

Washington Lower Columbia Salmon Recovery And Fish & Wildlife Subbasin Plan



Photo credit: USFWS

Lower Columbia Fish Recovery Board
May 28, 2010
Final

Volume I – Contents

- 1 INTRODUCTION**
 - 1.1 Vision
 - 1.2 An Integrated Plan
 - 1.3 An Ecosystem Approach
 - 1.4 Geographic Planning Area
 - 1.5 Planning Horizon
 - 1.6 Plan Development & Revision
 - 1.7 Plan Organization

- 2 LISTED SPECIES**
 - 2.1 Overview
 - 2.2 Chinook Salmon
 - 2.3 Chum Salmon
 - 2.4 Coho Salmon
 - 2.5 Steelhead
 - 2.6 Bull Trout

- 3 LIMITING FACTORS, THREATS & IMPACTS**
 - 3.1 Overview
 - 3.2 Habitat – Streams
 - 3.3 Habitat – Estuary & Columbia Mainstem
 - 3.4 Dams
 - 3.5 Fisheries
 - 3.6 Hatcheries
 - 3.7 Ecological Interactions
 - 3.8 Climate & Ocean Effects

- 4 GOALS, CRITERIA & OBJECTIVES**
 - 4.1 Overview
 - 4.2 Recovery Goals
 - 4.3 Recovery Criteria
 - 4.4 Objectives – the Recovery Scenario
 - 4.5 Targets & Benchmarks

- 5 REGIONAL STRATEGIES & MEASURES**
 - 5.1 Overview
 - 5.2 Integrated Regional Strategy
 - 5.3 Habitat – Streams
 - 5.4 Habitat – Estuary & Columbia Mainstem
 - 5.5 Dams
 - 5.6 Fisheries
 - 5.7 Hatcheries
 - 5.8 Ecological Interactions
 - 5.9 Climate and Ocean Effects

- 6 SPECIES: RECOVERY STRATEGIES & BENCHMARKS**
 - 6.1 Overview
 - 6.2 Chinook Salmon
 - 6.3 Chum Salmon
 - 6.4 Coho Salmon
 - 6.5 Steelhead
 - 6.6 Bull Trout
- 7 SUBBASIN SUMMARIES**
 - 7.1 Overview
 - 7.2 Estuary Tributaries: Chinook, Wallacut, Deep
 - 7.3 Grays River
 - 7.4 Elochoman River & Skamokawa Creek
 - 7.5 Mill, Abernathy & Germany Creeks
 - 7.6 Cowlitz River – Upper
 - 7.7 Cowlitz River – Lower
 - 7.8 Coweeman River
 - 7.9 Toutle River
 - 7.10 Kalama River
 - 7.11 Lewis River – North Fork
 - 7.12 Lewis River - East Fork
 - 7.13 Salmon Creek
 - 7.14 Washougal River
 - 7.15 Lower Columbia Gorge Tributaries
 - 7.16 Wind River
 - 7.17 Little White Salmon River
 - 7.18 Upper Columbia Gorge Tributaries
- 8 OTHER SPECIES**
 - 8.1 Overview
 - 8.2 American Shad
 - 8.3 Channel Catfish
 - 8.4 Cutthroat Trout
 - 8.5 Eulachon
 - 8.6 Green Sturgeon
 - 8.7 Northern Pikeminnow
 - 8.8 Pacific Lamprey
 - 8.9 Smallmouth Bass
 - 8.10 Walleye
 - 8.11 White Sturgeon
 - 8.12 Larch Mountain Salamander
 - 8.13 Oregon Spotted Frog
 - 8.14 Western Pond Turtle
 - 8.15 Columbian Whitetail Deer
 - 8.16 Fisher
 - 8.17 River Otter
 - 8.18 Seals and Sea Lions
 - 8.19 Western Gray Squirrel
 - 8.20 Bald Eagle
 - 8.21 Band-Tailed Pigeon
 - 8.22 Caspian Tern

- 8.23 Dusky Canada Goose
- 8.24 Osprey
- 8.25 Red-eyed Vireo
- 8.26 Sandhill Crane
- 8.27 Yellow Warbler

- 9 MONITORING & RESEARCH**
 - 9.1 Framework
 - 9.2 Biological Status Monitoring
 - 9.3 Habitat Status Monitoring
 - 9.4 Implementation/Compliance Monitoring
 - 9.5 Action Effectiveness Monitoring
 - 9.6 Uncertainty & Validation Research
 - 9.7 Data and Reporting

- 10 IMPLEMENTATION**
 - 10.1 Framework
 - 10.2 Implementation Mechanism
 - 10.3 Institutional Structure
 - 10.4 Coordination & Administration
 - 10.5 Adaptive Management Process & Schedule
 - 10.6 Public Education & Outreach
 - 10.7 Evaluating Plan Sufficiency
 - 10.8 Measures
 - 10.9 Implementation Actions

- 11 COSTS**
 - 11.1 Overview
 - 11.2 Habitat – Streams
 - 11.3 Habitat – Estuary & Columbia Mainstem
 - 11.4 Dams
 - 11.5 Fisheries
 - 11.6 Hatcheries
 - 11.7 Monitoring & Research
 - 11.8 Coordination & Administration
 - 11.9 Total Costs of Recovery

- 12 REFERENCES**
 - 12.1 Acknowledgements
 - 12.2 Citations
 - 12.3 Acronyms
 - 12.4 Glossary

1. INTRODUCTION

This is an introduction section for the regional volume of the Recovery Plan. It discusses the scope and context of the overall Washington Lower Columbia Recovery/Subbasin planning effort being led by the Lower Columbia River Fish Recovery Board. It describes the healthy and harvestable vision for salmon and steelhead and explains how this planning process addresses the federal Endangered Species Act (ESA), Northwest Power and Conservation Council (NPCC) subbasin plans for fish and wildlife adversely affected by the development and operation of the Columbia River hydropower system, and state salmon recovery and watershed management planning processes. It describes the area and time frame addressed by the Plan. The section also provides an overview of the Plan development process and the framework that brings different stakeholders and interested parties together as participants.

1. INTRODUCTION

1.1. VISION.....1-2

1.2. AN INTEGRATED PLAN.....1-3

 1.2.1. ESA Recovery Planning 1-3

 1.2.2. NPCC Subbasin Planning 1-5

 1.2.3. Washington Watershed Planning 1-6

 1.2.4. Washington Salmon Habitat Protection & Restoration 1-7

1.3. AN ECOSYSTEM APPROACH.....1-8

1.4. GEOGRAPHIC PLANNING AREA.....1-9

1.5. PLANNING HORIZON1-10

1.6. PLAN DEVELOPMENT & REVISION1-11

 1.6.1. Planning Organization and Participants 1-11

 1.6.2. Community and Public Participation 1-13

 1.6.3. Summary of Revisions to Interim Plan 1-13

1.7. PLAN ORGANIZATION1-16

Figures

Figure 1-1. Lower Columbia River watersheds considered in this planning process..... 1-9

1.1. Vision

This Plan is intended to serve as 1) a Recovery Plan for Washington lower Columbia salmon and steelhead populations and 2) a Northwest Power and Conservation Council Columbia River Basin Fish and Wildlife Plan for the lower Columbia subbasins. The goal is to develop a scientifically credible, socially and culturally acceptable, and economically and politically sustainable plan to:

- Restore the region's fish species listed as threatened under the federal Endangered Species Act (ESA) to healthy, harvestable levels, and;
- Protect and enhance other fish and wildlife species that have been adversely affected by human actions, including the development and operation of the Federal Columbia River Power System.

Salmon, steelhead and trout of the lower Columbia basin including its Washington tributaries, have been depleted to the point where four species have been listed under the federal Endangered Species Act (ESA). These species together also once supported thriving fisheries that are now greatly diminished and dependent mostly on hatchery production.

The Plan provides a roadmap for recovery. It describes common goals and a coordinated course of action that is scientifically sound, acceptable to the public, and economically sustainable. It includes a comprehensive set of beneficial actions that are sound and address the range of threats as they are understood at this time. Protection, restoration, and enhancement actions are selected to provide maximum benefit and ensure the efficient use of resources.

The Plan focuses on outcomes and allows implementing agencies and other entities the flexibility to craft innovative, yet scientifically sound, approaches that best fit local conditions and values. Adaptive management will be a critical element of Plan implementation because existing information is too uncertain to definitively identify exactly how much of which actions will be sufficient to achieve recovery. And so the Plan includes an implementation framework by which the Plan will evolve based on results of monitoring, refinements in prioritization methods, additional information on costs and other economic factors, and specific implementation plans to be developed by implementing entities. The Plan can succeed only if local, state, and federal interests take ownership and are involved in implementation and adaptive management.

This Plan's vision for recovery encompasses recovery of lower Columbia River salmon and species listed under the U. S. Endangered Species Act, in the sense that ESA delistings will be achieved while working toward the Plan's "broad sense" vision for recovery.

VISION

Washington lower Columbia salmon, steelhead and bull trout are recovered to healthy, harvestable levels that will sustain productive sport, commercial, and tribal fisheries through the restoration and protection of the ecosystems upon which they depend and the implementation of supportive hatchery and fishery practices.

The health of other native fish and wildlife species in the lower Columbia will be enhanced and sustained through the protection of the ecosystems upon which they depend, the control of non-native species, and the restoration of balanced predator/prey relationships.

1.2. An Integrated Plan

The planning process integrates four interrelated initiatives to produce a single Recovery/Subbasin Plan for the Washington portion of the lower Columbia to serve the following purposes:

- Endangered Species Act recovery planning for four salmonid species listed as threatened: Chinook salmon, chum salmon, coho salmon, and steelhead.
- Northwest Power and Conservation Council (NPCC) fish and wildlife subbasin planning for eight full and three partial subbasins.
- Watershed planning pursuant to the Washington Watershed Management Act, RCW 90-82.
- Habitat protection and restoration pursuant to the Washington Salmon Recovery Act, RCW 77.85.

This integrated approach provides significant benefits, including:

- Ensuring consistency and compatibility of goals, objectives, strategies, priorities and actions;
- Eliminating redundancy in the collection and analysis of data; and
- Establishing the framework for a partnership of federal, state, tribal and local governments under which agencies can effectively and efficiently coordinate planning and implement efforts for restoration of listed salmonids and the enhancement of other fish and wildlife species of interest.

An interim version of the Recovery Plan was completed by the LCFRB in 2004. The Plan was accepted in 2006 by the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) as the interim Recovery Plan for the Washington portion of the lower Columbia River region. The Plan was also adopted by the NPCC in 2005 as an amendment to their Columbia River Basin Fish and Wildlife Program, which directs more than \$140 million per year of Bonneville Power Administration revenues to protect, mitigate and enhance fish and wildlife affected by hydropower dams.

The 2010 version of the Recovery Plan (this version) is a revision of the interim Plan undertaken to reconcile Washington planning elements with recent outcomes from the recovery planning process for the Oregon components of the listed species and to more fully address the needs for coho salmon which were formally listed as threatened after completion and adoption of the interim Plan. At the same time, this revision also incorporates significant new information on species status and listing factors that has become available in the intervening period. Examples of new information include more rigorous quantitative assessments of fish status based on a Population Viability Analysis (PVA) framework and revised assessments of hatchery effects undertaken by a regional Hatchery Scientific Review Group (HSRG).

1.2.1. ESA Recovery Planning

Four salmon and steelhead species in the lower Columbia region, including Chinook, chum, coho, and steelhead have been listed as threatened under the ESA. Under ESA section 4(f), a recovery plan must include the following:

- Site-specific management actions necessary for the conservation and survival of the species,
- Objective, measurable criteria which, when met, would result in a determination that the species be removed from the list (i.e., delisting), and
- Estimates of the time required and cost to carry out those measures needed to achieve recovery.

Recovery plans are guidance and not regulatory documents, thus no agency or entity is required by the ESA to implement the recovery strategies or actions in the plans unless otherwise legally mandated. Although not regulatory, the authors of the ESA clearly saw recovery plans as a central guiding vehicle for the recovery of listed species. ESA delisting can occur at a point when a listed species and its ecosystem are restored, and the species' future is safeguarded to the point that protections under the ESA are no longer needed. Decisions to delist are based on a species' biological status and on the status of the listing factors to the species, as identified in the ESA section 4(a)(1). [See Chapter 4 for a more detailed discussion of recovery goals and criteria].

As the listing agency for anadromous salmonids, the National Marine Fisheries Service (NMFS) is responsible for developing recovery plans under ESA section 4(f) for Chinook, chum, and coho salmon and steelhead. This Plan is intended to serve as a part of the ESA Recovery Plan that will be adopted by the NMFS for Chinook, chum, coho and steelhead of the lower Columbia River region. Listed lower Columbia River salmon and steelhead species include populations in both Washington and Oregon. Thus, recovery of listed lower Columbia River salmon will require significant improvements and substantive, coordinated measures on both sides of the river.

For the purposes of recovery planning, NMFS has grouped listed species by geographical region in order to provide consistent and comprehensive guidance. These regional groups are called "domains." Each domain typically includes multiple species for which listing units are defined as Evolutionarily Significant Units (ESUs) or Distinct Population Segments (DPSs). Currently, 17 ESUs and DPSs of Pacific salmon and steelhead in the Pacific Northwest are listed under the ESA. NMFS has designated five recovery domains: Willamette/Lower Columbia; Interior Columbia River; Puget Sound and Washington Coast; Oregon Coast; and the Southern Oregon/Northern California Coast. This Plan covers the Willamette/Lower Columbia Recovery Domain including two "subdomains": the lower Columbia River consisting of the four listed lower Columbia ESUs and the Upper Willamette River, which includes two listed species in the Willamette River above Willamette Falls (Willamette Spring Chinook ESU and Willamette Winter Steelhead DPS).

NMFS is developing recovery plans through a collaborative effort involving federal and state agencies, tribes, local governments, and the public. Under this approach, local recovery plans and subbasin plans will be used as the basis for an ESA recovery plan. To accommodate the different planning efforts, NMFS partitioned the Lower Columbia River subdomain into three management units, with each unit developing a recovery plan:

Washington Lower Columbia: The Lower Columbia Fish Recovery Board (LCFRB) is coordinating local recovery planning efforts for the Washington Management Unit portion of the Lower Columbia River Subdomain. The LCFRB completed a draft Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan (December 15, 2004). NMFS approved the Plan as an Interim Regional Recovery Plan in February 2006.

Oregon Lower Columbia: Oregon is developing the recovery plan for this management unit in parallel with recovery planning for the Upper Willamette Unit which occurs solely in Oregon.

White Salmon: NMFS is leading development of the recovery plan for this management unit which includes the White Salmon River basin in Washington.

A comprehensive plan for the entire Lower Columbia River subdomain will synthesize LCFRB's Plan for the Washington Lower Columbia Management Unit, Oregon's plan for the Oregon Lower Columbia Management Unit and NMFS' plan for the White Salmon Management Unit. NMFS will work with the states and local entities involved in management unit plan development, and with representatives from other sectors (e.g., ocean fisheries, tribal fisheries, and Columbia mainstem hydropower) as appropriate to integrate the management unit plans. Final ESA recovery plans will maintain and incorporate the

management unit plans, thereby endorsing the recommendations and decisions already put forward by local recovery planners and implementers in the process

Consistent with an ecosystem approach to salmon and steelhead recovery and integration of multiple planning efforts, this Plan also includes information on other significant fish, reptile, mammal, and bird species, including other species listed under the ESA (bull trout, green sturgeon, eulachon, Columbian whitetail deer, Steller sea lions). Many of these other species are affected to various degrees by measures identified in this Plan for salmon and steelhead. However, this Plan is not intended to serve as a recovery plan for listed species other than salmon and steelhead.

Separate recovery plans have been or will be developed by NMFS or the USFWS for other listed species. For instance, the USFWS has developed a draft recovery plan for bull trout (USFWS 2002). Thus, this LCFRB Recovery Plan does not have quite the same relationship to the USFWS Bull Trout recovery plan as it has to the NMFS salmon recovery plan. The USFWS has federal jurisdiction over bull trout, which are listed as threatened under ESA, as well as cutthroat trout, which are currently not federally-listed. A Bull Trout Draft Recovery Plan, developed collaboratively with other federal, state, Tribal and private recovery unit team members, covers an extensive geographical area of the western states. The draft Recovery Plan represents four Distinct Population Segments, each of which is further segmented into recovery units which are the primary elements for recovery plan development. Much of the USFWS Lower Columbia Recovery Unit falls within the LCFRB planning area. The LCFRB Recovery Plan builds on provisions of the USFWS Lower Columbia Recovery Unit Plan to ensure that bull trout recovery efforts are integrated into the broader salmonid recovery strategies and actions for the lower Columbia. Although completion of a final bull trout recovery plan has been delayed pending the outcome of a 5-year-status review, the LCFRB Plan identifies objectives and actions consistent with those specified in the USFWS bull trout plan to address recovery. The USFWS is a participant in the LCFRB planning process and in providing advice on bull trout conservation.

Well-developed recovery or management plans exist for other listed species including bald eagle, Columbia whitetail deer, and Steller sea lion. These recovery plans define biological objectives and strategies for these species. This subbasin management plan integrates the various species-specific plans into a comprehensive framework for salmon and steelhead recovery.

1.2.2. NPCC Subbasin Planning

The NPCC was created by Congress in 1980 to give Washington, Oregon, Idaho, and Montana a voice in how the region plans for its energy needs, while at the same time mitigating the effects of the Federal Columbia River Power System on fish and wildlife resources.¹ To this end, the NPCC has developed the Columbia Basin Fish and Wildlife Program (Program) which sets forth goals and strategies for the protection and enhancement of fish and wildlife resources. The NPCC uses the Program to solicit and evaluate proposals for on-the-ground projects and research.

On August 12, 2002, pursuant to Section 4(h) of the Northwest Power Act, the Northwest Power and Conservation Council requested in writing that state and federal fish and wildlife agencies, Indian tribes and others submit recommendations for amendments to the Council's Columbia River Basin Fish and Wildlife Program. The Council requested recommendations for objectives and measures for the program at the subbasin level, to be submitted in the form of a subbasin plan for each subbasin or as possible elements for a subbasin plan.

On May 28, 2004, the Council received proposed subbasin plans for 59 subbasins of the Columbia River, formally recommended for amendment into the Council's fish and wildlife program. Following a lengthy

¹ The Northwest Power and Conservation Council (NPCC) was formerly referred to as the Northwest Power Planning Council.

public review process required by the Power Act, the Council formally adopted in September 2005 as amendments into the program subbasin plans for 57 subbasins, based on the recommendations submitted.

Eight of these subbasins fall totally within the lower Columbia region in Washington. Three others (Columbia Estuary, Lower Columbia, and Columbia Gorge) are shared with the state of Oregon. The LCFRB, under contract with the NPCC, developed subbasin plans for the eight Washington subbasins and worked with the Lower Columbia River Estuary Partnership to develop plans for the three shared subbasins as part of the integrated recovery planning process.

Subbasin plans:

- Identify the goals for fish, wildlife, and habitat;
- Define objectives that measure progress toward the those goals;
- Establish strategies to achieve the objectives; and
- Incorporate and build upon existing fish and wildlife information and activities.

Completed subbasin plans were adopted as part of the NPCC's Fish and Wildlife Program and help direct BPA funding of projects that protect, mitigate and enhance fish and wildlife that have been adversely impacted by the development and operation of the Columbia River hydropower system. The NPCC's effort is also linked to and accommodates the needs of other programs in the basin that affect fish and wildlife. Along with the NMFS and the USFWS, the NPCC and BPA also use the adopted subbasin plans to help meet the requirements of the Federal Columbia Power System Biological Opinion.

1.2.3. Washington Watershed Planning

The state Watershed Management Act (RCW 90.82) provides local communities the opportunity to plan for the future use of their water resources in consultation with state agencies. To facilitate this planning, the state has been divided into Water Resource Inventory Areas (WRIAs). There are five WRIAs in the lower Columbia. Watershed planning efforts are underway in all five areas. The LCFRB coordinates watershed planning in four of the five lower Columbia WRIAs (WRIA's 25 and 26 – Grays, Elochoman and Cowlitz, and WRIA's 27 and 28 – Salmon, Washougal and Lewis) and is an active participant in planning for the fifth WRIA (WRIA 29A – Wind and White Salmon).

Watershed plans for these WRIAs address issues associated with:

- Water quantity, including the availability and current use of water and actions needed to meet future needs for fish and people;
- Water quality, including current water quality problems, priorities for addressing these problems, and water quality monitoring;
- Stream flows, including the adequacy of existing flows for fish and other in-stream uses and measures to protect or enhance stream flows; and
- Habitat, including the current condition of fish habitat and measures to protect or enhance habitat to support salmon recovery efforts.

Water quantity and quality and stream flow studies and data collected by the watershed planning initiatives are incorporated in the Regional Recovery Plan. Habitat data collected by the recovery planning effort are shared with the watershed planning effort. Policies, strategies, actions, and priorities are coordinated to ensure that they are compatible and complement each other.

Watershed Plans were completed for WRIA's 25/26 and 27/28 and adopted in 2006. Detailed Implementation Plans for these WRIA's were adopted in 2008.

1.2.4. Washington Salmon Habitat Protection & Restoration

The Washington Salmon Recovery Act (RCW 77.85):

- Provides for the funding of habitat protection and restoration efforts;
- Requires local and regional program organizations to identify and prioritize project needs; and
- Directs that the Washington Department of Fish and Wildlife develop guidance for regional salmon recovery efforts.

The Salmon Recovery Funding Board (SRFB) coordinates the funding process on the statewide level. It establishes program policies and directions as well as grant requirements. It screens project proposals and awards grants. Lead entities coordinate the process on the local or regional level. They develop habitat protection and restoration strategies for their area. They solicit, evaluate, rank, and propose projects to the SRFB. The LCFRB serves as the lead entity for the lower Columbia region. In this capacity, the Board has developed, annually updated and expanded a lower Columbia habitat strategy which provides a basis for prioritizing proposed habitat projects. Development of the strategy has been merged with the recovery planning effort and the strategy has evolved into an integral element of the Plan.

1.3. An Ecosystem Approach

This Plan takes an ecosystem approach to salmon and steelhead recovery that recognizes:

- The hierarchical organization and function of salmon and steelhead from species through population levels;
- Environmental and human factors affecting each species and population throughout its life cycle at landscape and local scales;
- The combination of overlapping and unique life cycle requirements and limiting factors among salmon and steelhead species; and
- Other significant fish and wildlife species that share habitats and are affected by protection and restoration of salmon and steelhead.

An ecosystem approach is essential to the development of an effective recovery plan for salmon and steelhead in the lower Columbia region because of the large scale of the affected area and the large number of listed species. Where recovery plans for other species and areas more typically focus on a single species or a limited number of populations, the lower Columbia Plan addresses 4 species comprised of over 100 populations originating in two states and migrating between two countries. Any action taken to benefit a specific species or area will inevitably affect associated species and areas. Consideration of overlapping needs and affects will, by design, optimize the balance of effectiveness and efficiency of recovery.

At the same time, ecosystem components of the plan must ultimately translate into benefits at the fish population level sufficient to meet the broader recovery goals. Populations are the fundamental building blocks of salmon and steelhead species. NMFS will ultimately need to track status and limiting factors at the population scale for recovery implementation assessment and reporting requirements. Therefore this Plan includes both ecosystem and population-level presentations of fish status, limiting factors, goals, strategies and measures.

1.4. Geographic Planning Area

As described earlier, NMFS partitioned the Lower Columbia River subdomain into three management units, with each unit developing a recovery plan. This Plan addresses the Washington Lower Columbia River Management Unit of the Lower Columbia River Recovery Planning “subdomain” identified by NMFS.

The 5,700 square mile planning area encompasses the entire Lower Columbia Salmon Recovery Region. It is comprised of eight full NPCC subbasins: the Grays, Elochoman, Cowlitz, Kalama, Lewis, Washougal, Wind, and Little White Salmon (Figure 1-1). Three additional subbasins are shared with the state of Oregon: Columbia Estuary, Lower Columbia, and Columbia Gorge.

The planning area includes the Washington portion of the mainstem and estuary of the lower Columbia River as well as 18 major and a number of lesser tributary watersheds (Figure 1-1). These include the Chinook, Grays, Skamokawa, Elochoman, Mill, Abernathy, Germany, Cowlitz, Coweeman, Kalama, Lewis, Lake, Washougal, Duncan, Hardy, Hamilton, Wind, and Little White Salmon rivers. In all, the tributaries total more than 1,700 river miles.

The White Salmon subbasin was not included in the initial LCFRB planning process at the request of Klickitat County but is subject to a separate management unit recovery planning effort led by NMFS. However, status and objectives were considered in this Plan for salmon in the White Salmon subbasin because these populations are part of the listed unit that includes other Washington lower Columbia River populations.

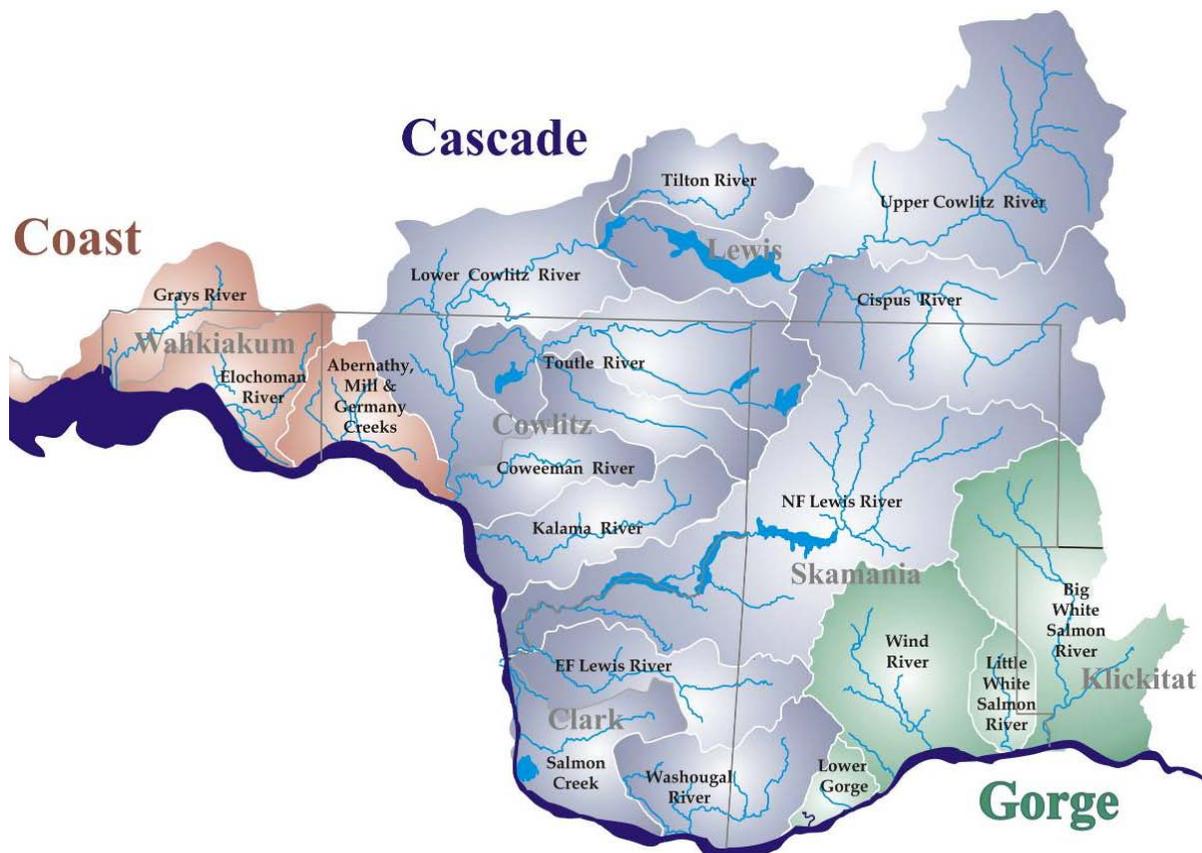


Figure 1-1. Lower Columbia River watersheds considered in this planning process.

1.5. Planning Horizon

The Plan uses a planning period or horizon of 25 years, dating from a baseline referenced to the initial salmon and steelhead listings in 1998-1999. The goal is to fully implement, within 25 years, all actions needed to achieve recovery of the listed salmon species and the biological objectives for other fish and wildlife species of interest. This includes all actions in the Plan and any additional actions identified based on future monitoring and evaluation. Declining species trajectories should be reversed and species should demonstrate improvements consistent with biological objectives.

This Recovery Plan describes species status, limiting factors, and threats as of the listing baseline. This Plan also identifies a comprehensive suite of strategies and measures intended to achieve recovery goals by addressing factors and threats prevalent at or before listing. A variety of recovery actions have begun to be implemented in the interim since the listing baseline and the 2004 completion of the interim Plan for the Washington management unit of the Willamette/Lower Columbia River recovery domain. Definition of the listing baseline at the time of listing allows for the recognition of initial recovery efforts that have already been undertaken but for which species benefits are only just now being realized. Initial efforts have likely contributed to significant improvements in the viability of many populations and are expected to provide continuing benefits. This approach is also consistent with the biological basis for species status assessments. Biological benefits of recovery actions typically require one or more generations to translate into fish numbers. Thus, even current status reflects conditions prevalent prior to listing. This updated version of the Recovery Plan includes explanations of the degree to which specific measures that have already implemented where appropriate.

It is recognized that full restoration of habitat conditions and watershed processes for all species of interest will likely take more than 25 years. As a result, some species are not expected to meet biological viability criteria within a 25 year timeframe. In order to clearly establish expectations for implementation of recovery measures and species improvements necessary to reach long term recovery goals, this Plan establishes a schedule of benchmarks in 12 year intervals beginning at the 1998-1999 listing baseline (described in more detail in Chapter 4). Thus, the first 12-year benchmark period coincides with the 2010 completion of the revised Recovery Plan.

1.6. Plan Development & Revision

This Plan is a revised and expanded version of the Interim Recovery Plan adopted by NMFS in 2006. The revisions are needed to:

- Support NMFS's efforts in development of an overarching lower Columbia salmon and steelhead recovery plan that integrates recovery efforts in the estuary and the Washington and Oregon tributary watersheds;
- Fully describe the recovery program for Coho, which were listed as threatened under the ESA subsequent to the adoption of the Interim Plan; and
- Incorporate new information and analyses.

As with the Interim Plan, the revised Plan focuses on answering five key questions for the species of interest. These questions are:

- Where are we now?
- How did we get here?
- Where do we need to go?
- How do we get there?
- How do we know when we're there?

Technical information and analyses were updated and revised to provide a foundation for answering the first three questions. The technical foundation is a comprehensive collection of information and analysis relating to the Plan's focal fish and wildlife species and the environmental conditions and human activities that affect their health and viability. It describes and analyzes current conditions and trends, and explains the analytical methods used. The technical foundation incorporates guidance from the TRT in describing an analytical framework for evaluating species status and goals based on the Viable Salmonid Population concept (McElhany et al. 2000, 2003, 2006, and 2007). The revised and updated technical foundation material is contained in a series of Technical Appendices to the Plan.

Based on the updated technical information and analyses, this Plan provides revised biological objectives; regional and subbasin strategies, measures and actions; an implementation framework; and monitoring and adaptive management measures.

1.6.1. Planning Organization and Participants

The LCFRB led and coordinated the development of the initial Interim Plan and this revised Plan. LCFRB was established by state statute (RCW 77.85.200) in 1998 to oversee and coordinate salmon and steelhead recovery efforts in the lower Columbia region of Washington. It is comprised of representatives from the state legislature, city and county governments, the Cowlitz Indian Tribe, private property owners, hydro project operators, the environmental community, and concerned citizens. The LCFRB is committed to finding solutions that restore fish and provide for the needs of the citizens of the region. Adoption of the final Recovery Plan will require consensus of all LCFRB members.

Since the success of salmon and steelhead recovery and enhancement of other fish and wildlife species will require the support and coordinated efforts of federal, state, tribal, regional, and local entities, a collaborative approach was used to develop the Plan.

Completion of this revised Plan for the Washington management unit of the lower Columbia River recovery domain involved an extensive coordination process with representatives from Oregon and

NMFS to develop a comprehensive and complementary approach to salmon recovery in the lower Columbia. Since completion of the interim Washington Plan in 2004, Oregon has undertaken an extensive recovery planning process for their portion of the domain. As a placeholder for Oregon populations, the interim Washington Plan assumed improvements in Oregon salmon populations that represent proportional contributions to recovery based on the relative numbers and status of populations within Washington and Oregon ESUs. Oregon has subsequently identified specific population improvements which necessitated review and reconsideration of some initial assumptions for Washington populations.

Further, populations in both states are affected by many common factors including out-of-subbasin effects of Columbia River mainstem and estuary habitat conditions, fisheries, hatcheries, ecological factors, and climate/ocean factors. Effective recovery strategies require development of consistent measures and actions by both states to address these common factors. The process of synthesis or “roll-up” of these plans will address interdependencies and issues of regional scope, and ensure that the entire salmon life cycle and all threats are addressed. For example, there are interdependencies between the states related to some local hatchery and fishery issues, so certain recovery actions will need to be agreed upon by both states. In addition, some recovery actions related to fisheries, hatcheries, the Federal Columbia River Power System, and the estuary are regional in scope and will require a regionally consistent set of assumptions and actions. The roll-up will also address ESU-level recovery criteria and regionally coordinated research, monitoring, evaluation, and adaptive management strategies.

Planning coordination also included consideration of additional information that became available after the interim Plan was completed. Examples included additional TRT guidance on population identification and recovery criteria, an estuary module developed by NMFS to provide common guidance to all Columbia Basin domains, and a hydro module that incorporated guidance from the Federal Columbia River Power System Biological Opinion.

The coordination process involved a series of technical and policy level meetings to exchange information and to develop approaches and alternatives for further consideration in the recovery planning processes of each state. This coordination process was facilitated by an ESU Recovery Roll-up Steering Committee consisting of representatives from NMFS, the Washington Governor’s Salmon Recovery Office (GSRO), the Oregon Governor’s Office, the LCFRB, WDFW, the Oregon Department of Fish and Wildlife (ODFW), and the Lower Columbia River Estuary Partnership (LCREP).

Through this coordination process the LCFRB completed an initial draft of the revised Plan. The draft Plan was provided to all of the principal recovery partners in the Washington Lower Columbia region for review and comment. These partners include:

- Federal Agencies: NMFS, USFWS, the U.S. Forest Service (USFS), and the U.S. Army Corps of Engineers (USACE).
- Tribal Governments: Cowlitz Indian Tribe, the Yakama Nation, and the Chinook Tribe.
- Washington State Agencies: The WDFW, the GSRO, the Department of Ecology (Ecology), the Department of Natural Resources (WDNR), the Department of Transportation (WSDOT), and the Department of Agriculture (WDOA).
- Regional Organizations: The NPCC, LCREP and the WRIA 25/26 and 27/28 Watershed Planning Units.
- Local Governments: Clark, Cowlitz, Lewis, Skamania, and Wahkiakum counties and the cities of Vancouver and Camas.

In addition, the Recovery Plan Implementation Steering Committee (RPIC), originally proposed in the Interim Plan, will be reactivated to promote interagency coordination and participation in completing

the revised Plan. NMFS, USFWS, NPCC, LCREP, WDFW, GSRO, Ecology, the USFS, Counties, the Cowlitz Indian Tribe, the Yakama Nation, and the Chinook Tribe were invited to participate on the committee. Upon adoption of the Plan, the RPIC will assist the LCFRB in guiding the implementation of the revised Plan.

1.6.2. Community and Public Participation

A 30-day public comment period was held to solicit agency and public comments on the draft of the revised Plan. Informational displays and written materials were prepared to assist the public in identifying and understanding the major changes to the Plan. Four community workshops were held throughout the region to provide multiple opportunities for the public to speak with LCFRB staff and agency personnel involved in the drafting of the Plan and to collect public comments.

All agency and public comments were reviewed and, where warranted and appropriate, the draft Plan was revised. A comment response document was prepared to indicate how comments handled.

1.6.3. Summary of Revisions to Interim Plan

This revision incorporates new information and developments since completion of the interim WA Plan in 2004, including:

Scenario Refinement

New information has pointed to the need for revision of several population priorities identified in the draft scenario. The interim Plan included a recovery scenario that identified target status by population based on biological significance, feasibility, and equitable sharing of the recovery burden. This scenario was developed using the best information available at the time. Since then, new information has included:

- Population priorities identified by ODFW for Oregon populations.
- Updated assessments of the restoration potential for WA populations based on updated Ecosystem Diagnosis and Treatment (EDT) estimates.
- Updated status and recovery gap assessments for WA populations consistent with refinements in the analytical framework for recovery planning developed by NMFS, Oregon and Washington scientists (consistent with TRT guidance).
- Recovery implementation feasibility analysis developed by WDFW for hatchery and fishery actions (incorporating analysis by the HSRG²).

Improved Analytical Framework for Status & Gaps

The revised Plan incorporates a more-rigorous quantitative Population Viability Analysis (PVA) framework for assessing population status and gaps developed by scientists from NMFS, Washington, and Oregon since the interim WA Plan was adopted. This included additional TRT products that were developed or completed after the 2004 Plan was completed (McElhany et al. 2006, 2007). The new framework:

- captures scientific advances since the interim Plan was developed,

² The Hatchery Scientific Review Group (HSRG) is the independent scientific review panel of the Pacific Northwest Hatchery Reform Project established by Congress in 2000 in recognition that while hatcheries play a legitimate role in meeting fishery and conservation goals for Pacific Northwest salmon and steelhead, the hatchery system was in need of comprehensive reform. The HSRG has reviewed all state, tribal and federal hatchery programs in Puget Sound, Coastal Washington, and the Columbia River Basin. Their final report for the Columbia River Basin was issued in early 2009 (http://www.hatcheryreform.us/mfs/welcome_show.action).

- provides a consistent theoretical framework for evaluating status and objectives among WA, OR, and NMFS;
- makes more direct use of all available data on fish abundance, productivity, spatial distribution, and genetic diversity;
- provides a consistent analytical approach for linking status, gaps, improvements, and effects of potentially-manageable factors based on population risk and parameters related to risk; and
- produces more realistic and robust estimates of productivity and abundance improvements consistent with recovery. Changes in status and gaps also affect the scenario and H-specific recovery strategies.

Revised Habitat Analyses (Ecosystem Diagnosis & Treatment Results)

The revised Plan incorporates revised habitat evaluations based on updated EDT information on current and potential habitat capacity of each subbasin, limiting factors, and restoration/preservation values by stream reach. EDT is a systematic analytical tool that identifies fish limiting factors and fish habitat capacity from stream habitat descriptions. EDT analyses were revised since 2004:

- to represent the finer hydro-geographical scale needed to include the smaller tributary streams that provide significant spawning and rearing habitats for species such as coho;
- to include additional information on reach-specific habitat conditions in some stream reaches; and
- to provide more consistent treatment of habitat input data among all subbasins.

The revised information affected the recovery scenario and subbasin-specific priorities for habitat improvements. Estimates of manageable impacts in subbasin habitat were also updated based on revised EDT results.

Depth of Coho Treatment

The revised Plan includes a more rigorous treatment of coho status, objectives and strategies. Coho were addressed as a focal species in the interim Plan but in lesser detail than the other species because they were not listed at the time and because the available information on coho was limited. Significant upgrades in the current Recovery Plan include:

- quantitative estimates of status and goals by population based on improved EDT and PVA analyses;
- factor and reach-specific habitat measures and priorities based on more comprehensive EDT analysis; and
- refinements in fishery and hatchery actions based on recovery-related developments.

Refinements in Strategies & Measures

The revised Plan includes revisions to measures based on implementation developments over the period since the interim Plan was adopted. These include refinements in fishery and hatchery programs identified through the collaborative efforts of the LCSRB, HSRG, ODFW, WDFW, and NMFS, to address recovery plan objectives and reforms identified through the HSRG process. These changes reflect actions identified in WDFW's Conservation and Sustainable Fisheries Plan which is, in part, an implementation plan for hatchery and fishery measures identified in the Recovery Planning process. Changes include reductions in production, elimination of hatchery releases in selected wild fish refuge areas, operation of weirs to reduce hatchery fish straying into key natural production areas, reintroduction programs of historic stock types, and development of integrated local broodstock. Revision of several hydro-related measures was warranted based on new license agreements for the

Cowlitz and Lewis river projects or the Federal Columbia River Power System Biological Opinion.³ Estimates of manageable impacts of hatcheries were also updated based on HSRG analyses.

Addition of Interim Benchmarks

Interim benchmarks were added to provide near, intermediate and long term reference points for evaluating progress toward recovery in the implementation of actions addressing each category of threat (habitat, dams, fisheries, hatcheries, ecological factors). The interim Plan previously included long term goals, objectives and targets but did not establish interim benchmarks that recognize constraints on action implementation schedules and time lags in realizing the benefits of various actions. Benchmarks are integral to the adaptive implementation approach identified in the Recovery Plan by including periodic checkpoints of progress and course corrections toward recovery goals and objectives.

Estuary Module Incorporation

The Columbia River Estuary Recovery Plan Module (<http://www.nwr.noaa.gov/Salmon-Recovery-Planning/ESA-Recovery-Plans/Estuary-Module.cfm>) is part of a larger regional planning effort to develop recovery plans for Endangered Species Act-listed salmon and steelhead in the Columbia River basin. The module focuses on habitat in the lower Columbia River below Bonneville Dam and how that habitat affects the survival of ESA-listed chum, steelhead, Chinook, and coho from throughout the Columbia River basin. This includes the LCR Chinook, coho, and steelhead and the CR chum in the Oregon portion of the lower Columbia management area. Geographically, the module covers the tidally influenced reaches of the lower river, estuary, and plume. The goal of the module is to identify actions that, if implemented, would improve the survival of ESA-listed salmon and steelhead during their migration and rearing in the estuary and Columbia River plume.

The module identifies and prioritizes limiting factors and threats in the estuary that affect the viability of salmon and steelhead populations. The module lists actions whose implementation would reduce the threats and thus increase survival of salmon and steelhead during their time in the estuary. The module also estimates the cost of implementing each action over a 25-year period. A description of monitoring, research, and evaluation needs is being completed and will be included as an appendix to the module.

Estuary material throughout the WA Management Unit Plan has been updated to reflect current descriptions and guidance in the estuary module that was completed by NMFS since the interim Plan was adopted. The estuary material in the interim Plan informed the development of the estuary module but the module took this material to another level. The Plan defers to the estuary module while generally presenting a summary of guidance described therein. Estimates of manageable impacts in the estuary were also updated for consistency with the estuary module.

Organizational Improvements

The organization of the regional Plan (Volume I) has been revised to improve readability and transparency of the chain of logic from the vision through the actions. Descriptions of the approach and technical basis for Plan elements are upgraded. Additional descriptions of species and subbasins are included in the regional Plan to provide a stronger context for strategies and actions.

³ The Federal Columbia River Power System (FCRPS) includes a series of dams, powerhouses, and reservoirs operated throughout the basin for power production, flood control, irrigation, navigation, recreation, and fish, wildlife, and cultural resource protection. NMFS issued the FCRPS 2008 Biological Opinion, also referred to as the Remand of the 2004 Biological Opinion on the FCRPS, on May 5, 2008. The Biological Opinion includes the mainstem Columbia from Bonneville Dam to the river's mouth, which extends to much of the area included in this Plan for the Washington portion of the lower Columbia. The biological opinion details the effects of hydro development on listed fish species and their critical habitat. The Biological Opinion also identifies a series of reasonable and prudent alternatives to address impacts on fish and habitat.

Errata and Editorial Corrections

The revised Plan includes a number of minor editorial corrections identified in subsequent reviews.

Cost Estimates

More comprehensive estimates of costs are being incorporated into the Plan. The interim Plan identified a framework for estimating costs but did not develop specific estimates for actions identified in the Plan.

1.7. Plan Organization

This Recovery Plan is organized into two volumes and a series of supporting appendices.

Volume I (this volume) provides a regional overview of recovery from a species, listing factor, and subbasin perspective, monitoring and research needed to support recovery efforts, and an approach to implementation of the Plan.

- A Listed Species chapter identifies the basis for listing and provides an overview of the status and life history of each species.
- A Limiting Factors and Threats chapter describes categories of conditions that affect fish status and human activities or other dynamics that potentially affect limiting factors including specific statutory listing factors identified by the ESA.
- A Goals and Criteria chapter describes recovery goals consistent with the vision of the Plan, criteria for defining recovery goals and objectives, an integrated recovery scenario that meets recovery objectives for salmon and steelhead species, and targets and benchmarks for designing recovery strategies and evaluating progress.
- A Regional Strategies and Measures chapter describes recovery strategies, working hypotheses, and strategies and measures to address each category of threat.
- A Species Recovery Strategies & Benchmarks chapter describes objectives, factors and threats, and the strategy for recovery specific to each species.
- A Subbasins chapter provides brief summary descriptions of each of the 17 subbasins addressed by the Plan, status and objectives of listed populations, factors affecting each population, and a habitat strategy for addressing key habitat factors.
- An Other Species chapter provides descriptions and guidance for other significant fish, reptile, amphibian, mammal, and bird species in the region for the purposes of the Northwest Power and Conservation Council subbasin plan application of this Plan.
- A Monitoring and Research chapter describes different categories of monitoring needed to evaluate progress toward recovery. These include biological status, habitat status, implementation/compliance, and action effectiveness. The chapter also addresses uncertainty and validation research, and reporting. For each element of a comprehensive monitoring and evaluation program, the chapter identifies objectives, strategies, indicators, sampling and analytical design, and corresponding implementation actions.
- An Implementation chapter describes the means and organizational structure by which implementation of the Plan's recommended actions will be coordinated, managed and overseen. It melds implementation of programs and actions with the monitoring and evaluation process. It describes the mechanism that will be used to track, evaluate, and report progress. It describes the process for revising the Plan's strategies, measures, and actions. It identifies

economic factors and an approach for weighing economic considerations in Plan implementation. Finally, it identifies partners involved with specific actions.

- A Costs chapter identifies costs of implementing recovery actions.
- A References chapter which includes citations, acronyms and a glossary.

Volume II consists of a series of subbasin plans that describe species and limiting factors and include detailed assessments of local habitat conditions. Where Volume I includes overarching descriptions of strategies and measures for recovery, Volume II details subbasin-specific habitat actions and priorities designed to achieve objectives for each listed ESU.

- Habitat assessments are based on an Integrated Watershed Assessment and Ecosystem Diagnosis and Treatment Analysis which identify specific watershed habitat and processes, and stream habitat process conditions and limitations.
- Key programs and projects affecting each subbasin are described.
- A management plan is included for each subbasin that describes priority measures and actions to prioritize and address key habitat factors and areas.

The Recovery Plan also includes a series of appendices which provide more detailed descriptions of species programs, and methods addressed by the Plan.

- A focal fish species appendix provides detailed descriptions of the status and limiting factors of listed salmon and steelhead species which augment the summary information included in the species chapter of Volume I.
- Other sensitive fish and wildlife species, or species of special ecological or recreational significance in the lower Columbia region are addressed in a separate appendix which identifies strategies and measures to guide related fish and wildlife program activities.
- Appendices also include detailed descriptions of related programs, a technical framework for economic analysis of recovery actions, and more detailed descriptions of methods for assessment results reported throughout the Plan.