# Appendix A
# Evaluation of Watershed Council Watershed Assessments

## Introduction

To gain a better understanding of conditions, problems, and needs at a watershed level, the Willamette Restoration Initiative (WRI) sampled watershed assessments and action plans from throughout the Willamette Subbasin. Based on geographic representation, as well as thoroughness and availability of materials, documents from the following eight watersheds were reviewed:

| Lower Subbasin | Upper Subbasin |
|---|---|
| Clackamas River Watershed | Long Tom Watershed |
| Johnson Creek Watershed | Mary's Watershed |
| Tualatin Watershed | McKenzie Watershed |
| Yamhill Watershed | South Santiam Watershed |

In the pages that follow, summary statements compiled from source documents are given for each watershed in the following categories: Overview, Habitat Condition, Major Problems, and High Priority Needs. Common categories of concern emerged during the review, and information on priority need is further organized into broad categories as give below. Note the conservation and restoration themes.

*HIGH PRIORITY NEEDS*

- ***CONSERVATION AND RESTORATION***
  - floodplain function and off-channel storage,
  - in-stream complexity,
  - riparian and wetland restoration,
  - water quality and water quantity, and
  - fish and wildlife/habitat restoration
- *Monitoring and Assessment*
- *Education and Information*
- *Institutional Collaboration*

All watersheds in the Willamette Subbasin face varying problems of poor water quality, increasing threats to water quantity and in-stream complexity, floodplain degradation and reduced off-channel storage, and loss of critical fish and wildlife habitat. Since the late eighties, watershed council restoration and enhancement activities have contributed significantly to improved subbasin conditions. But most watershed councils face an uphill battle of limited funds and limited technical capacity. Moreover, they struggle constantly to find the means to educate, inform, and involve local citizens in watershed protection and restoration. Institutional collaboration varies among watershed councils. A steady source of funding would facilitate the ability of watershed councils to engage in improved institutional collaboration, monitoring, assessment, restoration, and outreach activities.

The nature and extent of ecological problems and the accelerated pace at which they have occurred over the last 50 years, lend urgency to the adage, "protect the best and restore the rest." Watershed councils, with their roots in local communities, are well positioned to articulate the sense of urgency and to raise the level of community stewardship. In addition, most have conducted the necessary assessments to determine where the high-priority areas are. What remains to be done is to provide the means to watershed councils to complete and implement their individual action plans in cooperation with watershed partners.

## Lower Willamette Subbasin

### Clackamas Watershed

#### Overview

The Clackamas River watershed drains more than 940 square miles, including forested areas in the upper watershed and agricultural areas and densely developed areas in the lower watershed. The Clackamas River is nearly 83 miles long. Throughout the watershed, numerous small streams and tributaries feed the waters of the Clackamas. More than 72 percent of the land in the watershed is publicly owned, 25 percent is privately owned and 3 percent is tribal. Nearly the entire upper watershed is contained within the Mt. Hood National Forest. Most of the lower watershed is privately owned, and the area in between the upper and lower watershed contains parcels of land owned by private timber and the BLM.

### Habitat Condition

The Clackamas River is located below Willamette Falls, and thus has no natural or man-made barriers between the ocean and the lower Clackamas River up to River Mill dam. The Clackamas River supports several species of anadromous fish, including spring and fall Chinook salmon, coho salmon, cutthroat trout, and summer and winter steelhead. Some areas in the upper watershed were designated special areas for wildlife and spotted owl habitat under the 1994 Northwest Forest Plan. The watershed includes 2 congressionally reserved Wilderness Areas (Bull of the Woods and Salmon-Huckleberry).

Fish Creek and the Clackamas, Collawash, Hot Springs Fork/Collawash, and Roaring rivers are designated 'Tier 1 watersheds' under the Northwest Forest Plan's Record of Decision. This means they contribute directly to the conservation of at-risk anadromous salmonids. Eagle Creek is a 'Tier 2 watershed', meaning it does not contain at-risk fish stocks but is an important source of high-quality water.

The upper Clackamas River, Collawash River, and the Hot Springs Fork/Collawash River are listed by the Oregon Chapter of the American Fisheries Society as 'Type 1' Aquatic Diversity Areas, meaning they are relatively healthy systems that are among the best examples of a particular ecosystem type.

Four sections of the Clackamas River are designated by OPRD as State Scenic Waterways. DSL and ODFW have designated approximately 225 miles of essential salmon habitat in the watershed.

Nine land cover categories have been defined for the watershed: urban (3%); mature forest (51%); re-growth forest (22%); early forest and non-forested upland (19%); native vegetation, valley floor (1%); irrigated crops (2%); grass fields, small grains (1%); perennial snow (<1%); and open water (<1%).

#### Major Problems

Key concerns include: declines of naturally spawning anadromous salmonids, over fishing, oceanic and down river conditions, dams, land use practices, urban growth, water quantity and quality. Four species of fish in the Clackamas River are considered at risk: late wild winter steelhead, spring and fall Chinook salmon, late fall coho, and cutthroat trout. The wild late fall coho run is listed as one of the last runs in the lower Columbia basin.

The Clackamas River from its mouth to River Mill dam, Eagle Creek from its mouth to the wilderness boundary, and the entire length of Fish Creek are listed by DEQ for summer temperature. Fish Creek is also listed for habitat modification. Sediment is a potential concern for the Clackamas River from its mouth to River Mill dam.

Pollution source points include 2 Superfund sites, 48 NPDES permit locations, and 2 Toxic Release Inventory sites. In addition there are 218 stone mines and 37 sand and gravel mines. DEQ has identified more than 100 clean up sites and more than 600 leaking underground storage tanks throughout Clackamas County.

In the middle Clackamas River subwatershed, 38 percent of the land area has high potential for erosion. Other subwatersheds of concern for erosion include Fish Creek (30%), Collawash River (21%), and Hot Springs Fork/Collawash River (20%).

Metro and local governments have identified approximately 7,000 acres in the lower watershed for future urban development.

**High priority needs**

Conservation and restoration

- Maintain and improve native anadromous and resident fish habitat throughout the watershed (The Clackamas River is identified in the All H" paper as one of the priority watersheds for salmon recovery.).
- Improve floodplain connectivity to stem the loss of habitat from side and off channels.
- Improve fish passage in the lower watershed (county roads list 376 barriers in this region).
- Maintain and enhance water quality to meet and surpass state water quality standards.
- Maintain sufficient flows to support in-stream beneficial uses.
- Increase in-stream woody debris and spawning gravel.
- Protect and enhance natural areas associated with river and stream habitat.

Monitoring and assessment

No specific monitoring or assessment priority actions were mentioned, although the watershed council has clearly made use of these activities in the development of its atlas.

Education and information

No specific priority actions for education and information appear in the atlas.

Institutional collaboration

No specific priority actions for institutional collaboration appear in the atlas, although the watershed council has clearly profited from a close collaboration with Metro, The Wetlands Conservancy, Student Watershed Research Project, EPA, USDA Forest Service, BLM, ODFW, and the State Service Center for GIS.

## Johnson Creek Watershed

**Overview**

The Johnson Creek watershed is a 52-square mile area of varied landscapes that drains six jurisdictions: the cities of Milwaukie, Portland, Gresham, and Happy Valley and portions of the counties of Clackamas and Multnomah. Johnson Creek is the common feature to all six jurisdictions.

**Habitat condition**

Before urbanization, the watershed was a diverse area of upland and wetland forests with extensive vegetative growth on the forest floors, marshes, and scrub-shrub habitats. In the uplands, Douglas fir, bigleaf maple, western hemlock, western redcedar, and oak trees dominated the landscape. Black cottonwood forests with an understory of willow characterized the lowlands and floodplains. Salmon and trout were present throughout the mainstem Johnson Creek and in most of the tributaries. Today, little of that historical condition remains.

**Major problems**

Alteration of the natural floodplain has eliminated many of the areas that once absorbed and conveyed floods through the watershed. The most significant alteration was performed in the 1930s by the Works Progress Administration, when Johnson Creek was subjected to extensive rock lining

and channel deepening and straightening to control flooding. **Major problems** facing the watershed today include nuisance flooding, water quality problems, and fish and wildlife declines. Development within the watershed has followed the typical pattern of population growth throughout the Pacific Northwest with removal of vegetation and an increase in impervious surfaces, channel straightening, and bank hardening. These changes have reduced in-stream channel stability and complexity and have increased storm water runoff. The physical and hydrologic changes have necessitated an increasing reliance on engineered structures, such as storm water detention facilities, bypass pipelines, and dikes and revetments.

The entire length of Johnson Creek is on DEQs 303(d) list as water quality limited for bacteria, summer temperature, and toxics (DDT and dieldrin). Physical habitat complexity has been simplified, modified, or eliminated for much of the creek. Severe bank erosion is evident in many reaches. Sediments in the creek are "a constituent of concern."

**High priority needs**

Conservation and restoration

- Eight high-priority, early-action projects:
  - Lower Johnson Creek fish habitat and riparian corridor restoration.
  - Tideman Johnson Nature Park wetlands enhancement, fish habitat and wildlife corridor creation, and tributary protection..
  - Bell Station flood mitigation through removal of fill and wetland construction.
  - West Lents flood mitigation through wetland construction, increase in in-stream complexity, and fish habitat improvement.
  - Lents alternatives for effective storage of floodwaters using wetlands and open space.
  - Alsop floodplain restoration through wetland construction and open space design for flood storage, water quality enhancement, and fish and wildlife habitat.
  - Gresham stream corridor through wetland enhancement to increase flood storage and to provide benefits for water quality and fish and wildlife habitat.
  - Upper reaches riparian improvements for water quality and fish and wildlife habitat.
- *Protect and restore floodplain function.* Due to the extent of build-out in the watershed, re-establishment of the full spectrum of historical stream/floodplain interactions is not feasible. However, careful management of floodplains can be used to partially restore important ecological functions for fish and to provide a means for re-establishing channel processes.
  - allow floodwaters access to the floodplain and connect backwater channels to the creek to create off-channel habitat for juvenile salmonids.
  - re-grade and lower banks where appropriate
  - purchase properties through a 'willing seller' program.
  - work with additional property owners adjacent to the creek to implement terracing activities.
  - wetland construction and enhancement.
  - stream bank restoration (terracing and re-vegetation).
  - remove the WPA wall, where appropriate.
  - maximize passive flood storage sites by removing fill and structures in the historic floodplain.
- *Modify flooding through large off-channel storage in a few selected locations.*
  - maintain a database of inundated properties.
  - minimize impacts to fish passage.
  - minimize the number of storage sites throughout the watershed.
  - minimize the height of perimeter berms at storm water detention facilities
  - create a passive system to reduce reliance on engineered solutions.
- *Restore in-stream complexity.*
  - large wood

  - pool/riffle sequences
  - deep pools
  - increase sinuosity and restore the creek's natural meander to help reduce flow velocities
  - reduce erosion through stream bank restoration and re-vegetation.
  - increase bank stabilization by removing invasive species and re-planting with native riparian vegetation.
- *Riparian restoration*.
  - stream shading
  - large wood and fine organic litter recruitment
  - bank stabilization
  - sediment control
  - nutrient exchange
- *Wetland restoration*.
  - build constructed wetlands in areas where there are no existing wetlands or where wetland function is seriously degraded.
  - enhance areas that currently exhibit wetland characteristics
  - disperse wetland sites throughout the watershed to maximize ecological benefits
- *Fish habitat restoration and wildlife corridors and habitat patches.*
  - reconnect floodplains to stream channels and restore floodplain function.
  - increase in-stream complexity by supplying large wood to the creek.
  - replace or upgrade impassable culverts.
  - address problems of fish passage due to pipe crossings in the stream bed.
  - create wildlife corridors and connections to upland areas.
  - protect tributaries.
- *Water quality improvement.*
  - reconnect floodplains.
  - restore complex habitat features both in- and off-channel
  - restore riparian buffers where appropriate.
  - implement stormwater, erosion, and environmental zone programs.
  - reduce the impacts of outfalls that discharge directly to the creek by removing or diverting them through some sort of mitigation measure, such a bio-filtration swale.
  - work with landowners to mitigate the effects of large-area impervious surfaces through the use of drainage swales and retrofits.

Monitoring and assessment

No specific monitoring or assessment priority actions appear in the action plan, although the watershed council has clearly made use of these activities in the development of its restoration plan.

Education and information

Work with private property owners near the creek to:

  - educate them about stream stewardship and the impacts of their actions to the creek.
  - alter habits and practices to better protect and enhance Johnson Creek.
  - protect seeps and springs
  - replant riparian corridors with native vegetation.

Institutional collaboration

No specific priority actions for institutional collaboration appear in the action plan, although the watershed council has clearly profited from a close collaboration with Portland's Bureau of Environmental Services, city and county governments, ODFW, and DEQ in developing its restoration plan.

## Tualatin River Watershed

### Overview

The Tualatin River Watershed is set within a growing and thriving metropolitan area and a large temperate rain forest. Lowland portions, historically and still prevalently agricultural, are giving way to increased residential and industrial development.

**Habitat condition**
The status of watershed biodiversity is overall poorly documented. Monocultures and low-diversity disturbed urban and rural environments have greatly diminished habitat variability.

Water quality and quantity have been the subject of intense scrutiny since TMDLs were developed a decade ago for the watershed's streams and other water bodies. Soils are naturally fertile and productive.

**Major problems**
As the population and economic base of the region has grown, stresses on the watershed have increased. Hagg Lake and Barney Reservoir were constructed to provide irrigation for cropland, supply municipal water, provide flood protection, and improve water quality. Today, the watershed is far from self-sufficient with respect to water supply. Flooding remains a problem.

Stream channels have been severely altered to improve drainage and increase flows. The loss and alteration of side channels, oxbows, and wetlands suggest a need for channel restoration throughout the watershed.

Agricultural demand for irrigation from groundwater wells is increasing. Groundwater quantity is decreasing in some areas, resulting in some restrictions. Groundwater quality is generally good except in shallow wells where the risk of contamination is greater.

The watershed has been a pioneer in water quality improvements, but remains hampered by the cumulative impacts of growth and development. Most, if not all, readily identifiable point sources of phosphorus from agricultural and urban areas have been eliminated. However, non-point sources remain a problem; phosphorus concentrations in the mainstem Tualatin River, Hagg Lake, and Barney Reservoir exceed TMDLs.

In the mainstem, dissolved oxygen, pH, temperature, and suspended sediments are not in compliance with state standards. In most tributaries, sediment, temperature, bacteria, and dissolved oxygen are significant problems. Low flows, lack of riparian vegetation, erosion, and surface water runoff are contributing factors. Many tributaries and segments of the Tualatin River have been designated by DEQ as water quality limited for temperature, bacteria, dissolved oxygen, and sediment.

Increased ground cover on agricultural lands has improved soil stability and helped control erosion. However, buffer and riparian zone management practices have not yet been applied widely. Ditch walls and stream banks are frequently unstable and erode due to poor vegetation cover. Fertilizer and pesticide use exceeds levels needed to optimize farm profit, resulting in increased soil phosphorus concentrations. In urban areas, soil is frequently covered with impervious surfaces.

Natural riparian areas are narrow or lost entirely, large areas of wetlands have been drained or filled, and only scattered remnants of old growth trees remain.

Air quality regulations have done a good job of managing point sources of pollution, but projected increases in industry and vehicle use within the watershed are expected to impact air quality.

**High priority needs**
Conservation and restoration
- Water and soil quality
  - reduce contaminants in water to protect aquatic life and human health.
  - stabilize channels (within natural range) with in-stream structures.
  - maintain high quality and stable groundwater levels.

- decrease contaminants in soil to protect ecological and human health.
- optimize water intake and storage.
- maintain optimal plant productivity; support diverse biota.
- establish stable soils to minimize erosion.

• Fish and Wildlife
  - conserve and improve fish and wildlife habitat (Priority Action #2)
    - promote and implement stream bank and riparian restoration.
    - improve fish passage at identified priority artificial obstructions.
    - encourage placement of fish screens on water diversions in areas where fish may be present.
    - assess in-stream water rights for fish needs.
    - promote development of management plans for non-indigenous terrestrial and aquatic species.
    - identify priority habitat areas and suggest strategies for protection and management of wildlife purposes.
  - decrease pollutants to levels protective of human health and the environment.
  - maintain habitat and biological diversity across the watershed.
  - sustain agriculture and forestry.
  - protect at-risk species.
  - sustain aquatic and terrestrial systems.
  - increase streamside plantings to enhance fish habitat, stabilize stream channels, and benefit terrestrial organisms.
• Air Quality
  - maintain air quality that meets or exceeds federal standards.
  - prevent adverse air quality impacts on biological systems.
  - maintain high visibility.
  - allow no offensive odors.
  - limit emissions of toxins.
• Humans
  - use inputs, especially scarce and non-renewable resources, efficiently.
  - minimize adverse inputs and outputs.
  - balance economic and environmental impacts.
  - minimize threats to plants and animals.
  - provide an esthetically pleasing environment.
  - provide diverse recreational opportunities.
  - provide adequate employment and housing opportunities.

Monitoring and assessment

• Assess watershed conditions to help prioritize restoration activities (Priority Action #1)
  - conduct stream habitat surveys and mapping.
  - inventory habitat for fish species and other significant fauna and flora.
  - determine functions and values of wetlands and uplands within the floodplain in terms of effect on water quality, flood reduction, and wildlife usage and habitat.
• Meet standards for designated beneficial uses for a given body of water.
• Quantify and time stream flows to support ecological and human uses.

Education and information

• Develop, support, and implement a broad-based education/outreach program focusing on reducing non-point source pollution and improving protection and management of riparian areas (Priority Action #3).
  - work with local schools to enhance stewardship and science education by incorporating study of the Tualatin River and its watershed into science curricula.

  - conduct workshops for streamside residents focusing on environmentally friendly riparian management practices (e.g., naturescaping).
  - help develop, customize, and distribute education brochures, videos and newsletters to provide information about proper riparian management and water quality improvement.
  - expand the TRWC speakers' bureau.
- Develop demonstration projects in priority areas in cooperation with willing landowners to encourage restoration on private lands (Priority Action #4).
  - assist NRCS, SWCD, and ODF in identifying and recruiting private landowners to participate in demonstration projects for priority sites.
  - monitor the effectiveness of demonstration projects.
  - make use of existing incentive programs that encourage demonstration projects.
- Establish a Tualatin Watershed Resource Collection and web site (Priority Action #5).
  - compile and catalog existing watershed information.
  - maintain GIS information and develop an atlas
- Promote management practices that improve watershed function and protect values (Priority Action #6).
  - evaluate management practices.
  - develop strategies to reduce soil erosion.
  - promote the improvement of soil quality.
  - educate landowners about impacts of nitrogen and phosphorus to residential lawns and croplands.
  - promote projects and developments that minimize effective impervious surfaces.
  - conduct road, ditch, culvert assessments, inventories, and maintenance training to reduce erosion and flooding.
  - support and enhance Integrated Pest Management.
- Expand existing watershed monitoring programs to broaden citizen involvement and to create greater awareness (Priority Action #9).
  - determine monitoring needs.
  - track and coordinate monitoring activities throughout the watershed.
  - encourage best management practices and rehabilitation effectiveness monitoring
  - determine data needs and gaps, especially in priority areas.
  - develop a "State of the Watershed" report.
- Promote recreational experiences that foster watershed stewardship (Priority Action #10).
  - improve access along the Tualatin River and its tributaries, where appropriate.
  - educate users and recreation providers about how to protect riparian areas.
  - promote partnerships and citizen involvement to address maintenance, funding, safety, and rive ethics.
  - promote restoration, enhancement, and monitoring efforts as educational opportunities.
  - improve recreational fishing of non-sensitive species.

More education, incentives, and funding for implementation of the Agricultural Water Quality Management Area Plan (1010).

Institutional collaboration

- Work with water managers to implement the Integrated Water Resource Management strategy (Priority Action #7).
  - promote urban water conservation and re-use measures.
  - promote use of efficient irrigation systems.
- Assist designated management agencies with implementation of all non-point source water quality management plans (Priority Action #8).
  - promote SB 1010 process.
  - assist the Unified Sewerage Agency, cities, and counties with implementation of urban stream watershed plans.

## Yamhill Watershed

### Overview

Private ownership of nearly all the land. Agriculture has been and continues to be an important part of the watershed's economy. Some privately owned industrial timberland and BLM administered land

### Habitat condition

Historically, fire played an important role in maintaining oak savanna and prairie ecosystems. The suppression of fire has allowed Douglas fir to expand its range. Vegetation varies dramatically. The steep west and north sides are heavily forested with young Douglas fir. The east and south sides with their flatter topography is mostly under cultivation. Thus, for much of the watershed, crops (mostly perennial grass) and trees (mostly hardwoods and some conifers) for commercial harvest are the dominant vegetation classes.

Four main habitat types exist in limited quantities: riparian forest, woodlands, prairie (wet and dry), and oak savanna. The majority of streams have some riparian vegetation, although it is often brush and hardwoods in narrow strips. Many riparian areas have no vegetation at all.

The majority of channels in the lowland areas of the watershed were once floodplain-type channels and are now deeply incised, low gradient, moderately confined channels. These channels pose the greatest challenge to restoration efforts, but also have the greatest value for improving habitat.

Many streams in the middle to upper elevations have the potential to become salmon habitat. Headwaters streams offer little opportunity for enhancement or restoration as they are generally too steep for salmonids.

### Major problems

Increased interest from urban dwellers in living in the country has resulted in a growth in "hobby farms."

The watershed probably never supported large numbers of salmonids. Stream surveys for fish are incomplete and most pre-date the 1996 floods, which altered channels dramatically. Several endangered species, including winter steelhead.

Non-native plants compete vigorously with native vegetation in riparian, wetland, and disturbed areas.

The loss of wetlands due to drainage, disking, and tiling has contributed to the channelization of most streams in the watershed. Remaining wetlands are often in degraded condition, or have been farmed or urbanized.

The proximity of roads to streams has resulted in channel hardening and has prevented the ability of streams to meander and flood.

Water quality in the watershed is affected by municipal wastewater discharges, urban storm water runoff, and runoff from agricultural and forested lands. It is also adversely affected by river flow depletion as a result of water diversion, primarily by agriculture. Some of these influences on water quality are regulated; others are not.

Water quality data are limited, although most streams have been monitored for temperature. The South Yamhill River is 303(d) listed for bacteria and temperature; the North Yamhill River for bacteria, temperature, and flow modifications. It is also at risk for pH, nutrients, chlorophyll, dissolved oxygen, and sediment. Several streams are similarly listed. Flow information is limited. Deer Creek and the South Yamhill River are over-allocated for water rights; seasonal demand exceeds water supply. The west fork of Palmer Creek has been listed for toxics.

Over 30 years ago, county official identified stream bank erosion as the largest single soil erosion problem in the county. Since then, the problem has worsened. Major causes of stream bank erosion include removal of riparian vegetation, timber harvesting and urban development in riparian areas, agricultural cultivation, straightening of streambeds, and increased runoff due to agricultural drainage tiling.

**High priority needs**

Conservation and restoration

Water Quality

- Encourage and promote the preparation and implementation of runoff plans for cities and highways.
- Encourage storm water treatment and reduction of impervious surfaces in new development.
- Promote the reduction of pollutants in storm water associated with construction activities.
- Promote water quality conservation plans and water quality education for agricultural areas.
- Discourage new direct discharges of municipal or industrial wastewater to streams in the watershed unless water quality is appropriately protected.
- Promote the reduction of sources of phosphate discharges.
- Promote roadside maintenance practices to prevent erosion and improve water quality.

- *Water Supply*
  - Promote the implementation of urban water conservation measures.
  - Support the study of the water supply problem and the development of a short-term municipal and industrial water supply plan.
  - Support long-term regional water supply planning.
  - Promote implementation of agricultural water conservation and management measures.
- Fish and Wildlife Habitat Improvement Actions
  - promote Best Management Practices and incentives for the restoration and maintenance of riparian lands.
  - Support the acquisition of priority habitat by public agencies or land trusts
  - Support and promote conservation easements
  - Promote the leasing or donation of water rights for in-stream flow
  - Encourage the placement of fish screens on diversions
  - Promote restoration and maintenance of in-stream habitat
  - Encourage the use of ODFWs Wildlife Habitat Conservation and Management Program.
  - Support preservation and restoration of wetlands.
  - Support the creation of a stockpile or inventory of restoration project materials.

Monitoring and assessment

- Improve water-quality monitoring throughout the watershed.
- Investigate sources of sediment, especially from non-point sources.
- Place gaging stations at select locations.
- Locate culverts and determine replacement priorities.
- Form and operate technical advisory committees.
- Conduct watershed assessments and identify data gaps.
- Prepare an inventory of riparian habitat through watershed assessments.
- Promote an environmental monitoring program

Education and information

*Watershed Stewardship*

- Continue operation of the Yamhill Basin Council.
- Obtain stable funding for the Yamhill Basin Council.
- Develop and implement a public education program.
- Establish a Yamhill Watershed Resource Center.

- Encourage and support the formation of Yamhill subbasin councils or groups.
- Support funding for implementation of the Action Plans and Projects.

Institutional collaboration

No specific priority actions for institutional collaboration appear in the action plan, although the watershed council has clearly profited from a close collaboration with numerous local, state, and federal agencies, as well as private organizations and other stakeholders.

## Upper Willamette Subbasin

### Long Tom Watershed

#### Overview

The Long-Tom Watershed is ecologically and socially diverse. The presence of multiple ecoregions in the watershed calls for management and restoration strategies that reflect the unique nature and challenges of each region. In addition, the diversity of land uses requires different management and resource conservation strategies.

Approximately 88 percent of the watershed is in private ownership, with the remaining 12 percent under federal administration. With such a high percentage of land in private ownership, the ability to assess and influence land use practices and management is limited. Further, much of the private land is divided into many small parcels, further compounding the problem of assessing and influencing land use practices. Finally, a growing urban population will increase the challenges of natural resource management and conservation in the future.

Land use is primarily in forestry (46 percent), agriculture (31 percent), and rural and urban residential (17 percent). A variety of forest types and stand ages cover principally the western and southern foothills of the watershed. The central and eastern portions of the watershed have gentler gradients, making them more suitable for agriculture and urban development.

#### Habitat condition

There are approximately 1,410 miles of streams in the watershed. The watershed has a relatively high proportion of sensitive channels because a large proportion of streams flow through broad, silt-covered valleys.

Water quality, in-stream habitat, and riparian zone conditions are poorer in the non-forested lowland areas where urban development, agriculture, and residential land predominates. These areas have the potential to be important aquatic habitat.

Wetlands were once extensive along valley bottomlands, covering over 40,000 acres of the watershed. Wet prairie was the dominant kind of wetland in the watershed (about 85 percent), and today is the most altered and diminished of wetland habitats. Nevertheless, the watershed has the largest amount of wet prairie remaining in the entire Willamette Basin. Agriculture and urban development, as well as fire suppression, have altered a large percentage of wetlands in the watershed.

#### Major problems

Water quality

Many of the streams in the watershed are moderately impaired or impaired for water temperature, phosphorus, and dissolved oxygen. Fecal coliform bacteria, turbidity, sedimentation, heavy metals, and pesticides are of concern in some reaches. Several streams have been designated by the Department of Environmental Quality as being water quality limited. High summer temperatures,

low dissolved oxygen, stream habitat modification, non-native fish species, and pesticides impair sensitive native fish species.

Highly and moderately sensitive channels are found in the valley bottomlands. Channelization, impoundments, and road crossings are the most significant channel modifications in the watershed. Restoration of stream segments would help meet multiple objectives. However, because land along the bottom of the valley is so heavily developed and valuable for farming, finding landowners interested in actively restoring channels (which might mean allowing some seasonal flooding) will be a challenge.

Sedimentation and erosion are due to several sources: rural road instability; slope failure from forest roads; surface erosion from rural roads, ditches, and croplands; sediment from urban areas. Sediment delivery from forest roads and logging-related landslides may be the most significant impact of forestry on aquatic resources. Three crop types account for 75 percent of all agricultural erosion: areas in grass seed, grain, and meadow foam rotation, bare and fallow land, and Christmas tree farms.

Riparian Areas

Across the watershed, 19 percent of riparian zones exhibit a high loss of ecological function, 39 percent have a moderate loss, and 42 percent a low loss. (Ecological function refers to such features as shade, large woody debris, band stability, habitat.).

Riparian zones that used to be in closed forest bottomland show the greatest loss of ecological function (46 percent), due mostly to the absence of trees. Although less altered than bottomland forests, closed forest uplands and woodlands can similarly point to an absence of trees as the principal cause for the portions exhibiting a high loss of ecological function. In all cases, timber harvest and development are the causes for tree loss.

In contrast, savannas and prairies — habitats that have historically been characterized by an absence of trees — now have been invaded by trees and shrubs. They are now the most endangered habitats in the watershed. Fire suppression, flood abatement, and the spread of non-native plant species have all contributed to this habitat-altering invasion. Overall, these habitats exhibit a moderate loss of ecological function.

Shrublands also exhibit a moderate loss of ecological function due to the narrowness of the riparian areas covered by shrubs. A few isolated miles have a high loss of ecological function due to exposed soil, which indicates a high potential for erosion.

**High priority needs**

Conservation and restoration

- Promote conservation tillage.
- Protect remaining wet prairie habitats.
- Promote land management practices across the landscape that protect aquatic habitat and water quality
- Reduce and prevent the creation of stream channelization. Where possible, reintroduce flooding into adjacent wetland habitat and allow streams to meander.
- Alleviate the impacts of small check dams by replacing or removing them.
- Reduce and prevent the creation impervious surfaces and prevent other human-caused sedimentation effects from washing into streams.
- Restore wetlands adjacent to streams to improve riparian zone conditions and enhance fish habitat.
- Replant stream sides with native grasses, shrubs, and trees in areas that show signs of instability and have a high potential for success.

- Implement "passive restoration," such as allowing trees to grow to maturity and leaving large woody debris along stream banks and in channels.
- Exclude livestock grazing, prevent urban and residential development in riparian areas
- Remove and prevent the re-emergence of shrubs and noxious weeds from prairies and savannas; re-introduce prescribed burning.
- Improve fish passage around dams and culverts
- Reduce water temperatures and improve dissolved oxygen levels especially in areas of low stream flow and sluggish current.
- Prioritize sites with high-quality fish habitat and areas having the best potential for aquatic species recovery.
- Encourage the creation of pond turtle and amphibian habitat on private lands.
- Control the spread and prevent the introduction of exotic plants and animals.
- Upgrade culverts that block upstream fish passage and undersized culverts that may cause road washouts.
- Assist farmers with fish screening.

Monitoring and assessment

- Identify seasonal low-flow problems by monitoring stream flow throughout the watershed and by calculating water consumption by sub-watershed.
- Conduct extensive wetland surveys basin wide and develop wetland protection plans.

Education and information

- Provide educational opportunities for students and council members regarding historic ecological conditions, processes, and functions.
- Educate citizens about water quality problems and ways in which citizens can contribute to solutions.
- Use knowledge of ecological conditions, processes, and functions to prioritize and guide restoration and conservation activities.
- Facilitate implementation of best management practices for urban municipalities (e.g., storm water management), rural homeowners, and farmers.
- Improve information on:
  - culverts (capacity and location, identify fish barrier problems)
  - roads (basin wide inventory to inform analyses of surface erosion potential)
  - road washouts on private lands
  - wetland habitat (extent and location)
  - sources of sediment production
  - water quality monitoring (e.g., improve data on turbidity and suspended sediment; improve frequency monitoring for temperature and *E. coli*).
  - pesticides (type used and extent of use; regular monitoring)
  - long-term fish surveys

Institutional collaboration

No specific priority actions for institutional collaboration appear in the action plan, although the watershed council has clearly profited from a close collaboration with Portland's county governments, ODFW, and DEQ in developing its restoration plan.

## Mary's River Watershed

### Overview

The Mary's River Watershed encompasses 310 square miles of forested, agricultural, and urban lands along the west side of the Willamette Subbasin. Land use is primarily a mix of forestry, agriculture, rural residential and urban commercial and residential. Land ownership in the upland forest area consists of private forest industry and federal forest management. Ownership in the valley is largely private. The distribution of households is shifting from rural and farm-associated holdings to non-farm residences and developments.

**Habitat condition**
The watershed is divided into three distinct areas:

1) An upland forest area characterized by small, relatively fast-flowing streams on forested slopes that coalesce into the headwaters of either the Mary's River or Muddy Creek. These streams are generally cool and clear and flow over gravels and cobbles. The streams support cutthroat trout, sculpins, and a variety of amphibians. The landscape is a mix of second-growth forests with scattered residences and small farms.

2) A valley agricultural area located on the valley floor where the gradient is gentle and streams are slower and warmer. The streams are in close proximity to human development, and therefore, are affected by transportation crossings, drainage projects, and reduced riparian cover. Peamouth, sand rollers, Oregon chub, dace, and redside shiners, along with many introduced fish species populate the streams. The area was historically a mix of forests, open prairies, and seasonal wetlands. Today, it is mostly in agriculture, pastures, and scattered residences, with remnant forests. This area includes the Mary's River near Philomath and most of the lower Muddy Creek area.

3) A downstream urban area includes the Mary's River where it flows through downtown Corvallis and a variety of riverside parks and developed landscapes.

**Major problems**
Water Quality
Portions of the Mary's River is on DEQs 303(d) list for flow modification, bacteria, and temperature. With regard to temperature, it is not known whether warmer stream temperatures are a natural phenomenon or are due to land use modifications. The source of bacteria inputs needs to be identified.

Major sources of water pollution include storm water runoff and wastewater effluent from urban areas, cropland erosion, mass erosion and surface erosion from forestlands and roads, grazing, and fertilizer and pesticide applications. Bacteria counts show contamination in Oak Creek, and to a lesser extent in Squaw Creek, Lower Mary's River, and the tributaries of Muddy Creek. Runoff from livestock operations are likely important sources. Habitat complexity is low for all streams.

Water Quantity
Mary's River water is over-allocated during low-flow periods. No tracking system for withdrawals is in place. The clearing of forests, development of pastures and fields, and channelization of waterways eliminated many side channels, seasonal off-channel refuges, and wetlands. Section 404 (wetland fill permit) violations appear to be commonplace.

Land Use
Most areas beyond the riparian zone have been altered from their natural condition by land use practices. Riparian zones appear to be intact, forested zones dominated by hardwoods. A large number of culverts exist on the landscape, with many of them blocking upstream habitat. "Transition channels," from the forested uplands to Muddy Creek, have moderate to high bank erosion potential. Most of the losses of wetland and riparian vegetation probably occurred in the 1930s. However, remaining wetlands may be threatened with additional loss through draining and urban development. Soil erosion appears to be elevated in some areas of the watershed due to poor soil management practices and roads. Excessive livestock use of riparian zones may be occurring in some areas of the watershed, resulting in loss of riparian vegetation and the introduction of bacteria and other pollutants to streams.

Fish and other wildlife
Five species of fish in the Mary's River are considered sensitive — winter steelhead, spring Chinook, coho, Oregon chub, and Pacific lamprey. Reduced habitat (from dam construction,

channel "cleaning" for navigation, channelization, and bank stabilization), competition from introduced species, and over-harvesting are among the likely causes of decline.

The rapid rate of settlement and modification of the watershed has resulted in alteration and loss of both aquatic and terrestrial habitats. Habitat modification and loss, together with direct effects of human population and competitive pressures from introduced species, have contributed to declines in several species. Currently, 97 plant and animal species are considered to be at some level of "sensitive" status.

**High priority needs**

Conservation and restoration

- Protect high-priority wetlands, emergent wetlands, and forested riparian zones.
- Investigate the feasibility of removing a water intake on the middle fork of Rock Creek.
- Restore high-priority wetlands, emergent wetlands, and forested riparian zones.
- Increase in-stream woody debris
- Restore side-channel and off-channel habitats

Monitoring and assessment

- Implement a systematic, long-term monitoring program.
- Monitor water quality for creeks and tributaries from Mary's River (determine the sources of high temperatures and bacteria).
- Monitor water quantity, especially withdrawals during low-flow summer months.
- Monitor groundwater quality.
- Monitor fish abundance and distribution.
- Finalize culvert assessments on remaining private lands.
- Develop GIS layers of cutthroat trout distribution in the watershed.
- Monitor nutrient losses from uplands the their subsequent concentrations in surface water
- Track fertilizer and pesticide use and transport.
- Monitor impacts from road density.
- Improve the frequency of road inspections to identify potential problems such as plugged culverts, rutting, and sedimentation.
- Improve data on listed species.
- Conduct detailed assessments of the current extent and condition of riparian forests.
- document the number of new dwellings in the watershed and look for trends such as construction in riparian zones.
- Assess select areas that may have more than 6 percent of land covered by impervious surfaces. Take steps to reduce the number and extent of impervious surfaces.
- Collaborate with ODFW to perform surveys of the status and distribution of sandroller populations within the lower Mary's River. Assess specific habitat needs and threats.
- Monitor land use changes within the watershed.
- Obtain baseline data about stream condition for a suite of nutrients and basic water chemistry and determine relationships with non-point sources.
- Collaborate with ODFW and Audubon on annual monitoring of bird populations.

Education and information

- Educate citizens about resource values in the watershed.
- Educate citizens about the impacts of streamside recreation on stream bank erosion and sedimentation.
- Provide information on resource stewardship and land use.
- Advocate and provide education on wetland protection and restoration.
- Advocate and provide education on best management farm practices (conservation tillage, manure management, pesticide and fertilizer use)

- Advocate land uses that are compatible with land capability and that are environmentally sound.
- Develop with willing landowners demonstration projects designed to protect and enhance at-risk habitats.
- improve best management practices on farmlands and pasturelands to reduce erosion and sediment concentrations.

Institutional collaboration

- Enforce Section 404 permitting.
- Apply similar riparian buffer standards used in forest practices to pastures, cropland, and urban lands (where feasible).

## McKenzie River Watershed

### Overview

The lower McKenzie River watershed is primarily private property which, although having undergone significant change in the last century, offers good opportunities for conservation and restoration.

Under current zoning and policies, human population growth in the watershed will probably not be a primary driver of change in most portions of the lower McKenzie River watershed because few opportunities remain to build. Recreational conflicts are expected to increase in the future. House construction on now-vacant riverfront lots (one-third are still vacant) and the re-development of occupied parcels will have impacts to riparian areas and water quality.

In the upper watershed, the USDA Forest Service manages large, contiguous blocks of federal land (62 percent). Below Blue River, federal and private forest lands are mixed in a checkerboard ownership pattern, with federal lands administered and managed by the Bureau of Land Management (6 percent) and the private forest lands owned and managed by forest industries. Almost all of the floodplain is private land. Total private land comprises 31 percent of the watershed.

Forestry is the dominant land use in the watershed, with the exception of the floodplain, which is predominantly agriculture and commercial and residential development

### Habitat condition

Aquatic and wildlife habitat in the watershed is relatively good. High-quality habitat currently exists at many locations along the McKenzie River. The lower McKenzie River has excellent water quality.

Eight families of fish, with a total of 23 species, are native to the McKenzie River watershed. Salmon (with the exception of spring Chinook) and trout are abundant in the river due to excellent water quality, cool water temperatures and good water flows in summer, a rocky river bed, enforcement of strict fishing regulations, and the existence of complex habitat where the river meanders and where side channels exist.

Oak savannas likely no longer exist in the McKenzie River watershed. Oak woodlands, riparian cottonwood forests, and wetlands are critical tree and plant communities. Numerous bird species depend on oak savannas and woodlands; grasslands; riparian woodlands; shrub habitats; lakes, ponds, and wetlands; and conifer forests. Oak woodlands are being encroached by conifers. Remaining groves of cottonwoods and oaks are at risk of being lost due to development pressures.

The McKenzie-Willamette confluence and the Cedar Creek area appear to have the most intact wetlands in the lower watershed, and therefore, are high-priority areas for conservation. The confluence region is also the area with the greatest potential for establishing western pond turtle strongholds. On the McKenzie floodplain, ponds and off-channel aquatic habitats are most extensive near the confluence of the Willamette River.

**Major problems**

Water Quantity

Two large flood control dams — Cougar and Blue River — have altered the magnitude and timing of flows in the lower McKenzie River. Peak flows have been greatly diminished by the Cougar and Blue River dams. Power canal diversions also contribute to flow reductions. The biological consequences of these flow reductions include diminished ability of the river to meander and carve out new side channels, ponds, and alcoves for native fish. Also, the river is less able to keep these off-channel features cleared of fine sediments and to keep substrate throughout the river free of fine material. Restoration of peak flows is unlikely, given the damage it would cause to private property. Monthly flows have been altered by upstream reservoirs. The biological consequences have not yet been evaluated but could include fish stranding in off-channel features.

Water Quality

Throughout the McKenzie River, a low level of nitrogen is available for uptake by plants. There is also a low level of phosphorus available for biologic uptake. The reservoirs are phosphorus sinks in summer. *E. coli* levels are of concern along some tributaries.

Although the McKenzie River is cold for a large western river, reservoir releases in the late summer and fall are warm. As a result, the McKenzie River and some tributaries are on DEQs 3030(d) list as water quality limited.

Suspended sediment is less than what it was prior to dam construction. Water turbidity is highly variable in the watershed, and is nearly always greater during heavy rainfall in tributaries than in the main channel of the McKenzie River. Road-related landslides and landslides on forest slopes contribute equally to erosion rates.

Wetland and Riparian Areas

Bank stabilization (berms and rip rap) increases yearly, but only 13 percent of banks in the lower McKenzie watershed are hardened and just 0.3 percent in the upper watershed.

Much of the riparian forest that used to occur along the McKenzie and Mohawk rivers has been lost. Riparian conifers and hardwoods older than forty years are decreasing in abundance. Dampened peak flows have allowed willows to colonize areas that were formerly kept bare by floods. The spread of reed canary grass has reduced the extent and quality of gravel and sand bars.

Riverfront development is increasing due to flood control. Natural vegetation between houses and the river has been significantly altered.

Fish

Non-native fish number 11 families and 31 species. Among native fish, declines have been recorded for spring Chinook salmon in the watershed. Causes for these declines include reduced fish passage due to dams, water releases from reservoirs, competition from hatchery fish, and loss of rearing habitat

**High priority needs**

Conservation and restoration

- Conserve river segments that could and currently do provide good off-channel habitat.
- Conserve river segments that exhibit high channel complexity.
- Conserve quality riparian woodlands with large trees.
- Conserve remaining oak woodland habitats.
- Conserve wetlands
- Restore channel complexity to rivers.
- Remove invasive plants.
- Restore wetlands.

- Restore vegetative cover along river banks wherever possible.
- Restore areas along the mainstem that could provide better off-channel habitat.

Monitoring and assessment

- Survey western pond turtles and their remaining habitat in the lower McKenzie River watershed.
- Identify additional tributary streams that are abnormally warm in the summer.
- Identify landslide-prone road segments and repair them.
- Investigate reasons why lower McKenzie River tributaries have low densities of insects — a preferred food source for salmonids.
- Evaluate the biological consequences of reduced monthly flows from reservoirs.

Education and information

- Educate citizens about the need to give the river room "to roam."
- Educate landowners about the importance of maintaining natural riparian vegetation.
- Educate homeowners about the risks of building in the historic landslide torrent tracks and in flood-prone areas next to rivers.
- Increase awareness of the scarcity and decline of oak woodlands and of their importance to scores of wildlife species.
- Educate citizens about the need to leave large woody debris in river channels and in the floodplain to help improve channel complexity, improve fish habitat, and enhance riparian conditions.

Institutional collaboration

- Encourage ODFW to limit hatchery introductions throughout the watershed.
- Encourage ODFW to improve the accuracy of their wild Chinook population assessment by eliminating the introduction of unmarked hatchery Chinook fry into Cougar Reservoir.
- Encourage the city of Springfield and Lane County to revise zoning and land use rules to prevent development in floodplains and in riparian areas.
- Encourage the city of Springfield and Lane County to identify and eliminate sources of fecal coliform bacteria river contamination.
- Encourage the US Army Corps of Engineers to modify Blue River Dam to eliminate warm water releases from the reservoir.
- Encourage the US Army Corps of Engineers to transport logs trapped at reservoirs to reaches below the dams so that they may continue to benefit fish habitat in downstream reaches.
- Encourage DSL to enforce riverfront bank stabilization and building permits.
- Encourage local jurisdictions to prevent further development in riparian areas.
- Encourage municipalities to manage for native ecosystems in parks and greenspaces.

## South Santiam Watershed

### Overview

The South Santiam River drains approximately 1,040 square miles and is a primary tributary to the Willamette River. Steep mountainous terrain comprises the eastern 80 percent of the watershed, and floodplain dominated by agriculture and rural and urban development comprise the remaining 20 percent.

### Habitat condition

Stream geomorphology demonstrates a broad range of characteristics providing diverse habitat potential for salmonids. Overall, water quality throughout the lower watershed exceeds minimum standards. Monitoring data, however, suggest that both bacteria and turbidity are potential concerns throughout the lower watershed.

The higher elevations in the watershed are mainly mature, dense forest, while the lower elevations are mainly grass and shrub and mature, sparse forest. Poor riparian areas are mainly in the lower elevations. These areas are characterized by narrow, discontinuous riparian zones that are often

dominated by grass and shrub vegetation. Despite a few clearcuts, the headwaters are characterized by managed forest lands in good condition, with wide buffers and mature stands of conifers and hardwoods.

**Major problems**

Water Quality

Water quality issues for the lower watershed include bacteria and turbidity, and for the upper watershed, bacteria, turbidity, nutrients, temperature, and dissolved oxygen. Dewatering potential is high in the Neal, Thomas, Ames, and Crabtree sub-watersheds.

Fisheries

Fisheries in the watershed have undergone significant changes in the last century, with the most serious impacts being habitat modification and competition from hatchery and introduce warm water fish. The only two anadromous fish native to the watershed — winter steelhead and spring Chinook salmon — are listed as threatened under the Endangered Species Act.

As much as 85 percent of the historical spawning area in the Middle Santiam for winter steelhead was blocked by construction of the Green Peter Dam. Only 200-300 adults pass over the Foster Dam to spawn each year. The two dams have increased low flows in late summer and fall, changing water temperature. They have also reduced flood frequency and intensity, allowing encroachment of the floodplain by development and agriculture.

Other impacts to watershed fisheries include stream flow and temperature problems, riparian habitat losses, excessive water withdrawals from some low-elevation streams, in-stream habitat degradation, splash dams, debris removal, and stream channelization.

**High priority needs**

Conservation and restoration

- Help landowners develop water conservation and water quality management plans, with an emphasis on best management practices and sustainability; cooperate with DOA 1010.
- Approach golf course developers on assistance, plantings, SSWC membership, etc.
- Use SWCD office property to demonstrate appropriate planting for erosion control.
- Cooperate with the City of Lebanon in planting poplars near the landfill.
- Reduce stream temperatures to at least the state standard for select sub-watersheds; plant trees along riparian areas.
- Reduce fecal coliform bacteria to state standard levels for select sub-watersheds; work with landowners to keep domestic animals out of creeks.
- Fish passage:
  - ensure fish passage within DSLs Essential Salmonid Habitat areas.
  - screen water withdrawals within DSLs Essential Salmonid Habitat areas.
  - improve smolt passage at Foster Dam.
  - improve fish passage and screen at Lebanon Dam.
  - improve fish passage at Sankey and Lebanon dams.
  - replace culverts with the largest amount of desirable habitat above them.
  - install a fish screen at the Albany-Lebanon canal intake.
- Fish habitat restoration:
  - identify and protect the healthiest and most productive anadromous fish-bearing streams.
  - restore habitat in select sub-watersheds below natural barriers.
  - protect Moose and Canyon creeks and Soda Fork, which are primary spawning grounds for winter steelhead.
  - restore and enhance riparian shade in DSLs Essential Salmonid Habitat areas, in areas with historic and current anadromous fish, and in high-priority sub-watersheds.
- Actions raised in the watershed assessment, but not identified as high priority:

- encourage agricultural landowners to protect riparian habitat, minimize practices that contribute to pollution and sediment of in-stream habitat, conserve water.
- improve dissolved oxygen levels to meet salmonid spawning requirements.
- reduce nutrient and sediment input into watersheds; encourage landowners to use proper amounts of fertilizer on lawns in urban areas and on fields in rural areas; work with landowners to stabilize stream banks.
- ensure fish passage in areas with historic fish presence, but outside of DSLs Essential Salmonid Habitat areas; screen water withdrawals.
- ensure fish passage at Green Peter Dam.
- restore fish habitat for all streams above and below Green Peter Dam not listed as high priority.

Monitoring and assessment

Water Quality and Quantity

- further characterization of bacteria and turbidity, especially in lower watershed reaches.
- conduct a land use analysis to target sources of *E. coli* in Hamilton Creek.
- identify sites for fecal coliform cleanup.
- test popular swimming holes weekly in the summer.
- begin a testing program for nutrients in Hamilton Creek.
- conduct detailed temperature monitoring at key locations throughout the watershed.
- determine sources of pollutant loading from Lacomb Irrigation District ditch; reduce.
- compare recommended flows to historical levels; identify tributaries deficient in flow, especially those that are critical to fish production.
- flow information for Thomas and Crabtree creeks.
- install a gaging station to monitor flows at the mouths of select creeks having a high potential for dewatering.

• Fish passage and fish habitat restoration:
  - assess culverts within DSLs Essential Salmonid Habitat areas.
  - quantify habitat above culverts blocking fish passage.
  - identify unscreened water withdrawals.
  - identify in-stream projects for DSLs Essential Salmonid Habitat areas, for areas with historic and current anadromous fish, and for high-priority sub-watersheds.
• Assessments
  - compile a list of needed coverages and information; work with the county and the State of Oregon GIS to obtain needed information.
  - compile information for each sub-watershed from DEQs STORET database, other state and federal agency databases, fish hatcheries, and private industry databases; analyze and summarize information, and determine key issues and questions for each sub-watershed.
  - prioritize sub-watersheds; develop a process and schedule for prioritized sub-watersheds; recommend specific actions in each sub-watershed; amend and revise, as needed.
  - compile existing information in sub-watershed assessments on listed species.
  - investigate macroinvertebrate biodiversity in streams to locate sources of productivity and fish production.
  - identify practical alternatives for off-stream watering, fencing, etc.
  - study best management practices for temporary riparian pastures.
  - identify large water users.
  - quantification of habitat blocked by culverts.
  - data on stream reaches where fish productivity is high.
• Reporting and Quality Assurance
  - write biannual report with monitoring program data.
  - write final reports for: OWEB grant, Rogue Wave grant, EPA Education grant.

  - organize quality assurance checks on 10 percent of the samples; ensure that the quality assurance plan is followed by teachers and volunteers; evaluate annually to determine if more frequent tests or more parameters are necessary.
  - work with DEQ to get the Quality Assurance Project plan approved and data used in 305b water quality reports.
- Actions raised in the watershed assessment, but not identified as high priority:
  - monitor nutrients and sediments to determine sources of pollutant loading
  - photo-document potential problem areas for nutrient and sediment input.
  - assess culverts in areas with historic fish presence, but outside of DSLs Essential Salmonid Habitat areas.
  - ensure fish passage in all areas with cutthroat trout.

Education and information

- Develop presentations on:
  - Accomplishments (deliver to local government, commission).
  - How RARE money has been used (present to partners).
  - Water quality monitoring program (present to contributors).
  - Watershed action plan (present to public and gather public input)
- Develop:
  - an outreach and education strategy for Hamilton Creek.
  - educational materials on best management practices; information in feed stores, newsletters, extension bulletin.
  - a direct mailing to livestock owners on best management practices.
- Co-sponsor or host a:
  - series of programs with city parks and recreation.
  - stream bank restoration workshop in cooperation with Linn SWCD and NRCS.
  - watershed Technical Advisory Committee meeting on fish issues; invite people knowledgeable of such issues, compile existing information, prioritize restoration areas.
  - riparian restoration workshop for landowners.
  - public workshop on controlling erosion.
  - refresher courses for teachers and volunteers; train on fecal coliform bacteria procedures, macroinvertebrate inventorying, and aquatic and riparian habitat assessment.
  - workshops on septic system maintenance and provide information; provide information on loans to replace or repair failing septic systems.
  - Plant and use Tucker's wildlife pond as a demonstration area.
- Continue existing education and outreach efforts:
  - Representation at the Linn County Fair and other community events.
  - Watershed tours and other pertinent tours.
  - Update and maintain web site.
  - Update and distribute the membership roster to all members annually.
  - Radio announcements on useful project ideas and land use practices.
  - Place meeting announcements in local newspapers.
  - Place articles about current conditions and *E. coli* in local newspapers.
  - Contribute to and publish the SSWC monthly newsletter.
  - Expand newsletter circulation, especially to Hamilton Creek residents.
  - Monitoring support and technical assistance to teachers and volunteers; write grants for monitoring supplies and equipment; administer existing grants.
  - Request assistance from schools, youth groups, civic organizations, and retirees for the full range of council activities; maximize the use of volunteers.
  - Provide information on sources of native plant materials; develop a list of local landowners willing to share plants from their property.
- Actions raised in the watershed assessment, but not identified as high priority:

- Encourage pollutant trading for water quality problems.

Institutional collaboration

- Coordinate water quality and habitat assessments with other agency programs.
- Negotiate with Lebanon High School, local colleges, and other locations for lab space; write grants.
- Work with local universities and colleges to get intern assistance with testing.
- Work with Linn SWCD to find project sites.
- Cooperate with Linn SWCD, NRCS, and Home*A*Syst to provide technical assistance to landowners on land management/septic system practices to reduce fecal coliform bacteria.
- Cooperate with Linn SWCD and NRCS to provide technical assistance to landowners on land management practices to reduce non-agricultural temperature pollution.
- Continue to work with local communities on dissolved oxygen and sedimentation problems.
- Work with the City of Albany, ODFW, and the Corps to improve fish passage.
- Work with irrigation districts to increase water conservation, stream flows, and pipe ditches.
- Continue to:
  - Maintain and establish links with existing programs; NGOs; and local, state, and federal agencies within the watershed; compile a database.
  - Participate in the Central Coast/Upper Willamette watershed coordinator's group.
  - Utilize government resources wherever available.
  - Form partnerships throughout the watershed.
  - Focus on the long-term sustainability of environmental values and land use objectives.

Council Operations

- Develop procedures and plans for SSWC operations; develop formal board meeting procedures for the annual meeting.
- Council to discuss committee goal-change recommendations and to approve action plan changes annually.
- Meet quarterly with employees to review work, reassign priorities, etc.; provide an annual evaluation of employee work.
- Determine future employee/volunteer needs based on the council action plan.
- Develop an MOU with Linn SWCD/NRCS for office space, supplies, and equipment.
- Establish a system for book and record keeping; develop an annual budget.
- Financial and in-kind support:
  - write grant requests for project implementation and materials; for needed equipment and supplies; for a watershed coordinator's salary.
  - work with the Central Coast/Upper Willamette to apply for sustainable operations funding;
  - develop sources of in-kind support.
- Outreach Committee to review education, citizen involvement, and cooperation goals, and to recommend changes annually to council; establish a committee chair.
- Projects committee to review projects goal and recommend changes annually to council.
- Technical Advisory Committee to:
  - review diversity and productivity, water quality, fish and wildlife habitat, and assessment goals and to recommend changes annually to council.
  - hold Project Committee meetings and select a committee chair;
  - establish project criteria and guidelines that follow the NRCS technical guide
  - determine priorities for restoration and other actions;
  - develop project and stream monitoring plans;
  - an MOU with landowners about project longevity.
  - monitoring protocols

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# Appendix A

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## Appendix B
## Columbia Basin Fish and Wildlife Managers' Goals and Objectives

# Columbia Basin Fish and Wildlife Managers' Goals and Objectives Under the Northwest Power Act

The Northwest Power Act refers to and defines the roles of "fish and wildlife managers"---namely those authorities recognized by state and federal law as having responsibilities for fish and wildlife management in the region. These managers include federal, state, and tribal fish and wildlife organizations.

These managers have identified goals and objectives for meeting the requirements of the Northwest Power Act based on such sources as: the Fish and Wildlife Coordination Act, 16 U.S.C. 661-666c; Fish and Wildlife Act, 16 U.S.C. 742; Endangered Species Act 16 U.S.C. 1531-1543; Federal Power Act §18, 16 U.S.C. 811; Migratory Bird Treaty Act, 16 U.S.C. 703-711; Revised Code of Washington, Titles 75 & 77; and treaties between the US Government and the federally recognized Indian tribes of the Columbia River Basin.)

The managers' framework for fish and wildlife recovery starts with goals and principles to guide overall fish and wildlife management in the Columbia basin. Sub-goals and regional objectives for anadromous and resident fish and wildlife provide more specific guidance. This framework includes information gleaned from the Council's Fish and Wildlife Program, Proposed Recovery Plan and Biological Opinions for Endangered Species, Wy-Kan-Ush-Mi Wa-Kish-Wit, and other tribal, state and federal plans and policies. It also responds to the points raised by the Independent Scientific Group in its report, "Return to the River."

I. The Goal for Columbia Basin Fish and Wildlife Restoration

**Restore sustainable, naturally producing fish and wildlife populations to support tribal and nontribal harvest and cultural and economic practices.** This goal will be achieved by restoring the biological integrity and the genetic diversity of the Columbia River ecosystem and through other measures that are compatible with naturally producing fish and wildlife populations. This goal is intended to fulfill the nation's and the region's obligations under treaties and executive orders with Northwest Indian tribes, treaties with Canada, and applicable resource protection, restoration and enhancement statutes and regulations.

II. Regional Principles

**General Principle:** The scientific foundation of the fish and wildlife managers' Multi-Year Plan views ecosystems as dynamic networks of natural and human factors. While the Columbia River ecosystem can be described and studied, it is a constantly moving target, and opportunities for prediction and manipulation are limited. It is prudent to understand and utilize the natural physical and biological processes that create and maintain productive ecosystems. Species reflect their associated landscapes and ecosystems. Hence, the condition and abundance of desired species reflect the condition of the ecosystem. Technology should be used to foster needed ecosystem attributes rather than replace them.

**Specific Principles:** This general principle is consistent with three principles identified by the Independent Scientific Group. Fish and wildlife managers have added specific references to anadromous fish, resident fish, and wildlife to the ISG principles.

Restoration of Columbia River fish and wildlife resources must address the entire natural and cultural ecosystem including upland, riparian, freshwater, estuarine and ocean habitats where appropriate. This consideration includes human developments, as well as natural habitats.

Sustained natural productivity requires a network of complex and interconnected habitats, which are created, altered and maintained by natural physical processes in uplands, riparian, freshwater, the estuary and the ocean. These diverse and high-quality habitats are crucial for reproduction, rearing, migration, maintenance of food webs and predator avoidance.
Life history diversity, genetic diversity and meta-population organization are ways fish and wildlife populations adapt to their complex and connected habitats. This bio-diversity and its organization contribute to the ability of fish and wildlife populations to cope with the environmental variation that is typical of terrestrial, freshwater, and saltwater environments.

The fish and wildlife managers have identified three additional principles which they believe are important for restoration activities.
Salmonid species can function as keystone populations throughout their historic range. For example, the decay of large numbers of salmon carcasses effectively cycle nutrients from the ocean to freshwater ecosystems. Salmon probably had a key role in physically structuring the environment and providing an appreciable food base for terrestrial species. It is important to re-establish the nutrient cycle in those areas still accessible to salmon. The loss of that nutrient cycling in those areas now blocked to anadromous fish must be adjusted for when developing restoration plans.
Restoration of fish and wildlife resources depends upon managing human impacts to achieve ecosystem conditions that allow natural development of suitable ecosystem functions. Suitable ecosystem conditions can be achieved by managing human impacts to allow natural development of needed characteristics. Technology should be used to foster the development of suitable conditions rather than replace natural functions.
Salmonids, and other species, can function as indicator species to define desired environmental conditions. In those subbasins still accessible to anadromous fish, salmon are a suitable yardstick for defining normative conditions. In this sense the needs of salmon also describe the majority of needs of a particular assemblage of other native species which, historically, occupied the same freshwater habitat. In areas blocked to anadromous fish, other sensitive native fish and wildlife species such as Kootenai River white sturgeon, bull trout, and bald eagles can serve as indicators of ecosystem condition. We should strive to reestablish and maintain the bio-diversity represented by these historically co-evolved native fish and wildlife species assemblages.

*A. Regional Anadromous Fish Objectives*
The Anadromous Fish Managers have chosen some regional objectives, including:
By 2005, implement actions sufficient to halt the declining trend in salmon and steelhead populations above Bonneville Dam.
Restore healthy, naturally reproducing populations of salmon in each subregion accessible to salmon. Healthy populations are defined as having an 80 percent probability of maintaining themselves for 200 years at a level that can support harvest rates of at least 30 percent.
By 2001, obtain the information necessary to manage and restore Pacific lamprey.
By 2025, increase the total adult salmon and steelhead returns above Bonneville Dam to  million annually in a manner that supports tribal and non-tribal harvest.
Fully mitigate for losses of anadromous fish, resident fish, and wildlife within 200 years.

*B. Regional Resident Fish Sub-Goals and Objectives*
The Resident Fish Managers have chosen several sub-goals and objectives to guide resident fish management, including:
Mitigation efforts to address resident fish losses due to human caused impacts, including the construction and operation of the hydrosystem.

Substitute lost anadromous populations with resident populations to address the loss of salmon and steelhead in those areas permanently blocked to anadromous fish as a result of the construction and operation of hydroelectric dams.
Mitigate and compensate for resident and anadromous fish losses caused by the construction and operation of federally-operated and federally-regulated hydro-power projects.
Ensure the continued persistence, health, and diversity of existing resident fish species by reducing or removing impacts caused by habitat degradation (including water quality, water quantity, and hydropower development), competition and/or hybridization with non-native species, and over-harvest (direct and incidental).
Restore native resident fish species (subspecies, stocks and populations) to near historic abundance throughout their historic ranges where habitats exist and where habitats can be feasibly restored.
Maintain and restore healthy ecosystems and watersheds which preserve functional links among biota to ensure the continued persistence, health and diversity of all species including game fish species, non-game fish species, and other organisms.
Administer and increase opportunities for consumptive and non-consumptive resident fisheries for native, introduced, wild, and hatchery-reared stocks that are compatible with the continued persistence of native resident fish species and their restoration to near historic abundance (includes intensive fisheries within closed or isolated systems).

*C. Regional Wildlife Sub-Goal and Objectives*

The wildlife sub-goal is to achieve and sustain levels of habitat and species productivity in order to fully mitigate for the wildlife losses that have resulted from the construction and operation of the federal and nonfederal hydroelectric system in the Columbia River Basin.
Develop mitigation plans that will fully mitigate for wildlife losses.
Coordinate efforts within the Columbia Basin.
Ensure that trust/settlement agreements and other mitigation programs demonstrate consistency with mitigation goals, objectives, and methods.
Track mitigation goals and the gains in habitat units (HU) as a result of implemented mitigation plans.
Ensure consistent application of Habitat Evaluation Process (HEP) methodology. Ensure baseline HEP estimates are completed as projects come on line.
Conduct operational loss assessments.
Develop a monitoring and evaluation plan that measures habitat and species response to management actions.
Develop policy regarding substitution of habitat types.

# Appendix C
# Summary of State of Oregon
# Fish and Wildlife Management Goals and Objectives

## Summary of Fish and Wildlife Management Goals and Objectives of State of Oregon and Oregon Department of Fish and Wildlife

This summary includes information on Oregon's:

- Revised Statutes
- Wildlife Diversity Plan
- Black Bear Management Plan
- Cougar Management Plan
- Elk Management Plan
- Migratory Game Bird Program Strategic Management Plan

I. Oregon Revised Statutes

Oregon Revised Statutes are laws passed by the legislative bodies (House and Senate) of Oregon, giving guidance to ODFW for management of fish and wildlife resources. ORS 496.012 refers specifically to wildlife, but fish are included as part of wildlife.

**Goals**:

1. Species of wildlife maintained at optimum levels.
2. Lands and waters of this state that are developed and managed to enhance the production and public enjoyment of wildlife.
3. Utilization of wildlife that is orderly and equitable.
4. Public access to lands and waters of the state, and the wildlife resources thereon, that are developed and maintained.
5. Wildlife populations and public enjoyment of wildlife are regulated compatibly with primary uses of the lands and waters of the state.
6. Provision of optimal recreational benefits

II. Oregon Department of Fish and Wildlife Plan and Program Goals

*(bulleted items listed following objectives are implementing strategies)*

*A. Oregon Wildlife Diversity Plan (ODFW 1993)*

**Goal**: Maintained wildlife diversity in Oregon that is protected and enhanced, including populations and habitats of native non-game wildlife at self-sustaining levels throughout natural geographic ranges.

Objective 1. Protect and enhance populations of all existing native non-game species at self- sustaining levels throughout their natural geographic ranges by supporting the maintenance, improvement or expansion of habitats and by conducting other conservation actions.

- Maintain existing funding sources and develop new sources of public, long-term funding required to conserve the wildlife diversity of Oregon.
- Identify and assist in the preservation, restoration and enhancement of habitats needed to maintain Oregon.s wildlife diversity and non-consumptive recreational opportunities.
- Monitor the status of non-game populations on a continuous basis as needed for appraising the need for management actions, the results of actions, and for evaluating habitat and other environmental changes.

Objective 2. Restore and maintain self-sustaining populations of non-game species extirpated from the state or regions within the state, consistent with habitat availability, public acceptance, and other uses of the lands and waters of the state.

- Identify, establish standards and implement management measures required for restoring threatened and endangered species, preventing sensitive species from having to be listed as threatened or endangered, and maintaining or enhancing other species requiring special attention.
- Reintroduce species or populations where they have been extirpated as may be feasible.

Objective 3. Provide recreational, educational, aesthetic, scientific, economic and cultural benefits derived from Oregon.s diversity of wildlife.

- Develop broad public awareness and understanding of the wildlife benefits and conservation needs in Oregon.
- Increase or enhance opportunities for the public to enjoy and learn about wildlife in their natural habitats.
- Seek outside opportunities, resources and authorities and cooperate with other agencies, private conservation organizations, scientific and educational institutions, industry and the general public in meeting Program Objectives.
- Maintain and enhance intra-agency coordination through dissemination of Program information, development of shared databases and coordination of activities that affect other Department divisions and programs; identify activities within other programs which affect the Wildlife Diversity program, and develop mutual goals.

Objective 4. Address conflicts between non-game wildlife and people to minimize adverse economic, social, and biological impacts.

- Assist with non-game property damage and nuisance problems without compromising wildlife objectives, using education and self-help in place of landowner assistance wherever possible.
- Administer the Wildlife Rehabilitation Program.
- Administer the Scientific Taking Permits Program.
- Administer Wildlife Holding and other miscellaneous permits.
- Provide biological input to the Falconry Program for the establishment of raptor-capture regulations.
- Update the Wildlife Diversity Plan every five years.

*B. Oregon Black Bear Management Plan (ODFW 1987)*

**Goal**: Black bear populations in Oregon are protected and enhanced, providing optimum recreational benefits to the public and compatible with habitat capability and primary land uses.

Objective 1. Determine black bear population characteristics.

- Implement or cooperate in research to learn more about black bear ecology in Oregon, develop accurate populations estimates and provide a measurement of population trend.

Objective 2. Determine black bear harvest levels.

- Obtain improved harvest information through use of combination report card/tooth envelope.
- Monitor black bear harvest and implement harvest restrictions if necessary.
- Develop an educational program to alert black bear hunters of the need for improved black bear population information.
- If necessary, initiate mandatory check of harvested black bear.

Objective 3. Continue current practice of allowing private and public landowners to take damage causing black bear without a permit.

- The Department will not seek any changes in current statutes.
- Continue to work with other agencies and private landowners in solving black
- bear depredation problems.
- Explore the possibility of using sport hunters for damage control.

*C. Oregon's Cougar Management Plan (ODFW 1993a)*

*Goals:*

1. Cougars are valued by many Oregonians and recognized as an important part of Oregon.s wildlife fauna.
2. Cougar populations are healthy within the state and into the future.

3. Healthy populations of cougar are managed with a recognition of the desires of the public and the statutory obligations of the Department.

*Objectives:*

Objective 1. Continue to gather information on which to base cougar management.

- Continue to authorize controlled cougar hunting seasons conducted in a manner that meets the statutory mandates to maintain the species and provide consumptive and non-consumptive recreational opportunities.
- Continue to study cougar population characteristics as well as the impact of hunting on cougar populations.
- Continue to update and apply population modeling to track the overall cougar population status.
- Continue mandatory check of all hunter-harvested cougar and evaluate the information collected on population characteristics for use in setting harvest seasons.
- Continue development of a tooth aging (cementum annuli) technique.

Objective 2. Continue to enforce cougar harvest regulations.

- Continue to work with OSP to monitor the level of illegal cougar hunting activity.
- Implement appropriate enforcement actions and make the necessary changes in regulations to reduce illegal cougar hunting.
- Continue to inspect taxidermist facilities and records to discourage and document the processing of cougar hides lacking Department seals.

Objective 3. Document and attempt to eliminate potential future human-cougar conflicts.

- Provide information to the public about cougar distribution, management needs, behavior, etc.
- Attempt to solve human-cougar conflicts by non-lethal methods.
- Consider additional hunting seasons or increased hunter numbers in areas where human-cougar conflicts develop.
- Manage for lower cougar population densities in areas of high human occupancy.

Objective 4. Manage cougar populations through controlled hunting seasons.

- Base regulation modifications on population trends, as annual fluctuations in the weather can greatly influence recreational cougar harvest.
- Continue to regulate cougar hunting through controlled permit seasons.

Objective 5. Continue to allow private and public landowners to take damage-causing cougar without a permit.

- No changes will be sought to existing damage control statutes.
- Continue to work with landowners to encourage reporting of potential damage before it occurs, with the goal of solving complaints by other than lethal means.
- Continue to emphasize that damage must occur before landowners or agents of the Department may remove an offending animal.
- Encourage improved livestock husbandry practices as a means of reducing cougar damage on domestic livestock.
- Continue to work with other agencies to solve cougar depredation problems.

Objective 6. Manage deer and elk populations to maintain the primary prey source for cougar.

- Work with landowners and public land managers to maintain satisfactory deer, elk and cougar habitat.
- Evaluate the effects of human activities and human disturbance on cougar.
- Take action to correct problems in areas where human access is detrimental to the welfare of cougar or their prey base.

*D. Oregon's Elk Management Plan (ODFW 1992)*

**Goal***:* Elk populations in Oregon that are protected and enhanced elk populations, providing optimum recreational benefits to the public and compatible with habitat capability and primary land uses.

Objective 1. Maximize recruitment into elk populations and maintain bull ratios at Management Objective levels. Establish Management Objectives for population size in all herds, and maintain populations at or near those objectives.

- Maintain bull ratios at management objectives.
- Protect Oregon.s wild elk from diseases, genetic degradation, and increased poaching which could result from transport and uncontrolled introduction of cervid species.
- Determine causes of calf elk mortality.
- Monitor elk populations for significant disease outbreaks, and take action when and were possible to alleviate the problem.
- Improve data collection procedures to attain necessary information at 80% confidence level with a 20% bound on error.
- Establish population models for aiding in herd or unit management decisions.
- Adequately inventory elk populations in all units with significant number of elk.

Objective 2. Maintain, enhance and restore elk habitat.

- Ensure both adequate quantity and quality of forage to achieve elk population management objectives in each management unit.
- Ensure habitat conditions necessary to meet population management objectives are met on critical elk ranges.
- Prevent elk damage to private land where little or no natural winter range remains.
- Maintain public rangeland in a condition that will allow elk populations to meet and sustain management objectives in each unit.
- Reduce wildlife damage to private land.

Objective 3. Enhance consumptive and non-consumptive recreational uses of Oregon.s elk resource.

- Develop a policy that outlines direction for addressing the issues of tag allocation to private landowners and public access to private lands in exchange for compensation to private landowners.
- Increase bull age structure and reduce illegal kill of bulls while maintaining recreational management objectives.
- Maintain levels of hunter recreation in all units.
- Identify, better publicize, and increase the number of elk viewing opportunities in Oregon.

*E. Oregon Migratory Game Bird Program Strategic Management Plan (ODFW 1993)*

**Goal**: Populations and habitats of native migratory game birds and associated species that are protected and enhanced at prescribed levels throughout natural geographic ranges in Oregon and the Pacific Flyway, contributing to Oregon.s wildlife diversity and the uses of those resources.

Objective 1. Integrate state, federal, and local programs to coordinate biological surveys, research, and habitat development to obtain improved population information and secure habitats for the benefit of migratory game birds and other associated species.

- Establish an Oregon Migratory Game Bird Committee to provide management recommendations on all facets of the migratory game bird program, migratory game birds and associated species.
- Use population and management objectives identified in Pacific Flyway Management Plans and Programs.
- Develop a statewide migratory game bird habitat acquisition, development, and enhancement plan based on flyway management plans, ODFW Regional recommendations, and other state, federal, and local agency programs.
- Implement a statewide migratory game bird biological monitoring program, including banding, breeding, production, migration, and wintering area surveys based on population information needs of the flyway and state.
- Develop a statewide program for the collection of harvest statistics.
- Prepare a priority plan for research needs based on flyway management programs
- Annually prepare and review work plans for wildlife areas that are consistent with policies and strategies of this plan.

- Develop a migratory game bird disease contingency plan to address responsibilities and procedure to be taken in the case of disease outbreaks in the state. It will also address policies concerning .park ducks., captive-reared, and exotic game bird releases in Oregon.

Objective 2. Assist in the development and implementation of the migratory game bird management program through information exchange and training.

- Provide training for appropriate personnel on biological survey methodology, banding techniques, waterfowl identification, habitat development, disease problems, etc.

Objective 3. Provide recreational, aesthetic, educational, and cultural benefits from migratory game birds, other associated wildlife species, and their habitats.

- Provide migratory game bird harvest opportunity.
- Regulate harvest and other uses of migratory game birds at levels compatible with maintaining prescribed population levels.
- Eliminate impacts to endangered or threatened species.
- Reduce impacts to protected or sensitive species.
- Provide a variety of recreational opportunities and access, including viewing opportunities, throughout the state.
- Provide assistance in resolving migratory game bird damage complaints.
- Develop opportunities for private, public, tribal, and industry participation in migratory game bird programs including, but not limited to, conservation, educational, and scientific activities.
- Disseminate information to interested parties through periodic program activity reports, media releases, hunter education training, and other appropriate means.

Objective 4. Seek sufficient funds to accomplish programs consistent with the objectives outlined in the plan and allocate funds to programs based on management priorities.

- Use funds obtained through the sale of waterfowl stamps and art to fund all aspects of the waterfowl management program as allowable under ORS 497.151.
- Develop annual priorities and seek funding through the Federal Aid in Wildlife Restoration Act.
- Solicit funds from .Partners in Wildlife. as appropriate.
- Seek funds from a variety of conservation groups such as Ducks Unlimited and the Oregon Duck Hunter.s Association.
- Solicit funds from the Access and Habitat Board as appropriate and based on criteria developed by the Board and the Fish and Wildlife Commission.
- Pursue funds from other new and traditional sources, such as corporate sponsors and private grants.

## Appendix D
## Oregon Department of Fish and Wildlife
## Draft Oregon Plan / Willamette River Basin Operational Plan

**DRAFT**

# THE OREGON PLAN
# WILLAMETTE RIVER BASIN OPERATIONAL PLAN

## INTRODUCTION

This plan is intended to describe how Vision 2006, the six-year strategic plan for the Oregon Department of Fish and Wildlife (Department) is being implemented to protect and restore natural production of native fish and wildlife in the Willamette River Basin. This plan also contemplates and addresses issues the Department is working on as a partner in regional efforts to recover fish and wildlife listed as sensitive, threatened or endangered under state and federal laws, and to restore the health of the Willamette River Basin watershed.

## GOALS AND OBJECTIVES

**GOAL 1: *Healthy and sustainable fish and wildlife populations and their habitats.* (Vision 2006: Goal 1)**

Expected Outcome: *Populations and communities of native fish and wildlife at an abundance and distribution in time and place such that they can naturally sustain themselves under the full range of environmental conditions they face over their life span including utilization.*

Performance Measure: *Fish and wildlife populations that reflect the diversity of native, natural habitats within Oregon and the values of its citizens*. (Vision 2006: Performance Measure for Goal 1)

Objectives

Objectives are developed for species that are key indicators of ecosystem health and/or are important for public use and enjoyment. Objectives are also developed for habitats important to these species. The objectives describe expected performance in the near and long terms, and thus serve as performance standards (benchmarks) and measures for the strategies and actions in the plan.

As implied by the "expected outcome" stated above, an overarching objective that applies to all species in all subbasins and watersheds is:

*Within-species diversity necessary to naturally sustain populations under the full range of environmental conditions they face over their life span including utilization.*

Particular species of fish and wildlife were selected as key indicators of changes in Willamette valley ecosystems because they are sensitive to changes in ecosystem health and share requirements with a larger, associated community of animals and plants. A second set of indicators measure habitat factors that determine habitat suitability for fish and wildlife.

| Habitat Type | Indicator Species | Physical Factors |
|---|---|---|
| Aquatic (rivers, lakes, & ponds) | Fish: Bull, cutthroat, & rainbow trout, steelhead, chinook & coho salmon, Oregon chub, lamprey, sandrollers<br>Wildlife: Pond turtles, red-legged frogs, painted turtles | Water quantity, quality and physical habitat |
| Riparian | Great Blue Herons, yellow warblers, beavers, bald eagles | Size, species Composition, width, amount, distribution |
| Wetland | Wood ducks, pond turtles, red legged frogs, painted turtles, dunlins | Amount, spring size, distribution, Species. Composition |
| Grassland | Western meadowlarks, western bluebirds, rattlesnakes, streaked horn lark, Vesper sparrow | Amount, size, distribution, Species Composition, shrub encroachment |
| Oak Woodland | White breasted nuthatches, Acorn woodpeckers, Band-tailed pigeons | Amount, size, distribution, Species Composition, % conifer encroachment |
| Hardwoods | Silver-gray squirrel | Amount, size, distribution, Species Composition, tree size class, down wood and snags |
| Conifer | Black-tail deer, elk | Amount, size, distribution, Species Composition, tree size class, down wood and snags |
| Rocky Habitats (cliffs, caves, & talus) | Rattlesnakes, Townsend's big-eared bat | Amount, size, distribution |

The following is a list of objectives and sub objectives presented geographically by basin or subbasin. The objectives are based on the Department's Vision 2006 strategic plan. Sub objectives are defined for each objective and describe natural production targets for key indicator species of native fish and wildlife and the habitats that are important to them. Sub objectives for public use and enjoyment describe bench marks for direct and incidental harvest of naturally produced fish and wildlife and opportunities to observe, appreciate, experience, and value fish and wildlife. Sub objectives are based on objectives in state or federal plans. If no plan or no quantitative objectives within a plan exist, sub objectives are based on the professional judgement of fish and wildlife managers in the basin.

**Objective 1.1**: *Within the next six years, improved abundance and distribution of native freshwater and marine fish and wildlife populations.* (Vision 2006: First Objective, Goal 1)

**Sub-Objectives**

***Basin-Wide***

**Sub-Objective 1.1.1**: A diversity index of at least ___ for ***native aquatic species*** in the Willamette River and its tributaries as measured by ___ in ___, with an interim target of at least ___ by 2006 (*no citation*).

**Sub-Objective 1.1.2**: Twenty populations of ***naturally-produced Oregon chub***, with at least five hundred adults in each population and with stable or increasing trends for seven years (at least four populations each in the Middle Fork Willamette, Santiam, and Mainstem Willamette

subbasins). The interim target is ten populations of at least five hundred adults each with stable or increasing trends for five years (at least three populations in each subbasin) by 2008 (Oregon Chub Recovery Plan, 1998).

**Sub-Objective 1.1.3**: At least five local populations of ***naturally-produced adult bull trout*** in the core areas of the Willamette Recovery Unit (McKenzie/Middle Fork, Clackamas) with at least one thousand adults in each population and with stable or increasing trends for no less than ten years. The interim target is three populations of at least five hundred adults each with stable or increasing trends for no less than five years by 2012 (*Bull Trout Recovery Plan- in press*).

**Sub-Objective 1.1.4**: Increasing trend in numbers of ***naturally-produced adult cutthroat trout*** in their historical range in the Willamette River and its tributaries (Willamette Basin Fish Management Plan, October 1991) as measured by an average density of at least ___ adults per square-meter in a sample of ___ randomly selected reaches in ___ streams, with an interim target of at least ___ by 2006.

**Sub-Objective 1.1.5**: Increasing trend in numbers of ***naturally produced adult resident rainbow trout*** in their historical range in the Willamette River and its tributaries as measured by an average density of at least ___ adults per square-meter in a sample of ___ randomly selected reaches in ___ streams (Willamette Basin Fish Management Plan, October 1991), with an interim target of at least ___ by 2006.

**Sub-Objective 1.1.6**: Increasing trend in numbers of ***naturally-produced adult Pacific lamprey*** in the Willamette River and its tributaries as measured at Willamette Falls (Willamette Basin Fish Management Plan, June 1980), with an interim target of at least ___ by 2006.

**Sub-Objective 1.1.7**: Increasing trend in numbers of ***naturally-produced adult white sturgeon*** in their historical range in the Willamette River and its tributaries (Main Stem Willamette Subbasin Fish Management Plan, March 1992) as measured by an average density of at least ___ adults per square-meter in a sample of ___ randomly selected reaches in ___ streams, with an interim target of at least ___ by 2006.

**Sub-Objective 1.1.8**: Increasing trend in numbers of ***naturally-produced adult mountain whitefish*** in their historical range in the Willamette River and its tributaries (Willamette Basin Fish Management Plan, October 1991) as measured by an average density of at least ___ adults per square-meter in a sample of ___ randomly selected reaches in ___ streams, with an interim target of at least ___ by 2006.

**Sub-Objective 1.1.9**: Increasing trend in numbers of ***naturally-produced adult sandrollers*** in their historical range in the Willamette River and its tributaries (Willamette Basin Fish Management Plan, October 1991) as measured by an average density of at least ___ adults per square-meter in a sample of ___ randomly selected reaches in ___ streams, with an interim target of at least ___ by 2006.

**Sub-Objective 1.1.10**: Increasing trend in numbers of ***naturally-produced sensitive wildlife species*** in their historical range throughout the Willamette River Basin, as measured by trends in target species, including western pond turtle, northern red-legged frog, yellow-legged frog, sharp-tail snake, western rattlesnake, western meadowlark, vesper sparrow, grasshopper sparrow, streaked horned lark, purple martin, and yellow-breasted chat (*no citation*), with an interim target of at least ___ by 2006.

**Sub-Objective 1.1.11:** Median ages of ***black bear*** greater than 5 years for all bears, greater than 4 years for males, and greater than 6 years for females (Black Bear Management Plan, 1993).

**Sub-Objective 1.1.12:** Bull: cow ratios for ***elk*** of 1:10, and abundances in Willamette-Valley Wildlife-Management Units as follows (Elk Management Plan, 1992, and Proposed Management Objectives for Elk- Northwest Region, 1993):

| | |
|---|---|
| Alsea | 7,000 |
| Indigo | 4,700 |
| McKenzie | 5,200 |
| Santiam | 5,900 |

| | |
|---|---|
| Siuslaw | 4,000 |
| Stott Mt. | 1,500 |
| Trask | 5,200 |
| Willamette | De-emphasis zone |
| Wilson | 3,200 |

**Sub-Objective 1.1.13:** Buck: doe ratios for ***black-tailed deer*** of 1:5 (based on 1996-2000 herd composition averages, Big Game Statistics reports for the years 1996 through 2000).
**Sub-Objective 1.1.14:** Median age of ***cougar*** in the Willamette Basin outside urban and agricultural areas greater than two years (Based on 1987 – 1992 age distribution for cougars in Oregon, Cougar Management Plan 1993 – 1998, 1993).

*Calapooia River*
**Sub-Objective 1.1.15**: At least six hundred fifty ***naturally-produced adult spring chinook salmon*** as estimated by redd counts (Santiam and Calapooia Subbasin Fish Management Plan, March 1992), with an interim target of at least one hundred by 2006.
**Sub-Objective 1.1.16**: At least one thousand one hundred seventy ***naturally-produced adult winter steelhead*** as estimated by redd counts of at least 25 redds per mile (Santiam and Calapooia Subbasin Fish Management Plan, March 1992), with an interim target of at least 15 redds per mile by 2006.
*Clackamas River*
**Sub-Objective 1.1.17**: At least two thousand nine hundred ***naturally-produced adult spring chinook salmon*** as measured at North Fork Dam (Willamette Basin Fish Management Plan, March 1998), with an interim target of at least one thousand nine hundred by 2006.
**Sub-Objective 1.1.18**: At least three thousand ***naturally-produced adult winter steelhead*** as measured at North Fork Dam (Clackamas Basin Fish Management Plan, January 1992), with an interim target of at least one thousand five hundred by 2006.
**Sub-Objective 1.1.19**: At least three thousand ***naturally-produced adult coho salmon*** as measured at North Fork Dam (Clackamas Basin Fish Management Plan, January 1992), with an interim target of at least eight hundred by 2006.
**Sub-Objective 1.1.20**: An as yet undetermined number of ***naturally-produced adult bull trout*** initially reintroduced as fry per recommendations from a feasibility analysis (*Bull Trout Recovery Plan- in press*). Annual transfers of bull trout fry from a suitable donor population by 2006. [This assumes the feasibility analysis favors reintroducing bull trout into historic habitat in the Clackamas Subbasin.]
*Coast Range Tributaries*
**Sub-Objective 1.1.21**: At least six hundred seventy five ***naturally-produced adult winter steelhead*** as estimated by redd counts of at least 5 redds per mile (Coast Range Subbasin Fish Management Plan, March 1992), with an interim target of at least 3 redds per mile by 2006.
*McKenzie River*
**Sub-Objective 1.1.22**: At least ten thousand ***naturally-produced adult spring chinook salmon*** as measured at Leaburg Dam (Willamette Basin Fish Management Plan, March 1998), with an interim target of three thousand to five thousand by 2006.
**Sub-Objective 1.1.23**: At least 400 ***naturally-produced adult bull trout***, and an increasing trend in abundance (*Bull Trout Recovery Plan- in press*). Expanded distribution into areas currently under utilized, e.g., Sweetwater Creek by 2006.
Middle Fork Willamette River
**Sub-Objective 1.1.24**: At least ___ ***naturally-produced adult spring chinook salmon*** as estimated with redd counts (Willamette Basin Fish Management Plan, March 1998), with an interim target of at least ___ by 2006.
**Sub-Objective 1.1.25**: An as yet undetermined number of ***naturally-produced adult bull trout*** initially reintroduced as fry (*Bull Trout Recovery Plan- in press*). Successful adult bull trout

reintroduction as evidenced by multiple age classes and evidence of spawning, i.e., presence of redd and spawning bull trout by 2006.

Molalla River

**Sub-Objective 1.1.26**: At least seven hundred fifty ***naturally-produced adult spring chinook salmon*** as estimated with redd counts (Molalla and Pudding Subbasin Fish Management Plan, March 1992), with an interim target of at least ___ by 2006.

**Sub-Objective 1.1.27**: At least three thousand five hundred ***naturally-produced adult winter steelhead***, as estimated with redd counts (Molalla and Pudding Subbasin Fish Management Plan, March 1992), with an interim target of at least ___ by 2006.

*Pudding River*

**Sub-Objective 1.1.28**: At least ___ ***naturally-produced adult spring chinook salmon*** as estimated with redd counts (Willamette Basin Fish Management Plan, March 1998), with an interim target of at least 100 adults by 2006.

**Sub-Objective 1.1.29**: At least one thousand two hundred fifty ***naturally-produced adult winter steelhead***, as estimated with redd counts (Molalla and Pudding Subbasin Fish Management Plan, March 1992), with an interim target of at least ___ by 2006.

Santiam River

**Sub-Objective 1.1.30**: An as yet undetermined number of ***naturally-produced adult bull trout*** initially reintroduced as fry per recommendations from a feasibility analysis (*Bull Trout Recovery Plan- in press*). Annual transfers of bull trout fry from a suitable donor population by 2006. [This assumes the feasibility analysis favors reintroducing bull trout into historic habitat in the Santiam Subbasin.]

*North Santiam River*

**Sub-Objective 1.1.31**: At least three thousand four hundred ***naturally-produced adult spring chinook salmon*** as measured at Bennett Dam, with an interim target of at least two hundred by 2006. Objective set is 1.42 times the estimated two thousand four hundred adult fish that historically returned to sites upstream from Detroit Dam (Santiam and Calapooia Subbasin Fish Management Plan, March 1992) because 30% of North Santiam production occurred downstream from Detroit Dam.

**Sub-Objective 1.1.32**: At least three thousand ***naturally-produced adult winter steelhead*** as measured at Bennett Dam, with an interim target of at least two thousand by 2006. Objective is based on a mitigation level of twelve hundred adult fish for lost production upstream from Detroit Dam (Santiam and Calapooia Subbasin Fish Management Plan, March 1992), plus a natural production level of approximately 2000 adult fish based on contemporary trap counts at Bennett Dam and spawning survey information.

South Santiam River

**Sub-Objective 1.1.33**: At least one thousand four hundred ***naturally-produced adult spring chinook salmon*** as measured at Foster Dam (Santiam and Calapooia Subbasin Fish Management Plan, March 1992), with an interim target of at least two hundred by 2006. Objective equals mitigation level for lost production upstream from Foster and Green Peter dams.

**Sub-Objective 1.1.34**: At least one thousand nine hundred ***naturally-produced adult winter steelhead*** as measured at Foster Dam (Santiam and Calapooia Subbasin Fish Management Plan, March 1992), with an interim target of at least four hundred fifty by 2006. Objective is based on historical adult fish production of six hundred fifty upstream from Foster Dam and twelve hundred fifty above Green Peter Dam.

Tualatin River

**Sub-Objective 1.1.35**: At least two thousand ***naturally-produced adult winter steelhead*** as measured at/ by ___ (Tualatin Basin Fish Management Plan, 1992), with an interim target of at least six hundred by 2006.

**Objective 1.2**: *Within the next six years, improved amount, distribution, and types of habitats that support a diversity of fish and wildlife species.* (Vision 2006: Second Objective, Goal 1)
Sub-Objectives
Basin-Wide

**Sub-Objective 1.2.1**: At least fifty thousand acres of **oak woodland habitat** by 2050 distributed throughout its historic range in patches of sufficient size and quality to sustain populations of dependent species (*Draft Willamette Restoration Strategy 1.0, November 2000*), with an interim target of no net loss by 2006. Oak woodland habitat includes woodland and savannas.

**Sub-Objective 1.2.2**: At least fifty thousand acres of **grassland habitat** by 2050 distributed throughout its historic range in patches of sufficient size and quality to sustain populations of dependent species (*Draft Willamette Restoration Strategy 1.0, November 2000*), with an interim target of no net loss by 2006. Grassland habitat includes valley, mid-slope and high-elevation wet and dry prairies.

**Sub-Objective 1.2.3**: At least two hundred thousand acres of **riparian habitat** by 2050 distributed throughout its historic range in patches of sufficient size and quality to sustain populations of dependent species (*Draft Willamette Restoration Strategy 1.0, November 2000*), with an interim target of no net loss by 2006. Riparian habitat includes deciduous and coniferous forests and urban communities.

**Sub-Objective 1.2.4**: At least one hundred forty-five thousand acres of **hardwood forest habitat** by 2050 distributed throughout its historic range in patches of sufficient size and quality to sustain populations of dependent species (*Draft Willamette Restoration Strategy 1.0, November 2000*), with an interim target of no net loss by 2006. Hardwood forest habitat includes oak madrone, maple alder fir, and urban maple habitats.

**Sub-Objective 1.2.5**: At least ninety-three thousand acres of **wetland habitat** by 2050 distributed throughout its historic range in patches of sufficient size and quality to sustain populations of dependent species (*Draft Willamette Restoration Strategy 1.0, November 2000*), with an interim target of no net loss by 2006. Wetland habitat includes forested, open, agricultural, and urban types.

**Sub-Objective 1.2.6**: At least one hundred thousand acres of **conifer habitat** by 2050 distributed throughout its historic range in patches of sufficient size and quality to sustain populations of dependent species (*Draft Willamette Restoration Strategy 1.0, November 2000*), with an interim target of no net loss by 2006. Conifer habitat includes Douglas fir, ponderosa pine, hemlock, and true firs.

**Sub-Objective 1.2.7**: No net change in abundance and distribution of **rocky habitat** (*no citation*). Rocky habitat includes buttes, lava domes, basalt outcrops, gravel bars, talus slopes and cliffs, and caves.

**Sub-Objective 1.2.8**: Improved quality and connectivity of **instream habitat** in streams and rivers within the historic range of native fish and wildlife (*no citation*). Quality means sufficient flow, temperature, water quality, cover, forage base, etc for sustaining and recovering populations. Connectivity means that fish and wildlife have access to habitats necessary for sustaining and recovering populations.

**Sub-Objective 1.2.9**: Increased acres of **off-channel lake and pond** habitat distributed in the basin to benefit fish and wildlife populations (*no citation*).

**Sub-Objective 1.2.10**: Increase in quantity, quality, and distribution of **fish and wildlife habitats on agricultural lands** (*no citation*), with an interim target of no net loss in quantity, quality, and distribution of wildlife habitats because of agricultural practices through 2006. Agricultural lands include irrigated row crops, grass fields, nurseries, vineyards, berry farms and orchards, and intensively managed crops.

**Sub-Objective 1.2.11**: Increase in quantity, quality, and distribution of **fish and wildlife habitats in urban areas** (*no citation*), with an interim target of no net loss in quantity, quality, and distribution of wildlife habitats because of urban development through 2006. Wildlife

habitats in urban areas include native remnants, open spaces and parks, mixed native and non-native communities, buildings, bridges, and culverts.

**GOAL 2:** ***Enhanced use and enjoyment of native and non-native fish and wildlife resources consistent with restoring and maintaining healthy native fish and wildlife populations.*** **(Vision 2006: Goal 2)**

**Expected Outcome**: *Sustainable opportunities for all Oregonians to use and enjoy fish and wildlife now and in the future*.

**Performance Measures:**

*Increased number and types of opportunities for people to use and enjoy fish and wildlife while maintaining optimal fish and wildlife populations.* (Vision 2006: Performance Measure and First objective, Goal 2)

Increased number of days of use and enjoyment of fish and wildlife and number and diversity of people who use and enjoy fish and wildlife.

## Objectives

**Objective 2.1**: Within the next six years, development and maintenance of viable harvest opportunities in balance with sustainable populations of game species.

Sub-Objectives

Basin-Wide

**Sub-Objective 2.1.1**: A reasonable likelihood of encountering fish and wildlife for recreational harvest. Populations and communities of animals must be of sufficient abundance and distributed in time and place to provide a reasonable opportunity for encounter (*no citation*).

**Sub-Objective 2.1.2**: Harvest of exotic and artificially propagated fish and wildlife at levels and in a manner that maintains healthy populations of native, naturally-produced species (*no citation*).

**Sub-Objective 2.1.3**: Harvest impact rate of no more than 5 percent (hooking mortality) of ***naturally-produced adult bull trout*** encountered in fisheries (Oregon Administrative Rule xxx.xx.xxx). Harvest impacts are incidental to catch-and-release recreational fisheries on other trout species in the mainstem Willamette River and its tributaries.

**Sub-Objective 2.1.4**: Harvest of ***naturally-produced adult cutthroat trout*** in selected areas of the mainstem Willamette River and in certain areas within tributaries at levels that maintain healthy populations (Willamette Basin Fish Management Plan, October 1991). Many areas within waters containing listed salmon and steelhead are closed or are open only to catch-and-release fisheries to minimize harvest impacts on these populations.

**Sub-Objective 2.1.5**: Harvest of ***naturally-produced adult resident rainbow trout*** in selected areas of the mainstem Willamette River and in certain areas within tributaries at levels that maintain healthy populations (Willamette Basin Fish Management Plan, October 1991). Many areas within waters containing listed salmon and steelhead are closed or are open only to catch-and-release fisheries to minimize harvest impacts on these populations.

**Sub-Objective 2.1.6**: Harvest of ***naturally-produced adult Pacific lamprey*** in the Willamette River and its tributaries at levels that maintain healthy populations (Willamette Basin Fish Management Plan, June 1980).

**Sub-Objective 2.1.7**: Harvest of ***naturally-produced adult white sturgeon*** in the Willamette River and its tributaries at levels that maintain healthy populations (Main Stem Willamette Subbasin Fish Management Plan, March 1992).

**Sub-Objective 2.1.8**: Harvest of ***naturally-produced adult mountain whitefish*** in the Willamette River and its tributaries at levels that maintain healthy populations and provide for Basic Yield as defined under the Department's Trout Plan (Main Stem Willamette Subbasin Fish Management Plan, March 1992).

**Sub-Objective 2.1.9**: Harvest of ***migratory game birds*** at levels that maintain or enhance populations as prescribed by Pacific Flyway Management Plans (Oregon Migratory Game Bird Program Strategic Management Plan).
**Sub-Objective 2.1.10**: Harvest of ***native resident game birds*** at levels that maintain or enhance populations (1999 Game Bird Hunting Statistics, 1999).
**Sub-Objective 2.1.11**: Harvest of ***native fur-bearing mammals*** at levels that maintain healthy populations and are compatible with local primary land-uses. (The Department does not have a fur-bearer management plan, does not survey fur-bearers, and has not recently emphasized development or enhancement of trapping. Additionally, most municipalities, state parks, national parks and monuments, and national forests have restrictions on trapping on some or all lands under their management.)
**Sub-Objective 2.1.12**: Median ages at harvest of ***black bears*** greater than 3 years for all bears, greater than two years for males, and greater than 4 years for females. (Black Bear Management Plan, 1993)
**Sub-Objective 2.1.13**: Harvest of ***cougars*** at levels that do not exceed the quotas for the Coast Range (Zone A; 91 animals in 2000-2001) or the Cascades (Zone B; 104 animals in 2000-2001) (Oregon Administrative Rule 635-67-015).
**Sub-Objective 2.1.14**: Harvest of bull ***elk*** at levels that maintain five-year running-average hunter success rates in Willamette-Valley Wildlife-Management Units as follows (based on 5-year running average hunter success rates for 1996-2000, Big Game Statistics reports for the years 1996 through 2000):

| | |
|---|---|
| Alsea | 13% |
| Indigo | 9% |
| McKenzie | 9% |
| Santiam | 7% |
| Siuslaw | 9% |
| Stott Mtn. | 10% |
| Trask | 12% |
| Wilson | 11% |

**Sub-Objective 2.1.15**: Harvest of ***black-tailed deer*** at levels that maintain a 5-year running average hunter success rate of 20% (based on 5-year running average hunter success rates for 1996-2000, Big Game Statistics reports for the years 1996 through 2000).
Calapooia River
**Sub-Objective 2.1.16**: Harvest impact rate of no more than 7 percent (17 percent in 2001) of the Calapooia population of ***naturally-produced adult spring chinook salmon*** entering the Columbia River (Fisheries Management and Evaluation Plan, Upper Willamette River Spring Chinook in Fisheries of the Willamette Basin and Lower Columbia River Mainstem, February 2001). No harvest impact on the run after it enters the Calapooia River. Harvest impacts are incidental to targeted commercial and sport fisheries on hatchery-produced spring chinook.
**Sub-Objective 2.1.17**: Harvest impact rate of no more than 10 percent of the Calapooia population of ***naturally-produced adult winter steelhead*** (Draft Upper Willamette River Winter Steelhead Fisheries Management and Evaluation Plan, November 2000). No harvest impact on the run after it enters the Calapooia River. Harvest impacts are incidental to catch-and-release recreational fisheries (<___ %), and commercial fisheries (<0.2%), in the mainstem Columbia and Willamette rivers.
Clackamas River
**Sub-Objective 2.1.18**: Harvest impact rate of no more than 10 percent (20 percent in 2001) of the Clackamas population of ***naturally-produced adult spring chinook salmon*** entering the Columbia River (Fisheries Management and Evaluation Plan, Upper Willamette River Spring Chinook in Fisheries of the Willamette Basin and Lower Columbia River Mainstem, February 2001). Harvest impact rate of no more than 3 percent (6 percent in 2001) of the run after it enters

the Clackamas River. Harvest impacts are incidental to targeted commercial and sport fisheries on hatchery-produced spring chinook.

**Sub-Objective 2.1.19**: Harvest impact rate of no more than 10 percent of the Clackamas population of ***naturally-produced adult winter steelhead*** (Draft Upper Willamette River Winter Steelhead Fisheries Management and Evaluation Plan, November 2000). Harvest impacts are incidental to catch-and-release recreational fisheries (<___ %) in the Clackamas and mainstem Columbia and Willamette rivers, and commercial fisheries (<0.2%) in the mainstem Columbia and Willamette rivers.

**Sub-Objective 2.1.20**: Harvest impact rate of no more than 15 percent of the Clackamas population of ***naturally-produced adult coho salmon*** recruited to ocean and freshwater fisheries (State of Oregon Endangered Species Act Incidental Take Permit 2001-INC-09). Harvest impact rate of less than 1 percent of the run after it enters the Clackamas River. Harvest impacts are incidental to targeted commercial and sport fisheries on fall chinook and hatchery-produced coho salmon.

Coast Range Tributaries

**Sub-Objective 2.1.21**: Harvest impact rate of no more than 10 percent of the populations of ***naturally-produced adult winter steelhead*** in Coast Range tributaries (Draft Upper Willamette River Winter Steelhead Fisheries Management and Evaluation Plan, November 2000). No harvest impact on the run after fish enter Coast Range tributaries. Harvest impacts are incidental to catch-and-release recreational fisheries (<___ %), and commercial fisheries (<0.2%), in the mainstem Columbia and Willamette rivers.

McKenzie River

**Sub-Objective 2.1.22**: Harvest impact rate of no more than 9 percent (20 percent in 2001) of the McKenzie population of ***naturally-produced adult spring chinook salmon*** entering the Columbia River (Fisheries Management and Evaluation Plan, Upper Willamette River Spring Chinook in Fisheries of the Willamette Basin and Lower Columbia River Mainstem, February 2001). Harvest impact rate of no more than 3 percent of the run after it enters the McKenzie River. Harvest impacts are incidental to targeted commercial and sport fisheries on hatchery-produced spring chinook.

Middle Fork Willamette River

**Sub-Objective 2.1.23**: Harvest impact rate of no more than 9 percent (20 percent in 2001) of the Middle Fork Willamette population of ***naturally-produced adult spring chinook salmon*** entering the Columbia River (Fisheries Management and Evaluation Plan, Upper Willamette River Spring Chinook in Fisheries of the Willamette Basin and Lower Columbia River Mainstem, February 2001). Harvest impact rate of no more than 3 percent of the run after it enters the Middle Fork Willamette River. Harvest impacts are incidental to targeted commercial and sport fisheries on hatchery-produced spring chinook.

Molalla River

**Sub-Objective 2.1.24**: Harvest impact rate of no more than 10 percent (20 percent in 2001) of the Molalla population of ***naturally-produced adult spring chinook salmon*** entering the Columbia River (Fisheries Management and Evaluation Plan, Upper Willamette River Spring Chinook in Fisheries of the Willamette Basin and Lower Columbia River Mainstem, February 2001). Harvest impact rate of no more than 3 percent of the run after it enters the Molalla River. Harvest impacts are incidental to targeted commercial and sport fisheries on hatchery-produced spring chinook.

**Sub-Objective 2.1.25**: Harvest impact rate of no more than 10 percent of the Molalla population of ***naturally-produced adult winter steelhead*** (Draft Upper Willamette River Winter Steelhead Fisheries Management and Evaluation Plan, November 2000). Beginning in 2002, no harvest impact on the run after it enters the Molalla River. Harvest impacts are incidental to catch-and-release recreational fisheries (<___ %) in the Molalla (in 2001) and in the mainstem Columbia

and Willamette rivers, and commercial fisheries (<0.2%) in the mainstem Columbia and Willamette rivers.

Pudding River

**Sub-Objective 2.1.26**: Harvest impact rate of no more than 10 percent (20 percent in 2001) of the Pudding population of ***naturally-produced adult spring chinook salmon*** entering the Columbia River (Fisheries Management and Evaluation Plan, Upper Willamette River Spring Chinook in Fisheries of the Willamette Basin and Lower Columbia River Mainstem, February 2001). No harvest impact on the run after it enters the Pudding River. Harvest impacts are incidental to targeted commercial and sport fisheries on hatchery-produced spring chinook.

**Sub-Objective 2.1.27**: Harvest impact rate of no more than 10 percent of the Pudding population of ***naturally-produced adult winter steelhead*** (Draft Upper Willamette River Winter Steelhead Fisheries Management and Evaluation Plan, November 2000). No harvest impact on the run after it enters the Pudding River. Harvest impacts are incidental to catch-and-release recreational fisheries (<___ %), and commercial fisheries (<0.2%), in the mainstem Columbia and Willamette rivers.

*Santiam River*

*North Santiam River*

**Sub-Objective 2.1.28**: Harvest impact rate of no more than 10.5 percent (20 percent in 2001) of the North Santiam population of ***naturally-produced adult spring chinook salmon*** entering the Columbia River (Fisheries Management and Evaluation Plan, Upper Willamette River Spring Chinook in Fisheries of the Willamette Basin and Lower Columbia River Mainstem, February 2001). Harvest impact rate of no more than 3 percent of the run after it enters the North Santiam River. Harvest impacts are incidental to targeted commercial and sport fisheries on hatchery-produced spring chinook.

**Sub-Objective 2.1.29**: Harvest impact rate of no more than 10 percent of the North Santiam population of ***naturally-produced adult winter steelhead*** (Draft Upper Willamette River Winter Steelhead Fisheries Management and Evaluation Plan, November 2000). Harvest impacts are incidental to catch-and-release recreational fisheries (<___ %) in the North Santiam and in the mainstem Columbia and Willamette rivers, and commercial fisheries (<0.2%) in the mainstem Columbia and Willamette rivers.

*South Santiam River*

**Sub-Objective 2.1.30**: Harvest impact rate of no more than 10.5 percent (20 percent in 2001) of the South Santiam population of ***naturally-produced adult spring chinook salmon*** entering the Columbia River (Fisheries Management and Evaluation Plan, Upper Willamette River Spring Chinook in Fisheries of the Willamette Basin and Lower Columbia River Mainstem, February 2001). Harvest impact rate of no more than 3 percent of the run after it enters the South Santiam River. Harvest impacts are incidental to targeted commercial and sport fisheries on hatchery-produced spring chinook.

**Sub-Objective 2.1.31**: Harvest impact rate of no more than 10 percent of the South Santiam population of ***naturally-produced adult winter steelhead*** (Draft Upper Willamette River Winter Steelhead Fisheries Management and Evaluation Plan, November 2000). Harvest impacts are incidental to catch-and-release recreational fisheries (<___ %) in the South Santiam and mainstem Columbia and Willamette rivers, and commercial fisheries (<0.2%) in the mainstem Columbia and Willamette rivers.

Tualatin River

**Sub-Objective 2.1.32**: Harvest impact rate of no more than 10 percent of the Tualatin population of ***naturally-produced adult winter steelhead*** (Draft Upper Willamette River Winter Steelhead Fisheries Management and Evaluation Plan, November 2000). No harvest impact on the run after it enters the Tualatin River. Harvest impacts are incidental to catch-and-release recreational fisheries (<___ %), and commercial fisheries (<0.2%), in the mainstem Columbia and Willamette rivers.

**Objective 2.2**: Within the next six years, development and maintenance of non-harvest opportunities for all citizens to observe, appreciate, experience, and value fish and wildlife.
Sub-Objectives
Basin-Wide

**Sub-Objective 2.2.1:** Increased awareness of fish and wildlife.

**Sub-Objective 2.2.2:** Increased access to fish and wildlife habitats for non-harvest enjoyment, consistent with maintaining healthy and sustainable populations.

**Sub-Objective 2.2.3:** A reasonable likelihood of encountering fish and wildlife for non-harvest enjoyment. Populations and communities of animals must be of sufficient abundance and distributed in time and place to provide a reasonable opportunity for encounter.

## STRATEGIES, ACTIVITIES, AND ACTIONS

### STRATEGIES

*STRATEGIC THEME: Resource Management. The Oregon Department of Fish and Wildlife exists for the benefit of fish and wildlife resources and the public that uses and enjoys those resources.* ***(Vision 2006)***

**Strategy 1**: *Establish targets for the management of fish and wildlife populations and their habitats that balance the uses of lands and waters of the state with the values of Oregonians to ensure the sustainability of fish and wildlife populations.* (Vision 2006: Strategy 1.3)

**Problems the strategy addresses**:

- A concern that existing goals and objectives for fish and wildlife do not reflect a balance between uses of lands and waters and the values of Oregonians to ensure fish and wildlife sustainability.
- A concern that existing goals and objectives are not quantitatively explicit enough to serve as a basis for protecting and restoring fish and wildlife and measuring success and failure.

**Assumption upon which the strategy is based**:

- Sufficient information exists or can be collected to define scientifically rigorous goals and objectives necessary for protection and restoration of fish and wildlife and their habitats.
- The Department will make the investments necessary to develop and maintain the research, monitoring and evaluation programs necessary to define scientifically rigorous goals and objectives necessary for protection and restoration of fish and wildlife and their habitats.

**Activities**

**Activity 1.1.** Define or refine quantitative goals and objectives for fish and wildlife populations where needed.

**Action 1.1.1.** Define a group of key fish and wildlife indicator species to be used in defining fish and wildlife goals and objectives and in monitoring population status and trends.

**Action 1.1.2.** Develop habitat benchmarks based on frequency distributions of habitat parameters from contemporary habitat inventories.

**Action 1.1.3.** Develop a historic reconstruction of habitats and populations of key indicator species (numbers, distribution, diversity of life history types, vegetation assemblages, etc.).

**Action 1.1.4.** Develop models to assess theoretical sustainability of key indicator species, e.g. wild McKenzie River spring chinook.

**Action 1.1.5.** Determine reproduction and rearing potential for key indicator species in critical habitat types, e.g. spring chinook above all U.S. Army Corps of Engineers' dams.

**Action 1.1.6.** Describe species-habitat relationships and species distributions for key indicator species based upon historical records.

**Activity 1.2.** Incorporate new or revised goals and objectives into plans and policies for the management of fish and wildlife populations and their habitats.

**Strategy 2**: *Collect and analyze scientific information for use in decision-making.* (Vision 2006: Strategy 1.5)

**Problems the strategy addresses**:

A concern that we are not currently collecting the necessary information for sound decision-making.

A concern that we are not currently using the best science.

A concern that we are not currently assigning a high priority to programs that build a science base.

A concern that we do not presently know the status of, nor can we document changes in, healthy and at-risk fish and wildlife species and their habitats.

A concern that we are not currently collecting the necessary information to describe the status of and document changes in healthy and at-risk fish and wildlife species and their habitats.

A concern that we are not currently assigning a high priority to programs that assess the status of and document changes in healthy and at-risk fish and wildlife species and their habitats.

**Assumptions upon which the strategy is based**:

Sound science is an important factor considered in implementing decisions.

Sufficient information exists or can be collected to assess the status of and document changes in healthy and at-risk fish and wildlife species and their habitats.

The Department will make the investments necessary to develop and maintain the research, monitoring and evaluation programs necessary to assess the status of and document changes in healthy and at-risk fish and wildlife species and their habitats.

**Activities**

**Activity 2.1.** Assess the status of freshwater and marine fish and wildlife populations and their habitats to assist in establishing Department priorities and programs (Vision 2006: Strategy 1.2) and to improve our understanding of how populations are performing under the status quo

**Action 2.1.1.** Develop and implement protocols to measure and describe population traits of key indicator species, e.g. rainbow trout in standard pools in the McKenzie and Middle Fork Willamette sub-basins, Oregon chub in Willamette Basin ponds.

**Action 2.1.2.** Develop and implement protocols to measure and describe habitats of key indicator species that incorporate aerial photography, Geographic Information System data, limited ground surveys, habitat quality measurements, etc. Use existing protocols, such as the aquatic inventory protocol, as appropriate.

**Action 2.1.3.** Describe species composition and relative abundance in key habitats.

**Action 2.1.4.** Determine abundance, age-structure, population demographics, and taxonomy of key indicator species at the basin scale, e.g. sampling winter steelhead, spring chinook, and lamprey at Willamette Falls.

**Action 2.1.5.** Determine abundance, age-structure, population demographics, and taxonomy of key indicator species at the sub-basin scale, e.g. sampling at dams, spawning surveys, resting hole counts, etc.

**Action 2.1.6.** Describe distribution and relative abundance of juvenile life stages of key indicator species.

**Action 2.1.7.** Describe current inventory and distribution of key fish and wildlife habitats using maps, field investigations, Geographic Information System data, aerial photography and "Landsat" satellite imagery.

**Action 2.1.8.** Develop condition class rating system and describe the present condition class of key habitat types based on census routes within selected sub-samples of each habitat type and condition class.

**Activity 2.2.** Define and characterize limiting factors and factors for decline, including stresses that potentially influence fish and wildlife populations and their habitats, and interpret how the factors influence observed trends to improve our understanding of the relationships between fish and wildlife populations and landscape conditions.

**Action 2.2.1.** Identify and describe factors, including environmental and human stresses, limiting survival and natural production of key indicator species, e.g. spring chinook in the Molalla River Basin.

**Action 2.2.2.** Analyze relationships between factors and changes in abundance and other traits of key indicator individual species or species assemblages through time.

**Action 2.2.3.** Evaluate losses (injuries and deaths) of juvenile fish resulting from operation of the Sullivan Plant (Portland General Electric). Refine operating criteria for the Sullivan Plant to reduce losses.

**Action 2.2.4.** Evaluate effects of construction of temperature control structures in Cougar Reservoir on bull trout.

**Action 2.2.5.** Evaluate effects of lack of spawning gravel below Cougar and Blue River dams on natural production of chinook in the McKenzie River.

**Action 2.2.6.** Identify and determine the status of major prey species of key indicator species.

**Activity 2.3.** Assess likelihood of meeting goals and objectives for fish and wildlife populations under current management actions based on our best understanding of limiting factors and factors for decline.

**Action 2.3.1.** Develop parent-progeny estimates for key indicator species for as long a time series as possible. Analyze these estimates with regard full seeding of critical habitats.

**Action 2.3.2.** Describe population dynamics and life history of key indicator species, including interactions with environmental factors.

**Action 2.3.3.** Evaluate change in habitat quantity from present conditions into the future by establishing a network for information gathering that can be used to detect changes in wildlife habitat quantity.

**Activity 2.4.** Evaluate if and how current management programs can be improved to protect, mitigate and enhance fish and wildlife and their habitat.

**Action 2.4.1.** Characterize trends in abundance, age-structure, population demographics, etc of key indicator species at the basin scale, e.g. sampling at Willamette Falls.

**Action 2.4.2.** Characterize trends in abundance, age-structure, population demographics, etc. of key indicator species at the sub-basin scale, e.g. sampling at dams, spawning surveys, resting hole counts, etc.

**Action 2.4.3.** Characterize trends in habitat quality based on changes in condition class of key habitat types.

**Action 2.4.4.** Describe the relationships between trends in abundance, age-structure, population demographics, etc. of key indicator species, trends in quality of key habitats, and landscape conditions.

**Action 2.4.5.** Set priorities for protection, enhancement, mitigation, and restoration based on information such as the relationships between trends in abundance, age-structure, population demographics, etc. of key indicator species, trends in quality of key habitats, and landscape conditions.

**Action 2.4.6.** Design and implement monitoring and evaluation for specific management programs. Monitoring and evaluation will

Link information gathered with the program actions that affect change.

Identify key decision points or thresholds for defining changes in management programs (Compliance monitoring: Were program actions implemented as intended? vs. Effectiveness monitoring: Did programs actions produce the intended outcome? vs. Validation monitoring: Were the assumptions used in developing program actions correct?)

Define mechanisms for identifying new priorities and components for monitoring and evaluation (Identification of important stressors).

Enable public involvement, and be transparent and accountable.

Identify opportunities for cooperative monitoring programs and/or program development by other groups.

Identify roles and responsibilities for those involved in monitoring and evaluation. Examples include monitoring, and evaluating the effect on wild fish of the recreational fishery for spring chinook, or evaluating the success of attempts to reestablish natural production of spring chinook in Thomas and Crabtree creeks.

**Action 2.4.7.** Use available information and analyses to evaluate the effectiveness of and, if appropriate, identify changes to current management programs to protect, mitigate and enhance fish and wildlife and their habitat (adaptive or experimental management).

**Action 2.4.8.** Help state and federal land management agencies design programs to monitor the success and effectiveness of stream riparian and water quality protection measures.

**Activity 2.5.** Develop or refine coordinated information system to store and access information for use in research, monitoring and evaluation.

**Action 2.5.1.** Develop standard protocols for collecting and reporting data.

**Strategy 3**: *Protect, and where necessary recover, existing fish and wildlife populations and their habitats.*

**Problems the strategy addresses**:

- The legacy of past human activities combined with current human activities and current habitat conditions pose significant risk to the health of certain fish and wildlife populations.
- Socio-economic forces are affecting our ability to protect fish and wildlife and their habitats, particularly on private lands.

**Assumption upon which the strategy is based**:

- Department policies and programs can be designed and implemented to influence human activities and habitat conditions to meet objectives for fish and wildlife.
- Cooperation with other agencies and landowners is essential to meet our objective.
- Incentives can be developed to address current socio-economic disincentives to providing fish and wildlife habitat on private lands

**Activities**

**Activity 3.1.** Implement action plans for protection and recovery of self-sustaining populations of fish and wildlife.

**Action 3.1.1.** Work with others to implement existing species conservation and recovery programs in the Willamette Basin, e.g. Northwest Forest Plan, Oregon Chub Recovery Plan, Oregon Plan).

**Action 3.1.2.** Work with others to improve the status of fish and wildlife species listed as sensitive, threatened and endangered, especially chinook salmon, steelhead, bull trout, Oregon chub, western pond turtle, northern red-legged frog, yellow-legged frog, sharp-tail snake, western rattlesnake, western meadowlark, vesper sparrow, grasshopper sparrow, streaked horned lark, purple martin, yellow-breasted chat. (Vision 2006: Fourth Objective, Goal 1)

**Action 3.1.3.** Work with others to develop and implement programs, as needed, to manage healthy species in ways that sustain their health and enable protection and recovery of listed and sensitive species.

**Activity 3.2.** Help ensure water intakes (turbine, irrigation, municipal and industrial water supply, etc.) are properly screened to minimize negative effects on fish and wildlife populations.

**Action 3.2.1.** Provide technical advice to regulatory agencies on where, when, and what fish (species and life stage) are present and what needs to be done to ensure their safe passage by water intakes.

**Action 3.2.2.** Provide technical advice to private landowners, watershed councils, and other cooperators on where, when, and what fish (species and life stage) are present and what needs to be done to ensure their safe passage by water intakes.

**Action 3.2.3.** Work with the Eugene Water and Electric Board to install fish protection screening on the Walterville diversion canal.

**Action 3.2.4.** Initiate a program to screen all diversions, especially the Stayton Power Canal (if the former PP&L plant is licensed), the main irrigation canal at Stayton, Sidney ditch, the 19th Street diversion and Penn Annex lateral.

**Action 3.2.5.** Initiate a program to screen all diversions, in the South Santiam especially the Lebanon-Albany power canal.

**Action 3.2.6.** Work with Oregon Water Resource Department (through the Fish-Screening Cost-Share Program and other efforts) to ensure water right holders properly screen their water intakes. Contacts will be based on inventories of water diversions and their fish screens along the Mainstem Willamette River conducted by the Oregon State Police during 1996 and 1997.

**Action 3.2.7.** Work with Lake Oswego Corporation regarding the need to screen its diversion from the Tualatin River into Lake Oswego.

**Action 3.2.8.** Work with Portland General Electric (PGE) to reduce juvenile salmonid mortality at PGE's three-dam complex on the Clackamas River.

**Action 3.2.9.** Finalize operating criteria for the Sullivan Plant that will minimize downstream migrant mortality.

**Action 3.2.10.** Provide conceptual plans to the Santiam Water Control District and the City of Salem to improve juvenile fish passage facilities at Geren Island on the North Santiam River.

**Action 3.2.11.** Work with Oregon's members of Congress, the U.S. Army Corps of Engineers, and others to secure the funding for construction of a surface collection system at the head of Green Peter Reservoir for transport of steelhead and other salmonids around the reservoir and dam on the Middle Fork Santiam River.

**Action 3.2.12.** Work with U.S. Army Corps of Engineers to provide downstream passage for juvenile salmon at Dexter, Lookout Point, and Hills Creek dams.

**Activity 3.3.** Regulate recreational and commercial harvest consistent with healthy and sustainable fish and wildlife populations.

**Action 3.3.1.** Evaluate mortality associated with hooking and releasing key indicator species in recreational fisheries, e.g. spring chinook and steelhead.

**Action 3.3.2.** Fin mark hatchery-produced anadromous fish.

**Action 3.3.3.** In wild fish production areas, only allow sport and tribal harvest of fin-clipped anadromous fish (once full fin-clipping has been implemented).

**Action 3.3.4.** Manage sport and commercial fisheries for spring chinook to enable rebuilding of self-sustaining wild populations.

**Action 3.3.5.** Manage in-river commercial fisheries to minimize fishery impacts on wild coho.

**Action 3.3.6.** Assess sport-angling regulations for effectiveness in minimizing incidental mortality of bull trout in fisheries closed to bull trout harvest. Take action based on findings.

**Action 3.3.7.** Manage consumptive harvest on wild trout to enable the maintenance of self-sustaining populations.

**Action 3.3.8.** Evaluate conservation guidelines governing commercial and tribal harvest of Pacific lamprey, and change as necessary to ensure protection of these populations.

**Action 3.3.9.** Manage wildlife harvest programs to protect and enable the recovery of sensitive fish and wildlife species.

**Action 3.3.10.** Manage fisheries to enable protection and recovery of western pond turtles.

**Action 3.3.11.** Manage consumptive and non-consumptive recreational activities to enable the protection and recovery of sensitive species.

**Action 3.3.12.** Manage trout fisheries to reduce ecological interactions and mortality on juvenile anadromous salmonids.

**Action 3.3.13.** Continue to work with co-managers of Lower Columbia River commercial estuary and river net fisheries to maintain time, area, and gear restrictions that minimize bycatch of wild steelhead.

**Activity 3.4.** Help ensure instream flows are adequate to meet needs of fish and wildlife populations.

**Action 3.4.1.** Provide technical advice to regulatory agencies on where, when, and what fish and wildlife (species and life stage) are present and what the range of flows should be for successful reproduction, rearing, food production and foraging, habitation, and migration.

**Action 3.4.2.** Provide technical advice to private landowners, watershed councils, and other cooperators on where, when, and what fish and wildlife (species and life stage) are present and what the range of flows should be for successful reproduction, rearing, food production and foraging, habitation, and migration.

**Action 3.4.3.** Acquire in-stream water rights, as necessary, to ensure flows are adequate to meet the needs of fish and wildlife.

**Action 3.4.4.** Work with the U.S. Army Corps of Engineers to provide adequate river flows for migrating salmonids.

**Action 3.4.5.** Work with the Eugene Water and Electric Board and the Federal Energy Regulatory Commission to ensure that the re-licensing of facilities at Leaburg and Walterville is conditioned on increases in minimum flows from the canals sufficient to improve rearing-habitat for juvenile chinook in the McKenzie River.

**Activity 3.5.** Help ensure water temperatures are adequate to meet needs of fish and wildlife populations.

**Action 3.5.1.** Provide technical advice to regulatory agencies on where, when, and what fish and wildlife (species and life stage) are present and what the range of water temperatures should be for successful reproduction, rearing, growth, food production and foraging, habitation, and migration.

**Action 3.5.2.** Provide technical advice to private landowners, watershed councils, and other cooperators on where, when, and what fish and wildlife (species and life stage) are present and what the range of water temperatures should be for successful reproduction, rearing, growth, food production and foraging, habitation, and migration.

**Action 3.5.3.** Work with the U.S. Army Corps of Engineers to ensure structures designed to regulate discharge temperature are installed at Cougar and Blue River dams.

**Action 3.5.4.** Work with U.S. Army Corps of Engineers to correct water temperature problems associated with water released from reservoirs in the North Santiam River.

**Action 3.5.5.** Work with U.S. Army Corps of Engineers to correct water temperature problems associated with water released from reservoirs in the South Santiam River.

**Activity 3.6.** Help protect existing high quality habitat that is critical to the survival and prosperity of fish and wildlife populations.

**Action 3.6.1.** Provide technical advice to regulatory agencies on where, when, and what fish and wildlife (species and life stage) are present and what the quality of habitats should be for successful reproduction, rearing, growth, food production and foraging, habitation, and migration.

**Action 3.6.2.** Provide technical advice to private landowners, watershed councils, and other cooperators on where, when, and what fish and wildlife (species and life stage) are present and what the quality of habitats should be for successful reproduction, rearing, growth, food production and foraging, habitation, and migration.

**Action 3.6.3.** Identify and map fish and wildlife habitats using a geographic or landscape approach. Identify priorities for preservation.

**Action 3.6.4.** Request, as necessary, that the Water Resources Commission (through the Oregon Water Resources Department) to administratively close particularly sensitive areas to fill and removal activities.

**Action 3.6.5.** Identify public lands that, if protected, could serve as key reserves and migration corridors for fish and wildlife populations.

**Action 3.6.6.** Promote and expand use of the Wildlife Habitat Conservation and Management Program on private lands to help willing landowners maximize the value of their land for fish and wildlife habitat.

**Action 3.6.7.** Work to remove regulatory disincentives for maintaining fish and wildlife habitat on private lands presently in land use planning Goal 5.
**Action 3.6.8.** Work with local and state governments to develop incentives to encourage landowners to provide fish and wildlife habitat on private lands.
**Action 3.6.9.** Acquire or facilitate the acquisition by others of lands, conservation easements, etc. necessary to protect and restore critical habitats for reproduction, rearing, growth, food production and foraging, habitation, and migration of fish and wildlife.
**Action 3.6.10.** Work with public and private landowners to manage public access to protect habitats and minimize interactions with fish and wildlife during nesting or spawning and rearing, e.g. prohibit access to adult spring chinook holding areas on a seasonal basis to reduce prespawning mortality.

**Strategy 4**: *Restore populations of fish and wildlife* (Vision 2006: Strategy 1.4) *in habitats from which they have been extirpated or greatly reduced.*
**Problem the strategy addresses**:
- Populations of fish and wildlife have been extirpated or greatly reduced from some habitats, for example spring chinook salmon from above certain high dams and western meadowlark throughout the Willamette valley.
- The status of certain habitats is inadequate to support populations that allow us to meet fish and wildlife objectives.
- Socio-economic forces are affecting our ability to enhance fish and wildlife and their habitats.

**Assumptions upon which the strategy is based**:
- Public support would exist for re-establishment of the species.
- We can correct or compensate for factors that caused the extirpation.
- We have the ability to reestablish the populations.
- An appropriate source of the species is available.
- Technology and knowledge to reestablish the population is available.
- Activities

**Activity 4.1.** Help restore existing low quality habitat to conditions that would ensure the survival and prosperity of fish and wildlife populations.
**Action 4.1.1.** Provide technical advice to regulatory agencies on where, when, and what fish and wildlife (species and life stage) are present and what the quality of habitats should be for successful reproduction, rearing, growth, food production and foraging, habitation, and migration.
**Action 4.1.2.** Provide technical advice to private landowners, watershed councils, and other cooperators on where, when, and what fish and wildlife (species and life stage) are present and what the quality of habitats should be for successful reproduction, rearing, growth, food production and foraging, habitation, and migration.
**Action 4.1.3.** Identify and map high quality fish and wildlife habitats using a geographic or landscape approach. Identify priorities for restoration.
**Action 4.1.4.** Request, as necessary, that the Water Resources Commission (through the Oregon Water Resources Department) to administratively close particularly sensitive areas to fill and removal activities.
**Action 4.1.5.** Identify public lands that, if restored, could serve as key reserves and migration corridors for fish and wildlife populations.
**Action 4.1.6.** Promote and expand use of the Wildlife Habitat Conservation and Management Program on private lands to help willing landowners maximize the value of their land for fish and wildlife habitat.
**Action 4.1.7.** Work to remove regulatory disincentives for maintaining fish and wildlife habitat on private lands presently in land use planning Goal 5.

**Action 4.1.8.** Work with local and state governments to develop incentives to encourage landowners to provide fish and wildlife habitat on private lands.

**Action 4.1.9.** Acquire or facilitate the acquisition by others of lands, conservation easements, etc. necessary to protect and restore critical habitats for reproduction, rearing, growth, food production and foraging, habitation, and migration of fish and wildlife.

**Activity 4.2.** Help ensure fish and wildlife populations have access to habitats necessary for them to survive and prosper.

**Action 4.2.1.** Provide technical advice to regulatory agencies on where key fish and wildlife habitats are not or are under utilized because of blocked or restricted access, and describe what fish and wildlife (species and life stage) would benefit from better access to the habitats. Describe the importance of the habitats relative to successful reproduction, rearing, growth, food production and foraging, habitation, and migration.

**Action 4.2.2.** Provide technical advice to private landowners, watershed councils, and other cooperators on where key fish and wildlife habitats are not or are under utilized because of blocked or restricted access, and describe what fish and wildlife (species and life stage) would benefit from better access to the habitats. Describe the importance of the habitats relative to successful reproduction, rearing, growth, food production and foraging, habitation, and migration.

**Action 4.2.3.** Conduct inventories and maintain a database of fish passage barriers, including road culverts, tide gates, diversion dams, and other artificial features that may block migration.

**Action 4.2.4.** Work with the U.S. Army Corps of Engineers to develop adult fish passage facilities at Cougar Dam.

**Action 4.2.5.** Work with the U.S. Army Corps of Engineers to develop adult fish passage facilities at Detroit Dam.

**Action 4.2.6.** Work with Portland General Electric (PGE) to improve adult fish passage at PGE's three-dam complex on the Clackamas River.

**Action 4.2.7.** Work with the Santiam Water Control District and the City of Salem to improve adult fish passage facilities at Geren Island on the North Santiam River.

**Action 4.2.8.** Work with the Federal Energy Regulatory Commission to ensure that licensing conditions for Lebanon Dam on the South Santiam River include fish passage improvements.

**Action 4.2.9.** Work with the U.S. Army Corps of Engineers to improve upstream fish passage at Green Peter Dam.

**Action 4.2.10.** Work with the U.S. Army Corps of Engineers to provide fish passage as described in the South Santiam Reconnaissance Fishery Restoration Study.

**Action 4.2.11.** Work with the U.S. Army Corps of Engineers to design and complete feasibility studies for providing fish passage at all projects where such work is not ongoing or planned.

**Action 4.2.12.** Work with others to improve upstream fish passage at Thompson's Mill Dam and on the Calapooia River.

**Action 4.2.13.** Work with others to ensure effective upstream passage at Brownsville Dam bypass on the Calapooia River.

**Activity 4.3.** Develop and refine programs to enhance fish and wildlife populations in habitats from which they have been extirpated or greatly reduced.

**Action 4.3.1.** Determine the spawning and rearing potential for spring chinook in all habitats from which they have been extirpated or greatly reduced, e.g. above all U.S. Army Corps of Engineers dams. Develop priorities and schedule for restoring and enhancing spring chinook in these habitats.

**Action 4.3.2.** Work with the Eugene Water and Electric Board to increase the number of chinook spawning in the Carmen-Smith spawning channel on the upper McKenzie River.

**Action 4.3.3.** Transport adult spring chinook from the North Fork Ladder trap to underseeded habitat above North Fork Dam (e.g., Big Bottom).

**Action 4.3.4.** Release fingerling spring chinook, or excess hatchery-produced adult spring chinook into Little Fall Creek to increase natural production. Evaluate success after five years.
**Action 4.3.5.** Continue to expand the distribution of Oregon chub by transferring individuals into new habitats as identified in the Oregon Chub Recovery Plan.
**Action 4.3.6.** Re-establish naturally produced spring chinook above Cougar Dam.
**Action 4.3.7.** Transport adult spring chinook above Fall Creek Dam to seed the spawning and rearing habitat.
**Action 4.3.8.** Work with the U.S. Army Corps of Engineers to provide spring chinook access to production areas lost after the construction of Detroit Dam.
**Action 4.3.9**. Evaluate risks and benefits of using hatchery production based on wild parents to help reintroduce or rebuild extirpated or extremely depressed wild populations.
**Action 4.3.10.** Continue the experimental program of habitat improvement and releases of hatchery chinook to reestablish naturally producing spring chinook in the Mohawk system.
**Action 4.3.11.** Release smolts in Abiqua Creek to provide a return of 100 adult spring chinook. Evaluate program after one life cycle.
**Action 4.3.12.** Place surplus spring chinook adults, from South Santiam Hatchery, into the South Santiam River above Foster Reservoir to spawn naturally. Continue this practice until wild adults can be identified and passed upstream or information indicates that natural production is not occurring.
**Action 4.3.13.** Reintroduce bull trout into the Middle Fork Willamette Basin, Santiam Basin, and Clackamas Basin.
**Action 4.3.14.** Determine status and dynamics of northern red-legged frog, and yellow-legged frog and evaluate the feasibility and methods to protect and expand existing populations and re-establish extirpated populations. Concentrate on areas managed by ODFW or volunteer sites.
**Action 4.3.15.** Continue to manage and expand size and number of purple martin colonies. Participate in and support efforts of the interagency purple mountain working group.
**Action 4.3.16.** Continue to manage and expand size and number of western pond turtle populations. Participate in and support efforts of the interagency western pond turtle working group.

**Strategy 5**: *Minimize negative impacts of non-indigenous and exotic species (naturally and artificially produced) on native indigenous fish and wildlife.* (Vision 2006: Third Objective, Goal 1)

**Problems the strategy addresses**:
- Non-indigenous and exotic fish and wildlife can prey on native, indigenous species.
- Non-indigenous and exotic fish and wildlife can compete with native, indigenous species.
- Non-indigenous and exotic fish and wildlife can hybridize with native, indigenous species.
- Non-indigenous and exotic fish and wildlife can introduce and transmit disease to native, indigenous species.

**Assumptions upon which the strategy is based**:
- We have regulatory authority over certain non-indigenous and exotic fish and wildlife.
- Department programs can be designed to prevent, minimize, or eliminate negative impacts of non-indigenous and exotic fish and wildlife on native, indigenous species.
- It is impractical to eradicate non-indigenous and exotic fish and wildlife in most instances.

**Activities**

**Activity 5.1.** Describe the status of existing non-indigenous and exotic fish and wildlife that potentially influence native, indigenous fish and wildlife populations and their habitats and characterize the ecological relationships between existing non-indigenous and exotic and native, indigenous fish and wildlife populations to improve our understanding of interactions and effects.

**Action 5.1.1.** Estimate predation by pikeminnow and largemouth and smallmouth bass on key indicator species in each subbasin.

**Action 5.1.2**. Evaluate site specific biological, economic, and social impacts of nonnative fish species on bull trout and implement removal effort wherever feasible and biologically supportable (*Draft Recovery Plan for Bull Trout in the Willamette Recovery Unit)*.

**Activity 5.2.** Evaluate if and how current management programs can be improved to minimize negative impacts of existing non-indigenous and exotic fish and wildlife on native, indigenous fish and wildlife.

**Action 5.2.1.** Evaluate whether observed predation by pikeminnow and largemouth and smallmouth bass on key indicator species threatens the health of populations.

**Action 5.2.2.** Examine the ecological effects of naturalized populations of exotic fall chinook and coho in the upper Willamette basin.

**Action 5.2.3.** Evaluate the impact of hatchery produced summer steelhead on native steelhead and trout populations in the McKenzie, Santiam, and Clackamas subbasins.

**Action 5.2.4.** Evaluate the impact of hatchery produced trout releases on native trout populations.

**Action 5.2.5.** Continue evaluation of the high lake trout stocking policies to determine impacts on populations of amphibians and invertebrates.

**Action 5.2.6.** Evaluate the stray rate of hatchery summer steelhead in tributaries of the Willamette River and winter steelhead in tributaries of the Clackamas River.

**Action 5.2.7.** Evaluate the stray rate of hatchery coho salmon in tributaries of the Clackamas River.

**Action 5.2.8.** Continue the current evaluation of whether there is an overlapping distribution of hatchery and wild spring chinook in the North Santiam River.

**Activity 5.3.** Develop and refine management programs to eliminate or minimize negative interactions between non-indigenous and exotic fish and wildlife and native, indigenous species.

**Action 5.3.1.** Prohibit introduction of non-indigenous and exotic fish and wildlife where they are likely to negatively impact native, indigenous fish and wildlife populations and their habitats.

**Action 5.3.2.** Develop methods to reduce predation by pikeminnow and largemouth and smallmouth bass on key indicator species in subbasins where the predation threatens the health of the populations.

**Action 5.3.3.** Block runs of naturalized populations of exotic fall chinook and coho in the upper Willamette basin where significant negative effects on wild fish and wildlife have been observed.

**Action 5.3.4.** Reduce or eliminate hatchery programs for summer and winter steelhead, coho, and trout where significant negative effects (e.g. stray rates in excess of established guidelines) on native fish and wildlife populations have been observed.

**Action 5.3.5.** Modify high lake trout stocking policies where significant impacts on populations of amphibians and invertebrates are observed.

**Action 5.3.6.** Maintain the current practice of not stocking hatchery spring chinook in the Little North Santiam River.

**Action 5.3.7.** Develop native broodstocks of coho for Clackamas River to facilitate rehabilitation of that population.

**Action 5.3.8.** Complete development of native winter steelhead broodstock for the Clackamas River.

**Action 5.3.9.** Incorporate at least 3% wild spring chinook into the Clackamas Hatchery broodstock each year.

**Action 5.3.10.** Release only the current North Santiam hatchery stock of spring chinook stock into the North Santiam River.

**Action 5.3.11.** Relocate releases of spring chinook smolts in the McKenzie River if needed to avoid excessive hatchery genetic introgression with wild chinook below Leaburg Dam.

**Action 5.3.12.** Reduce releases of spring chinook in the North Santiam River if the current evaluation shows a significant overlap of hatchery and wild spring chinook.

**Action 5.3.13.** Modify the trap in the ladder at North Fork Dam on Clackamas River to permit the capture and removal of excess hatchery spring chinook adults, or provide such trapping at a new facility at River Mill Dam.
**Action 5.3.14.** Work with the U.S. Army Corps of Engineers to provide uncontaminated water at South Santiam Hatchery to protect hatchery eggs and juveniles from IHN and other potential diseases contracted through water from Foster Reservoir.
**Action 5.3.15.** Implement and enforce the Wildlife Integrity Rules to minimize the potential for establishment of additional invasive species.
**Action 5.3.16.** Manage harvest of non-native wildlife species to minimize negative impacts on native and sensitive fish and wildlife species.
**Action 5.3.17.** Develop control methods for established exotic wildlife species such as bullfrogs, nutria, opossum, fox squirrel, starlings, house sparrows, etc. to reduce their impact to indigenous wildlife.
**Action 5.3.18.** Work with others to eliminate or control new populations of non-native species where they threaten the health of native species or their habitats.
**Action 5.3.19.** Manage fisheries for warmwater fish while minimizing risks to native, naturally produced fish and wildlife.
**Action 5.3.20.** Eliminate stocking of brook trout in high lakes where outflow tributaries feed existing and potential suitable bull trout habitat (*Draft Recovery Plan for Bull Trout in the Willamette Recovery Unit).*

**Strategy 6**: *Minimize the negative effects of native fish and wildlife on each other.*
**Problems the strategy addresses**:
- Human activities have created imbalances in native fish and wildlife communities.
- Human activities have increased the effectiveness of predators and competitors in some localities.

**Assumptions upon which the strategy is based**:
- We have some, though limited, ability to counteract the effectiveness of native predators and competitors in certain localities.
- We have some, though limited, ability to influence human activities that create imbalances in native fish and wildlife communities.

**Activities**
**Activity 6.1.** Describe the status of healthy native fish and wildlife that potentially influence at-risk native fish and wildlife populations and their habitats and characterize the ecological relationships between healthy and at-risk populations to improve our understanding of interactions and effects.
**Activity 6.2.** Evaluate if and how current management programs can be improved to minimize negative interactions between healthy and at-risk native fish and wildlife populations.
**Activity 6.3.** Develop and refine management programs to minimize negative interactions between healthy and at-risk native fish and wildlife.
**Action 6.3.1.** Work with NMFS and others to develop programs to reduce negative impacts of healthy native species on native species at risk, e.g. marine mammals at Willamette Falls and terns in the lower Columbia.
**Action 6.3.2.** Manage harvest of native wildlife species to minimize negative impacts on other native and sensitive fish and wildlife species.
**Activity 6.3.3.** Manage fisheries for resident trout while minimizing risks to native, naturally produced fish and wildlife.
**Activity 6.3.4.** Manage healthy predator populations to reduce negative impacts to susceptible sensitive wildlife species (Predator Policy).

**Strategy 7**: *Minimize the adverse social and economic impacts caused by fish and wildlife.* (Vision 2006: Strategy 1.7)

**Problems the strategy addresses**:
- Certain fish and wildlife species cause social problems and economic losses.
- Certain fish and wildlife populations pose a risk to human health and safety.

**Assumptions upon which the strategy is based**:
- We have some, though limited, ability to manage populations or take problem animals.
- An informed and educated public would significantly reduce conflicts between wildlife and people.

**Activities**

**Activity 7.1**: Use education and self-help, and if necessary provide assistance, to help citizens address wildlife property damage and nuisance problems, including finding ways to coexist with wild animals.
**Activity 7.2**: Encourage citizens to use authorized private animal-damage control experts, when appropriate, to address wildlife property damage and nuisance problems.
**Activity 7.3**: Use harvest regulations to maintain certain wildlife populations at levels compatible with primary land-uses and public safety.
**Activity 7.4**: Work with federal and authorized private animal-damage control experts, when appropriate, to address wildlife problems that threaten public safety or cause high-value losses.
**Activity 7.5**: Help design land-use plans to avoid or minimize animal damage conflicts.
**Activity 7.6**: Acquire or encourage others to acquire lands prone to animal damage conflicts.

**Strategy 8**: *Develop new opportunities and maintain or enhance existing opportunities for use and enjoyment of fish and wildlife.*

**Problems the strategy addresses**:
- Current opportunities are not meeting the needs of certain constituents.
- Conflicts exist among the needs of our various constituents.
- Natural production of native species is insufficient to meet the demands of recreational and commercial users.
- Opportunities may not be available or accessible to certain portions of the population.

**Assumptions upon which the strategy is based**:
- We have the statutory authority to provide an orderly and equitable utilization of available fish and wildlife and optimum commercial and public recreational benefits, consistent with conservation of healthy fish and wildlife.
- We have the ability to assess the wants and needs of our constituents.
- Artificial propagation is an appropriate tool for mitigation for lost production as long as it does not pose unacceptable risk to the natural populations.
- We can meet non-consumptive needs through interpretative, public outreach programs.
- Existing policy directs us as to where we can and cannot use artificial production.

**Activities**

**Activity 8.1.** Identify, assess, develop and promote recreational uses of fish and wildlife desired by Oregonians. (Vision 2006: Strategy 2.1)

**Action 8.1.1.** Work with others to define key messages, themes, campaigns, and audiences to increase recreational uses of fish and wildlife.
**Action 8.1.2.** Work with others to identify information gaps, communication barriers, and misperceptions about opportunities for recreational uses of fish and wildlife.
**Action 8.1.3.** Work with others to identify the most effective means (tools, presentations, etc.) to foster awareness and understanding about opportunities for recreational uses of fish and wildlife.
**Action 8.1.4.** Develop and implement an education plan designed to foster understanding about opportunities for recreational uses of fish and wildlife.
**Action 8.1.5.** Coordinate ODFW education programs with Oregon Plan and Willamette Restoration Initiative Teams, as well as local governments and stakeholder groups.

**Action 8.1.6.** Monitor the effectiveness of education efforts and change programs as necessary to foster awareness and understanding about opportunities for recreational uses of fish and wildlife.

**Activity 8.2.** Develop and maintain strong partnerships to increase recreational opportunities. (Vision 2006: Strategy 2.2)

**Action 8.2.1.** Encourage the U.S. Army Corps of Engineers to change project operations to increase catch of spring chinook in the Middle Fork Willamette.

**Activity 8.3.** Enhance fisheries using artificial propagation while minimizing risks to native, naturally produced fish and wildlife.

**Action 8.3.1.** Release a maximum of 160,000 pounds of spring chinook salmon smolts in the McKenzie River (currently 783,000 fish). Adjust size and proportion of smolts released during fall and spring to return a larger proportion of older adults, maximize returns, and minimize costs.

**Action 8.3.2.** Release 197,000 pounds of spring chinook salmon smolts (currently 1,1000,000 smolts) into the Middle Fork Willamette River.

**Action 8.3.3.** Release 10,000 pounds of spring chinook salmon smolts (currently 100,000 smolts) into Fall Creek below Fall Creek Dam.

**Action 8.3.4.** Continue to release approximately 100,000 spring chinook smolts annually into the Molalla River.

**Action 8.3.5.** Maintain the current hatchery spring chinook releases of approximately 400,000 smolts in the North Santiam and 1,000,000 smolts in the South Santiam River.

**Action 8.3.6.** Estimate the number of hatchery produced spring chinook returning to the McKenzie Basin.

**Action 8.3.7.** Estimate the number of hatchery produced spring chinook returning to the Willamette Basin above the mouth of the McKenzie River.

**Action 8.3.8.** Evaluate the effectiveness of acclimation facilities in the lower Clackamas Basin for juvenile spring chinook smolts.

**Action 8.3.9.** Investigate acclimation facilities on the mainstem Willamette River above the falls to increase catch of hatchery spring chinook.

**Activity 8.4.** Improve access to certain Willamette Basin waters managed for fisheries.

**Activity 8.5.** Improve opportunities in certain Willamette Basin watersheds for viewing fish and wildlife.

*STRATEGIC THEME: Public Awareness and Support. The Oregon Department of Fish and Wildlife strives to build diverse and supportive constituencies and partnerships that are aware of and have ownership in fish and wildlife resource issues.* ***(Vision 2006)***

**Strategy 9**: *Assess the wants, needs and values of Oregonians to assist in establishing Department priorities and programs.* (Vision 2006: Strategies 1.1 & 4.1)

**Problems the strategy addresses**:

- A concern by certain constituents that their wants, needs, and values are not reflected in Department priorities and programs.
- The Department does not have ongoing programs to assess the wants, needs and values of Oregonians.

**Assumptions upon which the strategy is based**:

- We can improve public involvement in Department policy and decision making processes.
- Non-traditional constituents will have an interest in and will participate in an improved public involvement process.
- The Department can more efficiently and effectively utilize limited resources to meet public needs and expectations.
- Non-traditional constituents will financially support non-game fish and wildlife programs.

**Activities**

**Activity 9.1.** Identify fish and wildlife related wants, needs, and values of all Oregonians and improve the understanding of how wants, needs and values change with changes in human population demographics.
**Activity 9.2.** Involve current and future participants in fish and wildlife issues and activities to assist in establishing Department priorities and programs. (Vision 2006: Strategy 3.4)
**Action 9.2.1.** Create effective venues for public involvement in consensus building. (Vision 2006: Strategy 3.1)
**Activity 9.3.** Develop, enhance or revise management programs to address wants, needs, and values of all Oregonians.

**Strategy 10**: *Provide information to the public that enables them to increase their awareness and knowledge of fish and wildlife resource issues and what they can do to protect, mitigate and restore fish and wildlife and their habitat.*
**Problems the strategy addresses**:
- Currently available information is inadequate to meet public needs and understanding of fish and wildlife conservation.

**Assumptions upon which the strategy is based**:
- Conservation of fish and wildlife resources and support of Department programs requires an informed public.
- The Department can develop information programs that address the needs of the public.

**Activities**
**Activity 10.1.** Diversify and expand informational, educational, and interpretive outreach opportunities. (Vision 2006: Strategy 3.3)
**Action 10.1.1.** Work with others to define key messages, themes, campaigns, and audiences (e.g. the public, community planners, industry, and governments) to improve knowledge and acceptance of the needs of and what each can do to protect, mitigate and restore fish and wildlife and their habitats.
**Action 10.1.2.** Work with others to identify information gaps, communication barriers, and misperceptions about the needs of and what each can do to protect, mitigate and restore fish and wildlife and their habitats.
**Action 10.1.3.** Work with others to identify the most effective means (tools, presentations, etc.) to foster awareness and understanding of and support for addressing the needs of and what each can do to protect, mitigate and restore fish and wildlife and their habitats.
**Action 10.1.4.** Develop and implement an outreach plan designed to foster broad awareness and understanding of the challenges facing fish and wildlife and their habitats in the Willamette River Basin**.**
**Action 10.1.5.** Develop and implement an outreach plan designed to foster enthusiastic support for and involvement in projects that will benefit species within the Willamette River Basin and the habitats on which they depend.
**Action 10.1.6.** Coordinate ODFW outreach with Oregon Plan and Willamette Restoration Initiative Teams, as well as local governments and stakeholder groups.
**Action 10.1.7.** Monitor the effectiveness of outreach efforts and change programs as necessary to foster broad awareness and understanding of the challenges facing fish and wildlife and their habitats and enthusiastic support for and involvement in projects that will benefit these species.
**Activity 10.2.** Integrate fish and wildlife conservation management in public education. (Vision 2006: Strategy 3.2)
**Activity 10.3.** Improve Department web site to provide the type of information most often sought by the public.
**Strategy 11**: *Increase the* number and *diversity of participants in fish and wildlife*-oriented activities *that reflects Oregon's human demographics.* (rewording of Vision 2006: Goal 4)

**Problems the strategy addresses**:
- Present programs may not recognize or serve certain portions of Oregon society.
- Present programs may not optimize participation by existing constituents in harvest and non-harvest opportunities.

**Assumptions upon which the strategy is based**:
- There is a significant portion of society that has needs that we are not serving because of recent and significant changes in demographics.
- There is significant opportunity to increase participation by existing constituents, in fish and wildlife- oriented activities.
- We can assess and evaluate those needs and design programs to meet them.
- Activities

**Activity 11.1.** Identify underrepresented constituent groups and develop programs to increase their participation. (Vision 2006: Strategy 4.2)

**Strategy 12**: *Maintain and develop effective and supportive partnerships that enable the Oregon Department of Fish and Wildlife and its partners to reach mutual goals in resource management.* (Vision 2006: Goal 5)

**Problems the strategy addresses**:
- The Department has little authority over lands and waters across the state.
- The Department has inadequate resources to meet public needs.
- Programs of other agencies, organizations, businesses and private parties affect fish and wildlife.

**Assumptions upon which the strategy is based**:
- Partnerships are an effective method to meet fish and wildlife conservation and recreational needs.
- The Department has the resources to enter into and sustain partnerships.
- Partnerships will allow cooperators to meet their goals.

**Activities**

**Activity 12.1.** Identify common fish and wildlife interests and goals of current and potential partners. (Vision 2006: Strategy 5.1)

**Activity 12.2.** Develop and maintain effective and supportive partnerships with federal, other state, and tribal agencies to promote research and management actions that enable the Department and its partners to reach mutual goals in resource management. (Vision 2006: Strategies 5.3 & 5.4)

**Action 12.2.1.** Integrate fish and wildlife management programs with federal, other state, and tribal agencies, and provide technical support as requested.

**Action 12.2.2.** Encourage and assist the Mount Hood National Forest and others in their efforts to protect fish habitat above North Fork Dam on the Clackamas River.

**Action 12.2.2.** Coordinate with appropriate state and federal agencies, landowners, and interested public to ensure that spring chinook habitat in the mainstem Willamette is afforded adequate protection from human activities.

**Activity 12.3.** Coordinate with other regulatory natural resource entities to manage fish and wildlife resources. (Vision 2006: Strategy 1.6)

**Action 12.3.1.** Work with Oregon State Police, through the Cooperative Enforcement Program, to identify priorities for enforcement.

**Action 12.3.2.** Work with the National Marine Fisheries Service and U.S. Fish and Wildlife Service to design and implement management programs and species recovery plans consistent with Endangered Species Act requirements, e.g. develop hatchery genetic management plans, fisheries management evaluation plans, biological assessments and opinions on proposed federal actions, 2(d) compliance plans, Draft Recovery Plan for Bull Trout in the Willamette Recovery Unit, etc.

**Action 12.3.3.** Effectively communicate the wants and needs of Department partners to other state and federal agencies and tribal governments that impact fish and wildlife management. (Vision 2006: Strategy 5.2)

**Activity 12.4.** Work with watershed councils, businesses, schools, communities, and individuals to create opportunities, identify priorities, and provide technical support for their involvement in efforts to protect and restore fish and wildlife and their habitats.

**Activity 12.5.** Work with others to develop and implement incentive programs for watershed councils, businesses, schools, communities, and individuals to get involved in efforts to protect, mitigate and restore fish and wildlife and their habitats.

**Activity 12.6.** Work to obtain sufficient involvement of public and private partners to provide, promote, and adequately fund opportunities for non-harvest enjoyment of fish and wildlife.

STRATEGIC THEME: Workforce. The success of the Oregon Department of Fish and Wildlife depends on a diverse, satisfied, and highly effective workforce whose integrity and professional expertise is recognized throughout Oregon. **(Vision 2006)**

**Strategy 13**: *Develop a workforce known for its excellence in public and customer service by increasing diversity, competency, and expertise.* (Vision 2006: Goal 6)

**Problems the strategy addresses**:

- Department personnel do not adequately reflect the diversity of the changing human population of Oregon.
- Department personnel have low morale and job satisfaction.
- Department expertise and competence is questioned by the public and elected officials.
- The Department has been losing expertise in all fields due to many factors.

**Assumptions upon which the strategy is based**:

- A diverse and adequately trained workforce is available for employment.
- Positions and funding are available to hire a diverse workforce with appropriate expertise.
- Leadership and resources are available to improve workforce morale and satisfaction.
- Workforce job satisfaction can be addressed by an agency.
- Expertise needs of the Department are strategically determined on a regular basis.

**Activities**

**Activity 13.1:** Develop the expertise necessary to provide technical assistance to others and build the scientific basis of Department programs and priorities.

**Activity 13.2:** Develop recruitment, selection and promotion practices that rely on core competencies. (Vision 2006: Strategy 6.1)

**Activity 13.3:** Develop and provide training opportunities and employee development programs based on core competencies. (Vision 2006: Strategy 6.2)

**Activity 13.4:** Build an organizational structure that values workforce diversity. (Vision 2006: Strategy 6.3)

**Activity 13.5:** Provide clear direction to all employees about their authority, responsibility and expectations based on Department measures of success. (Vision 2006: Strategy 6.4)

**Activity 13.6:** Develop systems that assure employee input in decision-making and facilitate communication at all levels of the Department. (Vision 2006: Strategy 6.5)

**Activity 13.7:** Create opportunities to increase employee satisfaction. (Vision 2006: Strategy 6.6)

**Activity 13.8:** Develop reward and recognition systems that are aligned with Department measures of success. (Vision 2006: Strategy 6.7)

STRATEGIC THEME: Business Services and Support. The support systems within the Oregon Department of Fish and Wildlife facilitate its natural resource, customer and business needs. **(Vision 2006)**

**Strategy 14**: *Develop effective support and planning systems that enable the Department to manage fish and wildlife resources.* (Vision 2006: Goal 7)

**Problems the strategy addresses**:

- Department programs cannot adequately support long-term conservation programs and implement strategic plans without additional personnel and resources.
- The Department cannot adequately utilize available information and data management technology without additional resources and trained personnel.

**Assumptions upon which the strategy is based**:

- The Department cannot implement and maintain meaningful conservation programs without strong support and planning systems.
- The Department cannot provide adequate and efficient customer service to a growing human population without utilizing stronger internal support systems.

**Activities**

**Activity 14.1:** Revise and develop effective policies and procedures. (Vision 2006: Strategy 7.1)

**Activity 14.2:** Invest in updated technology that supports the natural resource and business management of the agency and responds to changing public expectations. (Vision 2006: Strategy 7.2)

**Activity 14.3:** Increase the percentage of the workforce that has access to data and communications systems. (Vision 2006: Strategy 7.3)

**Activity 14.4:** Standardize planning processes that improve the natural resource and business management of the Department. (Vision 2006: Strategy 7.4)

**Activity 14.5:** Streamline fiscal systems to allow programs/ projects to partner with other organizations. (Vision 2006: Strategy 7.5)

## Appendix E
## Streamflow Restoration Prioritization Matrix

| Watershed Number | Description | Priority Ranking | Opportunity Ranking | Need Ranking |
|---|---|---|---|---|
| 0100000000000000 | WILLAMETTE R @ mouth | 0 | 2 | 1 |
| 0101000000000000 | JOHNSON CR @ mouth | 0 | 4 | 1 |
| 0101100000000000 | CRYSTAL SPRINGS CR @ mouth | 2 | 4 | 3 |
| 0102000000000000 | CLACKAMAS R @ mouth | 0 | 1 | 4 |
| 0102100000000000 | CLEAR CR @ mouth | 0 | 1 | 2 |
| 0102110000000000 | CLEAR CR ab LITTLE CLEAR CR | 0 | 1 | 3 |
| 0102200000000000 | DEEP CR @ mouth | 2 | 4 | 4 |
| 0102210000000000 | N FK DEEP CR @ mouth | 2 | 4 | 4 |
| 0102220000000000 | TICKLE CR @ mouth | 2 | 3 | 4 |
| 0102300000000000 | EAGLE CR @ mouth | 0 | 1 | 3 |
| 0102310000000000 | N FK EAGLE CR @ mouth | 0 | 1 | 3 |
| 0102400000000000 | CLACKAMAS R ab 14210000 | 0 | 1 | 2 |
| 0102500000000000 | N FK CLACKAMAS R @ mouth | 0 | 1 | 1 |
| 0102440000000000 | S FK CLACKAMAS R @ mouth | 0 | 1 | 4 |
| 0102410000000000 | FISH CR @ mouth | 0 | 1 | 1 |
| 0102411000000000 | WASH CR @ mouth | 0 | 1 | 1 |
| 0102412000000000 | FISH CR ab WASH CR | 0 | 1 | 1 |
| 0102420000000000 | ROARING R @ mouth | 0 | 1 | 1 |
| 0102430000000000 | CLACKAMAS R ab 14209500 | 0 | 1 | 1 |
| 0102431000000000 | OAK GROVE FK CLACKAMAS R @ mouth | 0 | 1 | 4 |
| 0102432000000000 | COLLAWASH R @ mouth | 0 | 1 | 2 |
| 0102432100000000 | HOT SPRS FK COLLAWASH R @ mouth | 0 | 1 | 2 |
| 0102432200000000 | ELK L CR @ mouth | 0 | 1 | 1 |
| 0102432300000000 | E FK COLLAWASH R @ mouth | 0 | 1 | 1 |
| 0102433000000000 | CLACKAMAS R ab 14208000 | 0 | 1 | 1 |
| 0102433100000000 | PINHEAD CR @ mouth | 0 | 1 | 2 |
| 0102433200000000 | LOWE CR @ mouth | 0 | 1 | 1 |
| 0103000000000000 | TUALATIN R @ mouth | 0 | 2 | 2 |
| 0103100000000000 | TUALATIN R ab 14207500 | 1 | 3 | 3 |
| 0103130000000000 | FANNO CR @ mouth | 0 | 2 | 2 |
| 0103110000000000 | MCFEE CR @ mouth | 1 | 3 | 3 |
| 0103111000000000 | MCFEE CR ab GULF CAN | 0 | 3 | 2 |
| 0103120000000000 | TUALATIN R ab 14206500 | 0 | 4 | 2 |
| 0103125000000000 | ROCK CR @ mouth | 0 | 2 | 3 |
| 0103121000000000 | DAIRY CR @ mouth | 2 | 4 | 3 |
| 0103121100000000 | MCKAY CR @ mouth | 0 | 3 | 2 |
| 0103121110000000 | MCKAY CR ab UNN STR | 0 | 2 | 3 |
| 0103121111000000 | E FK MCKAY CR @ mouth | 0 | 2 | 2 |
| 0103121200000000 | W FK DAIRY CR @ mouth | 1 | 3 | 3 |
| 0103121300000000 | E FK DAIRY CR @ mouth | 0 | 3 | 2 |
| 0103121310000000 | E FK DAIRY CR ab UNN STR | 0 | 2 | 2 |
| 0103121311000000 | DENNY CR @ mouth | 0 | 2 | 3 |
| 0103121312000000 | PLENTYWATER CR @ mouth | 0 | 2 | 2 |
| 0103122000000000 | GALES CR @ mouth | 1 | 3 | 3 |
| 0103122100000000 | GALES CR ab ILER CR | 0 | 3 | 2 |
| 0103122110000000 | LITTLE BEAVER CR @ mouth | 0 | 2 | 2 |
| 0103122120000000 | BEAVER CR @ mouth | 0 | 2 | 1 |
| 0103122130000000 | S FK GALES CR @ mouth | 0 | 2 | 1 |
| 0103122140000000 | N FK GALES CR @ mouth | 0 | 2 | 1 |
| 0103123000000000 | SCOGGINS CR @ mouth | 0 | 1 | 3 |
| 0103123100000000 | SAIN CR @ mouth | 0 | 2 | 1 |
| 0103123200000000 | TANNER CR @ mouth | 0 | 2 | 2 |
| 0103124000000000 | TUALATIN R ab MERCER CR | 0 | 1 | 3 |
| 0104000000000000 | MOLALLA R @ mouth | 0 | 3 | 2 |
| 0104100000000000 | PUDDING R @ mouth | 0 | 3 | 1 |
| 0104110000000000 | PUDDING R @ 14202000 | 1 | 3 | 3 |

| Watershed Number | Description | Priority Ranking | Opportunity Ranking | Need Ranking |
|---|---|---|---|---|
| 01041110000000000 | BUTTE CR @ mouth | 1 | 3 | 3 |
| 01041120000000000 | PUDDING R @ 14201000 | 0 | 4 | 2 |
| 01041121000000000 | ABIQUA CR @ mouth | 2 | 3 | 4 |
| 01041122000000000 | SILVER CR @ mouth | 0 | 1 | 3 |
| 01041123000000000 | DRIFT CR @ mouth | 0 | 1 | 2 |
| 01041200000000000 | MILL CR @ mouth | 0 | 3 | 2 |
| 01042000000000000 | MOLALLA R @ 14200000 | 0 | 1 | 1 |
| 01042100000000000 | MILK CR @ mouth | 2 | 3 | 4 |
| 01042200000000000 | MOLALLA R ab MILK CR | 0 | 1 | 2 |
| 01042210000000000 | N FK MOLALLA R @ mouth | 0 | 1 | 1 |
| 01042220000000000 | MOLALLA R ab N FK MOLALLA R | 0 | 1 | 1 |
| 01042221000000000 | TROUT CR @ mouth | 0 | 1 | 1 |
| 01042222000000000 | MOLALLA R @ 14198500 | 0 | 1 | 2 |
| 01042222100000000 | TABLE ROCK FK MOLALLA R @ mouth | 0 | 1 | 1 |
| 01042222200000000 | MOLALLA R ab TABLE ROCK FK MOLALLA R | 0 | 1 | 2 |
| 01050000000000000 | WILLAMETTE R ab MOLALLA R | 0 | 1 | 1 |
| 01051000000000000 | YAMHILL R @ mouth | 0 | 3 | 2 |
| 01051100000000000 | YAMHILL R ab PALMER CR | 0 | 1 | 1 |
| 01051110000000000 | N YAMHILL R @ mouth | 0 | 3 | 2 |
| 01051111000000000 | PANTHER CR @ mouth | 0 | 3 | 2 |
| 01051111200000000 | N YAMHILL R ab TURNER CR | 0 | 1 | 2 |
| 01051111210000000 | TURNER CR @ mouth | 0 | 1 | 3 |
| 01051111220000000 | HASKINS CR @ mouth | 0 | 2 | 3 |
| 01051120000000000 | S YAMHILL R @ mouth | 0 | 3 | 2 |
| 01051121000000000 | S YAMHILL R @ 14194000 | 0 | 1 | 3 |
| 01051121100000000 | DEER CR @ mouth | 2 | 4 | 3 |
| 01051121200000000 | MILL CR @ mouth | 0 | 1 | 3 |
| 01051121300000000 | WILLIMINA CR @ mouth | 0 | 1 | 2 |
| 01051121310000000 | WILLIMINA CR @ 14193000 | 0 | 1 | 2 |
| 01051121400000000 | S YAMHILL R @ 14192500 | 0 | 1 | 2 |
| 01051121410000000 | AGENCY CR @ mouth | 0 | 1 | 2 |
| 01051121500000000 | SALT CR @ mouth | 1 | 3 | 3 |
| 01052000000000000 | MILL CR @ mouth | 0 | 1 | 2 |
| 01053000000000000 | WILLAMETTE R @ 14191000 | 0 | 1 | 1 |
| 01053100000000000 | RICKREAL CR @ mouth | 1 | 3 | 3 |
| 01053110000000000 | RICKREAL CR ab UNN STR | 0 | 1 | 3 |
| 01053200000000000 | LUCKIAMUTE R @ mouth | 2 | 4 | 3 |
| 01053210000000000 | LUCKIAMUTE R @ 14190500 | 0 | 1 | 2 |
| 01053211000000000 | LITTLE LUCKIAMUTE R @ mouth | 0 | 1 | 2 |
| 01053211100000000 | LITTLE LUCKIAMUTE R ab FERN CR | 0 | 1 | 2 |
| 01053212000000000 | LUCKIAMUTE R @ 14190000 | 0 | 1 | 3 |
| 01053212100000000 | PEDEE CR @ mouth | 0 | 1 | 3 |
| 01053212200000000 | LUCKIAMUTE R @ 14189500 | 0 | 1 | 1 |
| 01053220000000000 | SOAP CR @ mouth | 1 | 3 | 3 |
| 01053300000000000 | SANTIAM R @ mouth | 0 | 1 | 2 |
| 01053310000000000 | SANTIAM R @ 14189000 | 0 | 1 | 1 |
| 01053311000000000 | N SANTIAM R @ mouth | 0 | 1 | 3 |
| 01053311100000000 | STOUT CR @ mouth | 2 | 3 | 4 |
| 01053311200000000 | N SANTIAM R @ 14183000 | 0 | 1 | 1 |
| 01053311210000000 | LITTLE N SANTIAM R @ 14182500 | 0 | 1 | 2 |
| 01053311220000000 | N SANTIAM R ab LITTLE N SANTIAM R | 0 | 1 | 1 |
| 01053311221000000 | ROCK CR @ mouth | 0 | 1 | 1 |
| 01053311222000000 | MAD CR @ mouth | 0 | 1 | 1 |
| 01053311223000000 | N SANTIAM R @ 14181500 | 0 | 1 | 1 |
| 01053311223100000 | N SANTIAM R @ 14178000 | 0 | 1 | 1 |
| 01053312000000000 | S SANTIAM R @ mouth | 0 | 1 | 3 |
| 01053312100000000 | THOMAS CR @ mouth | 2 | 3 | 4 |

| Watershed Number | Description | Priority Ranking | Opportunity Ranking | Need Ranking |
|---|---|---|---|---|
| 0105331211000000 | NEAL CR @ mouth | 2 | 4 | 4 |
| 0105331220000000 | CRABTREE CR @ mouth | 2 | 4 | 4 |
| 0105331230000000 | HAMILTON CR @ mouth | 2 | 4 | 3 |
| 0105331240000000 | S SANTIAM R @ 14187500 | 0 | 2 | 2 |
| 0105331241000000 | MCDOWELL CR @ mouth | 0 | 4 | 2 |
| 0105331242000000 | AMES CR @ mouth | 0 | 3 | 2 |
| 0105331243000000 | WILEY CR @ mouth | 0 | 2 | 1 |
| 0105331243100000 | LITTLE WILEY CR @ mouth | 0 | 1 | 1 |
| 0105331244000000 | M SANTIAM R @ 14186500 | 0 | 1 | 1 |
| 0105331245000000 | S SANTIAM R @ 14185000 | 0 | 1 | 1 |
| 0105340000000000 | WILLAMETTE R @ 14174000 | 0 | 1 | 2 |
| 0105341000000000 | CALAPOOIA R @ 14173500 | 2 | 4 | 3 |
| 0105341100000000 | CALAPOOIA R @ 14172000 | 0 | 1 | 2 |
| 0105342000000000 | MARYS R @ mouth | 0 | 3 | 2 |
| 0105342100000000 | MUDDY CR @ 14171500 | 0 | 4 | 2 |
| 0105342200000000 | MARYS R @ 14171000 | 0 | 1 | 1 |
| 0105342210000000 | GREASY CR @ mouth | 1 | 3 | 3 |
| 0105342220000000 | MARYS R ab BLAKESLY CR | 0 | 1 | 1 |
| 0105343000000000 | MUDDY CR @ mouth | 0 | 4 | 1 |
| 0105344000000000 | LONG TOM R @ 14170000 | 0 | 3 | 2 |
| 0105345000000000 | MCKENZIE R @ 14165500 | 0 | 2 | 2 |
| 0105345100000000 | MOHAWK R @ 14165000 | 1 | 3 | 3 |
| 0105345200000000 | GATE CR @ 14163000 | 0 | 2 | 1 |
| 0105345300000000 | MCKENZIE R @ 14162500 | 0 | 1 | 1 |
| 0105345310000000 | QUARTZ CR @ mouth | 0 | 1 | 1 |
| 0105345320000000 | BLUE R @ mouth | 0 | 1 | 1 |
| 0105345330000000 | S FK MCKENZIE R @ mouth | 0 | 1 | 2 |
| 0105345331000000 | S FK MCKENZIE R @ 14159200 ab TIPSOO CR | 0 | 1 | 2 |
| 0105345340000000 | HORSE CR @ mouth | 0 | 1 | 2 |
| 0105345350000000 | MCKENZIE R @ 14159000 | 0 | 1 | 1 |
| 0105345351000000 | LOST CR @ mouth | 0 | 3 | 1 |
| 0105345352000000 | SCOTT CR @ mouth | 0 | 1 | 1 |
| 0105345353000000 | OLALLIE CR @ mouth | 0 | 1 | 2 |
| 0105346000000000 | WILLAMETTE R ab MCKENZIE R | 0 | 1 | 1 |
| 0105346100000000 | M FK WILLAMETTE R @ mouth | 0 | 2 | 1 |
| 0105346110000000 | HILLS CR @ mouth | 0 | 3 | 2 |
| 0105346120000000 | FALL CR @ mouth | 0 | 2 | 2 |
| 0105346121000000 | LITTLE FALL CR @ 14151500 | 0 | 3 | 1 |
| 0105346130000000 | LOST CR @ mouth | 1 | 3 | 3 |
| 0105346140000000 | N FK M FK WILLAMETTE R @ 14147500 | 0 | 1 | 2 |
| 0105346150000000 | M FK WILLAMETTE R ab N FK M FK WILLAMETTE R | 0 | 1 | 1 |
| 0105346151000000 | GRAY CR @ 14146700 | 0 | 1 | 1 |
| 0105346152000000 | SALT CR @ 14146000 | 0 | 1 | 1 |
| 0105346153000000 | HILLS CR @ 14145000 | 0 | 2 | 1 |
| 0105346154000000 | M FK WILLAMETTE R @ 14144800 | 0 | 1 | 1 |
| 0105346154100000 | GOLD CR @ mouth | 0 | 1 | 1 |
| 0105346154200000 | COAL CR @ mouth | 0 | 1 | 1 |
| 0105346200000000 | C FK WILLAMETTE R @ mouth | 0 | 1 | 2 |
| 0105346210000000 | ROW R @ mouth | 0 | 1 | 3 |
| 0105346220000000 | C FK WILLAMETTE R ab ROW R | 0 | 1 | 2 |
| 0200000000000000 | SCAPPOOSE CR @ mouth | 0 | 4 | 1 |
| 0201000000000000 | N SCAPPOOSE CR @ mouth | 0 | 4 | 2 |
| 0201100000000000 | SIERKES CR (DEEP CR) @ mouth | 1 | 3 | 3 |
| 0201200000000000 | ALDER CR @ mouth | 0 | 3 | 2 |
| 0201300000000000 | CEDAR CR @ mouth | 0 | 2 | 2 |
| 0201400000000000 | LIZZIE CR @ mouth | 0 | 2 | 3 |

Appendix E

| Watershed Number | Description | Priority Ranking | Opportunity Ranking | Need Ranking |
|---|---|---|---|---|
| 0201500000000000 | UNN STR @ mouth | 0 | 1 | 1 |
| 0202000000000000 | S SCAPPOOSE CR @ mouth | 0 | 4 | 2 |
| 0202100000000000 | RAYMOND CR @ mouth | 1 | 3 | 3 |
| 0202200000000000 | S SCAPPOOSE CR ab RAYMOND CR | 2 | 3 | 4 |
| 0202210000000000 | GOURLAY CR @ mouth | 2 | 3 | 4 |
| 0300000000000000 | MILTON CR @ mouth | 1 | 3 | 3 |
| 0301000000000000 | COX CR @ mouth | 0 | 1 | 2 |
| 0302000000000000 | SALMON CR @ mouth | 0 | 1 | 1 |
| 0303000000000000 | MILTON CR ab SALMON CR | 0 | 1 | 4 |

# Appendix F
# Willamette Subbasin Issues

## Issues Identified During Subbasin Summary Development

A number of issues have been identified during the compilation of the Willamette Subbasin Summary. These are highlighted briefly below with the intent of advancing the Willamette Subbasin Planning process.

**Local capacity:** Watershed councils, soil and water conservation districts, and local governments have the closest institutional proximity to the landscape and people and have been charged with substantial restoration responsibilities. However, the resources available at this scale are not sufficient for successful basin-wide restoration success.

**Refinement of emerging frameworks to guide strategic investment in restoration:** While the Willamette Subbasin would appear to be on the cutting edge of prioritization schema, there is a need for continued refinement of frameworks to arrive at more and firmer agreement about basinwide priorities.

**Integration of major recovery/restoration efforts** (CWA, ESA, NWPPA): There is a complex array of major recovery efforts underway in the basin. Ultimately, these efforts' regulations and directions must mesh to assure an efficient deployment of resources locally and to prevent conflicting or contradictory plan and project requirements.

**Defining scope of and priority for urban restoration:** Although only six percent of the Willamette Subbasin is urban, impacts from cities on the environment have an impact disproportionate to their total area. The restoration opportunities and obligations inherent in an urban landscape need to be more clearly and scientifically identified, and then communicated more broadly to the urban public, and funded.

**Public agencies' management. of publicly-owned land:** The requirements and roles of public agencies in managing lands they control likely warrants more scrutiny. Whether owned or managed by local, regional, state, or federal governments for natural resource, transportation or recreational use—the collective restoration opportunities on public lands may be significant.

**The role of a profitable agricultural economy in habitat restoration**: The Willamette Subbasin has some of the most fertile land on earth which has generated a robust and diverse agricultural economy. However, currently farming is beset by serious challenges which threaten to undercut its very foundations. Careful consideration of the farming factors for decline may help inform an equally serious need—namely, the central role farming should have in contributing to restoration.

**Transportation networks:** Although the impacts of the transportation system on habitat is well-documented and often severe, road jurisdictions are frequently limited in their ability to fund projects that are primarily environmental in nature. An assessment of the scope of this limitation and potential solutions would likely offer significant immediate benefits to the Willamette Subbasin.

## Appendix G
## Additional References for Related Material

**Additional References**

In the course of compiling the Summary, various partners provided a wealth of information on fish and wildlife-related conditions, activities, and programs in the Willamette Subbasin. Much of the information was used directly and incorporated in the Summary where it is cited under the References section. Information in addition to that needed in the Summary is gathered below as a general reference on the Willamette Subbasin.

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