Plan, a coordinated strategy for protecting water resources and meeting the requirements of the federal Clean Water Act (CWA) and Endangered Species Act (ESA). The Plan identifies and prioritizes specific projects, policies, and programmatic changes needed to further improve water quality, manage flooding and floodplains, and protect aquatic species in the Tualatin River Basin. In 2004, Oregon DEQ issued a Clean Water Act integrated, municipal, watershed-based permit to Clean Water Services—the first of its kind ever in the nation. The permit covers the four treatment facilities, urban storm water runoff, and allows for water quality credit trading.</p> |
| Salem and Marion County Area | <p>Salem has: adopted an ambitious Willamette Greenway zone amendment; a “Tree and Riparian Vegetation Preservation Ordinance”; started a Local Wetlands Inventory inventoried local parks and open spaces for native species and wildlife habitat; created an Erosion Prevention and Sediment Control Plan; and, a stream water quality monitoring program.</p> <p>Marion County has: a plan for acquiring open spaces; inventoried local parks and open spaces for native species and wildlife habitat, views wetlands as having stormwater retention capabilities; completed a “Historic Fish Distribution Study”; an ESA 4(d) Limit for routine road maintenance; an NPDES permit for the urbanized areas outside of Salem and Keizer; a native seed program to provide seeds for use both within the county and by others; and, initiated a park restoration program, a roadside native plant program, salmon recovery efforts, and an environmental education program.</p> |
| Eugene/Lane County Area | <p>The City of Eugene has: a natural resource management and conservation program, an open waterway and natural area acquisition program (“Ridges and Rivers” Program); adopted the West Eugene Wetlands Plan; about 2300 acres of parks and open spaces; a comprehensive Stormwater Management Plan and a stormwater fee program; a Healthy Natural and Built Environment policy; a Salmon Habitat Protection Overlay Zone; an Integrated Pest Management Policy; native and invasive species policies; a Willamette Riparian Habitat Management Plan; a Willamette River Floodplain Acquisition Study.</p> |

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| | <p>Lane County has completed an inventory of which streams are subject to Goal 5 riparian protections and has implemented vegetation removal limitations and structure setbacks for development in riparian areas (one of the first counties in the state to do so). The county’s comprehensive plan includes protections for sensitive plants and bird habitat. The county has also developed a Natural Resources Study focusing on three Goal 5 resources: wetlands, water areas (e.g., streams, lakes, and ponds) and their associated riparian vegetation, and wildlife habitat.</p> <p>In addition, there are other noteworthy conservation efforts in the Upper Willamette area basin, including environmental mitigation measures undertaken by the Eugene Water and Electric Board, the McKenzie Watershed Council, the McKenzie Trust, the City of Springfield, the City of Corvallis’ ESA and CSO programs, the Bureau of Land Management, other state and federal agencies, and local governments.</p> |
| <p>Willamette Valley Refuge System: USFWS & ODFW</p> | <p>The wildlife refuges of the U.S. Fish and Wildlife Service, the wildlife management areas of the Oregon Department of Fish and Wildlife, and the Willamette Greenway properties (managed primarily by the Oregon Parks and Recreation Department) represent important conservation efforts.</p> <p>Refuges, wildlife areas, and Greenway properties total over 40,000 acres (excluding acreage managed by local and regional governments for open space and natural areas). Because these areas are well-distributed throughout the basin’s lowlands, this represents a significant conservation network that will likely be integral to a variety of species protection and recovery efforts.</p> |

fish and wildlife habitat. It has completed an inventory of regionally significant fish and wildlife habitat and has analyzed region-wide tradeoffs of allowing, limiting, or prohibiting land uses that negatively impact habitat areas. Metro is now evaluating six regulatory program options and additional non-regulatory options to achieve habitat protection.

Clean Water Services is a special district that provides wastewater and surface water management services to urban Washington County. It operates four wastewater treatment plants that discharge into the Tualatin River and, along with Washington County, is also responsible for urban runoff. Clean Water Services has developed the Healthy Streams Plan, a coordinated strategy for protecting water resources and meeting the requirements of the federal Clean Water Act (CWA) and Endangered Species Act (ESA). The Plan identifies and prioritizes specific projects, policies, and programmatic changes needed to further improve water quality, manage flooding and floodplains, and protect aquatic species in the Tualatin River Basin. In 2004, Oregon DEQ issued a Clean Water Act integrated, municipal, watershed-based permit to Clean Water Services—the first of its kind ever in the nation. The permit covers the four treatment facilities, urban storm water runoff, and allows for water quality credit trading.

In 1995, Washington and Oregon joined together to address the environmental, recreational and economic issues facing the Lower Columbia River Estuary by establishing the Lower Columbia River Estuary Partnership. The Estuary includes the Columbia River below Bonneville Dam and the tidally influenced reaches of tributaries (which includes the Willamette up to Willamette Falls at Oregon City). The Partnership consists of agricultural interests, industry, ports, environmental groups, tribes, recreation groups, commercial fishing interests, and federal, state and municipal governments and agencies. LCREP has developed a Comprehensive Conservation and Management Plan to preserve and enhance the river. The Plan identifies 43 actions that address seven priority issues (biological integrity, conventional pollutants, toxic contaminants, habitat loss, human impacts, institutional constraints, and public awareness) and contribute to the ultimate goal of restoring and maintaining the biological integrity of the Lower Columbia River Estuary.

In addition, there are other notable conservation endeavors in the lower basin, including environmental mitigation measures undertaken by Portland General Electric, Clackamas Water Environment Services, the Clackamas River Basin Council, the Port of Portland, and other councils, state and federal agencies, and local governments.

Mid-Willamette Basin Area. Salem has adopted an ambitious Willamette Greenway zone amendment and a “Tree and Riparian Vegetation Preservation Ordinance” to protect riparian habitat within its jurisdiction and has started a Local Wetlands Inventory. Salem has inventoried local parks and open spaces for native species and wildlife habitat, and its Parks Department has adopted a “Sensitive Study Management Handbook” to help support that effort. The City has created an Erosion Prevention and Sediment Control (EPSC) Plan, and has passed an ordinance addressing erosion and sediment control and bank stability. In addition, the City has a stream monitoring program that samples twelve major streams within its jurisdiction for water quality parameters.

Marion County has a plan for acquiring new open spaces which includes funding from private donations, grants, and partnerships with other agencies. It has inventoried local parks and open spaces for native species and wildlife habitat, and views wetlands as having stormwater retention capabilities. The county has also completed a “Historic Fish Distribution Study” with Salem and

inventoried some county streams for fish presence and habitat quality. Marion County Public Works has an ESA 4(d) Limit (practices and policies determined by NOAA Fisheries to not harm salmonids) for routine road maintenance and holds an NPDES permit for the urbanized areas outside of Salem and Keizer. The county also uses and sells native seed for use both within the county and by others. In addition, Public Works has initiated a park restoration program, a roadside native plant program, and salmon recovery efforts, as well as environmental education opportunities.

Upper Willamette Basin Area. The City of Eugene administers a natural resource management and conservation program, and an open waterway and natural area acquisition program (“Ridges and Rivers” Program) designed to protect habitat as well as provide recreational opportunities. One of its more notable habitat conservation efforts is the West Eugene Wetlands Plan which protects the most valuable remaining wetlands while still providing development certainty. The City also oversees approximately 2300 acres of parks and open spaces within its jurisdiction. The City has a comprehensive Stormwater Management Plan and has implemented a stormwater fee program based on the amount of impervious surface area. Eugene also filters its wastewater through gravel beds to reduce outflow temperature.

The City also has also developed several conservation policies, including: a Healthy Natural and Built Environment policy that embraces “approaches that support natural resources protection [while meeting] other City and regional goals;” a Salmon Habitat Protection Overlay Zone, an Integrated Pest Management Policy, and native and invasive species policies. The City is also developing a Willamette Riparian Habitat Management Plan and conducting a Willamette River Floodplain Acquisition Study exploring the location and feasibility of acquiring key parcels to help protect salmon and other species habitat.

Lane County has completed an inventory of which streams are subject to Goal 5 riparian protections and has implemented vegetation removal limitations and structure setbacks for development in riparian areas (one of the first counties in the state to do so). The county’s comprehensive plan includes protections for sensitive plants and bird habitat. The county has also developed a Natural Resources Study focusing on three Goal 5 resources: wetlands, water areas (e.g., streams, lakes, and ponds) and their associated riparian vegetation, and wildlife habitat.

In addition, there are other noteworthy conservation efforts in the Upper Willamette area basin, including environmental mitigation measures undertaken by the Eugene Water and Electric Board, the McKenzie Watershed Council, the McKenzie Trust, the City of Springfield, the City of Corvallis’ ESA and CSO programs, the Bureau of Land Management, other state and federal agencies, and local governments.

Willamette Valley Wildlife and Natural Areas. Another form of concentrated conservation effort is the extent and geography of areas managed as fish and wildlife areas or greenways. It is another distinguishing feature of the Willamette Basin. The wildlife refuges of the U.S. Fish and Wildlife Service, the wildlife management areas of the Oregon Department of Fish and Wildlife, and the Willamette Greenway properties (managed primarily by the Oregon Parks and Recreation Department). These areas are increasingly being managed for natural values and biodiversity. In addition, many of the refuges are actively offering conservation assistance to neighboring private landowner to in effect increase the local conservation footprint.

Taken together, refuges, wildlife areas, and Greenway properties total over 40,000 acres—and this excludes acreage managed by local and regional governments for open space and natural area. Because these areas are well-distributed throughout the basin’s lowlands, this represents a significant conservation network that will likely be integral to a variety of species protection and recovery efforts.

4.3.3 Projects

As previously stated, the focus of the *Willamette Subbasin Plan* inventory effort was not on individual projects. Nevertheless, the pattern represented by recent projects offers some insight into current conservation priorities.

4.3.3.1 Projects Funded by Bonneville Power Administration

In the last decade, BPA has funded eight major projects in the Willamette Basin, as shown in Table 4-3. Over this time period, about \$13 million have been spent on these projects.¹

Table 4-3: Recent BPA-Funded Projects in the Willamette Basin

| |
|--|
| <i>Burlington Bottoms Wildlife Mitigation Project:</i> This project protects, maintains and enhances a diverse array of wetland habitats for many species of fish and wildlife including the state listed western painted and pond turtles and ESA species including bald eagles and salmon. |
| <i>Amazon Basin/Eugene Wetlands:</i> Restore/enhance riparian zones of seasonal streams, wet prairie, upland prairie, forested wetland, oak woodland, and dry coniferous forest. Complete a baseline Habitat Evaluation for new acquisitions and re-assess habitat conditions on existing mitigation area. |
| <i>Bio-engineering Evaluation of Retrofitted Oxygen Supplementation:</i> Determine if Chinook salmon can be reared at increased densities with oxygen supplementation without detrimental effects on the returns of adult salmon. Examine the effects of density, oxygen supplementation, and raceway design on water quality, rearing, and survival of Chinook salmon at Willamette Hatchery, Oakridge, Oregon |
| <i>Bull trout:</i> Monitor distribution, population trends, and habitat use of bull trout populations in the Upper Willamette Basin. Continue to implement the Rehabilitation Plan for bull trout in Middle Fork Willamette. Evaluate protocols for the re-introduction of bull trout into historic habitats in the upper Willamette River subbasin, and employ methods to monitor and evaluate the status and trends of bull trout populations in the Lower Columbia Province |
| <i>Willamette Basin Mitigation:</i> Mitigate for impacts caused by hydro-electric facilities through enhancements, easements, acquisitions, restoration, and management of wetlands and other NWPPC target habitat types and species in the Willamette Basin in Oregon |
| <i>McKenzie River Focus Watershed Program:</i> Develop, coordinate, plan, design, implement and monitor habitat protection, restoration and water quality projects; improve resource stewardship through public outreach and education |
| <i>Riparian Restoration and Enhancement Planning for Multnomah Channel:</i> Re-establish native riparian vegetation on public lands on Multnomah Channel bottomlands; assess vegetation and wildlife habitat on 309 acres of estuarine wetlands; develop enhancement strategy for freshwater marsh; develop watershed protection plan. |
| <i>Tualatin River National Wildlife Refuge Additions:</i> Secure, restore, and manage lands within the recently established Tualatin River National Wildlife Refuge to protect and enhance fish, wildlife, threatened and endangered species, and waters in the Tualatin River watershed |

¹ NPPC, BPA-funded projects, on Willamette Subbasin Web site, <http://www.nwccouncil.org/fw/subbasinplanning/willamette/default.asp>; specifically at: <http://www.nwccouncil.org/fw/subbasinplanning/displayprojects.asp?id=60>.

4.3.3.2 OWEB Project Assessment for Willamette Basin

In its 2001-2003 Oregon Plan Biennial Report (OWEB, 2003), OWEB compiled statistics on watershed restoration project type, location, and funding. Project locations are displayed in Figure 4-1. Most riparian and road projects are shown as having been completed in the forested uplands. There are more on the east- than west-side of the basin. Fish passage projects appear to more distributed through the basin—including very low in watersheds, but only below major dams that block fish migration. Instream habitat projects appear to be more common in the south and southeast portions of the basin. There appears to be a scarcity of upland projects generally, and of any type of project for the Valley floor.

Funding levels are shown in Figure 4-2. Most funding during 2000-2001 was for fish passage and road improvements, followed by riparian, instream, and wetland investments. Little was spent for upland improvements. OWEB estimates it funded over \$7 million in restoration projects in the 2001-2003 biennium (including assessments, council support, and education)—about a six-fold increase over 1995 levels. During the same period, OWEB estimates that the U.S. Forest Service invested about \$8 million; BPA, \$4.5 million; the National Resources Conservation Service, about \$3 million; and EPA, about \$1 million. According to these estimates, a total of over \$23 million went to restoration activities in 2001-2003.

In a separate report, the National Resources Conservation Service reports it made nearly \$8 million worth of payments in the Willamette basin through its various landowner conservation incentives programs in 2003 alone (this figure includes portions of Central Coast area; NRCS 2004. *Conserving Oregon's Landscapes*; Fiscal Year 2003 Annual Report for Oregon.).

4.4 Conservation Efforts Expected to Have Significant Impacts in the Near Future

A number of processes are underway that are likely to have significant impacts on fish and wildlife habitat in the near future.

4.4.1 NOAA Fisheries Salmon Recovery Planning

As previously described, NOAA Fisheries has established a Technical Recovery Team to develop a science-based framework and goals for salmon recovery in the Willamette-Lower Columbia Recovery Domain. NOAA Fisheries is also currently re-assessing its 1998 decision to list salmon stocks in the Northwest pursuant to a legal challenge. Depending on the outcome of individual stock listing decisions, the next step would be to complete the work of the TRT and accelerate the planning component of the recovery process. The development of a recovery plan for the domain will be a critically important milestone for Willamette Basin conservation.

The Recovery Plan will focus on identifying the measures and actions necessary to achieve the recovery goals identified by the TRT. Important steps in this process will include:

(1) inventorying all ongoing state, tribal, local, and Federal conservation plans and planning efforts, as well as all existing Habitat Conservation Plans and 4(d) rule components in each planning area; (2) evaluating these existing conservation plans and efforts to assess how well they address identified factors for decline and limiting factors, and the extent to which they

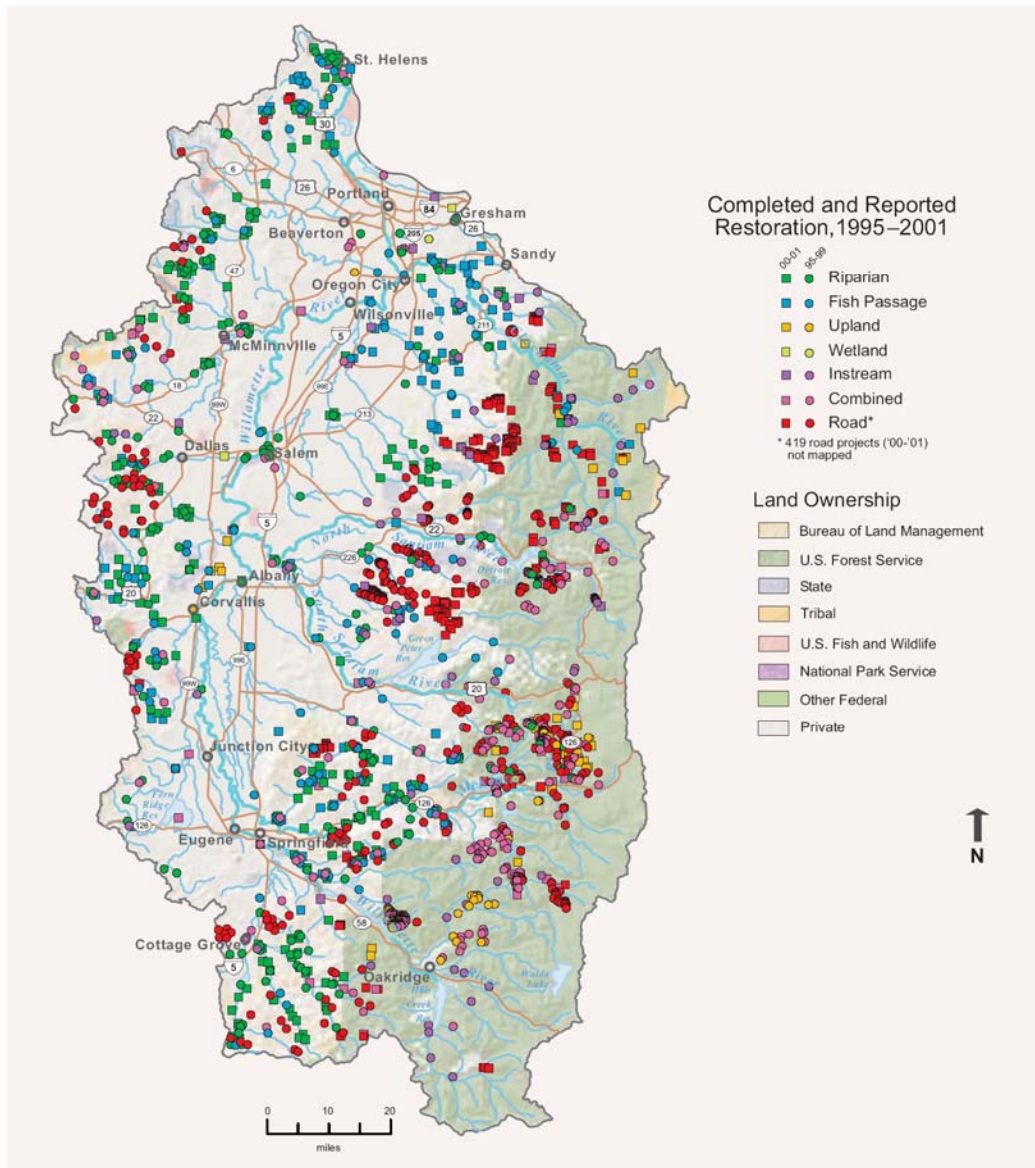


Figure 4-1: Willamette Basin Watershed Restoration Projects

Source: OWEB 2003

collectively achieve the identified recovery goals; (3) identifying and evaluating any additional or alternative measures necessary for achieving the identified recovery goals; (4) prioritizing the required recovery measures and identifying the entity or entities responsible for implementing them; and (5) estimating the costs and time needed to carry out the identified recovery measures.

Ultimately, NOAA Fisheries will need to ensure that the recovery plan will achieve the recovery goals, in what time frame, with what degree of certainty, and at what economic cost (NOAA Fisheries, Recovery Planning Web site).

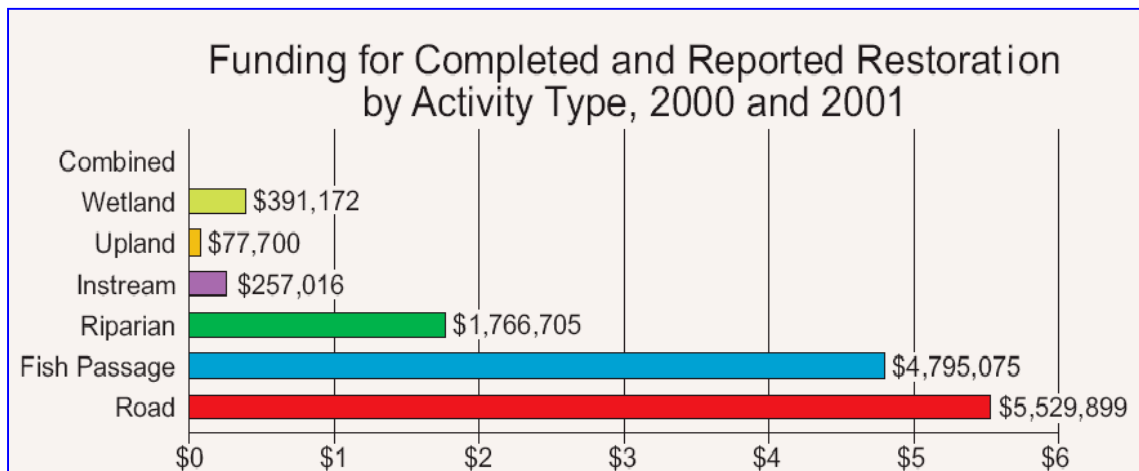


Figure 4-2: Funding for Restoration Activities in the Willamette Basin, 2000 and 2001

Source: OWEB, 2003.

4.4.2 Willamette Basin Project Biological Opinion

NOAA Fisheries and the U.S. Fish and Wildlife Service are currently performing an analysis under Section 7 of the Endangered Species Act to determine whether ongoing operations of the U.S. Army Corps of Engineers' Willamette Basin Project (both flood control dams and the Willamette Bank Protection Program) would jeopardize the survival and recovery of ESA-listed species. It is expected the Opinion will focus on restoration of physical and biological processes that will in turn allow the numbers, distribution and reproduction of listed fishes to rebound from their current depressed states. Actions recommended under the Opinion would likely include measures that address:

1. Physical processes of the upper Willamette fluvial ecosystem, including: disturbance; flow regime; sediment and large wood function; riparian vegetation and floodplain function; water quality; and,
2. Biological processes, including: migration; spawning; rearing; population trends; and, life-history diversity.

Actions would be both short- and long-term and could include structural modifications such as retrofitting dams with upstream and downstream fish passage facilities and water temperature control structures and a comprehensive research and monitoring program, the results of which would help to clarify ecosystem and species-specific effects of the Willamette Basin Project.

4.4.3 Total Maximum Daily Load Allocations

TMDLs have been approved by EPA for the Willamette River mainstem for dioxin; Tualatin River for temperature, bacteria, DO, solids, ammonia, chlorophyll a, pH, phosphorous; Yamhill River for phosphorous; Pudding River for Ammonia, BOD; Rickreall Creek for BOD; and Coast Fork Willamette for ammonia, phosphorous. (Pettit, 2002). As previously discussed, DEQ has made completion of TMDLs in the Willamette Basin a priority—most subbasins will be completed this year. Upon issuance of a final order, the load allocations in essence become

mandatory pollution targets that must be met by a number of organizations, including DEQ itself, the Oregon Forestry Department, the Oregon Department of Agriculture, certain municipalities and local governments. Each will be required to develop a TMDL implementation plan with 18 months of the final order. These plans must assure compliance with the load allocations. Once the final order is issued and the implementation plans in place, there should be continued and significant improvements in water quality over time and bring with it important fish and wildlife habitat benefits.

4.4.4 ODFW Comprehensive Wildlife Conservation Strategy (Conservation Plan)

The Oregon Department of Fish and Wildlife has begun preparing a Comprehensive Wildlife Conservation Strategy to provide a non-regulatory, publicly-reviewed, statewide approach to species and habitat conservation in Oregon. Plan objectives include: identifying species of greatest conservation need and their habitats; describing problems facing these species and habitats; describing priority research and survey efforts needed to identify factors to assist in their restoration ; describing needed conservation actions; and proposing monitoring plans. The Strategy will become the Wildlife Section of an integrated Statewide Conservation Plan designed to assure sustainability of Oregon's terrestrial and aquatic ecosystems and the economies that rely on them.

4.4.5 Northwest Oregon Invasive Weed Management Partnership

The Partnership is a recently-established collaborative network of over 50 public and private organizations in the Willamette Basin and adjacent coastal areas. The Partnership seeks to prevent the introduction and control the spread of the most harmful invasive plant species in NW Oregon by facilitating cooperative management among willing land managers. The Partnership supports coordination which may lead to development of Cooperative Weed Management Areas to implement on-the-ground activities. Cooperative Weed Management Areas can cover part of a county or multiple counties. They are formed locally by diverse stakeholders to prioritize weed management efforts and work together on implementation of their plans.

Three Cooperative Weed Management Areas are forming in the Willamette Basin:

- Upper Willamette CWMA (Eastern Lane, Linn, Benton)
- Marion, Yamhill, Polk CWMA
- Clackamas, Clark, Multnomah, Washington CWMA

Their Management and Operating Plans include: regular technical information-sharing and collaborative planning; weed control and inventory projects, especially False-brome, Gorse, Purple loosestrife, knotweeds, and knapweeds; development of shared weed databases; watching for new invaders—especially butterfly bush, giant hogweed, and kudzu; and public outreach and education.

This effort represents a resurgence in efforts to combat invasives and promises to be an important part of preserving fish and wildlife habitat.

4.5 Synthesis

4.5.1 Conservation Efforts Strong Points

Clearly there is an impressive range and breadth of conservation efforts in the Willamette Basin. Current conservation efforts are strong in a number of ways:

- Because roughly 70 percent of the basin is forest land, the Northwest Forest Plan and the Oregon Forest Practices act figure large in terms of current habitat protection. That equates to a very large geographic area in terms of environmental protection. In addition, substantial efforts are underway to protect non-forested riparian areas. Many Willamette Basin cities and counties protect riparian areas in some fashion, and increasing is being afforded through farmland incentives programs.
- There have been remarkable water quality improvements over the last 30 years—and huge improvements in major rivers over the last 100. The Willamette River is cleaner today than in 1972 when Oregonians celebrated dedicated efforts to clean it up. Even during the marked population growth of recent decades, all but one of the state’s 44 long-term monitoring sites in the Willamette Basin showed the same or improved water quality, as measured by the Oregon Water Quality Index. The most improved sites are those that had poor water quality in the Tualatin and Yamhill River Basins where TMDLs have been developed and Water Quality Management Plans are being implemented. According to DEQ, water quality improvements in these basins can be directly attributed to those activities (Greenwood, 2002; Pettit, 2002).
- This progress has been due to the establishment of major regulatory frameworks (such as the Clean Water Act), investment in treatment plants and technologies (including combined sewerage overflow abatement), stormwater controls and management, and continuous, growing attention to non-point source pollutions sources (for example, through TMDLs and Agricultural Water Quality Management Plans). In short, there has been a pervasive, broad, multi-scale, and relatively well-funded program for improving water quality in the Willamette Basin.
- Road-related fish passage improvements represent one of the most widespread and relatively well-resourced conservation efforts. Detailed inventories have been developed and prioritization efforts are underway, though not all inventories and priorities have been reconciled between organizations. However, far-reaching improvements have been made on city, county, state, and federal road system culverts, in part because of funding available from transportation sources and environmental mitigation programs. In addition, major reconstruction of fish passage facilities has been completed or is underway at hydroelectric dams in the Clackamas and McKenzie watersheds and at Willamette Falls.
- Significant protections for in-channel habitat are provided through Oregon’s fill and removal statutes and the federal 404 permitting process—and both of these have been re-inforced through the increased scrutiny resulting from Endangered Species Act consultations with NOAA Fisheries and the U.S. Fish and Wildlife Service.
- There has been a wholesale realignment of hatchery and harvest policies and practices, with more emphasis placed on protecting genetic diversity and more natural approaches for developing hatchery-raised fish.

- There is a well-established and well-distributed system of refuges and other protected lands of significant size from which a conservation network might be readily developed.
- Oregon’s land use planning system provides a consistent and usable framework for local governments to look closely at open space and natural area protection, and a process for attempting to balance competing needs.
- Finally, there is a high-functioning network of conservation agencies and organizations—as well as active citizen participants—that together are creating a growing number of local conservation initiatives.

4.5.2 Conservation Effort Improvements

4.5.2.1 General Findings

While the Willamette Basin is in many ways alive with conservation activity, there are areas in which more strategic efforts are clearly needed.

While the Oregon Forest Practices Act offers considerable breadth in environmental protection, a number of improvements have been recommended, based on a recent study by the Oregon Forestry Department and the Oregon Department of Environmental Quality. This study found that the Forest Practices Act rules likely needed to be improved to: meet large wood input levels for habitat and water quality purposes; reduce sediment input of roads used during the wet season; better deal with landslide-prone slopes; extend fish passage protections above areas currently used by fish to allow for recolonization; provide a more effective and efficient means of classifying streams for “fish use” (ODF, DEQ, 2002). Similarly, the Oregon Independent Multi-Disciplinary Science Team found that some specific aspects of the Oregon Forest Practices Rules and the Measures of the Oregon Plan need improvement in dealing with riparian buffers, large wood management, sedimentation and fish passage at road-stream crossings. Even with these changes, the Team indicated current site-specific approach of regulation and voluntary actions is not sufficient to accomplish the recovery of wild salmonids, and called for a landscape scale approach with flexible or adaptive management (Independent Multidisciplinary Science Team, 1999).

Replacing and improving culverts to enhance fish passage has been a very active area in terms of conservation effort. However, the strategic aspects of targeting most problematic culverts and assessing the effectiveness of recent culvert replacement warrants improvement. For example, based on August 2001 assessments, the U.S. Forest Service and Bureau of Land Management estimate their efforts to restore fish passage may ultimately cost over \$375 million and take decades. Several factors are inhibiting their efforts. Primarily, these agencies have not made sufficient funds available to do all the culvert work necessary. The process of obtaining federal and state environmental clearances and permits to perform the work, as well as the short seasonal “window of opportunity” to do the work, affects the agencies’ ability to restore fish passages quickly. In addition, a shortage of experienced engineering staff limits the number of projects that the agencies can design and complete. Currently, each barrier removal project generally takes 1 to 2 years from start to finish. Neither agency, however, knows the extent to which culvert projects ultimately result in improved fish passage because neither requires systematic post-project monitoring to measure outcomes (Hill, undated).

Oregon's land use planning system has clearly benefited fish and wildlife. Its focus on preventing development on productive farm and forest lands has provided long-term protection of large, unbroken tracts of forest and agricultural land. While most of this land is managed to generate economic benefits, it also often serves to provide nesting, feeding and cover areas, migration corridors and other essential habitat requirements of fish and wildlife. However, Oregon land use planning program lacks a conceptual framework for addressing habitat conservation and ecosystem health (Wiley, 2002).

Geographically, the bulk of existing restoration efforts are focused on forestlands and in urban areas, with an emphasis on salmon streams draining the Cascades. While many conservation efforts exist on the privately-owned farmlands of the Valley floor, their net effect has of necessity been blended with the profit-objectives inherent in successful farming. This situation is in contrast to the much more regulated environment in forested uplands subject to the Oregon Forest Practices Act and the Northwest Forest Plan. Consequently, the lowlands of the Willamette basin have not received the conservation investment that other parts of the basin have. The 2000 Oregon State of the Environment concluded: "... Oregonians now face a new set of environmental challenges that existing policies and programs may not be sufficient to address. Many of Oregon's key environmental problems are concentrated in the lowlands where most Oregonians live and work. Aquatic ecosystems, which integrate many kinds of activities, are most impacted and most at risk. ... Oregon's greatest environmental challenge for this century lies in the Willamette Valley. ... Whether we can improve the ecological health of the valley, measured currently by recovery of salmon stocks, while continuing economic growth and development for homes and communities will be a stern environmental test."

The opportunity to increase conservation investments in Willamette Basin private lands lies mostly in improving landowner incentives. The *Willamette Restoration Strategy* (WRI, 2001) identified several critical actions needed to increase investment, including improving the delivery of on-the-ground incentives programs, including the Conservation Reserve Enhancement Program. In 2002, the Oregon Watershed Enhancement Board requested the Oregon Department of Agriculture and the Oregon Association of Conservation Districts to conduct an evaluation CREP. At the close of the 2002 fiscal year, Oregon's CREP had signed up about 7,000 acres of a 100,000 acre goal. The evaluation found that although CREP appeared to be picking up speed in terms of enrollment as the farm community became familiar with it, a number of problems were affecting overall success, including: the government payments provided to participating farmers (rental rates) still fall short of market rates in some counties, especially in areas with high-value irrigated crops; a lack of readily-available technical assistance; lack of program outreach; and landowner apprehension about government programs and paperwork (National Association of Conservation Districts, 2003).

4.5.2.2 Needs Relating to Limiting Factors

Existing conservation efforts have largely resulted from programs designed to deal with specific results of the disruption of Willamette ecosystem function and dynamics (e.g., water temperature, sediment, hatcheries), rather than dealing with the causes. Thus, the largest 'gaps' relate to the need for conservation programs to more directly deal with the causes of limiting factors, especially in terms of flow regime, habitat connectivity, and channel simplification. In addition, there are institutional limiting factors that tend to amplify conservation challenges.

Flow Regime. On a basin-scale, there are few conservation efforts relating to re-establishing more natural flow regimes. The annual Willamette flood control operational plan has recently provided for more natural springtime flows to mimic freshets to benefit migrating juvenile salmonids. But this program does not address the more complex matter of flow management to support a range of environmental benefits—including winter-time channel formation flows. Analysis of such flows is being conducted at a subbasin scale through the Floodplain Restoration Feasibility Study. It is expected that broader aspects of flow regime will be addressed in the Willamette Basin Project biological opinion.

On a more local scale, there are a number of conservation efforts such as instream water right establishment and leasing by the state and non-profits, state and local water conservation programs, and site-specific flow improvement projects (such as channel and dam improvements). However, these efforts have not cumulated at the basin scale to deliver enduring flow benefits. In addition, the Oregon Department of Fish and Wildlife and the Oregon Water Resources Department have developed joint, collaborative priorities for instream flow restoration in the Willamette Basin, but these priorities have not yet been acted upon in any strategic manner.

Flow regime is also one of the primary controls of water temperature, a factor that widely limits aquatic species in the basin. While in headwater systems, riparian shade is critically important, systemically water temperature is strongly correlated with the timing and volume of flow. The recent work on temperature control structures in flood-control reservoirs in the McKenzie subbasin is an example both of a well-justified action to mitigate for dam effects and of the expense of such mitigation. It is expected that the Willamette Basin Project biological opinion will also address temperature-related aspects of the flood-control system.

Consequently, a new focus on conservation efforts that address restoration of a more natural flow regime is warranted.

Habitat Connectivity

Fish Habitat. As discussed, there is a high level of conservation activity related to addressing fish passage problems caused by roads and to some degree, by water diversions. Fish passage at hydroelectric dams has also been the subject of FERC dam relicensing negotiations and of utility investment plans. However, additional attention is needed to better coordinate and prioritize these fish passage efforts, especially in terms of the connections and timing of road-related fish passage work between local, state, and federal agencies.

There has been little conservation focus on fish passage around the major flood-control dams in the basin. The best aquatic habitat in the basin is above these dams. While there have been a number of fish passage experiments conducted, as well as ongoing discussions about the potential of fish passage in the future, there has been little or no concentrated effort to address fish passage at these dams. Again, it is expected that fish passage will be a major topic of the biological opinion.

Consequently, one of the highest priorities for additional conservation efforts is to identify the best means for making aquatic habitat available to basin salmonids.

Terrestrial Habitat. Terrestrial conservation efforts are strongest in federal forest lands and on state and federal wildlife refuges. Terrestrial efforts have not received the same degree of

attention as aquatic efforts. How terrestrial species interact and use habitat in interconnected ways has been less well-understood technically than for many aquatic resources.

Consequently, another high priority for Willamette Basin conservation efforts is to substantially enhance terrestrial protection and restoration efforts and to continue to improve the understanding of species character and need.

Geographic Implications. For the reasons discussed above, conservation efforts have been concentrated disproportionately on federal lands and forest lands (Pacific Northwest Ecosystem Research Consortium, 2002), especially in the uplands and on the east side of the basin. To better recognize the totality of ecosystem function and dynamics, it is critical that additional conservation efforts be focused on the lowlands, especially through landowner incentives.

Channel Simplification/Floodplain. Channel simplification has occurred both directly and deliberately (e.g., through historic side channel blockage and revetments) and indirectly, through diminished channel-forming peak flows caused by flood-control dams and by reduced supplies and recruitment of large wood caused by land management practices and tributary dams. While the Willamette Basin Project Biological Opinion will likely address this topic in detail, and ongoing investigations relating to the hyporheic zone and floodplain restoration will help develop a better understanding of simplification solutions, and a number of projects (such as that of Cascade-Pacific RCD above Corvallis or the work being done in the Eugene area) show promise of reversing some aspects of past channel simplification—more programmatic efforts are needed. Improvements to the Oregon Forest Practices Act regarding supply and recruitment of large wood should be made, as identified by the IMST, Oregon Department of Forestry and DEQ.

Institutional Factors. The conservation and restoration of subbasin fish and wildlife is limited by a number of factors relating to law, regulation, coordination, communication (including information management) and resource allocation (including funding). The *Willamette Restoration Strategy* (Willamette Restoration Initiative, 2001) seeks to assure that institutions and policies work in concert to restore watershed health, especially by improving local capacity, funding, public awareness, incentives, and coordination. It identified eight institutional factors of this nature (see Table 4-4).

In its *Strategy for Achieving Health Watersheds in Oregon* (OWEB, 2001) the Oregon Watershed Enhancement Board also identifies a number of measures needed to address existing factors that impede creating and maintaining healthy watersheds and natural habitats. These are categorized by three outcomes (effective investments, improved partnerships, and citizen understanding) to be achieved through 11 strategies, including integrating local priorities, establishing shared government priorities, enhancing public/private relationships, promoting local partnerships, and supporting local efforts.

Other institutional needs which, if not met, will continue to constrain watershed groups were identified in a Watershed Needs Assessment (Willamette Restoration Initiative, 1999) and include: the need for additional funding to assist councils, SWCDs, and local organizations in developing program capacity and delivery; improved education about Willamette issues within the context of a unified restoration plan; improved cooperation between local watershed groups and decreased competition for scarce resources; and, consistency and accountability of

institutions utilizing multiple methodologies to develop and implement a long-term, basin scale restoration plan.

Table 4-4: Institutional Limiting Factors in the Willamette Subbasin as Identified in the *Willamette Restoration Strategy*

| Limiting Factor | Explanation |
|---|--|
| Local Capacity | The capacity of cities, counties, watershed councils, soil and water conservation districts, and other community groups to achieve their goals is often hindered by inadequate technical, financial, and administrative support. (WRS Action 15, 21, 22, 27) |
| Funding | Funding is almost always insufficient to cover basic restoration needs. The money that does exist is not necessarily administered in a way that brings the broadest ecologic benefits. (WRS Key Rec. 2, 3; Action 27) |
| Public Awareness and Community Stewardship | The problems Willamette residents face are complicated and frequently do not lend themselves to instant understanding. A coordinated, concerted public awareness campaign on a par with commercial advertising is critical to secure a more active public role to reduce damaging activities, participate in monitoring and restoration projects, and learn about improved management systems. (WRS Action 17, 18) |
| Incentives | Environmental quality and economic vitality are sometimes seen as mutually exclusive, competing goals. While many basin residents express a strong desire for both, there is no shared vision or conceptual framework for achieving both. Properly designed and delivered incentives can bring market energies to conservation and move beyond regulatory minimums. The current design and delivery of incentives programs is inadequate to meet existing and future needs. (WRS Actions 4, 5, 15, 19, 20) |
| Coordination | The number and complexity of policies, plans, and programs makes coordination difficult. The various groups working to address subbasin issues all have their own objectives and priorities, with no single entity to tie them together. As a result, their efforts are not always consistent, efficient, or effective. (WRS Actions 1, 8, 11, 14, 15, 16, 21, 23, 24, 26) |
| Leadership | Basin leaders—both public and private—do not always understand and appreciate watershed issues and their significance. Partisanship and a lack of engagement can limit their ability to address the problems. (WRS Action 17) |
| Information Management | Many entities—including federal and state agencies, tribal and local governments, and watershed groups—work hard to collect valuable environmental, social, and economic data. This data acquisition is often uncoordinated, however, and the resulting data are incompatible with, or inaccessible to, other related efforts. As a result, data distribution and management are difficult, which frustrates understanding and effective decision making. Scientific information is often not communicated in a way that facilitates policy or decision making. (WRS Actions 11, 25) |
| Results Measurement | No shared vision, clearly defined goals and objectives, or consistent performance standards and measurements currently exist for conservation and restoration efforts. Consequently, there are no common yardsticks by which to measure results, make adjustments, and identify the most effective approaches. (WRS Key Rec. 3 and Action 25) |

Source: *Willamette Restoration Initiative, 2001.*

Also, as noted earlier in this section, institutional constraints include: limits on the Oregon Forest Practices Act in terms of riparian protection, large wood recruitment, fish passage and landscape-scale management (ODF, DEQ; 2002; Independent Multidisciplinary Science Team, 1999); the Oregon land use planning program's lack of a conceptual framework for addressing habitat conservation and ecosystem health (Wiley 2002); and the lack of conservation requirements and programs in the privately-held lowlands, including effective landowner incentives (National Association of Conservation Districts, 2003).

Summary. Put most simply, more focused conservation efforts are needed to do the following:

- Restore more natural flow regimes (and, therefore, temperatures).
- Restore aquatic habitat connectivity above major dams and through improved coordination of road-related fish passage improvements.
- Improve understanding of terrestrial wildlife needs.
- Design and implement a process for identifying lands needed for, and then establishing, a terrestrial habitat network.
- Improve conservation efforts in the lowlands, especially through landowner incentives.
- Restore channel complexity, especially in the floodplain of the Willamette and major tributaries.
- Address institutional factors such as coordination, communication (including information management), and resource allocation (including funding).