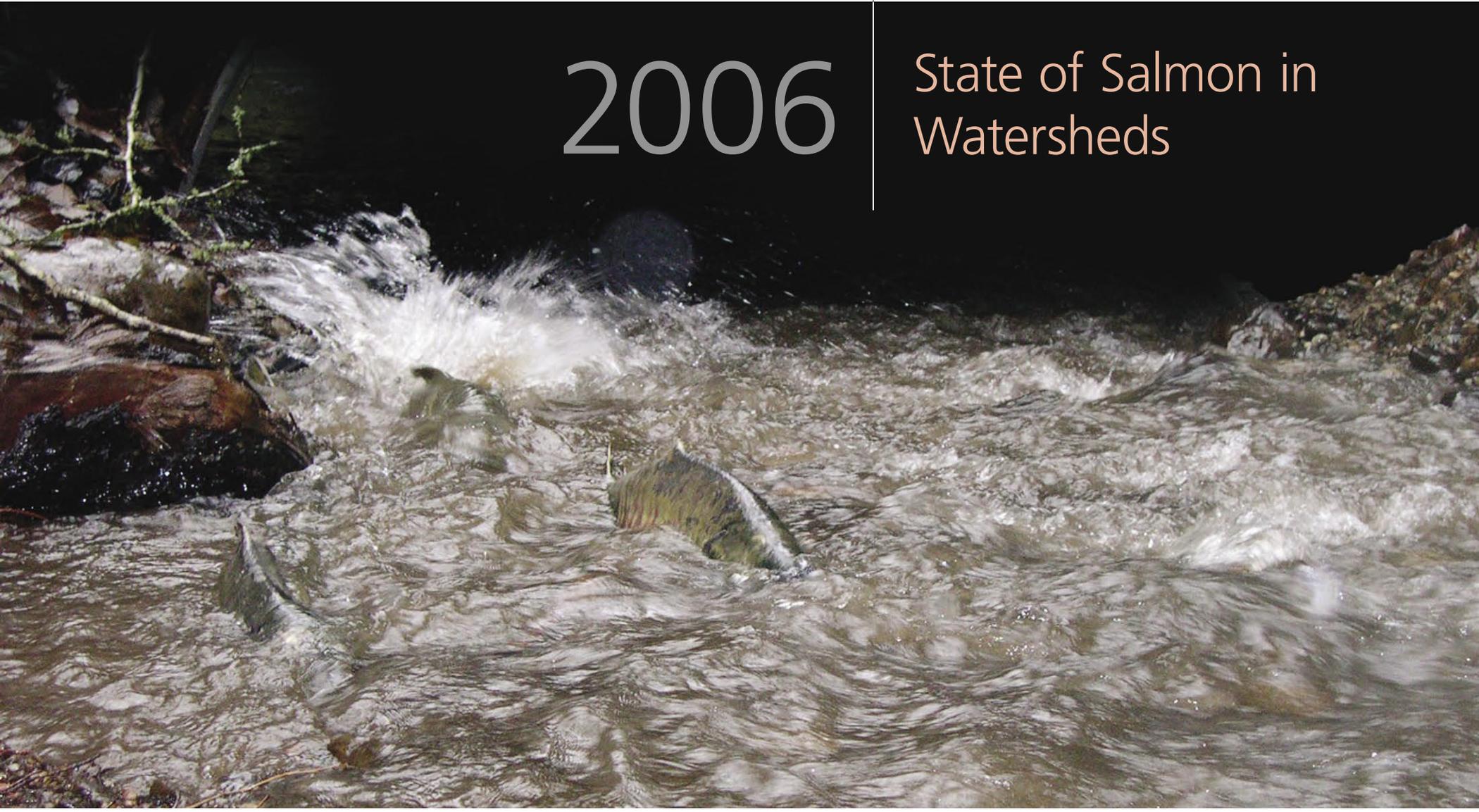


State of Washington
Governor's
Salmon Recovery
Office



2006

State of Salmon in
Watersheds



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If you would like copies of this document in an alternative format, please contact the Governor’s Salmon Recovery Office at the address listed above.

COVER PHOTO

Laura Till
Washington Department of
Fish and Wildlife

PROJECT PHOTOS

Courtesy of Salmon Recovery Funding Board, Regional Recovery Organizations, Lead Entities, and Tulalip Tribes

LANDSCAPE PHOTOS

Chris Drivdahl
Governor’s Salmon
Recovery Team

A wide, calm river flows through a valley, flanked by lush green forests and rolling hills. In the distance, mountains rise under a sky filled with soft, white clouds. The water reflects the light, and a small island is visible in the middle of the river. The overall scene is peaceful and scenic.

Salmon, from the Latin *salmo*, to leap.

Our Vision

To restore salmon, steelhead, and trout to healthy harvestable levels and improve habitats on which fish rely.



CHRIS DRIVDAHL

Our Goals and Strategies

Wild salmon populations will be productive and diverse

- ▶ Sustain salmon productivity by providing wild spawner escapement, conserving genetic diversity, and meeting basic needs of salmon for spawning, rearing and migration in watersheds and ecosystems. Stewardship of salmon will be the first priority in managing the resource.
- ▶ Meet the goal of the Endangered Species Act to return endangered and threatened species to the point where salmon no longer need the statute's protection.

We will have coordinated, science-based salmon recovery efforts

- ▶ Achieve cost-effective salmon recovery and use government resources efficiently.
- ▶ Use the best available science and integrate monitoring and research with planning and implementation.
- ▶ Ensure that citizens, salmon recovery partners and state employees have timely access to information, technical assistance and funding they need to be successful.

Our habitat, harvest, hatchery, and hydropower activities will benefit wild salmon

- ▶ Freshwater and estuarine habitats are healthy and accessible.
- ▶ Rivers and streams have flows to support salmon.
- ▶ Water is clean and cool enough for salmon.
- ▶ Hatchery practices meet wild salmon recovery needs.
- ▶ Harvest management actions protect wild salmon.
- ▶ Compliance with resource protection laws is enhanced.

Citizens and salmon recovery partners are engaged

- ▶ Create partnerships among governments and citizens. Provide leadership, coordination and technical assistance to create agreements on salmon recovery decision-making frameworks and recovery plans. Integrate scientific data with local knowledge and build in local flexibility and control.
- ▶ Inform, build support, involve and mobilize citizens to assist in restoration, conservation and enhancement of salmon habitat.

We will meet Endangered Species Act and Clean Water Act requirements

- ▶ Strengthen land, water, and fishery management policies, programs, and activities to avoid, minimize, and mitigate human impacts on salmon populations and their habitat.
- ▶ Seek Endangered Species Act compliance for state guidelines, regulations, and plans; permitting activities; funding of projects/activities; and state lands, facilities, and infrastructure.

Salmon Recovery Milestones 1990-2006

1990

1990 Ocean and Puget Sound marine coho and chinook fishing restrictions are underway to address coho population declines coast-wide.

Regional Fisheries Enhancement Groups are created by the Legislature.

1991 Federal government lists Snake River sockeye salmon as endangered.

1992 Federal government lists Snake River summer and fall chinook salmon as threatened.



1993 Wild Stock Restoration Initiative and Wild Salmonid Policy adopted by Department of Fish and Wildlife.

The Columbia River hydropower **biological opinion (BiOp)** is issued by federal agencies.

1994 The federal government adopts the **Northwest Forest Plan**.

A federal court rejects the 1993 BiOp.

1995 The federal government initiates overhaul of the way the federal power system is to be operated on the Columbia River.

1996 Department of Natural Resources adopts a **Habitat Conservation Plan** for 1.4 million acres of state-owned forestland.



1991

1992

1993

1994

1995

1996

1997

1997 Governor Locke brings together the state agencies that most affect salmon management in a forum called the **Joint Natural Resources Cabinet**.

The federal government lists Snake River steelhead as threatened and Upper Columbia steelhead as endangered.



1998 Governor Locke and Canadian Fisheries and Ocean Minister Anderson reach agreement to reduce fisheries.

The Legislature establishes the **Governor's Salmon Recovery Office**.

The **Independent Science Panel** is appointed by the Governor from recommendations by the American Fisheries Society.

Watershed Planning Units are created by the Legislature.

Lead Entities are also established by the Legislature.

The **Forests and Fish Agreement** is signed.

Lower Columbia Fish Recovery Board is established by the Legislature in Clark, Cowlitz, Lewis, Skamania, and Wahkiakum counties.



Federal government lists Lower Columbia River steelhead, and Upper Columbia, Northeast Washington, Lower Columbia, and Snake River bull trout as threatened.



1999 Locke/Anderson re-negotiate the landmark **Pacific Salmon Treaty**, providing a federal fund from which salmon restoration activities are to be paid.

The **Forests and Fish Agreement** becomes state law.

The **Salmon Recovery Funding Board** is established by the Legislature.

The **Statewide Strategy to Recover Salmon: Extinction is Not an Option** is completed.

Washington, Oregon, four Columbia River Treaty Tribes, and the federal government sign the **Columbia River Accord**.

Federal government lists Puget Sound Chinook, Hood Canal summer chum, Washington Coastal Lake Ozette sockeye, Lower Columbia River Chinook, Lower Columbia River chum, and Middle Columbia River steelhead as threatened. In addition, Upper Columbia spring Chinook is listed as endangered.



ESA listings of Chinook, coho, chum, and steelhead stocks in Washington now cover over 75% of the state.

1998	1999	2000	2001	2002	2003	2004	2005	2006
------	------	------	------	------	------	------	------	------

2000 Congress creates a federal hatchery reform initiative and establishes an independent **Hatchery Scientific Review Group**.

National Marine Fisheries Service and US Fish and Wildlife Service re-issue Biological Opinions for Federal Columbia River Power System operations.

The first **State Agency Action Plan**, a biennial implementation plan for the Statewide Strategy, is published.

The state's performance management system—**Salmon Recovery Scorecard**—is published.



The first **State of Salmon Report** is published.

2001 The Legislature mandates development of a **Comprehensive Monitoring Strategy** and action plan for watershed health with a focus on salmon recovery

2002 **Recovery Plan Model** is published.

2002 State of Salmon Report, the 2001-2003 State Agency Action Plan, and the 1999-2001 Action Plan Accomplishments are released.

The Comprehensive Monitoring Strategy is developed for consideration by the Governor and Legislature.

2003 **Regional Salmon Recovery Organizations** receive funding from the Salmon Recovery Funding Board to develop salmon recovery plans for listed salmon. These groups, working closely with local citizens, are the only organizations developing recovery plans for the purposes of the Endangered Species Act.

A federal judge hands back the **2000 Biological Opinion on operation of the Federal Columbia River Power System** for salmon and steelhead to NOAA Fisheries. The federal agency was told to resolve several deficiencies, including reliance on federal mitigation actions that have not undergone section 7 consultation under the Endangered Species Act, and reliance on range-wide off-site non-federal mitigation actions that are not reasonably certain to occur.

The Governor's Salmon Recovery Office produces the **2003-2005 State Agency Action Plan**, the third biennial implementation plan for the Statewide Strategy to Recover Salmon.



2004 The Governor signs Executive Order 04-03, creating the **Governor's Forum on Monitoring**. This Order establishes a coordinating body for monitoring salmon recovery and watershed health.

All Washington sub-basins submit their draft **Fish and Wildlife Sub-basin Plans** to the Northwest Power and Conservation Council on time. Collectively, the plans represent the largest compilation of data on fish, wildlife and environmental conditions ever in the Columbia River Basin.

The federal government issues a **Draft Hatchery Policy**, indicating how hatchery fish will be considered in salmon recovery, and revises its Status Reviews for listed fish in Washington. The latter proposes to down list Upper Columbia steelhead from endangered to threatened, and lists Lower Columbia coho for the first time as threatened. All other listings in Washington are proposed to remain as previously listed.

The Federal Energy Regulatory Commission approves a 50-year **Mid-Columbia Habitat Conservation Plan** as part of the relicensing process for three mid-Columbia dams.



The Lower Columbia Fish Recovery Board completes the **first salmon regional recovery plan** in Washington.

The Governor's Salmon Recovery Office publishes the **2004 State of Salmon in Watersheds Report**.

2005 **Draft recovery plans are completed** and delivered to NOAA-Fisheries for Puget Sound, Hood Canal, Middle Columbia, Upper Columbia, and Snake River Regions.

NOAA-Fisheries lists Lower Columbia coho as a threatened species, and down-lists Upper Columbia steelhead from endangered to threatened.

2006 **NOAA-Fisheries adopts the Lower Columbia recovery plan**, stating they were "...committing to implement the actions in the Interim Plan and supplement...work cooperatively on implementation...and encourage other Federal agencies to implement actions..."

NOAA-Fisheries places notices in the federal register of **intent to adopt interim recovery plans from all Washington salmon recovery regional organizations**.

A Habitat Conservation Plan for 1.6 million acres of forested state trust lands—mostly in Western Washington—in the range of the northern spotted owl is adopted by the federal government. This 70-year management plan is an agreement between DNR and federal agencies under the Endangered Species Act to guarantee that habitat commitments are met, while not penalizing the occasional incidental "take" of a federally listed animal or its habitat.

// It is my hope
that the enthusiasm
and spirit [to recover salmon]
in communities across the
state will continue for years
to come. //

**GOVERNOR
CHRISTINE GREGOIRE**

CHRIS DRIVDAHL



A letter from the Governor



Dear Reader:

The 1998 Washington Legislature had a bold vision. They believed Washingtonians knew how to protect and recover salmon, better than anyone else. They asked citizens to take the lead in salmon recovery by combining local and regional efforts into

a collaborative, statewide approach that would ensure public participation in salmon recovery.

Since then, many different groups and individuals across Washington have stepped up to this challenge. Representatives from agriculture, business, state and tribal governments, watershed coalitions and volunteer organizations came together and got to work.

Rather than waiting for direction from the federal government, we took the initiative and worked to develop salmon recovery plans from the bottom up. Today, these recovery plans are guiding major protection, recovery and restoration projects.

We have asked the federal government to adopt these plans under the Endangered Species Act. This has not been a simple undertaking and it is likely that nowhere in the United States has seen a grassroots effort quite like what has unfolded

in Washington. These plans serve as the beginning, not the end, of a tremendous amount of work to reclaim salmon populations that are healthy, harvestable and sustainable.

However, the best plans produce results, so we now must ask ourselves, "Are we making a difference?" We must demonstrate a good return on taxpayer dollars and we must be accountable, not only to the people who are funding our efforts, but to future generations as well. These questions and our answers will determine if we are successful and whether our grandchildren will enjoy the bounty and beauty of these great fish.

I am proud of efforts in Washington on behalf of salmon recovery. It is my hope that the enthusiasm and spirit in communities across the state will continue for years to come. Thank you for your interest in, and your dedication to, protecting this important part of our shared heritage.

Sincerely,

CHRISTINE O. GREGOIRE
WASHINGTON STATE GOVERNOR
DECEMBER 2006

Preface

This is the fourth in a series of biennial State of Salmon Reports. They have evolved over time in response to the emergence of recovery plans, and to better provide the most important information to our citizens and decision-makers in the clearest way possible.

Tracking and understanding the performance of our recovery efforts is challenging because of the diversity, technical complexity, and magnitude of actions being taken. Recovery actions are occurring across the state, from habitat restoration project sites in watersheds, to region-wide approaches for resource management, to statewide programs that affect how resources are regulated.

Recovery plans uniquely draw upon local and statewide actions, and add actions that are needed to address factors limiting salmon at the scale of the regional plan.

As the actions called for in recovery plans are being implemented, we need to be able to answer things like, "How are we doing?" "Have we made it?" "How much farther do we have to go?"

CHELAN COUNTY LEAD ENTITY



// The conservation of a great fishery resource involves a variety of circumstances, concerning which there is a dearth of information at the present time... //

US COMMISSIONER OF FISHERIES REPORT, 1937

Performance Monitoring Is Key

Without measuring the right things, we won't be able to tell how we are doing or if we need to adjust our course. In the last State of Salmon Report, we used a three-tiered approach to reporting our progress—at watershed, regional, and statewide scales. In this report we continue that approach and refine our look at information and monitoring from all three perspectives.

1 Watershed Scale Each watershed is complex, and people who are working to recover salmon want to see how their efforts are progressing. Watershed-scale monitoring is important because salmon will be recovered watershed-by-watershed, population-by-population. Protection and restoration actions are designed to address the specific limiting factors identified in each watershed, and we need to collect information at this scale to determine if we are solving those problems. Key high-level indicators at this scale will help inform local decision-makers and watershed partners about progress they are making, and should roll-up into indicators at other scales.

2 Regional Scale Our salmon recovery regions have been closely aligned with Evolutionarily Significant Units (ESUs), the scales at which salmon are listed under the Endangered Species Act (ESA). The many watershed and population actions must be rolled up to regional/ESU scales, and in turn, the status and trends of key indicators must be evaluated across the watersheds into a regional picture to see whether the listed species and their habitats are recovering. Key high-level indicators at the regional scale are important for regional decision-makers, stakeholders, and citizens to understand how well their plan is progressing. Regional indicators will be essential for providing NOAA with the information it needs to make ESA delisting decisions.

3 Statewide Scale This is the highest-level view and is represented by our “Baker’s Dozen Dials.” It is intended to give Congress, the Governor, and legislators a quick snapshot of what is happening in recovery across the state. Even more than for the other two scales, it requires much simplification and “plain talk” and because of its coarse scale, information that contributes to these indicators at the regional and watershed scales is typically masked. But, it is valuable as a quick and easy to understand the big picture of our progress.

Monitoring is occurring at each of these three scales, although many gaps exist. In addition, the parties tracking information can vary within and across scales, and often the data must meet other needs and mandates, which makes taking full advantage of what we have difficult. However, in keeping with our previous commitments, we attempt to make full use of all existing information.

It is still much too early to know if our efforts are working, and trends are still difficult to assess. But, we think this is a snapshot of important information that will help guide us in future decisions about this important part of our Northwest landscape.

2006 Salmon Recovery | High Level Indicators



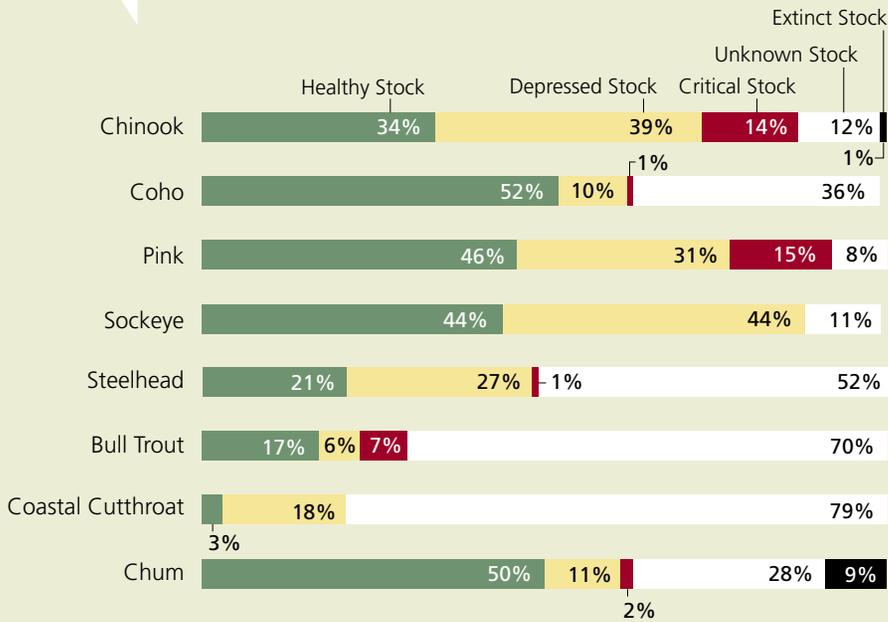
The art and science of measuring our progress have been evolving since we first began work on them in 1999. We still maintain the guiding principles of simplicity, brevity, objectivity, and clarity as we try to perfect the best set of statewide high-level indicators that can answer the questions people most want to know about our progress in salmon recovery. This year we have added hydropower, one that we feel will round out the picture of the four H's: Habitat, Harvest, Hatcheries, and Hydropower.

As in previous reports, these are the basic "dials" we are using as indicators of our work in salmon recovery. Because they are very general and represent a roll up of regional and watershed information, they mask much of what is going on at those other scales. However, they offer a quick and easy-to-understand reference point that relates to statewide questions of greatest interest.

As always, the more detailed information that lies beneath these indicators can be accessed through Washington's natural resource data portal at www.swim.wa.gov

► These basic "dials" are indicators of our work in salmon recovery. They offer a quick and easy-to-understand reference point that relates to statewide questions of greatest interest.

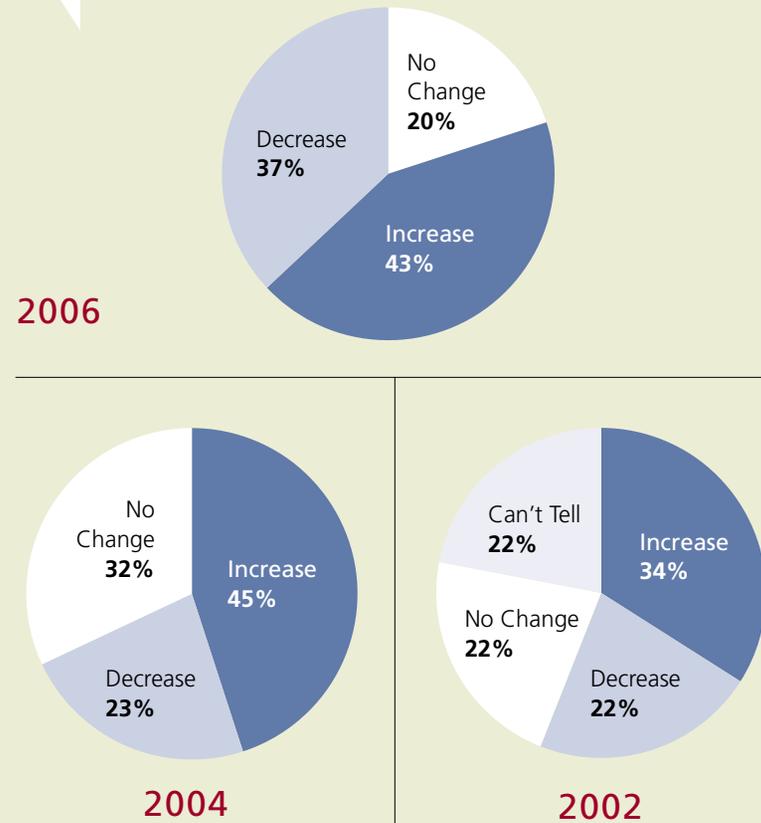
Fish Status Summary



- Status ratings are determined by the Washington Department of Fish and Wildlife and tribes.
- Summary is for 2006.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

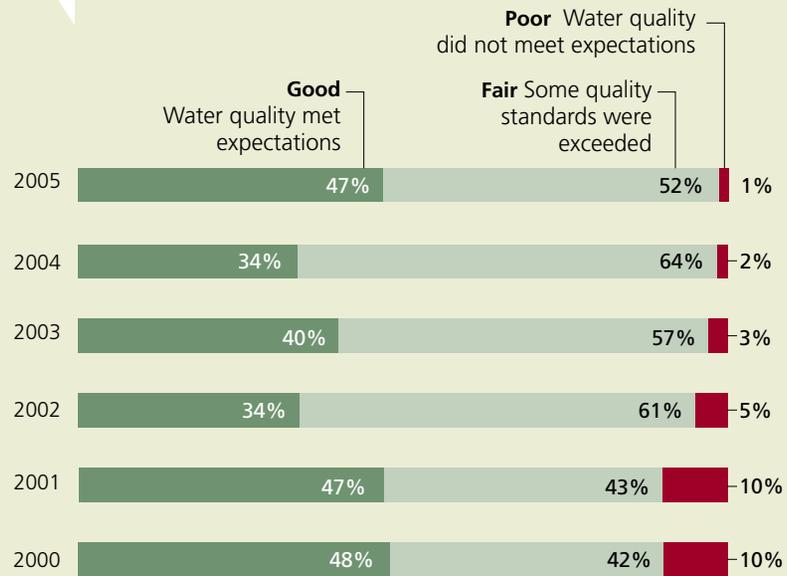
Trends in Wild Juvenile Salmon Production



- Pie charts represent 32 sampled stocks of all species statewide whose trends were increasing, decreasing, not changing, or unknown.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

Water Quality in Watersheds



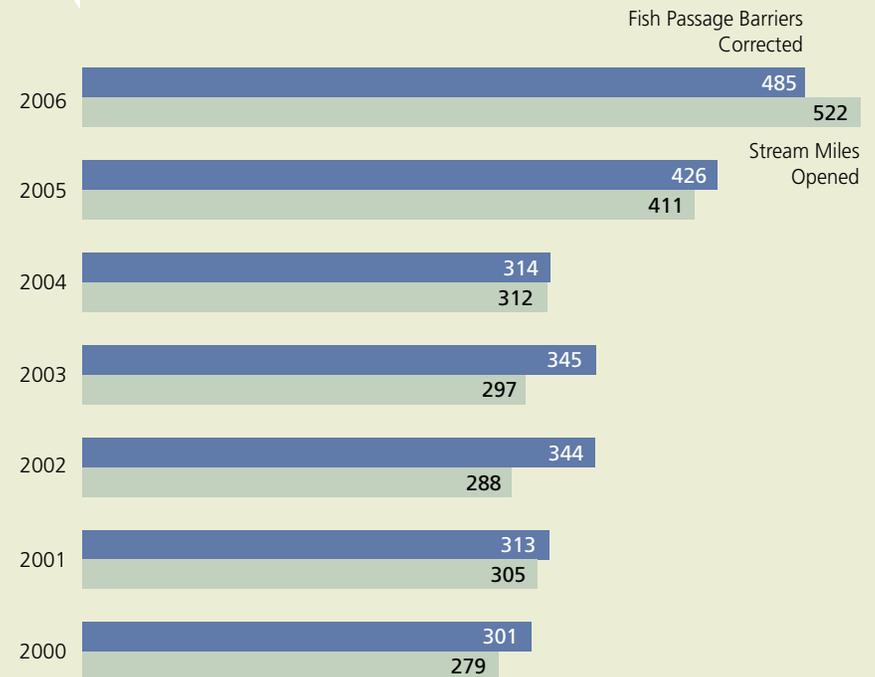
Water quality is measured by **Water Quality Index (WQI)**. This is a number that aggregates water quality data at a monitoring station for temperature, pH, fecal coliform bacteria, dissolved oxygen, nutrients, and sediments over a 12 month period.

62 sampling stations are monitored statewide in 62 watersheds.

A water year runs from October 1 until September 30.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY.

Fish Passage Barriers Corrected and Stream Miles Opened



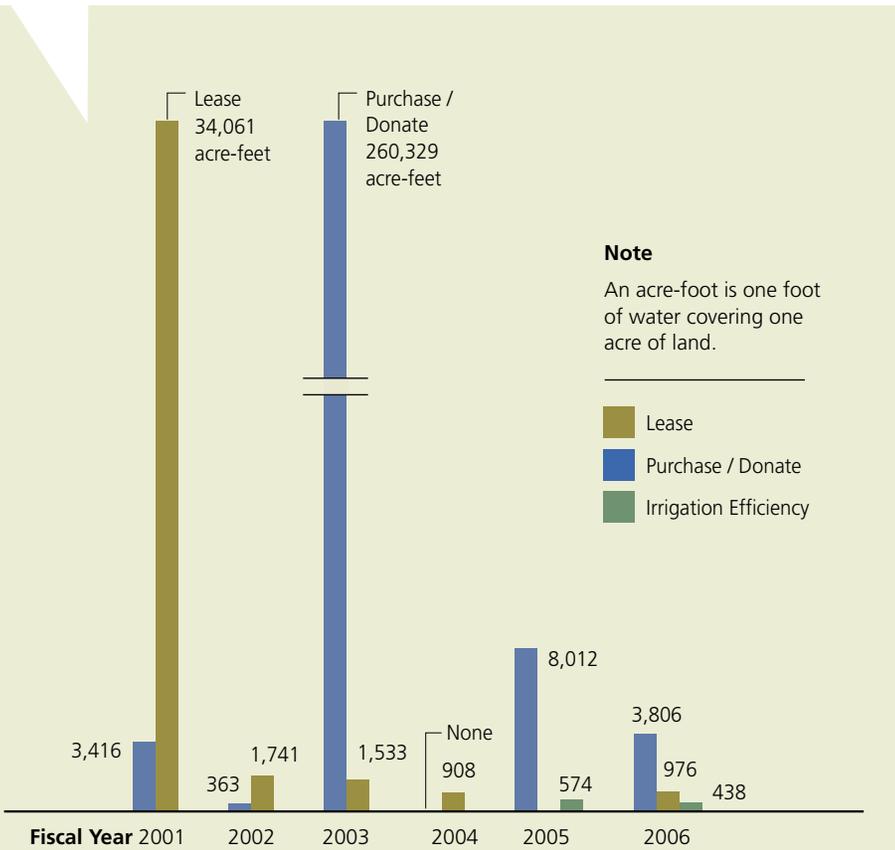
Number reflects the estimated number of barriers corrected statewide in a given year. Because of incomplete reporting, these numbers are expected to be lower than actual values.

Miles reflect the number of miles that are estimated to be opened as a result of barrier correction by year.

2006 data not complete at time of publication

DATA SOURCES: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF NATURAL RESOURCES, WASHINGTON DEPARTMENT OF TRANSPORTATION, SALMON RECOVERY FUNDING BOARD, FORESTS AND FISH, TRIBES AND LOCAL GOVERNMENTS. US FOREST SERVICE DATA AND BUREAU OF LAND MANAGEMENT INCLUDED AFTER 2002.

Acre-Feet of Water Restored to Streams



Note
An acre-foot is one foot of water covering one acre of land.

■ Lease
■ Purchase / Donate
■ Irrigation Efficiency

Restored water includes water from purchases, donations, or leases. The focus is on summer low flow periods and instream reaches where water availability is a limiting factor for fish.

Irrigation efficiencies restored to streams not tracked prior to 2005.

FY2003 represents a major commitment of federal funds to the Yakima River Enhancement Project.

300,000 acre-feet is almost 100,000 billion gallons—enough water to support the population Washington for almost 4 years.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

Endangered Species Act Compliant Harvest Goals



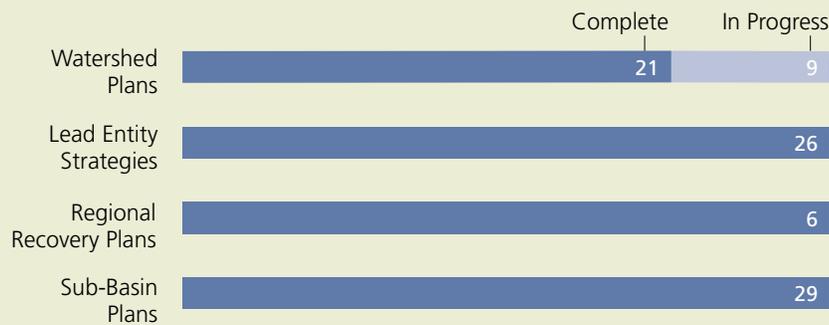
Data are for non-tribal fisheries.

NOAA-Fisheries has determined that established harvest protection goals do not negatively impact stocks or the ability to recover them.

- Fisheries met ESA harvest goals approved by NOAA-Fisheries
- Fisheries exceeded ESA harvest goals approved by NOAA-Fisheries by up to 15%
- Harvests exceed compliance with NOAA-Fisheries goals by less than 5%

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

Salmon Recovery Plan Status



► Watershed plans are developed under the Watershed Planning Act (RCW 90.82).

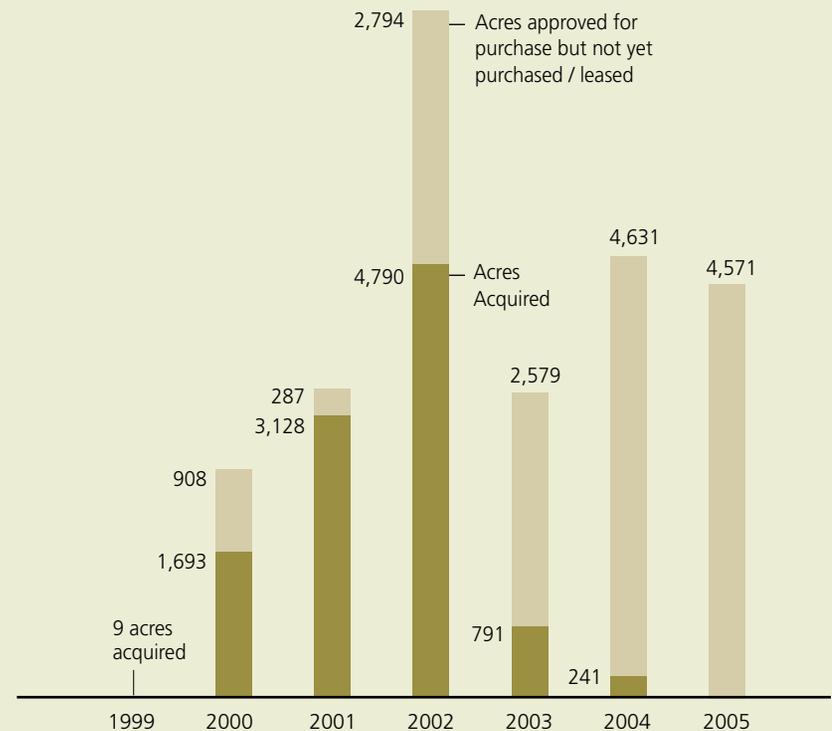
► Lead Entity Strategies are developed under the Salmon Recovery Act (RCW 77.85). A strategy is a habitat protection and restoration action plan for a watershed(s).

► Regional recovery plans are developed under the Salmon Recovery Act (RCW 77.85). All were submitted to NOAA-Fisheries by June 2005; they included one sub-regional (ESU) plan.

► Sub-basin plans are done under the Northwest Power and Conservation Council.

DATA SOURCE: GOVERNOR'S SALMON RECOVERY OFFICE

Acres Acquired for Salmon Restoration (Proposed)



► Funding by Salmon Recovery Funding Board.

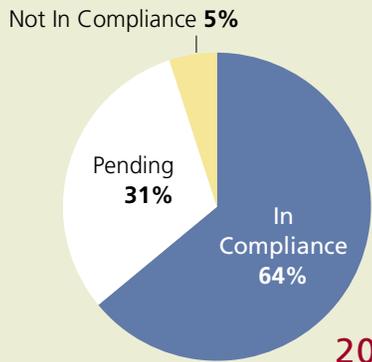
► Acres have been approved for purchase but actual acquisitions may be less.

DATA SOURCE: INTERAGENCY COMMITTEE FOR OUTDOOR RECREATION.

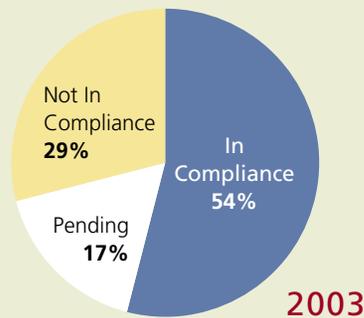
Hatchery Management Plans Meeting Endangered Species Act



2006



2004



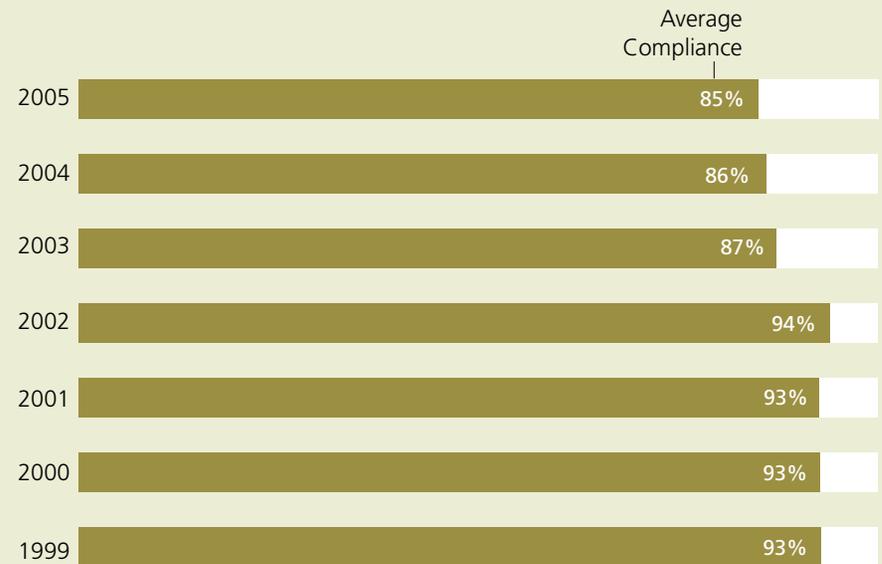
2003

► ESA compliance is measured by Hatchery Genetic Management Plans (HGMP) approved by NOAA-Fisheries and USFWS; a hatchery in compliance with ESA is consistent with wild salmon recovery.

- 418 hatchery programs included in 2003 and 2004.
- 422 hatchery programs included in 2006.
- 1% pending includes HGMPs for newly added programs not yet submitted to NOAA.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

Average Compliance Rate for Salmon and Steelhead Fishers



1999 Compliance based on 2,506 arrests and written warnings during 35,548 contacts.

2000 3,570 arrests and written warnings during 49,603 contacts.

2001 4,168 arrests and written warnings during 57,035 contacts.

2002 2,749 arrests and written warnings during 46,343 contacts.

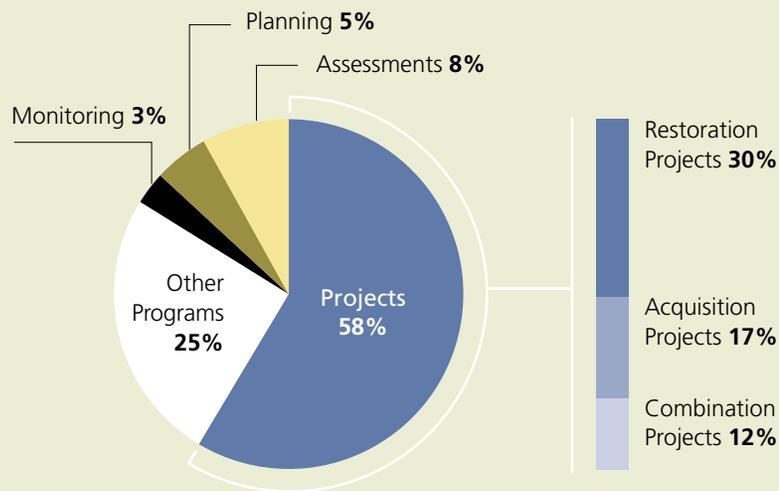
2003 6,768 violators during 53,189 contacts. **Note:** 2003 data differ from previous years and are reflective of a new activity reporting system for officers and revised definition of "violators."

2004 6,730 violators during 49,621 contacts.

2005 7,300 violators during 78,355 contacts.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

Salmon Recovery Funding Board (SRFB) Grants

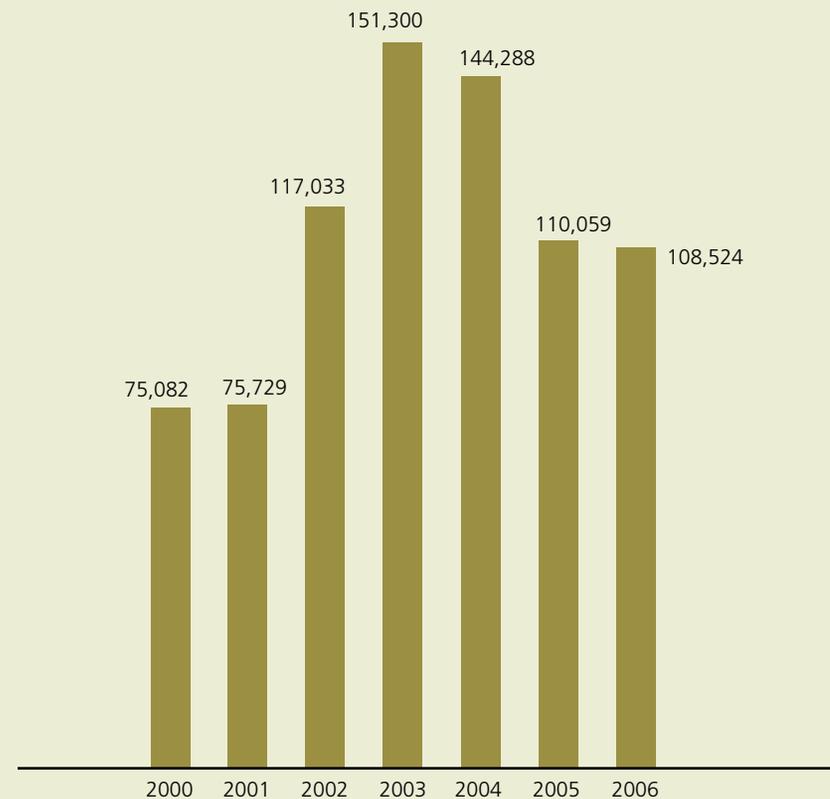


- Combination projects include both acquisition and restoration work.
- Other programs include those required or recommended by Congress, the Legislature, and NOAA-Fisheries, including Forests and Fish implementation, fish marking, lead entity support and other agency programs.

- FY2000-FY2005
- Sponsor matches exceed \$87.8 million.
- 718 projects funded.

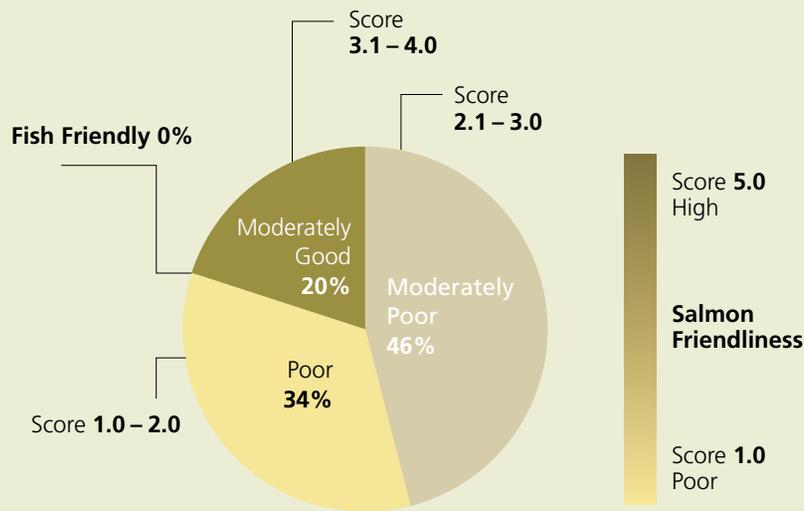
DATA SOURCE: INTERAGENCY COMMITTEE FOR OUTDOOR RECREATION.

Volunteer Hours in Watershed and Salmon Recovery Activities



DATA SOURCES INCLUDE WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, REGIONAL FISHERIES ENHANCEMENT GROUPS, WASHINGTON DEPARTMENT OF ECOLOGY, PLANNING UNITS, REGIONAL PLANNING ORGANIZATIONS, AND CONSERVATION COMMISSION.

Salmon Friendliness of Hydroelectric Projects



Projects were evaluated on the basis of adult passage and survival, juvenile passage and survival, water quality, flow regulation, mitigation for salmon production and/or habitat loss, license or operation guidelines, and cumulative impacts.

54 hydroelectric projects licensed by the Federal Energy Regulatory Commission (FERC) were considered.

// The first man to discover Chinook salmon in the Columbia, caught 264 in a day and carried them across the river by walking on the backs of other fish. His greatest feat, however, was learning the Chinook jargon in 15 minutes from listening to salmon talk. **//**

NATIVE AMERICAN
LEGEND

DATA SOURCE: DEPARTMENT OF FISH AND WILDLIFE

Regional Views

Mapping Our Progress¹

Washington's statewide recovery strategy says our habitat, harvest, hatchery, and hydropower activities will benefit wild salmon. State, federal, local, and tribal programs all have an influence on how this is accomplished. Recovery plans developed by regional organizations have inventoried and assessed current conditions, examined options for improving these conditions, agreed on goals, and proposed implementation actions by all that would achieve the goals. Implementation has begun. But, we need to routinely collect information all along the path that will help us stay on a course that achieves our goals.

Those working on monitoring and adaptive management in watershed and regional recovery efforts have made great strides but in most cases those chapters of plans are still in construction. In general, however, they all contain important common goals and

objectives. They want to improve the certainty that the actions undertaken are having the desired results, and that the actions are contributing to an increase in the character of salmon populations that eventually will determine whether those populations can be removed from the Endangered Species Act (ESA) list. It is also important that they are able to provide information on how the habitat upon which salmon depend is improving.

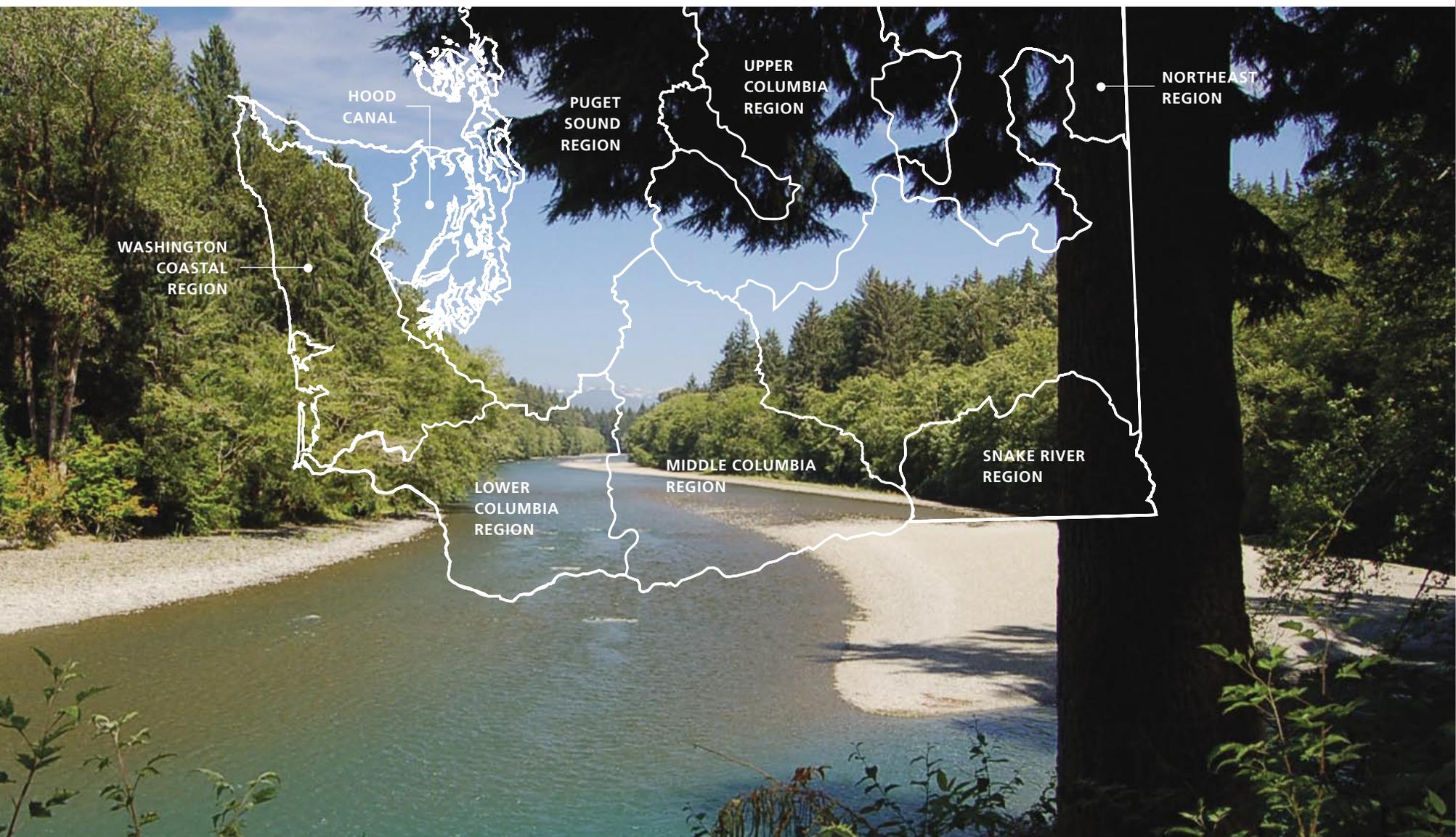
Simply put, monitoring should tell us, "Did we make it?"

At the same time, there will be limits to our ability to answer all high level questions at all scales, everywhere, all of the time. We will need to make informed choices about the most important things to monitor. Identifying key questions is an essential step toward that end.

// ...on my return to my lodge an indian called me in to his bower and gave me a small morsel of the flesh of an antelope boiled, and a peice of a fresh salmon roasted; both which I eat with a very good relish. this was the first salmon I had seen and perfectly convinced me that we were on the waters of the Pacific Ocean. //

MERIWEATHER LEWIS,
AUGUST 13, 1805

Salmon Recovery Regions



Some Key Questions

In 2000, we posed some questions that we wanted our high level statewide monitoring programs to answer. These questions informed selection and use of the indicators in the statewide “Dozen Dials.” For this report we also applied them to the regional scale and asked agencies and regional organizations to address the following questions and indicators:

Question:
Are hydroelectric facilities operating in a fish friendly manner?

- Measures:**
- ▶ Upstream passage goals at FERC licensed facilities
 - ▶ Actual passage achieved
 - ▶ Downstream passage goals
 - ▶ Actual passage achieved

Question:
Are streams accessible to wild salmon?

- Measures:**
- ▶ Barriers to anadromous fish passage
 - ▶ Miles of anadromous waters blocked

Question:
Do rivers and streams have flows that support wild salmon?²

- Measures:**
- ▶ Instream flows set³
 - ▶ Percent of time flow is met during low flow periods critical for fish⁴

Question:
Is water clean and cool enough to support wild salmon?⁵

- Measures:**
- ▶ Number of stream segments where waters did not meet water quality criteria for temperature, dissolved oxygen, pH, and fecal coliform⁶

Question:
Are listed populations abundant and productive?⁷

- Measures:**
- ▶ Run size wild component, 5 year average pre-listing and post-listing
 - ▶ Wild juvenile production, change from baseline mean⁸

Question:
Does harvest protect wild salmon?⁹

- Measures:¹⁰**
- ▶ Recovery plan spawner escapement goal
 - ▶ Number of wild spawners
 - ▶ Percent of wild fish harvested

Question:
Do hatchery practices meet the needs of wild fish?

- Measures:**
- ▶ Scientific evaluation of hatchery practices
 - ▶ Actions accomplished from scientific evaluation

As regional organizations mature and complete their monitoring plans, the recovery indicators and measures will evolve. The regional indices we introduced in our last report will also be re-evaluated for their possible contribution to the regional picture. Until then, the following pages offer a quick look at what we know—and sometimes, what we don’t know—about our progress in some regional scale indicators.

New for 2006



Members of the Squaxin Island Tribe participate in the First Salmon Ceremony.

Northeast and Washington Coastal Regions

We are presenting information for the Northeast and Washington Coastal salmon recovery regions for the first time. Talks among the stakeholders and local, state, federal, and tribal governments are under way in both regions to evaluate how to best integrate the work that has already been done in lead entity habitat planning with larger scale recovery efforts. As recovery goals are adopted, we will expand coverage of these regions to match the others in this report.

Nearshore Ecosystems

We've added indicators that we think are important contributors to answering the question, "Do our nearshore ecosystems meet the needs of wild salmon?" Following recommendations of the Washington Comprehensive Monitoring Strategy for Watershed Health and Salmon Recovery, we have included snapshots of three important factors:

Percent of Shoreline Modification Shallow estuarine and nearshore habitats are structurally complex and dynamic. All juvenile salmon move along the shallows of estuaries and nearshore areas during their migration to the sea, and may be found in these habitats throughout the year. Changes in the

shorelines, which are particularly prevalent in the most populated areas of Washington, simplify and reduce intertidal habitat areas. These modifications affect migrant corridors, transition of the fish from fresh to salt water, their eating habitats, and their ability to forage and seek refuge from predators.

Herring Spawning Areas Forage fish in general, and herring specifically, are vital components of the marine ecosystem and are a valuable indicator of the overall health of the marine environment. Chinook and coho, as well as many species of sea birds and marine mammals, depend on herring as an important prey item. Reductions of herring spawning have a direct effect on salmon productivity.

Eelgrass Concentrations Eelgrass is considered one of the most important components of nearshore marine environments for salmon. Eelgrass beds grow in shallow bays and coves, tidal creeks, and estuaries. Damage to eelgrass affects whole populations of fish, as well as the stability of our shorelines.

Also new for this report are the **Watershed Watch** sections. These are found for each region with a recovery plan, where we look more in-depth at an example watershed and examine how well we are able to answer the questions developed in 2000.

Puget Sound Salmon Recovery Region



Puget Sound Basin lies between the Cascade and Olympic mountains in Northwest Washington. It is the second largest estuary in the United States and covers more than 16,000 square miles. Twenty percent of the area is land, as diverse as farms, forests, parks, small towns, and busy cities. The remainder is freshwater, estuarine, and marine waters; over 20 major river systems and their tributary creeks drain mountain elevations of 7000 feet or more and drop to sea level within 50 to 70 miles.

Puget Sound is home to two-thirds of the state's population. Draft Puget Sound Chinook and bull trout recovery plans were completed in June 2005 and posted in the Federal Register in December 2005. The draft Hood Canal summer chum recovery plan was submitted in November 2005 and placed in the Federal Register in August 2006.

Key Facts

LISTED FISH

Chinook (threatened)
Hood Canal summer chum
(threatened)
Bull trout (threatened)

MAJOR FACTORS LIMITING RECOVERY

- ▶ Degraded floodplain and channel structure
- ▶ Degraded nearshore/marine and estuarine conditions and habitat loss
- ▶ Degraded riparian area and loss of in-river large woody debris
- ▶ Excessive sediment
- ▶ Degraded water quality and temperature
- ▶ Impaired instream flows
- ▶ Barriers to fish passage

RECOVERY PLANNING STATUS

Draft recovery plans completed for Chinook in June 2005 and posted in Federal Register December 2005. Final adoption by NMFS expected January 2007. Draft summer chum plan submitted in November 2005 and placed in Federal Register August 2006.

REGIONAL RECOVERY ORGANIZATION

Puget Sound Shared Strategy (for Chinook); Hood Canal Coordinating Council (for summer chum).

FEDERALLY RECOGNIZED TRIBES

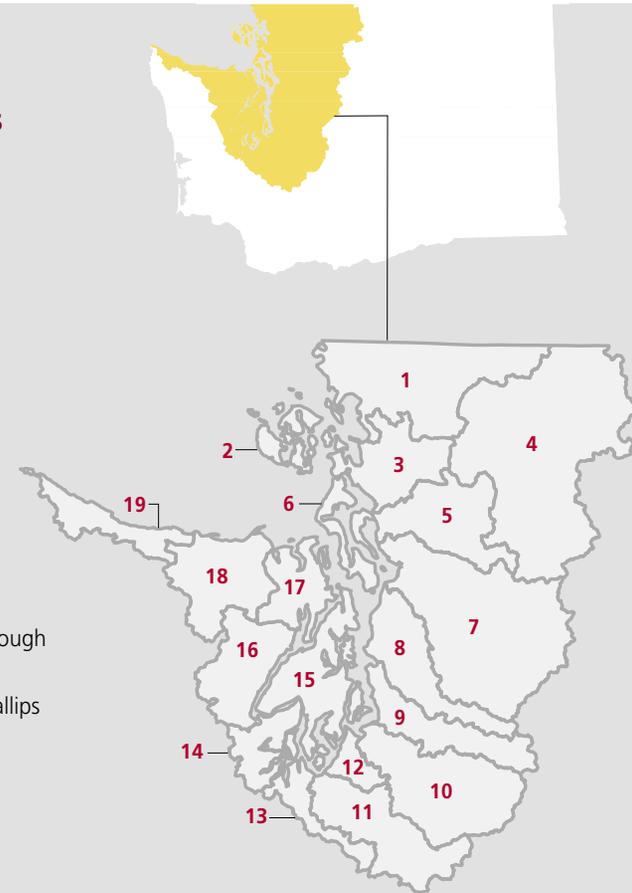
Lummi Nation, Nooksack, Stillaguamish, Jamestown S'Klallam, Muckleshoot, Nisqually, Port Gamble S'Klallam, Lower Elwha S'Klallam, Puyallup, Samish, Sauk-Suiattle, Skokomish, Squaxin Island, Stillaguamish, Suquamish, Swinomish, Tulalip, Upper Skagit, Snoqualmie.

COUNTIES

All or parts of Whatcom, Skagit, Island, San Juan, Snohomish, King, Pierce, Thurston, Mason, Kitsap, Jefferson, and Clallam.

WATER RESOURCE INVENTORY AREAS (WRIAs)

- 01 Nooksack
- 02 San Juan
- 03 Lower Skagit
- 04 Upper Skagit
- 05 Stillaguamish
- 06 Island
- 07 Snohomish
- 08 Cedar / Samish
- 09 Green / Duwamish
- 10 Puyallup / White
- 11 Nisqually
- 12 Chambers / Clover
- 13 Deschutes
- 14 Kennedy / Goldsborough
- 15 Kitsap
- 16 Skokomish / Dosewallips
- 17 Quilcene / Snow
- 18 Elwha / Dungeness
- 19 Hoko / Lyre





Area of Detail

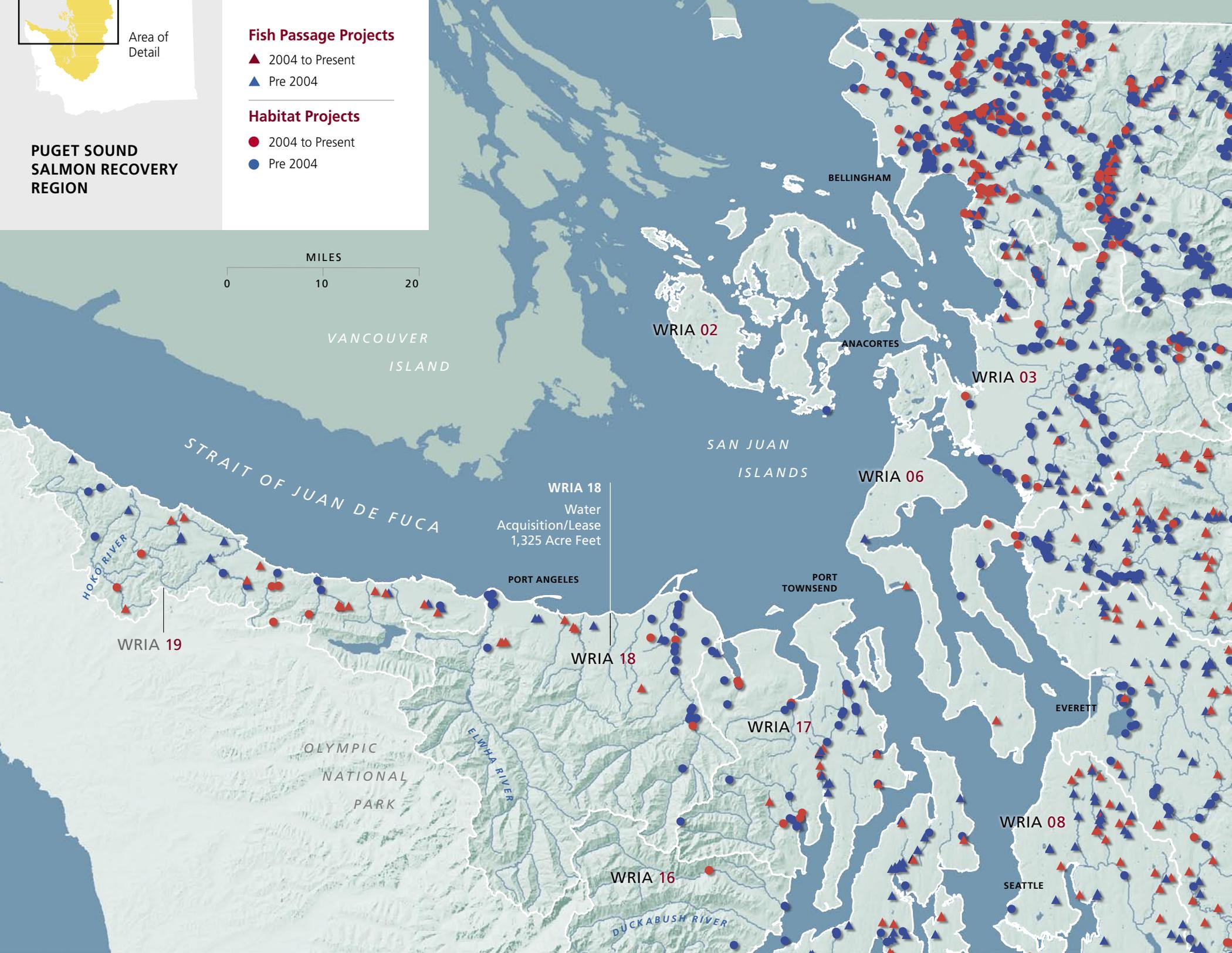
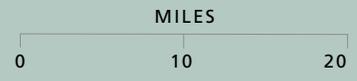
PUGET SOUND SALMON RECOVERY REGION

Fish Passage Projects

- ▲ 2004 to Present
- ▲ Pre 2004

Habitat Projects

- 2004 to Present
- Pre 2004



VANCOUVER ISLAND

WRIA 02

BELLINGHAM

ANACORTES

WRIA 03

SAN JUAN ISLANDS

WRIA 06

STRAIT OF JUAN DE FUCA

WRIA 18

Water Acquisition/Lease
1,325 Acre Feet

PORT ANGELES

PORT TOWNSEND

WRIA 18

WRIA 17

EVERETT

WRIA 08

OLYMPIC NATIONAL PARK

WRIA 16

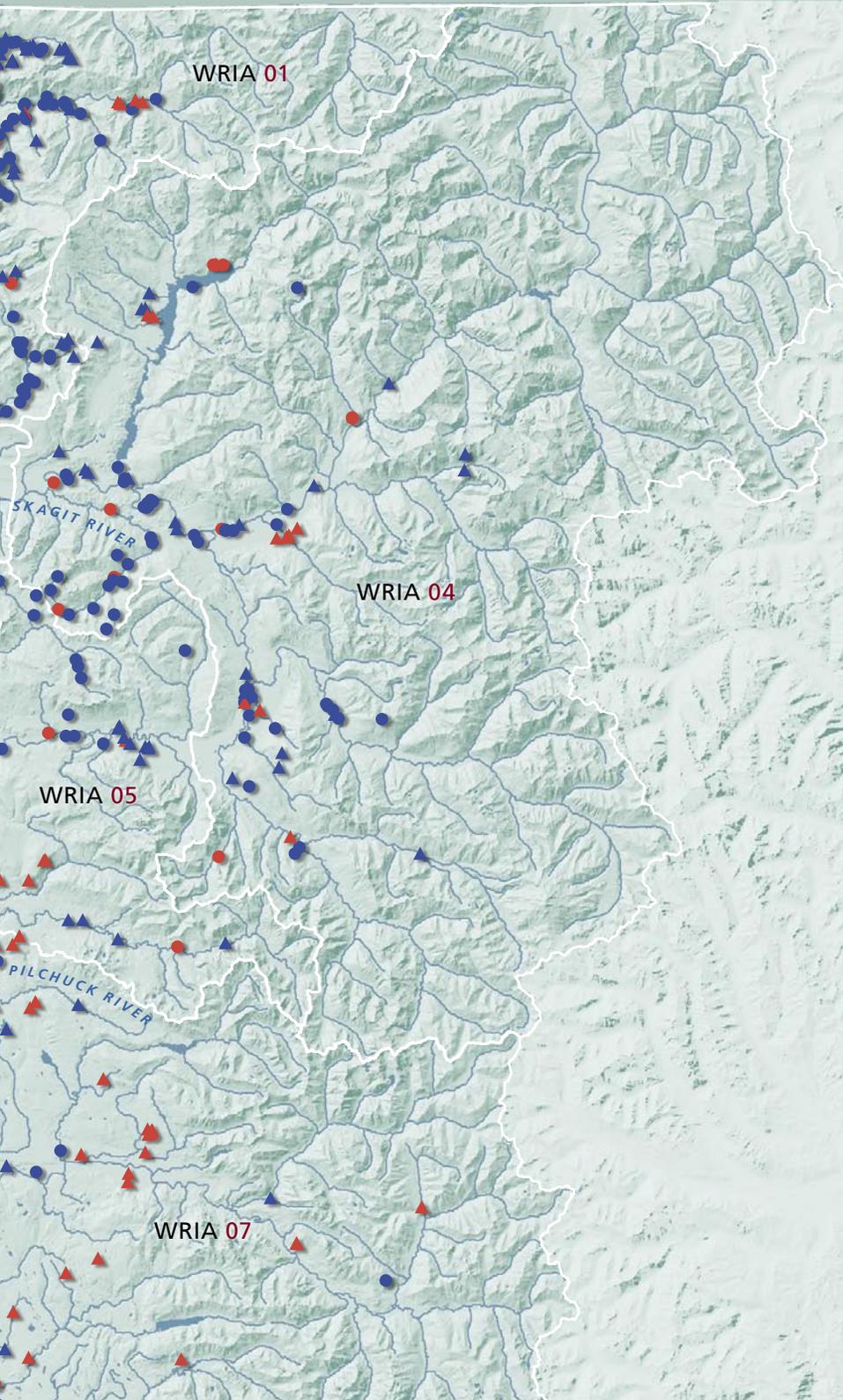
SEATTLE

HOKO RIVER

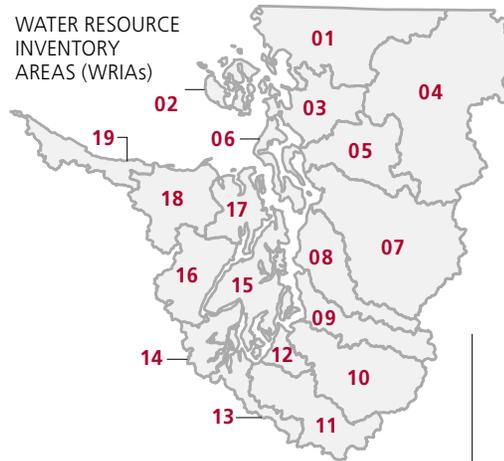
WRIA 19

ELWHA RIVER

DUCKABUSH RIVER



WATER RESOURCE INVENTORY AREAS (WRIAs)

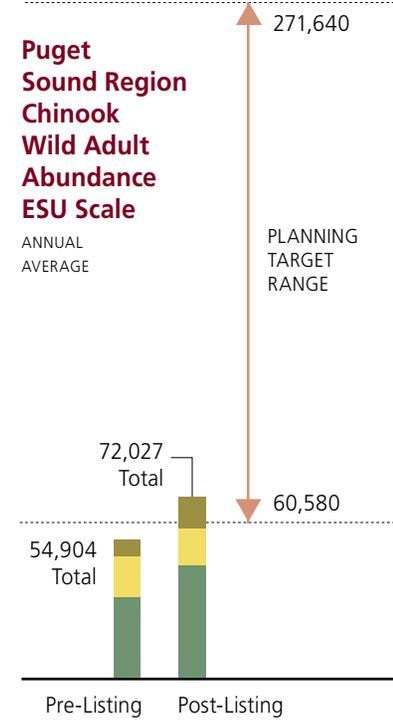


Watershed Cleanup Plans

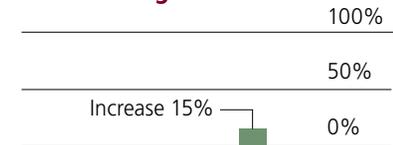
WRIA	Plans underway or completed	Plans Needed
WRIA 01	94	175
WRIA 02		3
WRIA 03	32	68
WRIA 04	1	1
WRIA 05	43	51
WRIA 06	3	3
WRIA 07	57	40
WRIA 08	33	162
WRIA 09	23	151
WRIA 10	42	60
WRIA 11	5	21
WRIA 12	3	20
WRIA 13	10	66
WRIA 14	10	67
WRIA 15	88	156
WRIA 16	12	21
WRIA 17	6	29
WRIA 18	16	26
WRIA 19		16

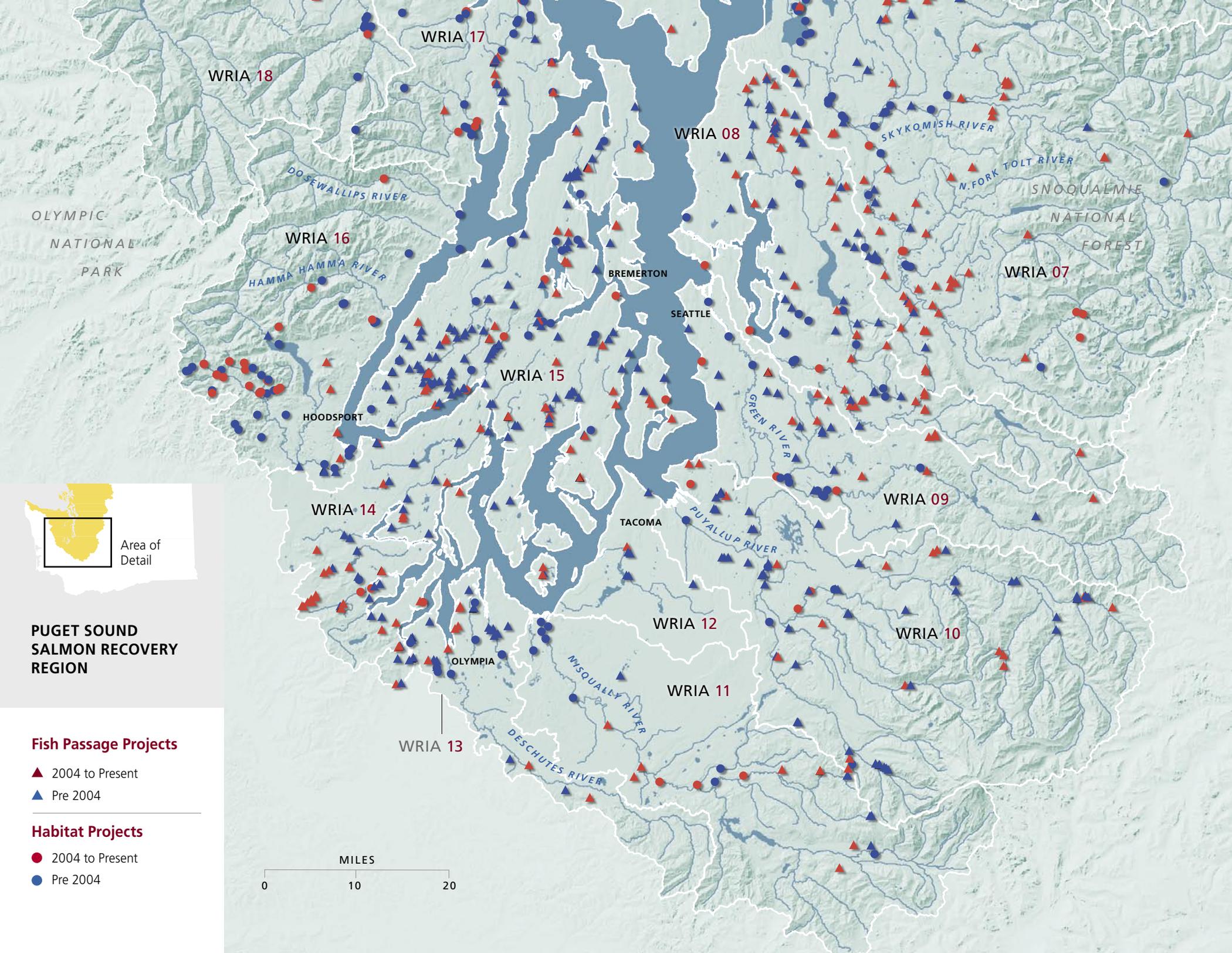
Puget Sound Region Chinook Wild Adult Abundance ESU Scale

ANNUAL AVERAGE



Puget Sound Region Wild Chinook Juvenile Production Since Listing





**PUGET SOUND
SALMON RECOVERY
REGION**

Fish Passage Projects

- ▲ 2004 to Present
- ▲ Pre 2004

Habitat Projects

- 2004 to Present
- Pre 2004



WRIA 18

WRIA 17

WRIA 08

WRIA 16

WRIA 07

WRIA 15

WRIA 09

WRIA 14

WRIA 12

WRIA 10

WRIA 11

WRIA 13

OLYMPIC
NATIONAL
PARK

SNOQUALMIE
NATIONAL
FOREST

DOSEWALLIPS RIVER

HAMMA HAMMA RIVER

SKYKOMISH RIVER

N. FORK TOLT RIVER

BREMERTON

SEATTLE

HOODSPORT

GREY RIVER

TACOMA

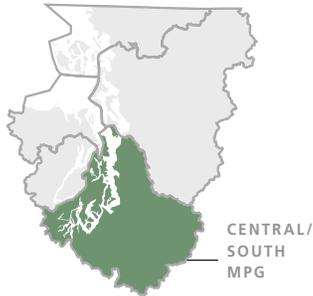
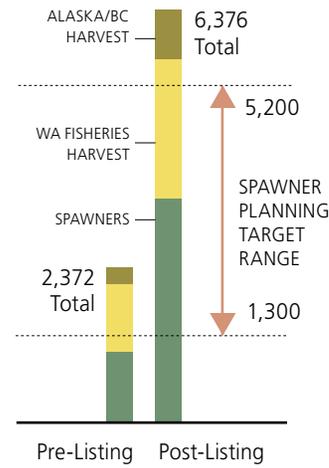
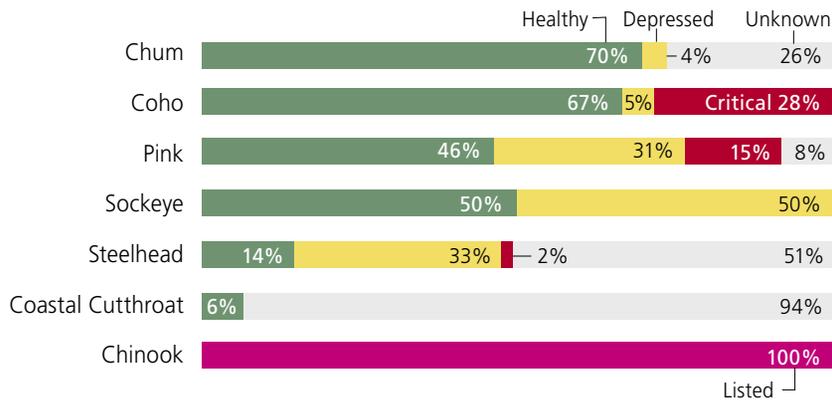
PUYALLUP RIVER

OLYMPIA

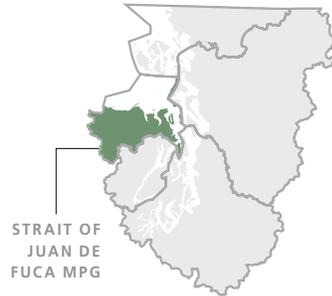
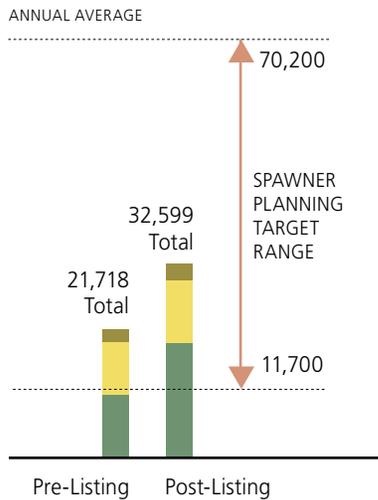
WISQUALLY RIVER

DESCHUTES RIVER

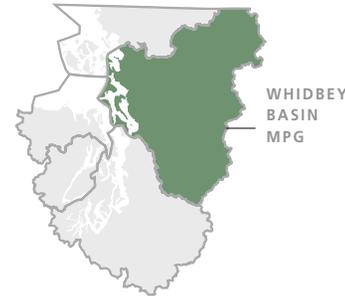
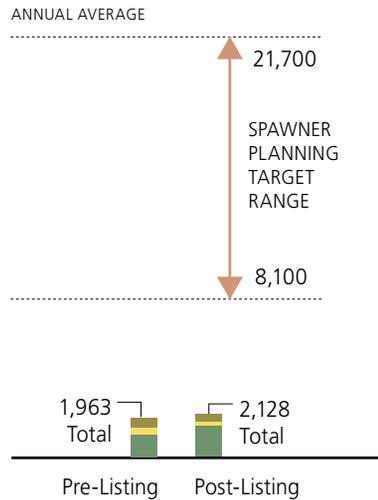
Fish Status



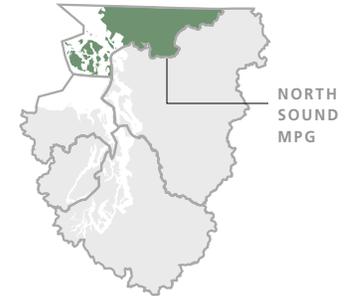
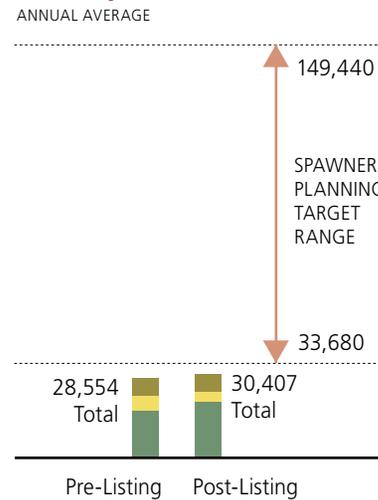
Chinook Wild Adult Abundance Central/South MPG



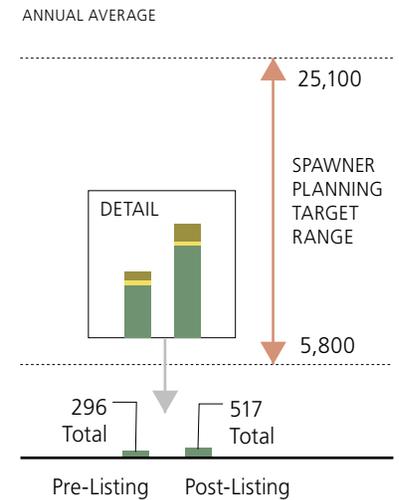
Chinook Wild Adult Abundance Strait of Juan de Fuca MPG



Chinook Wild Adult Abundance Whidbey Basin MPG



Chinook Wild Adult Abundance North Sound MPG





PUGET SOUND
SALMON RECOVERY
REGION

Watershed Watch Snohomish Basin WRIA 07



The Snohomish River Basin lies in King and Snohomish Counties in east-central Puget Sound. It covers 1,856 square miles (1,187,840 acres) and is the second largest watershed in Puget Sound. The Snoqualmie and Skykomish rivers are the major surface waters in

the watershed, and they converge to become the Snohomish River approximately 20 miles upstream of Puget Sound. Other major tributaries include the Tolt, Sultan, and Pilchuck.

The South Fork Tolt and Spada Lake Reservoirs supply water for more than a million people in Seattle, Everett, and nearby communities. About 75% of the watershed remains covered by natural vegetation. Municipal and industrial areas are concentrated along the western part of the major rivers and in and around Everett. Population growth is rapid, with a 59% growth rate projected for 2000-2030.

SNOHOMISH BASIN



WATER
RESOURCE
INVENTORY
AREA



Tulalip Tribes
Cultural Resources Survey
the Qwuloolt site

Qwuloolt Site
Planned for removal
in 2009

TULALIP TRIBES



Raging River
Restoration/Acquisition

SALMON RECOVERY FUNDING BOARD



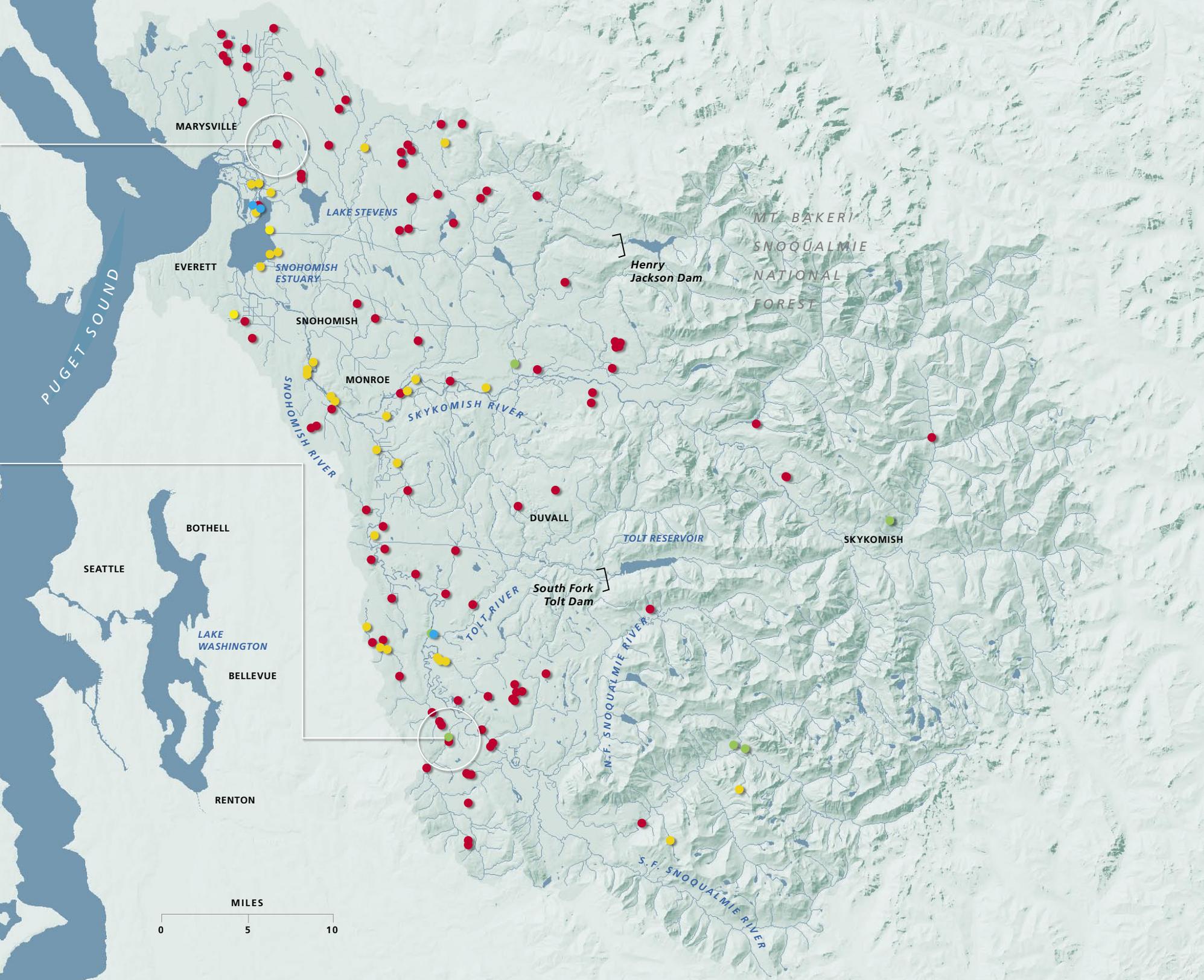
Wetland and
Natural Resources
Survey Crew



TULALIP TRIBES

RESTORATION PROJECTS

- Fish Passage
- Riparian
- Instream Habitat
- Instream Flows
- Estuary
- Upland
- Miscellaneous





SNOHOMISH BASIN WRIA 07 RECOVERY QUESTIONS

Are hydroelectric facilities operating in a “fish friendly” manner?

Indicator	Measured Results
Upstream passage goals at FERC licensed facilities	Black Creek, May Creek, Smith Creek, Twin Falls, Weeks Falls, Woods Creek: Unknown Jackson Project: None ; South Fork Tolt: None Required ; Overall: Unknown
Actual upstream passage achieved (any or all years for which data are available 1999-2006)	Black Creek, May Creek, Smith Creek, Twin Falls, Weeks Falls, Woods Creek: Unknown Jackson Project: None ; South Fork Tolt: None Required ; Overall: Unknown
Downstream passage goals at FERC licensed facilities	Black Creek, May Creek, Smith Creek, Twin Falls, Weeks Falls, Woods Creek: Unknown Jackson Project: None ; South Fork Tolt: None Required ; Overall: Unknown
Actual downstream passage achieved (any or all years for which data are available 1999-2006)	Black Creek, May Creek, Smith Creek, Twin Falls, Weeks Falls, Woods Creek: Unknown Jackson Project: None ; South Fork Tolt: None Required ; Overall: Unknown

Are streams accessible to wild salmon?

Indicator	Measured Results				
Inventory of major blockages	<table border="0"> <tr> <td>Complete barriers</td> <td>Partial barriers</td> </tr> <tr> <td style="text-align: center;">16</td> <td style="text-align: center;">24</td> </tr> </table>	Complete barriers	Partial barriers	16	24
Complete barriers	Partial barriers				
16	24				
Miles of anadromous waters inaccessible	Not available				

Are listed populations abundant and productive?

Indicator	Measured Results				
Run size achieved, 5 year average pre- and post listing. Wild component of Whidbey Basin Major Population Group.	<table border="0"> <tr> <td>Pre-listing</td> <td style="text-align: right;">28,554</td> </tr> <tr> <td>Post-listing</td> <td style="text-align: right;">30,407</td> </tr> </table>	Pre-listing	28,554	Post-listing	30,407
Pre-listing	28,554				
Post-listing	30,407				
Juvenile production (baseline mean)	1,232,397				

Is water clean enough to support wild salmon?

Indicator	Measured Results																	
Water quality index parameters	<table border="0"> <tr> <td>Fecal coliform</td> <td style="text-align: center;">28</td> <td style="text-align: center;">4</td> <td rowspan="4"> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #2e7d32; border: 1px solid black;"></div> Stream segments meeting standard </div> </td> </tr> <tr> <td>Dissolved oxygen</td> <td style="text-align: center;">57</td> <td style="text-align: center;">7</td> </tr> <tr> <td>pH</td> <td style="text-align: center;">59</td> <td style="text-align: center;">5</td> </tr> <tr> <td>Temperature</td> <td style="text-align: center;">50</td> <td style="text-align: center;">16</td> </tr> <tr> <td></td> <td></td> <td></td> <td> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #a1887f; border: 1px solid black;"></div> Stream segments not meeting standard </div> </td> </tr> </table>	Fecal coliform	28	4	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #2e7d32; border: 1px solid black;"></div> Stream segments meeting standard </div>	Dissolved oxygen	57	7	pH	59	5	Temperature	50	16				<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #a1887f; border: 1px solid black;"></div> Stream segments not meeting standard </div>
Fecal coliform	28	4	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #2e7d32; border: 1px solid black;"></div> Stream segments meeting standard </div>															
Dissolved oxygen	57	7																
pH	59	5																
Temperature	50	16																
			<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #a1887f; border: 1px solid black;"></div> Stream segments not meeting standard </div>															

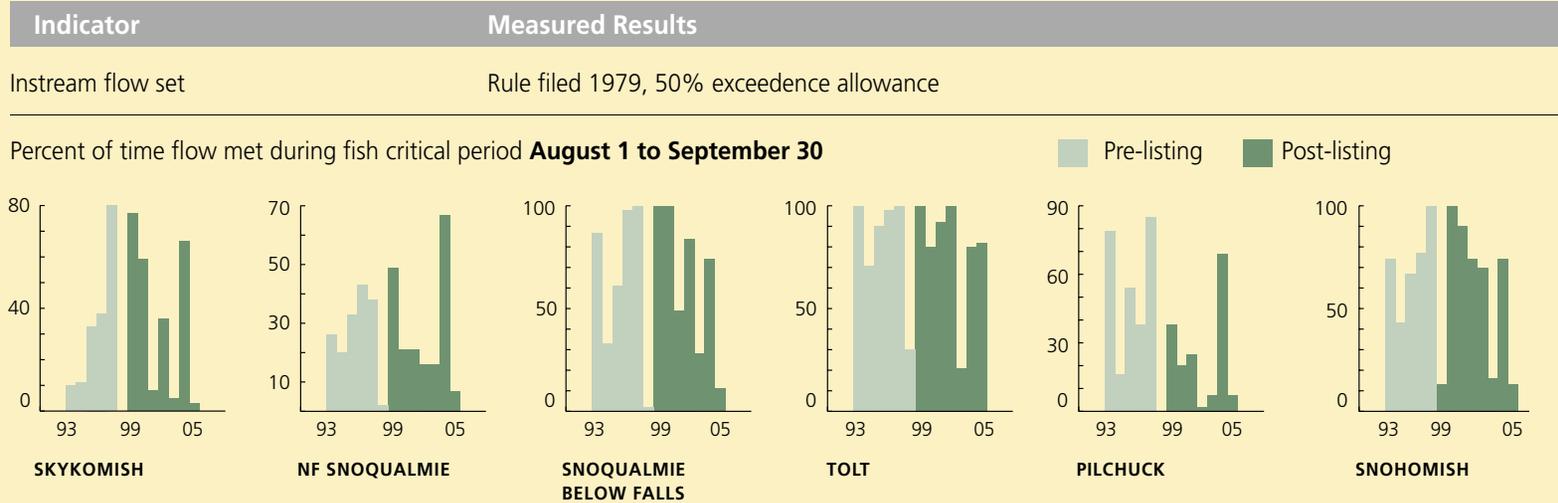
PUGET SOUND
SALMON RECOVERY
REGION

SNOHOMISH BASIN

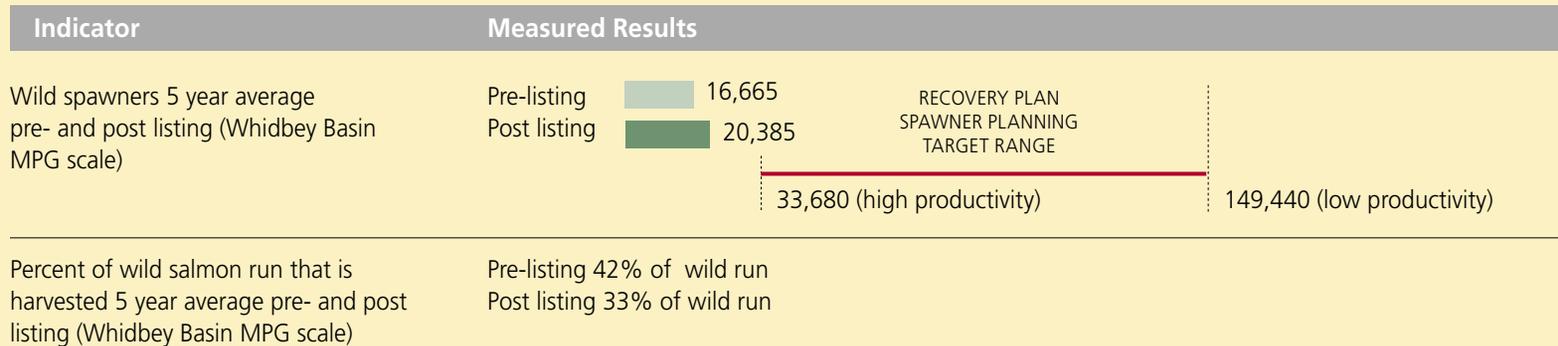


WATER
RESOURCE
INVENTORY
AREA

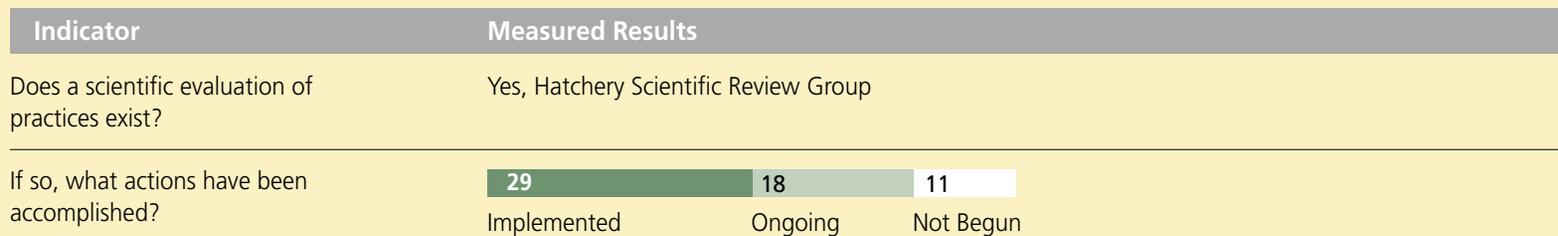
Do rivers and streams have flows that support wild salmon?



Does harvest management protect wild salmon?



Do hatchery practices meet the needs of wild salmon?



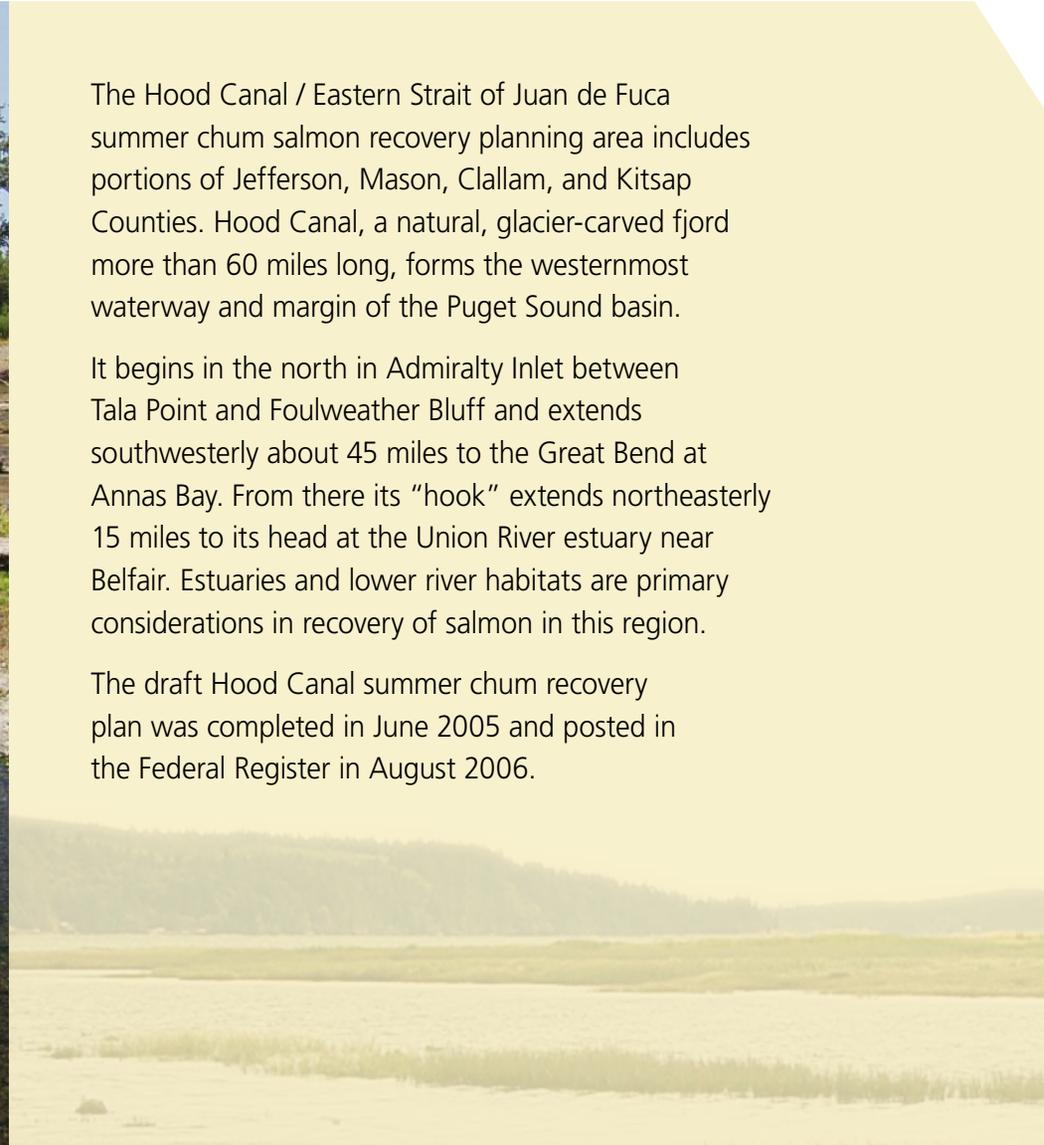
Puget Sound Salmon Recovery Region Hood Canal



The Hood Canal / Eastern Strait of Juan de Fuca summer chum salmon recovery planning area includes portions of Jefferson, Mason, Clallam, and Kitsap Counties. Hood Canal, a natural, glacier-carved fjord more than 60 miles long, forms the westernmost waterway and margin of the Puget Sound basin.

It begins in the north in Admiralty Inlet between Tala Point and Foulweather Bluff and extends southwesterly about 45 miles to the Great Bend at Annas Bay. From there its “hook” extends northeasterly 15 miles to its head at the Union River estuary near Belfair. Estuaries and lower river habitats are primary considerations in recovery of salmon in this region.

The draft Hood Canal summer chum recovery plan was completed in June 2005 and posted in the Federal Register in August 2006.



Key Facts

LISTED FISH

Hood Canal summer chum (threatened)
Bull trout (threatened)
Chinook(threatened)

MAJOR FACTORS LIMITING RECOVERY

- ▶ Degraded floodplain and channel structure
- ▶ Degraded nearshore/marine and estuarine conditions and habitat loss
- ▶ Degraded riparian area and loss of in-river large woody debris
- ▶ Excessive sediment
- ▶ Degraded water quality and temperature
- ▶ Impaired instream flows

RECOVERY PLANNING STATUS

Draft Hood Canal summer chum recovery plan completed in June 2005 and posted in Federal Register August 2006.

REGIONAL RECOVERY ORGANIZATION

Hood Canal Coordinating Council

FEDERALLY RECOGNIZED TRIBES

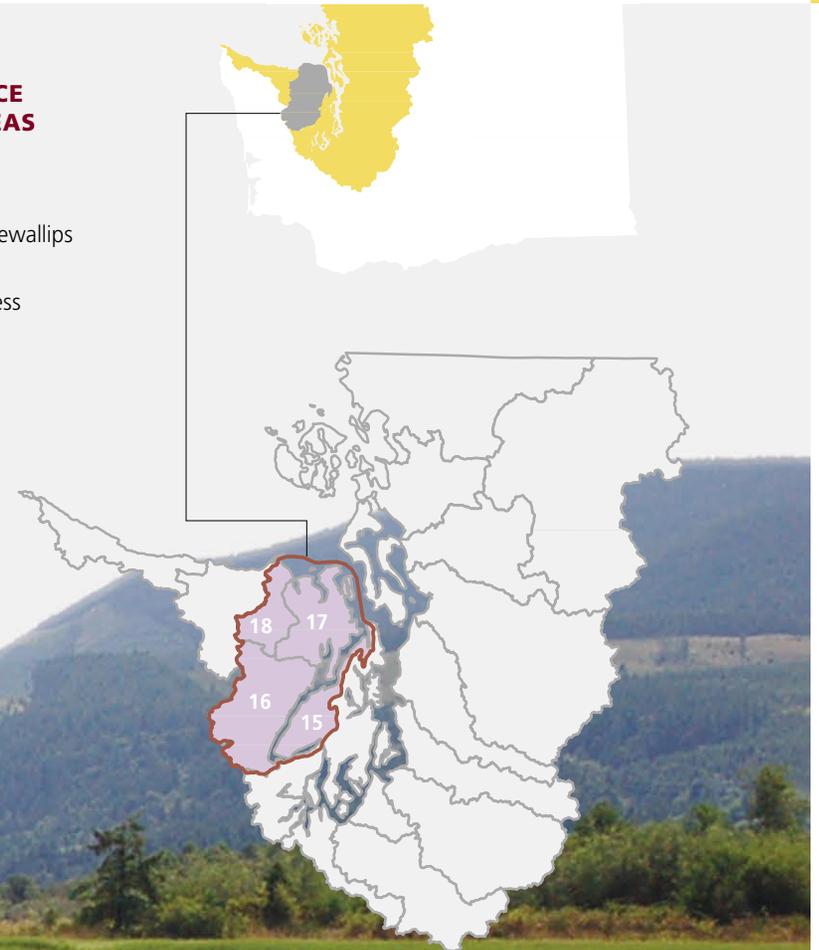
Skokomish, Port Gamble S'Klallam, Jamestown S'Klallam, Lower Elwha Klallam, Suquamish

COUNTIES

Parts of Mason, Kitsap, Jefferson, and Clallam.

WATER RESOURCE INVENTORY AREAS (WRIAs)

- 15 Kitsap
- 16 Skokomish / Dosewallips
- 17 Quilcene / Snow
- 18 Elwha / Dungeness





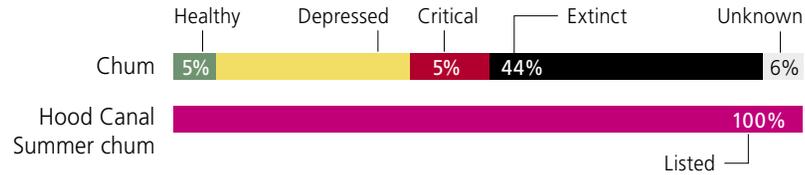
PUGET SOUND
SALMON RECOVERY
REGION
HOOD CANAL

// Loki...changed himself into a salmon, and lay hid among the stones of the brook. But the gods took his net and dragged the brook, and Loki, finding he must be caught, tried to leap over the net; but Thor caught him by the tail and compressed it, so that salmons ever since have had that part remarkably fine and thin. //

BULFINCH'S FABLES FROM A
NORSE LEGEND



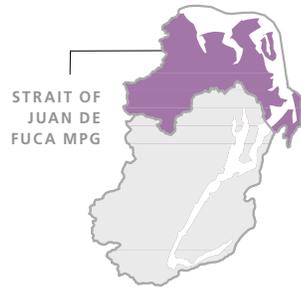
Fish Status



Note:

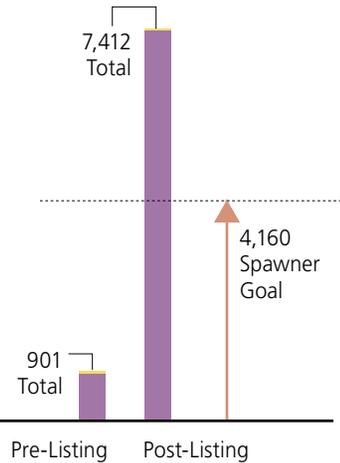
Coho, Chinook, pink, sockeye, steelhead, coastal cutthroat, and bull trout charts can be found on Puget Sound Salmon Recovery Region pages (XX to XX).

Juvenile production not available.



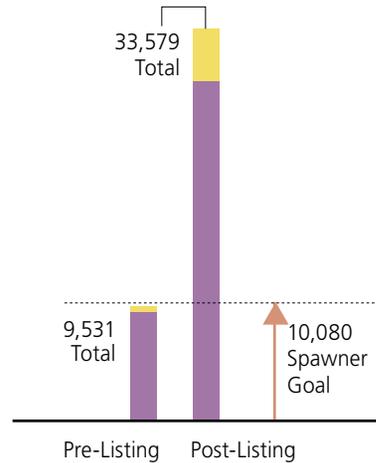
Hood Canal Summer Chum Adult Abundance Strait of Juan de Fuca MPG

ANNUAL AVERAGE



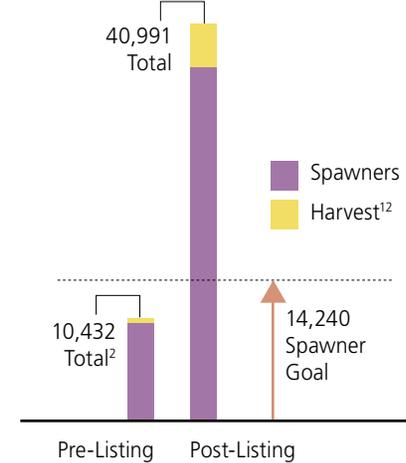
Hood Canal Summer Chum Adult Abundance Hood Canal MPG

ANNUAL AVERAGE



Hood Canal Summer Chum Adult Abundance¹¹ ESU Scale

ANNUAL AVERAGE





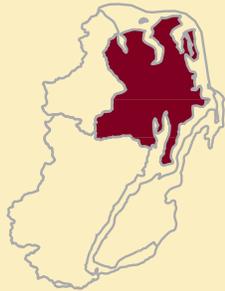
PUGET SOUND
SALMON RECOVERY
REGION
HOOD CANAL

QUILCENE BASIN



WATER
RESOURCE
INVENTORY
AREA

Watershed Watch Quilcene Basin WRIA 17



The Quilcene-Snow watershed covers more than 401,000 acres (626 square miles) of the northeastern Olympic Peninsula, in Jefferson and Clallam Counties. About 27,000 people live in the watershed, and population density is relatively low, with Port Townsend and Port Ludlow the main population centers. WRIA 17 extends from the northeast flank of the Olympic Mountains to Hood Canal and the Strait of Juan de Fuca. The watershed includes direct drainages to Puget Sound from Jimmycomelately Creek in the northwest to the Big Quilcene River in the south. More than 70% of the watershed is privately owned, while federal and state lands cover the remaining area. Slightly over half of the watershed is zoned forestry or agriculture. Estuarine and lower river (1-2 miles) areas are considered most important for salmon recovery.

The recovery plan uses impervious surfaces as an indicator of future development and pressure on natural systems; it estimates that along major river corridors, from 4.2% to 8.7% is currently developed. This number is projected to increase up to almost 12% in some areas.



AERIAL PHOTOGRAPHY COURTESY OF DNR. RESOURCE MAPPING

▲ Quilcene Bay Estuary Restoration.



Donovan
Creek Tidal Wetlands
Restoration

SALMON RECOVERY FUNDING BOARD

RESTORATION PROJECTS

- Fish Passage
- Riparian
- Instream Habitat
- Instream Flows
- Estuary
- Upland
- Miscellaneous





PUGET SOUND
SALMON RECOVERY
REGION
HOOD CANAL

QUILCENE BASIN



WATER
RESOURCE
INVENTORY
AREA

QUILCENE BASIN WRIA 17 RECOVERY QUESTIONS

Are hydroelectric facilities operating in a “fish friendly” manner?

Indicator	Measured Results
Upstream passage goals at FERC licensed facilities	Port Townsend Mill: Unknown Overall: Unknown
Actual upstream passage achieved (any or all years for which data are available 1999-2006)	Port Townsend Mill: Unknown Overall: Unknown
Downstream passage goals at FERC licensed facilities	Port Townsend Mill: Unknown Overall: Unknown
Actual downstream passage achieved (any or all years for which data are available 1999-2006)	Port Townsend Mill: Unknown Overall: Unknown

Are streams accessible to wild salmon?

Indicator	Measured Results				
Inventory of major blockages	<table border="0"> <tr> <td>Complete barriers</td> <td>Partial barriers</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Complete barriers	Partial barriers		
Complete barriers	Partial barriers				
					
Miles of anadromous waters inaccessible	Not available				

Are listed populations abundant and productive?

Indicator	Measured Results				
Run size achieved, 5 year average pre- and post listing. Wild component of Hood Canal Major Population Group.	<table border="0"> <tr> <td>Pre-listing</td> <td></td> </tr> <tr> <td>Post-listing</td> <td>33,580</td> </tr> </table>	Pre-listing		Post-listing	33,580
Pre-listing					
Post-listing	33,580				
Juvenile production (baseline mean)	No data collected				

Is water clean enough to support wild salmon?

Indicator	Measured Results																
Water quality index parameters	<table border="0"> <tr> <td>Fecal coliform</td> <td></td> <td>7</td> <td></td> </tr> <tr> <td>Dissolved oxygen</td> <td></td> <td>2</td> <td></td> </tr> <tr> <td>pH</td> <td></td> <td>11</td> <td></td> </tr> <tr> <td>Temperature</td> <td></td> <td>20</td> <td></td> </tr> </table>	Fecal coliform		7		Dissolved oxygen		2		pH		11		Temperature		20	
Fecal coliform		7															
Dissolved oxygen		2															
pH		11															
Temperature		20															

Do rivers and streams have flows that support wild salmon?

Indicator	Measured Results
Instream flow set	Rule under negotiation
Percent of time flow met during fish critical period August 1 to September 30	Not applicable at this time.

Does harvest management protect wild salmon?

Indicator	Measured Results								
Wild spawners 5 year average pre- and post listing (Hood Canal MPG scale)	<table border="1"> <caption>Wild Spawners 5 Year Average</caption> <thead> <tr> <th>Category</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>Pre-listing</td> <td>9,272</td> </tr> <tr> <td>Post listing</td> <td>28,989</td> </tr> <tr> <td>RECOVERY PLAN ESCAPEMENT GOAL</td> <td>10,080</td> </tr> </tbody> </table>	Category	Value	Pre-listing	9,272	Post listing	28,989	RECOVERY PLAN ESCAPEMENT GOAL	10,080
Category	Value								
Pre-listing	9,272								
Post listing	28,989								
RECOVERY PLAN ESCAPEMENT GOAL	10,080								
Percent of wild salmon run that is harvested, 5 year average pre- and post listing (Hood Canal MPG scale)	<table border="1"> <tbody> <tr> <td>Pre-Listing</td> <td>5%</td> </tr> <tr> <td>Post listing</td> <td>14%</td> </tr> </tbody> </table>	Pre-Listing	5%	Post listing	14%				
Pre-Listing	5%								
Post listing	14%								

Do hatchery practices meet the needs of wild salmon?

Indicator	Measured Results
Scientific evaluation of practices?	N/A. No WDFW hatchery in watershed. However, WDFW supplementation program accounts for an average 25% of run.

THE NEARSHORE ENVIRONMENT
PUGET SOUND, GRAYS HARBOR, AND
WILLAPA BAY INDICATORS

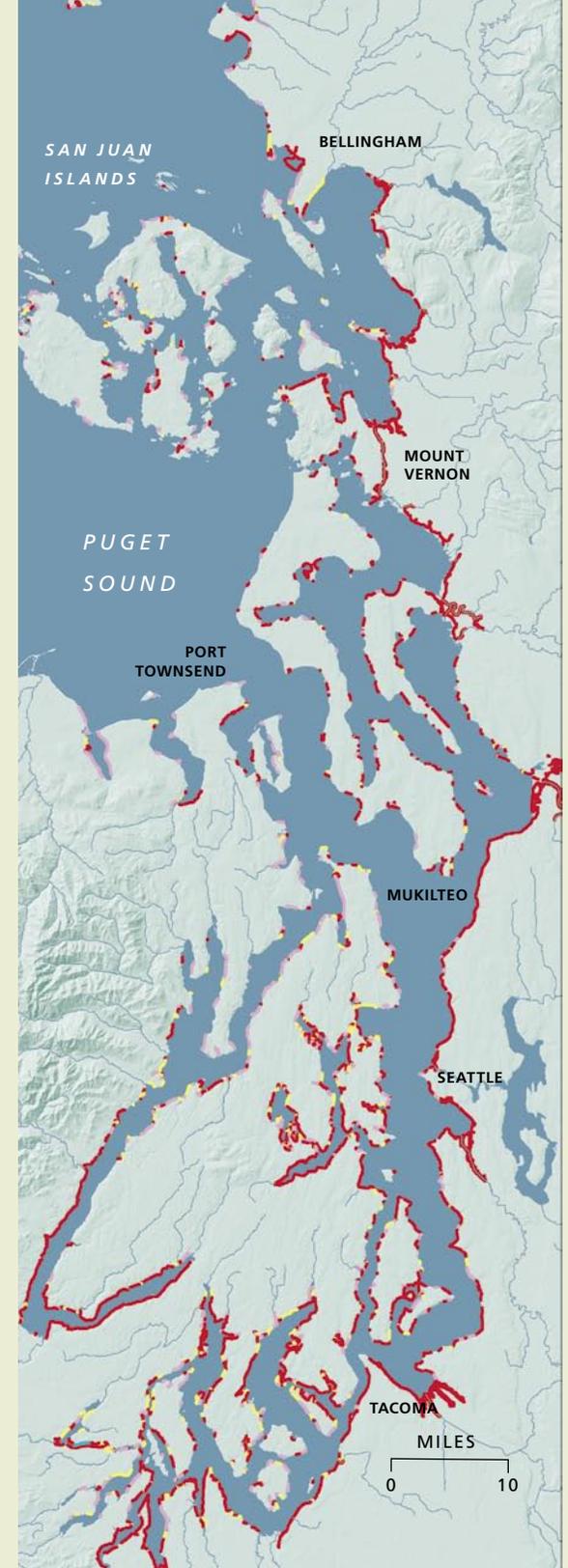
Shoreline Modification



- 10-30% Modified
- 40-60% Modified
- 70-100% Modified

DATA SOURCE: DEPARTMENT OF NATURAL RESOURCES, PUGET SOUND AMBIENT MONITORING PROGRAM.

► All juvenile salmon move along the shallows of estuaries and nearshore areas during their migration to the sea, and may be found in these habitats throughout the year.





HUGH SHIPMAN, WASHINGTON DEPARTMENT OF ECOLOGY

► Changes in the shorelines, which are particularly prevalent in the most populated areas of Washington, simplify and reduce intertidal habitat areas. These modifications affect migration corridors, transition of the fish from fresh to salt water, their eating habitat, and their ability to forage and seek refuge from predators.

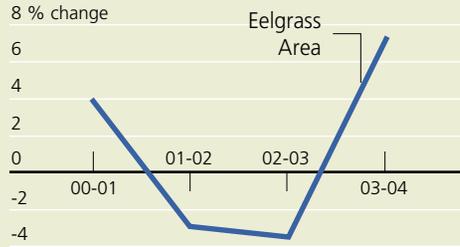
**THE NEARSHORE ENVIRONMENT
PUGET SOUND, GRAYS HARBOR, AND
WILLAPA BAY INDICATORS**

Eelgrass Concentrations



- Continuous Concentration
- Patchy Concentration

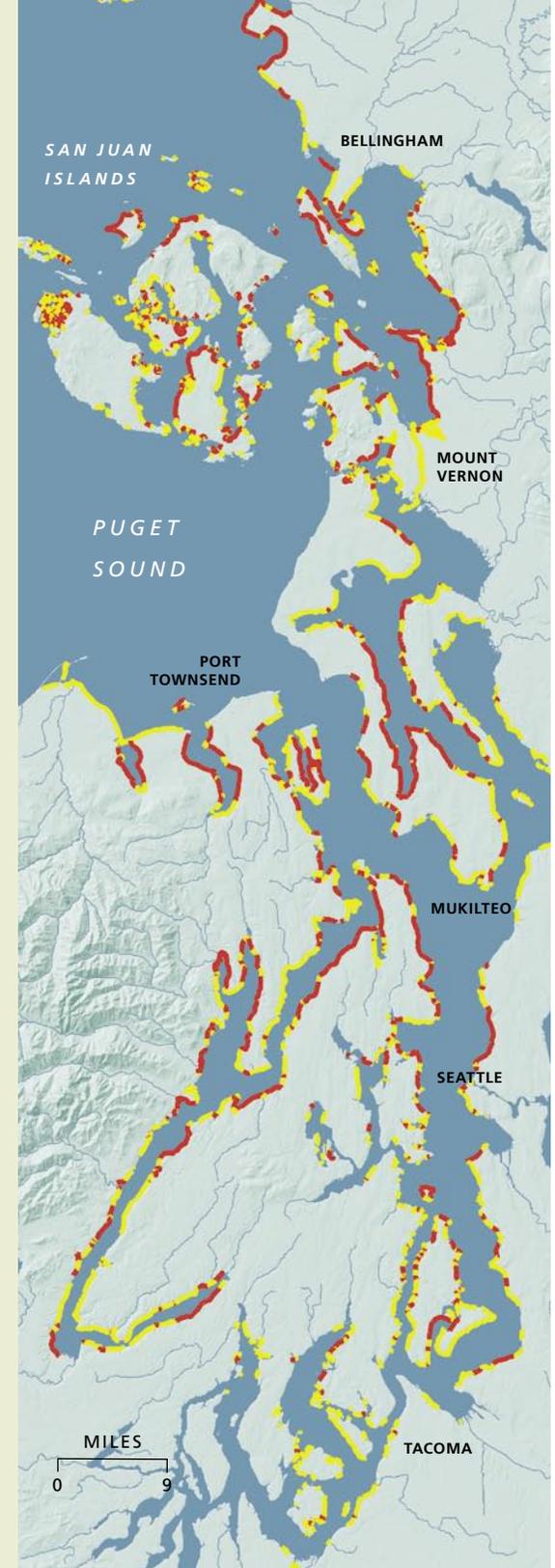
**PUGET SOUND ANNUAL CHANGE
IN EELGRASS AREA**



GRAYS HARBOR AND WILLAPA BAY: NO DATA AVAILABLE ON EELGRASS ANNUAL CHANGE.

DATA SOURCE: DEPARTMENT OF NATURAL RESOURCES, PUGET SOUND AMBIENT MONITORING PROGRAM.

► Eelgrass is considered one of the most important components of nearshore marine environments for salmon. Damage to eelgrass affects whole populations of fish, as well as the stability of our shorelines



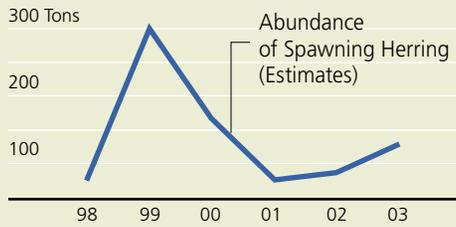
THE NEARSHORE ENVIRONMENT
PUGET SOUND, GRAYS HARBOR, AND
WILLAPA BAY INDICATORS

Herring Spawning Areas



■ Herring Spawning Areas

GRAYS HARBOR



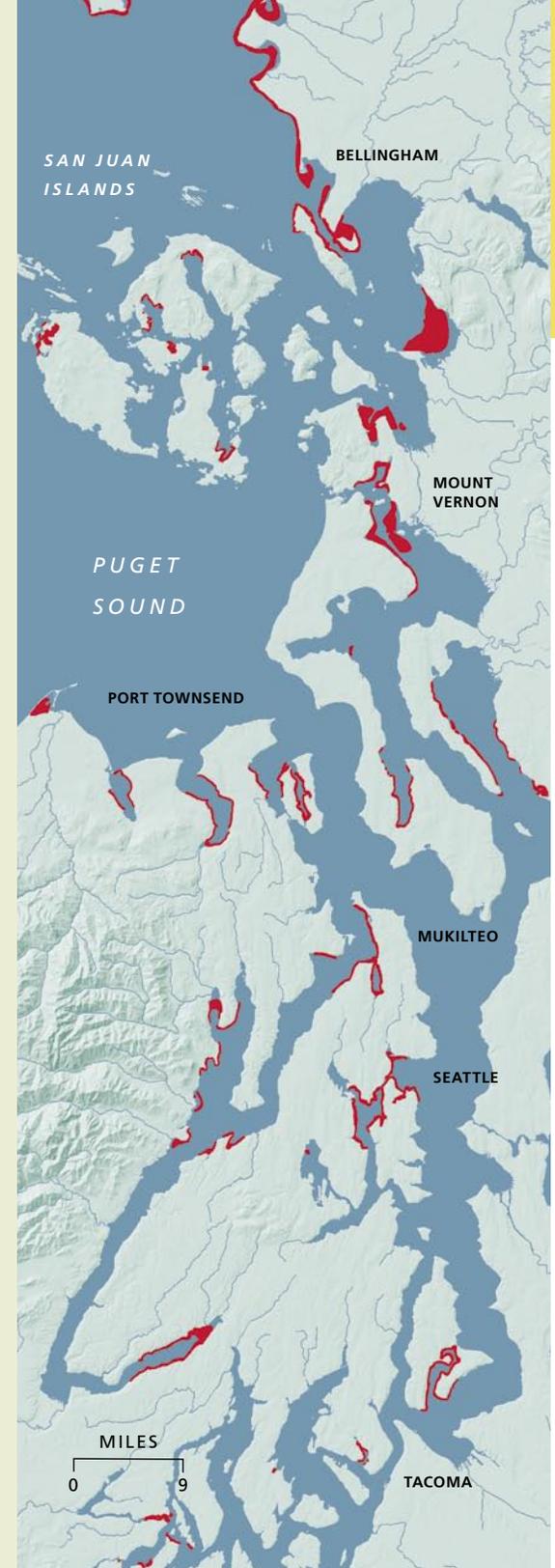
WILLAPA BAY



PUGET SOUND



DATA SOURCE:
 DEPARTMENT OF FISH
 AND WILDLIFE.



Washington Coastal Salmon Recovery Region



The Washington Coastal Salmon Recovery Region includes all Washington river basins flowing directly into the Pacific Ocean from Cape Flattery to Cape Disappointment. The watersheds in the region are heavily forested, lightly populated except for parts of the Chehalis River Basin, and have economies that rely upon timber, agriculture and recreational activities. ESA listings in the region include Lake Ozette sockeye, for which a recovery plan is expected by Spring 2007, and bull trout.

No regional salmon recovery organization currently exists, but a process initiated within the region is underway to consider which salmon recovery activities should be locally coordinated across the Coastal Region.

Key Facts

LISTED FISH

Bull trout (threatened)
Lake Ozette Sockeye (threatened).

RECOVERY PLANNING STATUS

Federal bull trout draft recovery plan; 5-year status review under way. Draft Lake Ozette Sockeye recovery plan in progress.

REGIONAL RECOVERY ORGANIZATION

A regional recovery organization has not formed, but discussions are under way regarding coordination across watersheds for recovery planning.

FEDERALLY RECOGNIZED TRIBES

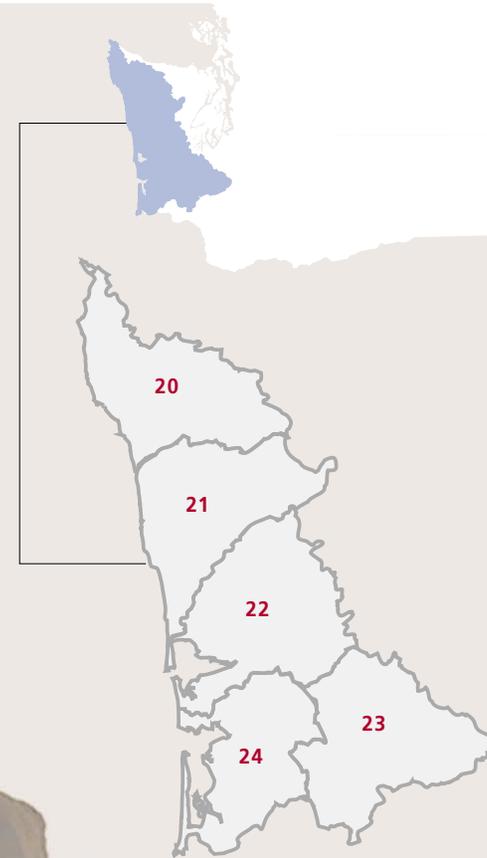
Makah, Hoh, Quileute, Quinault, Chehalis, Shoalwater Bay, Lower Elwha S’Klallam.

COUNTIES

Grays Harbor, and portions of Clallam, Jefferson, Lewis, Mason, Pacific, and Thurston.

WATER RESOURCE INVENTORY AREAS (WRIAs)

- 20 Soleduc
- 21 Queets / Quinault
- 22 Lower Chehalis
- 23 Upper Chehalis
- 24 Willapa





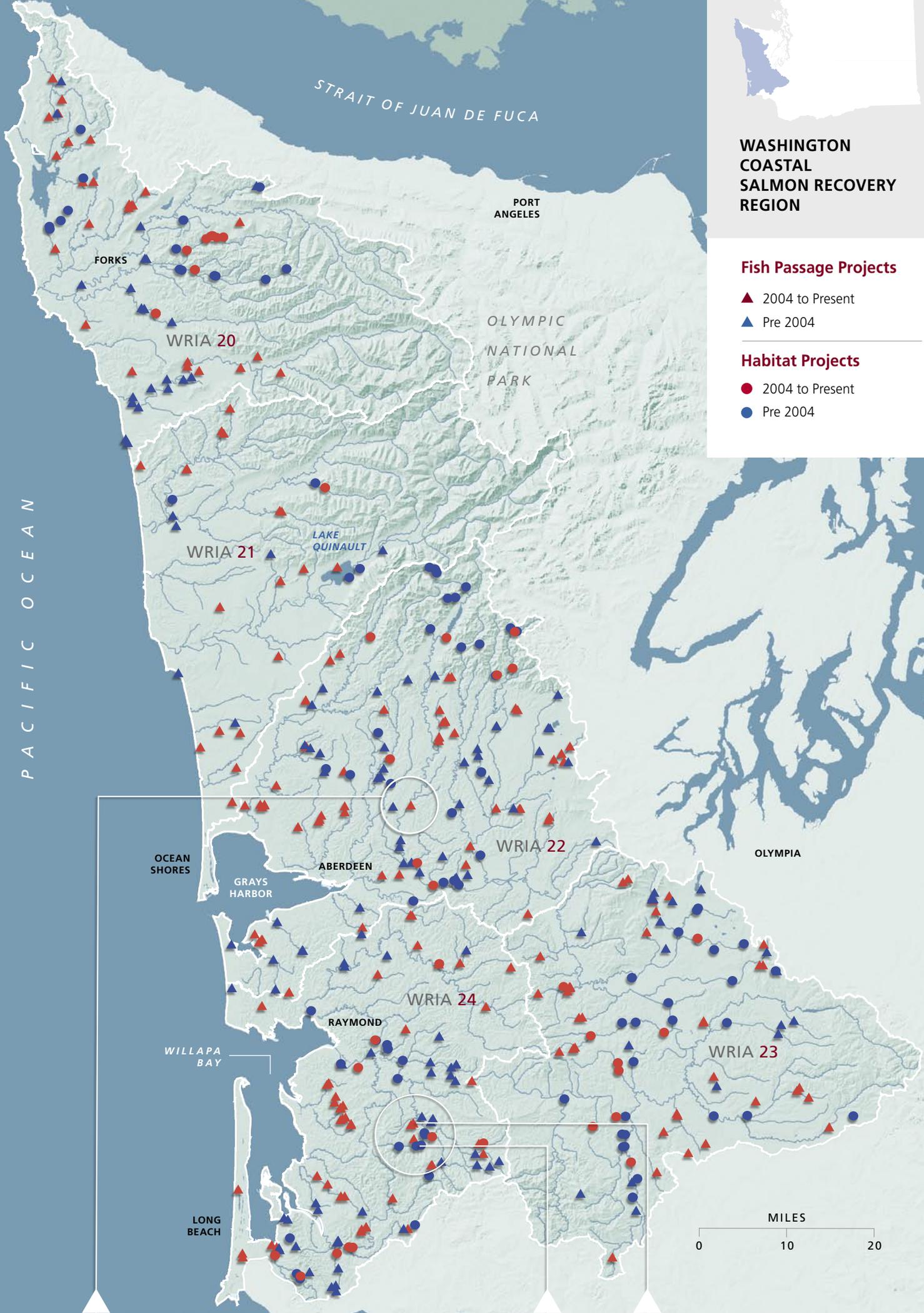
WASHINGTON COASTAL SALMON RECOVERY REGION

Fish Passage Projects

- ▲ 2004 to Present
- ▲ Pre 2004

Habitat Projects

- 2004 to Present
- Pre 2004





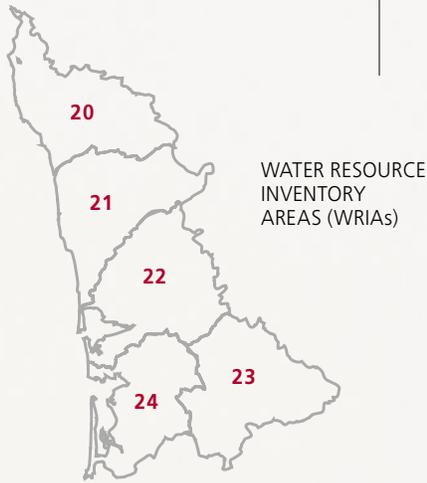
Barrier Correction on Wynoochee



Instream Habitat Improvement on Mid-Trap Creek



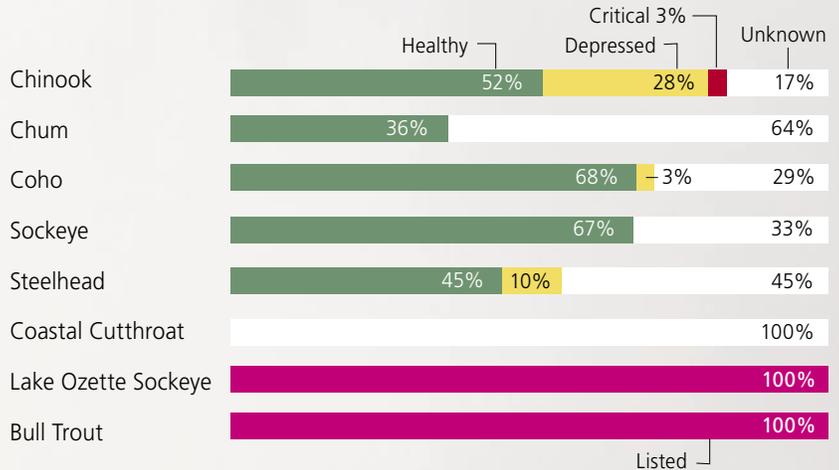
Culvert Replacement on Oxbow Creek



Watershed Cleanup Plans

WRIA	Plans Underway or Completed	Plans Needed
WRIA 20	1	51
WRIA 21		5
WRIA 22	87	8
WRIA 23	125	27
WRIA 24	55	67

Fish Status



Lower Columbia Salmon Recovery Region

The Lower Columbia Salmon Recovery region is in Southwest Washington. It extends from the coast to the Columbia Gorge, and is mainly forest and rural in nature. Population centers are mainly along the Interstate-5 corridor and Columbia River. The 5,700 square mile planning area (the White Salmon basin was omitted at the request of Klickitat County) included in the recovery plan encompasses the entire Washington portion of the mainstem and estuary of the lower Columbia River as well as 18 major and a number of lesser tributary watersheds.

In all, the tributaries total more than 1,700 river miles. A draft recovery plan for Washington portions of Lower Columbia River chum, Chinook, steelhead, and coastal bull trout was completed in December 2004 and approved by the National Marine Fisheries Service as an interim regional recovery plan in February 2006. A supplement for coho, which were just listed in June 2006, will be completed in early 2007.



Key Facts

LISTED FISH

- Chinook (threatened)
- Chum (threatened)
- Coho (threatened)
- Steelhead (threatened)
- Bull trout (threatened)

MAJOR FACTORS

LIMITING RECOVERY

- ▶ Degraded floodplain and channel structure
- ▶ Degraded nearshore/marine and estuarine conditions and habitat loss
- ▶ Degraded riparian area and loss of in-river large woody debris
- ▶ Excessive sediment
- ▶ Degraded water quality and temperature
- ▶ Impaired instream flows
- ▶ Barriers to fish passage
- ▶ Hatchery impacts
- ▶ Harvest impacts
- ▶ Predator harassment of spawners

RECOVERY PLANNING STATUS

Draft recovery plan for Washington portion of lower Columbia Chinook, steelhead, chum, and bull trout, delivered to NOAA-Fisheries December 2004. Approved in February 2006. A supplement for coho will be completed in early 2007.

REGIONAL RECOVERY ORGANIZATION

Lower Columbia Fish Recovery Board.

FEDERALLY RECOGNIZED TRIBES

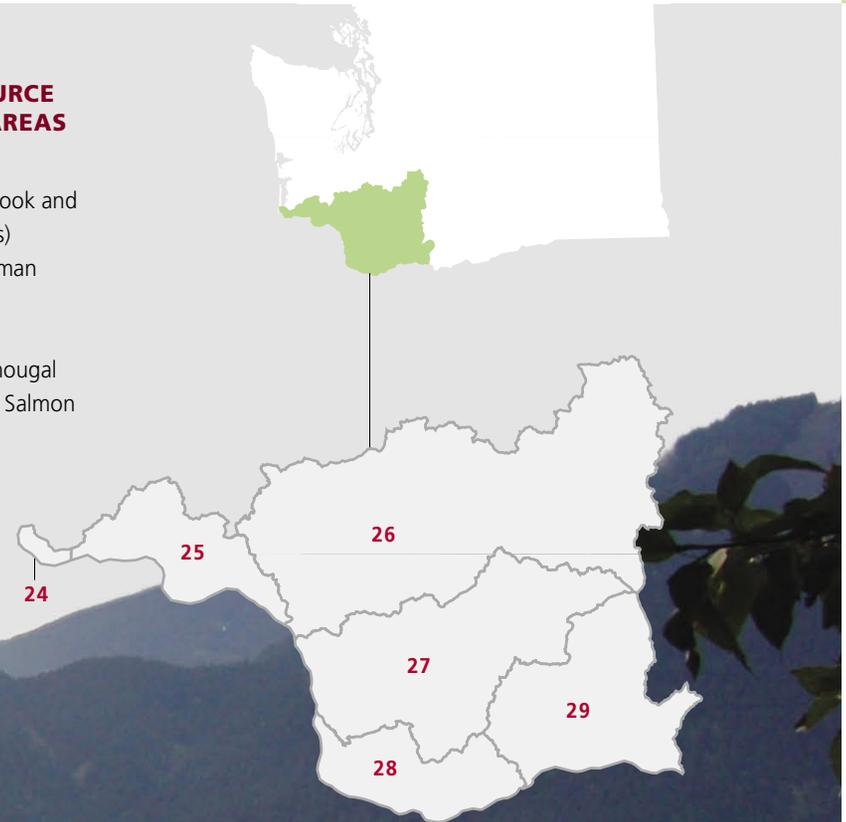
Cowlitz Tribe.

COUNTIES

Clark, Cowlitz, Lewis, Skamania, and Wahkiakum, and portions of Pacific and Klickitat.

WATER RESOURCE INVENTORY AREAS (WRIAs)

- 24** Willapa (Chinook and Wallicut rivers)
- 25** Grays / Elokoman
- 26** Cowlitz
- 27** Lewis
- 28** Salmon-Washougal
- 29** Wind / White Salmon



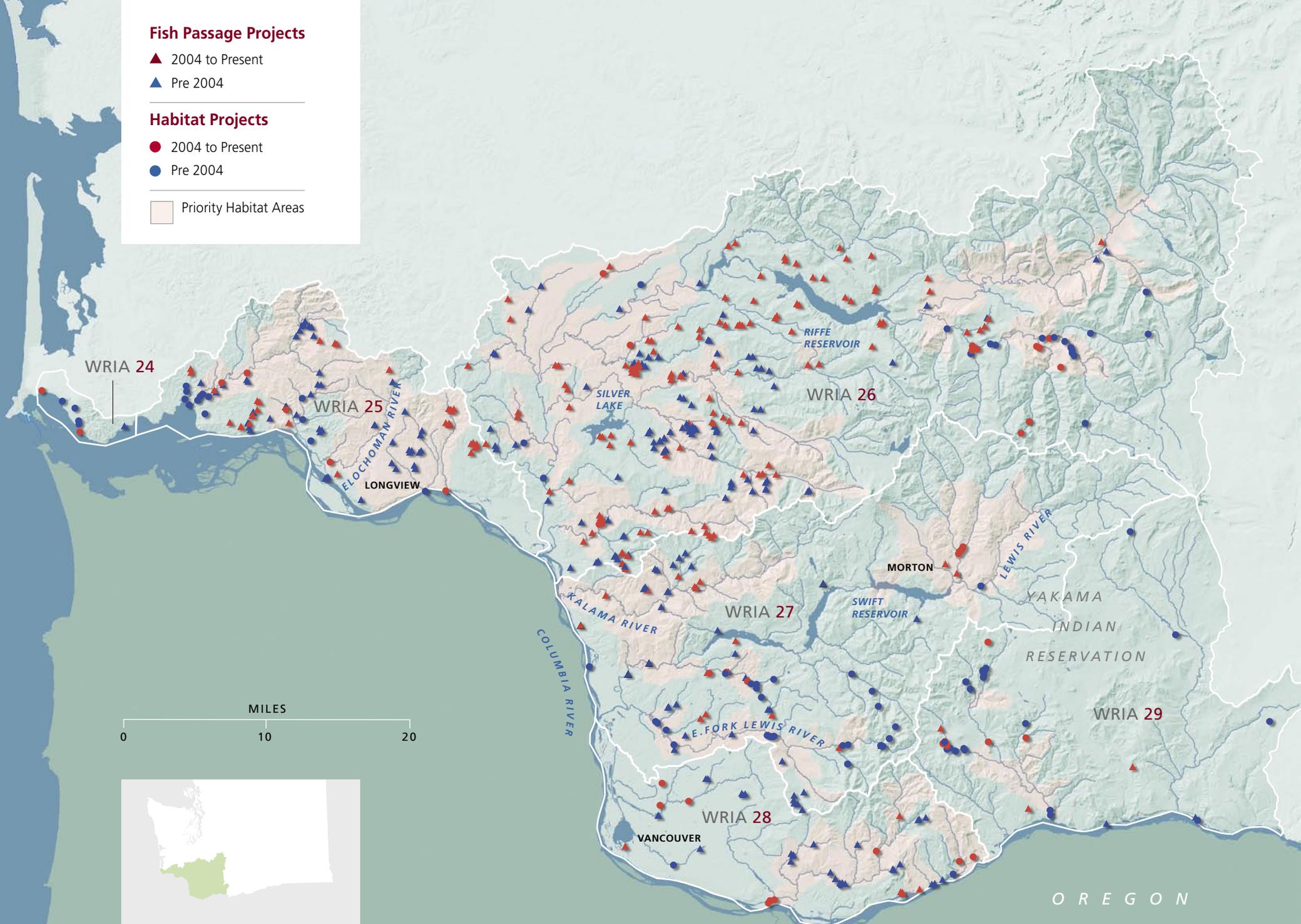
Fish Passage Projects

- ▲ 2004 to Present
- ▲ Pre 2004

Habitat Projects

- 2004 to Present
- Pre 2004

Priority Habitat Areas



MILES

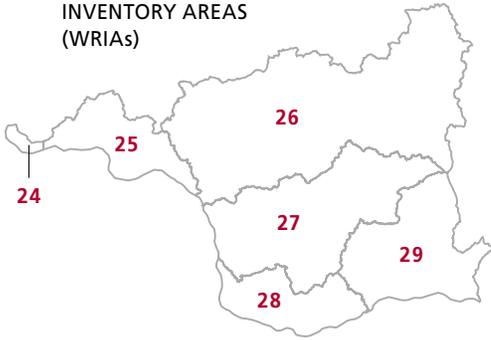
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**LOWER COLUMBIA
SALMON RECOVERY
REGION**

O R E G O N

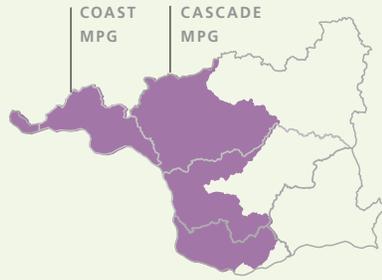
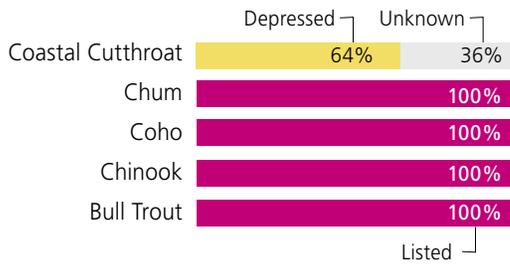
WATER RESOURCE INVENTORY AREAS (WRIsAs)



Watershed Cleanup Plans

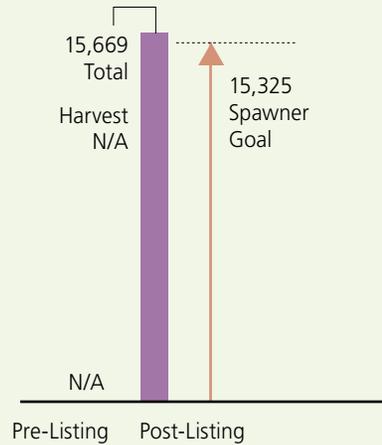
WRIsA	Plans Underway or Completed	Plans Needed
WRIsA 24	55	67
WRIsA 25	10	36
WRIsA 26	7	32
WRIsA 27	3	37
WRIsA 28	36	70
WRIsA 29	34	12

Fish Status



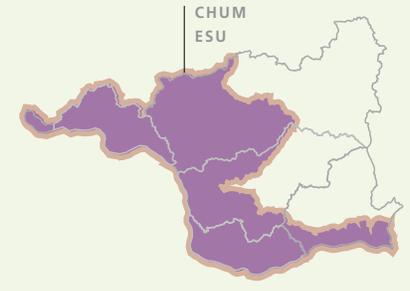
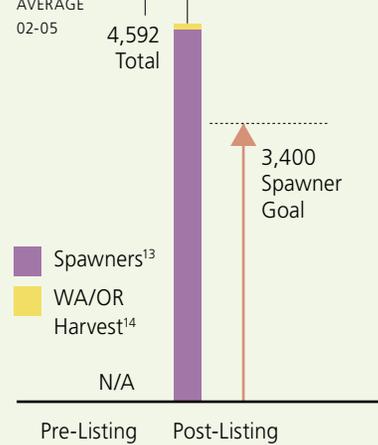
Chum Wild Adult Abundance Coast + Cascade MPG

ANNUAL AVERAGE 03-05



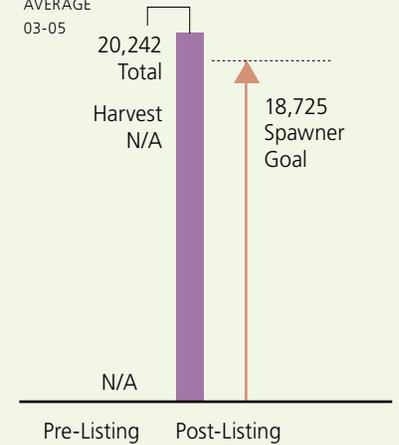
Chum Wild Adult Abundance Gorge MPG

ANNUAL AVERAGE 02-05

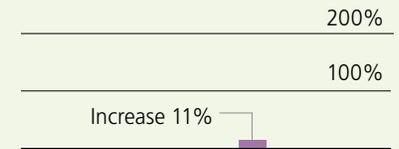


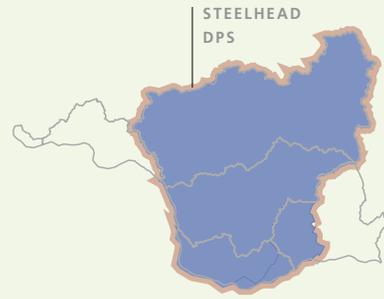
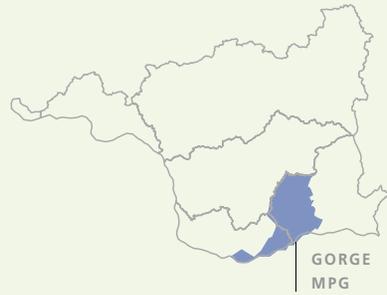
Chum Wild Adult Abundance¹⁵ ESU Scale

ANNUAL AVERAGE 03-05

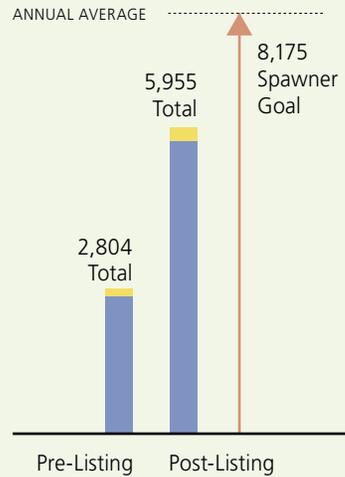


Chum Wild Juvenile Production¹⁵ Since Listing





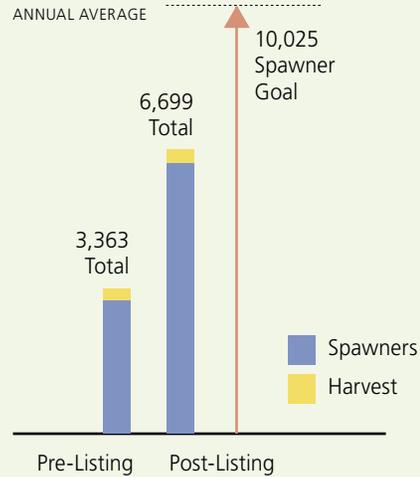
Steelhead Adult Abundance Cascade MPG



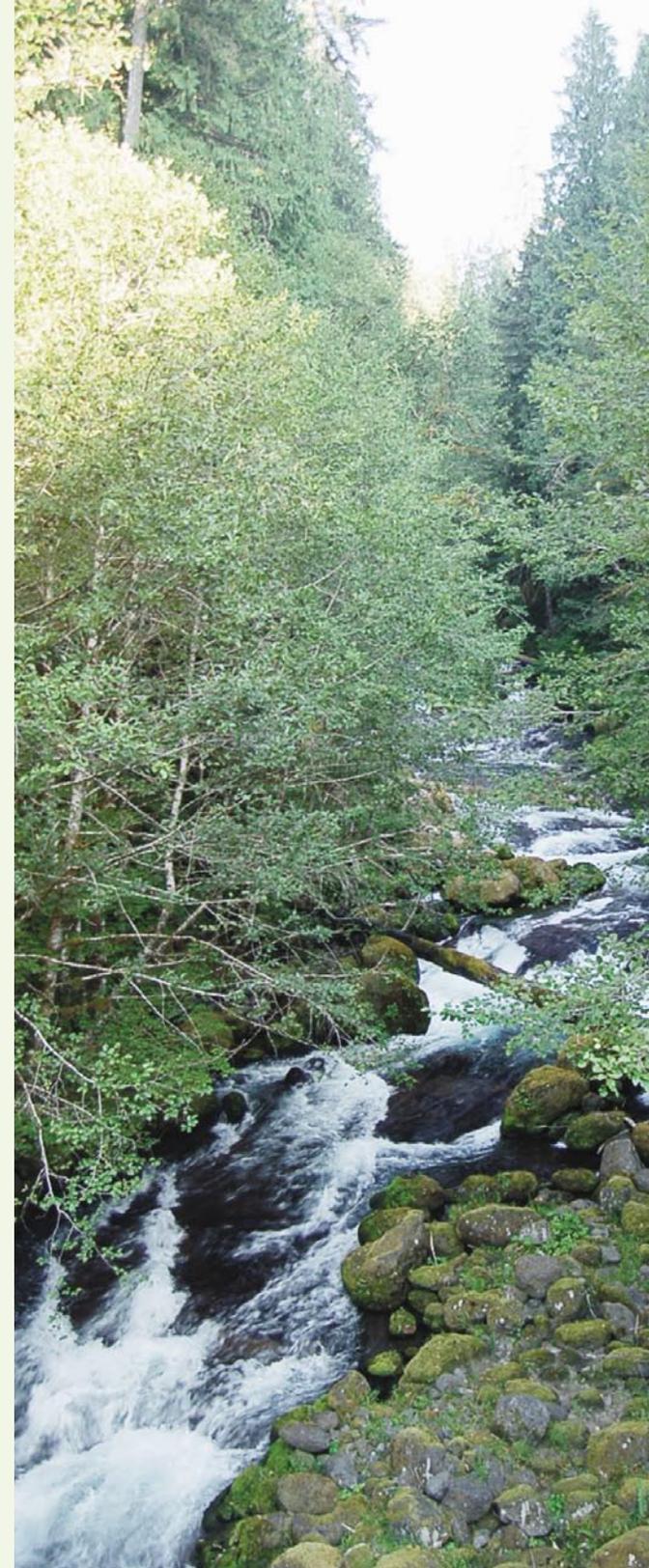
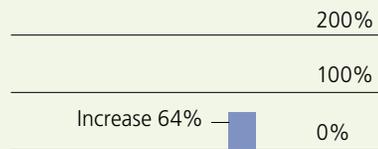
Steelhead Adult Abundance Gorge MPG



Steelhead Adult Abundance DPS Scale



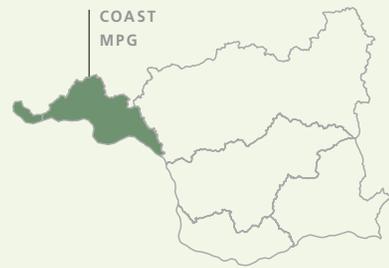
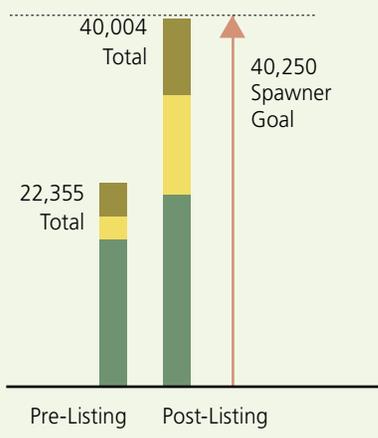
Steelhead Juvenile Production¹⁷ Since Listing





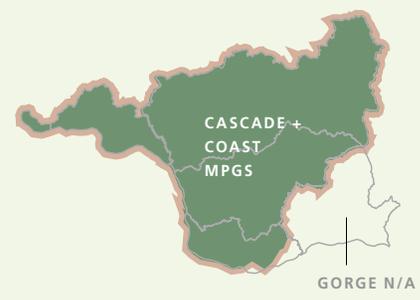
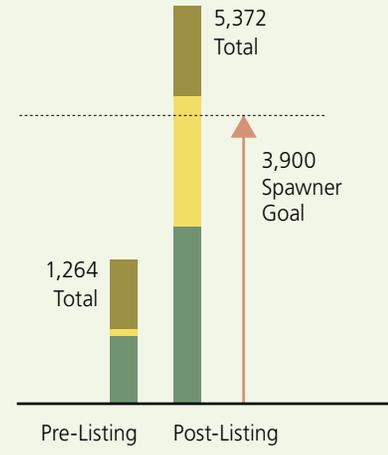
Chinook Wild Adult Abundance Cascade MPG

ANNUAL AVERAGE



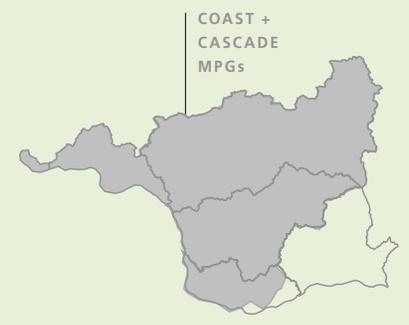
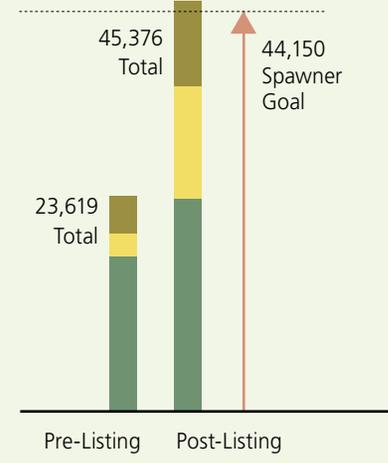
Chinook Wild Adult Abundance Coast MPG

ANNUAL AVERAGE



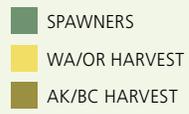
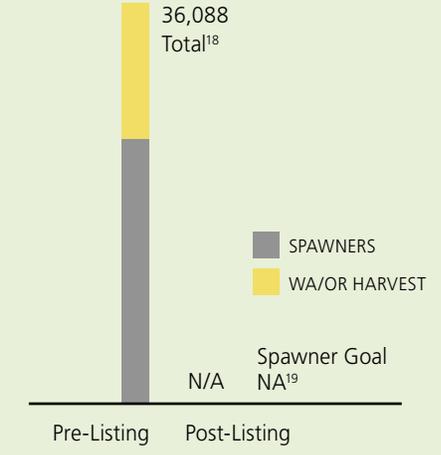
Chinook Wild Adult Abundance Cascade + Coast MPGs

ANNUAL AVERAGE

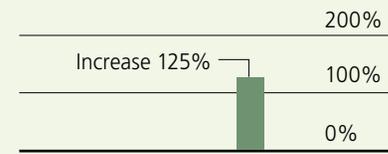


Coho Wild Adult Abundance Coast + Cascade MPGs

ANNUAL AVERAGE



Chinook Wild Juvenile Production Since Listing



Coho Wild Juvenile Production Since Listing

Data not available



LOWER COLUMBIA
SALMON RECOVERY
REGION

LEWIS-KALAMA
BASIN



WATER
RESOURCE
INVENTORY
AREA

Watershed Watch Lewis-Kalama Basin WRIA 27



This area is located in southwest Washington in Skamania, Clark, and Cowlitz counties and includes three major rivers: the Kalama, North Fork Lewis, and East Fork Lewis. All rivers drain into the Columbia

River. It covers 839,010 acres (1,311 square miles). Approximately 44% of the land is managed by the US Forest Service, while another 19% is managed by private and state timber owners.

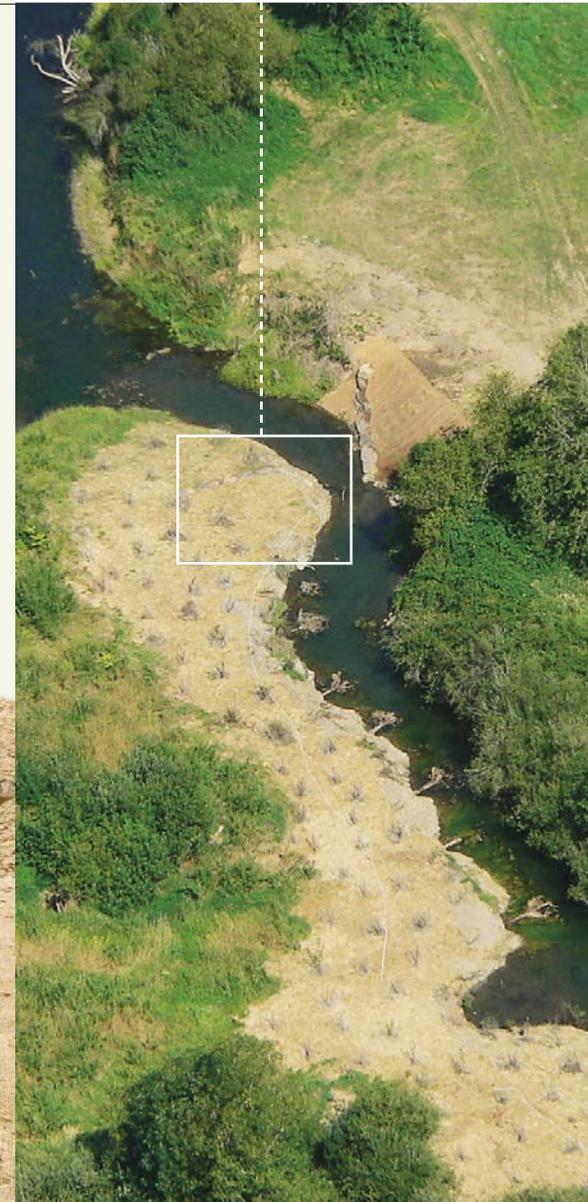
Clark County is the fastest growing part of the watershed, where population has tripled since 1960. Major impoundments exist on the North Fork Lewis (Swift, Yale, and Merwin Reservoirs). 14,300 live in North Fork Lewis River sub-basin, 5,300 live in the Kalama River sub-basin, and 24,400 reside in the East Fork Lewis River sub-basin where population is expected to more than double by 2020.



PHOTOS BY LOWER COLUMBIA FISH RECOVERY BOARD



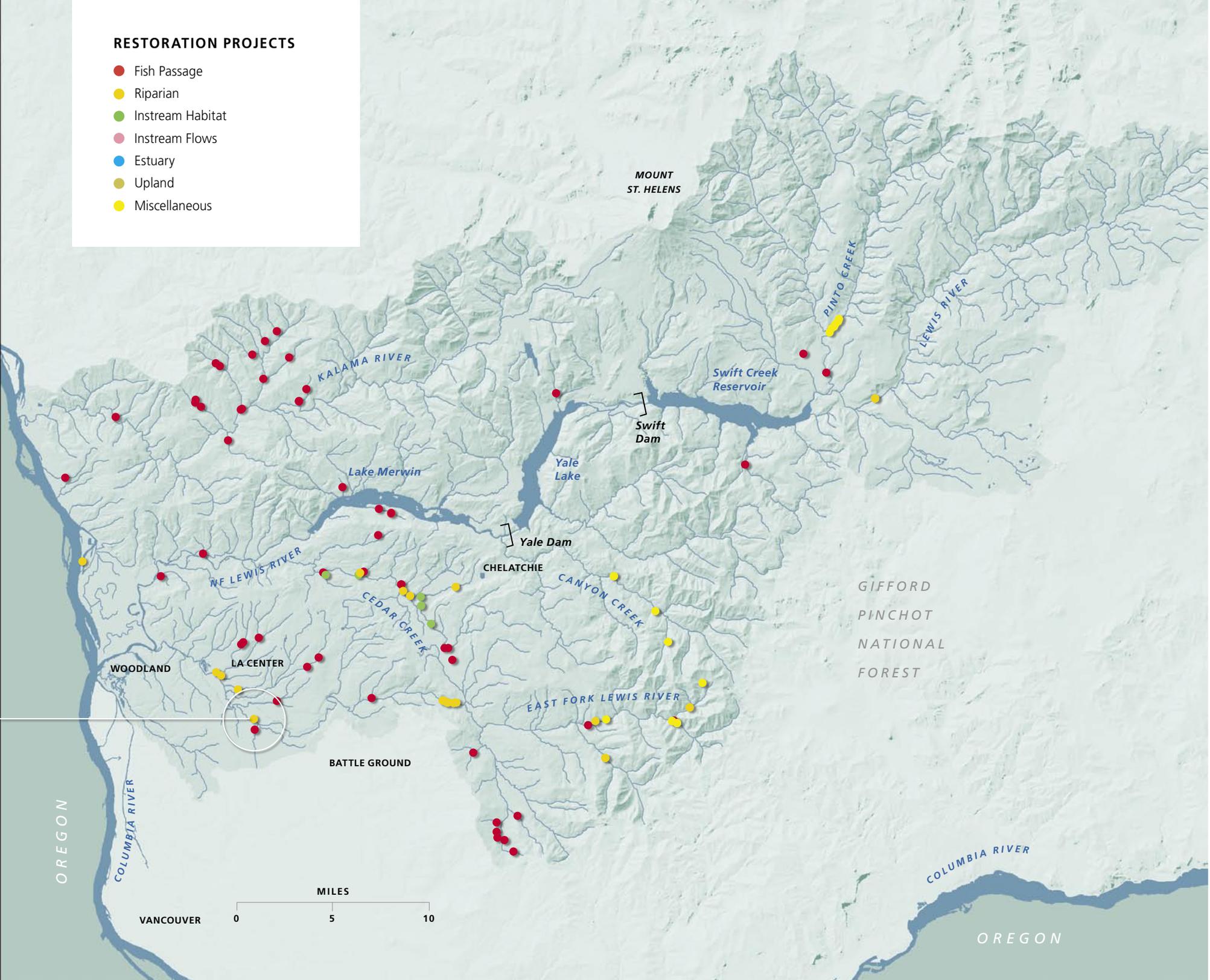
Habitat
Improvement on
East Fork Lewis
River



Below: Instream
Habitat Improvement
on Lockwood
Creek

RESTORATION PROJECTS

- Fish Passage
- Riparian
- Instream Habitat
- Instream Flows
- Estuary
- Upland
- Miscellaneous





LOWER COLUMBIA
SALMON RECOVERY
REGION

LEWIS-KALAMA
BASIN



WATER
RESOURCE
INVENTORY
AREA

LEWIS-KALAMA BASIN WRIA 27 RECOVERY QUESTIONS

Are hydroelectric facilities operating in a “fish friendly” manner?

Indicator	Measured Results
Upstream passage goals at FERC licensed facilities	Biggs Creek: Unknown Merwin, Swift 1, Swift 2, Yale: Requirements in settlement agreement, license not issued
Actual upstream passage achieved (any or all years for which data are available 1999-2006)	Biggs Creek: Unknown Merwin, Swift 1, Swift 2, Yale: None
Downstream passage goals at FERC licensed facilities	Biggs Creek: Unknown Merwin, Swift 1, Swift 2, Yale: Requirements in settlement agreement, license not issued
Actual downstream passage achieved (any or all years for which data are available 1999-2006)	Biggs Creek: Unknown Merwin, Swift 1, Swift 2, Yale: None

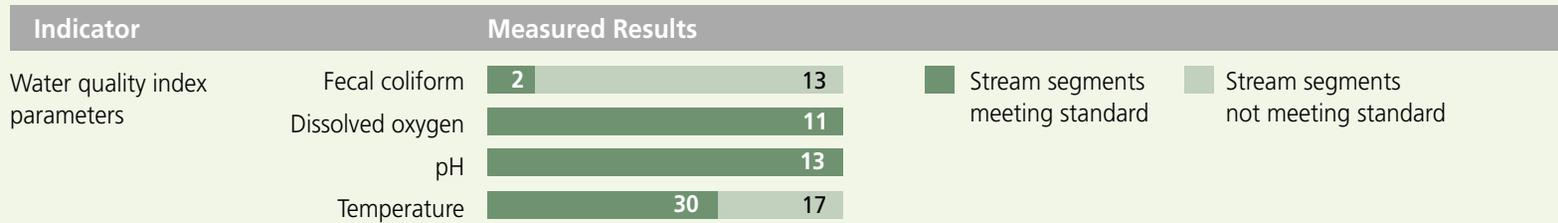
Are streams accessible to wild salmon?

Indicator	Measured Results				
Inventory of major blockages	<table border="0"> <tr> <td>Complete barriers</td> <td>Partial barriers</td> </tr> <tr> <td style="text-align: center;">55</td> <td style="text-align: center;">97</td> </tr> </table>	Complete barriers	Partial barriers	55	97
Complete barriers	Partial barriers				
55	97				
Miles of anadromous waters inaccessible	Not available				

Are listed populations abundant and productive?

Indicator	Measured Results	
Run size achieved, 5 year average pre- and post listing. Wild component of Cascade Major Population Group.	Chinook	Pre-listing 22,355
		Post-listing 40,004
	Steelhead	Pre-listing 2,804
		Post-listing 5,955
	Coho	Data not available
	Chum	Data not available
Juvenile production (baseline mean, may be average of several sites)	Chinook: 77,604 Steelhead: 17,637 Coho: 68,282 Chum: 26,470	

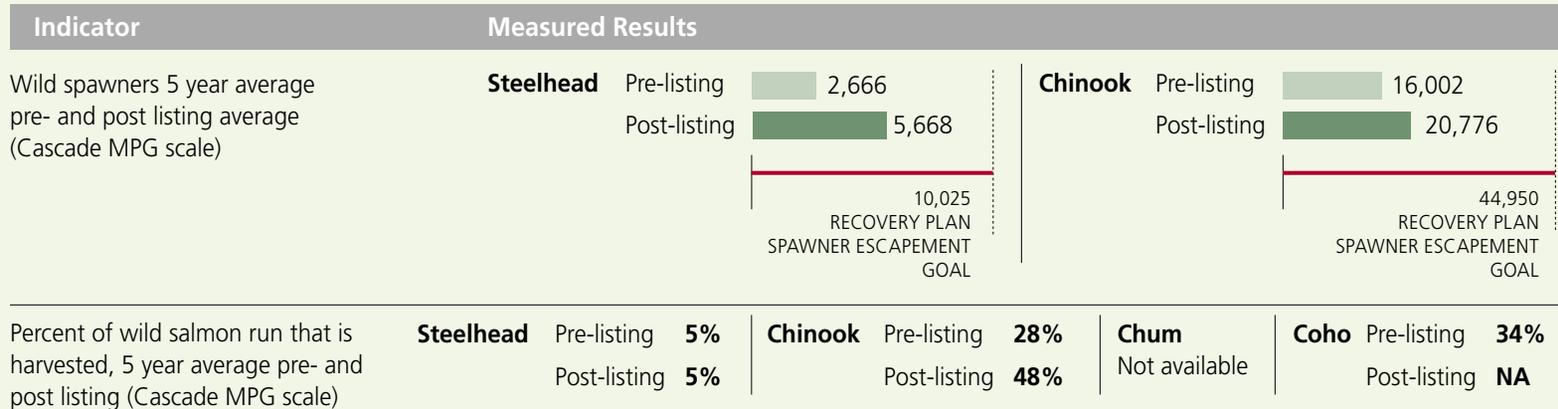
Is water clean enough to support wild salmon?



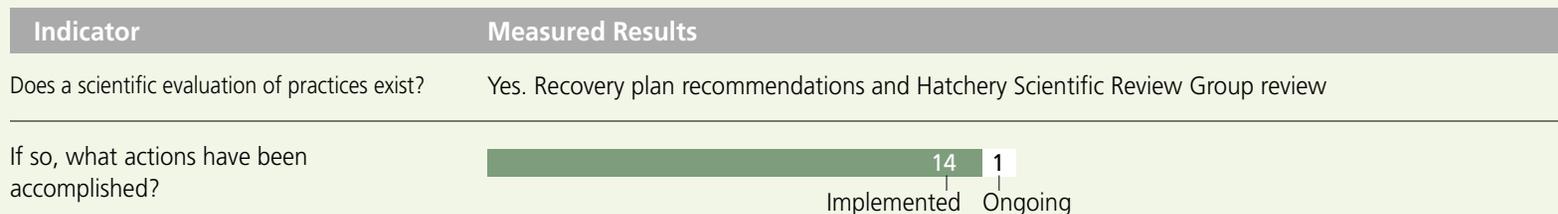
Do rivers and streams have flows that support wild salmon?

Indicator	Measured Results
Instream flow set	Flow negotiations underway
Percent of time flow met during fish critical period August 1 to September 30	Not applicable.

Does harvest management protect wild salmon?



Do hatchery practices meet the needs of wild salmon?



Middle Columbia Salmon Recovery Region



The Middle Columbia Salmon Recovery Region is located in central Washington along the east slope of the Cascade Mountains. Public forests and farms dominate the forested, mountainous terrain and dry, shrub-steppe hills that cover most of the region. It includes the Columbia River and its tributaries entering from the west and north from the Yakima River to the Big White Salmon River.

The draft recovery plan was completed in June 2005 and posted in the Federal Register in May 2006. The plan covers Yakima River Basin portions of the Middle Columbia River steelhead listing, which includes the Columbia River Basin and tributaries upstream from the Wind River to and including the Yakima River and excluding the Snake River. The plan also addresses a bull trout “core” area in the Yakima Basin.

Key Facts

LISTED FISH

Steelhead (threatened)
Bull trout (threatened)

MAJOR FACTORS LIMITING RECOVERY

- ▶ Hydropower system mortality on Columbia River
- ▶ Impaired stream flows in tributaries
- ▶ Barriers to fish passage in tributaries
- ▶ Excessive sedimentation
- ▶ Degraded riparian habitat
- ▶ Degraded water quality and temperature
- ▶ Altered channel morphology

RECOVERY PLANNING STATUS

Draft recovery plan for Yakima basin portion of mid-Columbia steelhead and bull trout completed in June 2005 and posted in Federal Register in May 2006.

REGIONAL RECOVERY ORGANIZATION

Yakima Sub-basin Fish and Wildlife Planning Board.

FEDERALLY RECOGNIZED TRIBES

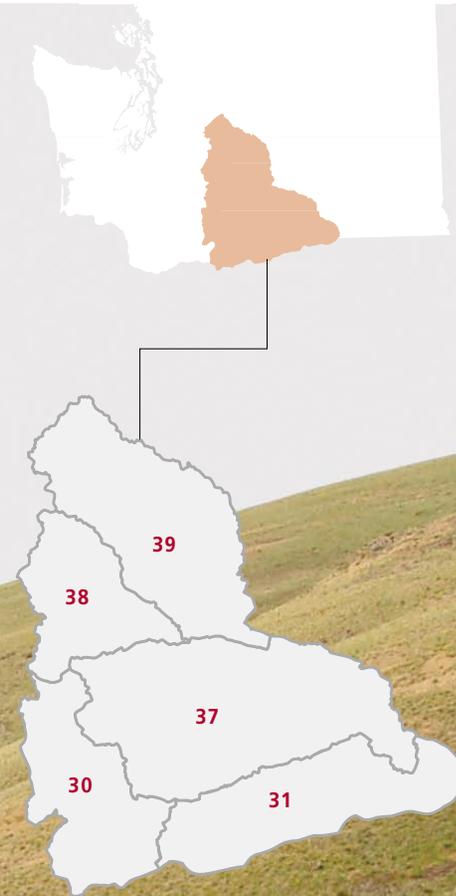
Yakama Nation.

COUNTIES

Benton, Kittitas, Yakima, parts of Chelan and Klickitat.

WATER RESOURCE INVENTORY AREAS (WRIAs)

- 30 Klickitat
- 31 Rock-Glade
- 37 Lower Yakima
- 38 Naches
- 39 Upper Yakima





MIDDLE COLUMBIA SALMON RECOVERY REGION

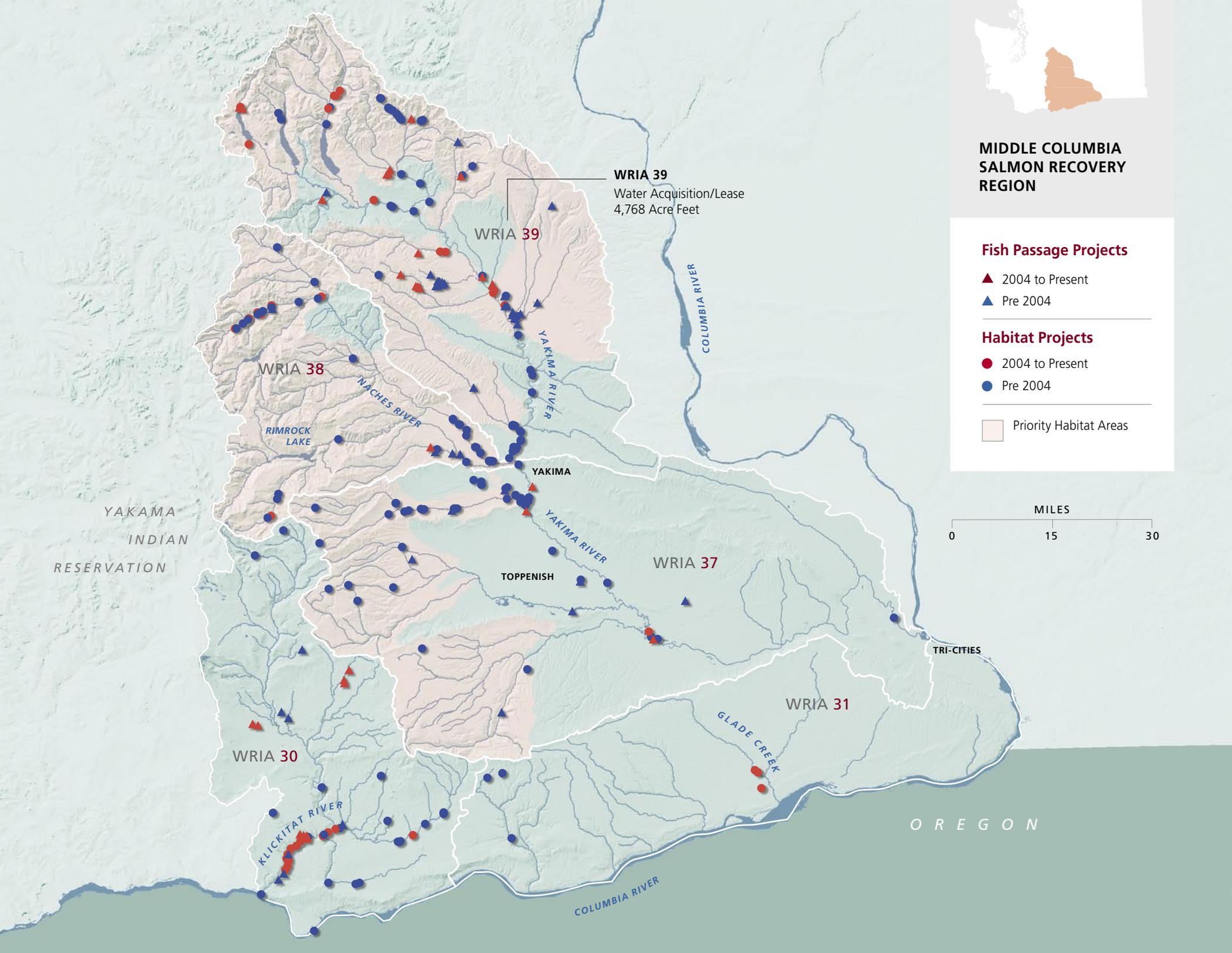
Fish Passage Projects

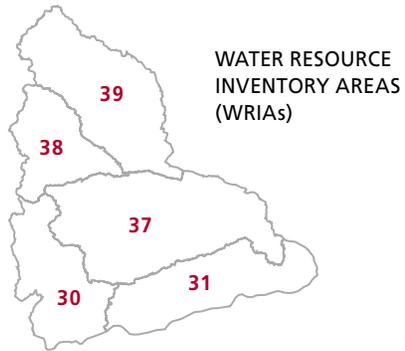
- ▲ 2004 to Present
- ▲ Pre 2004

Habitat Projects

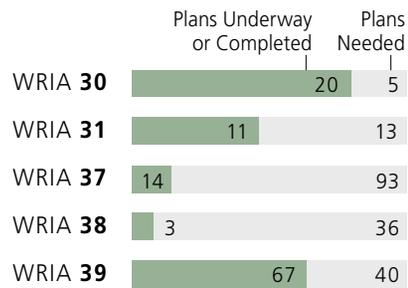
- 2004 to Present
- Pre 2004

□ Priority Habitat Areas

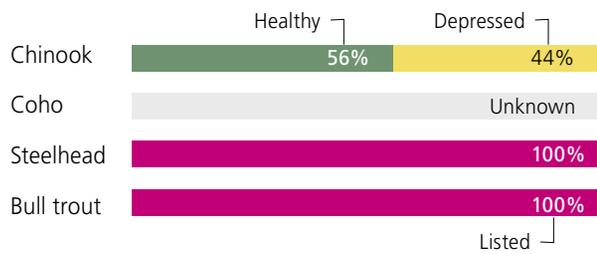




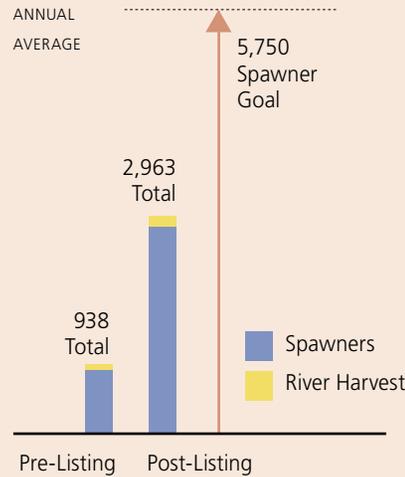
Watershed Cleanup Plans



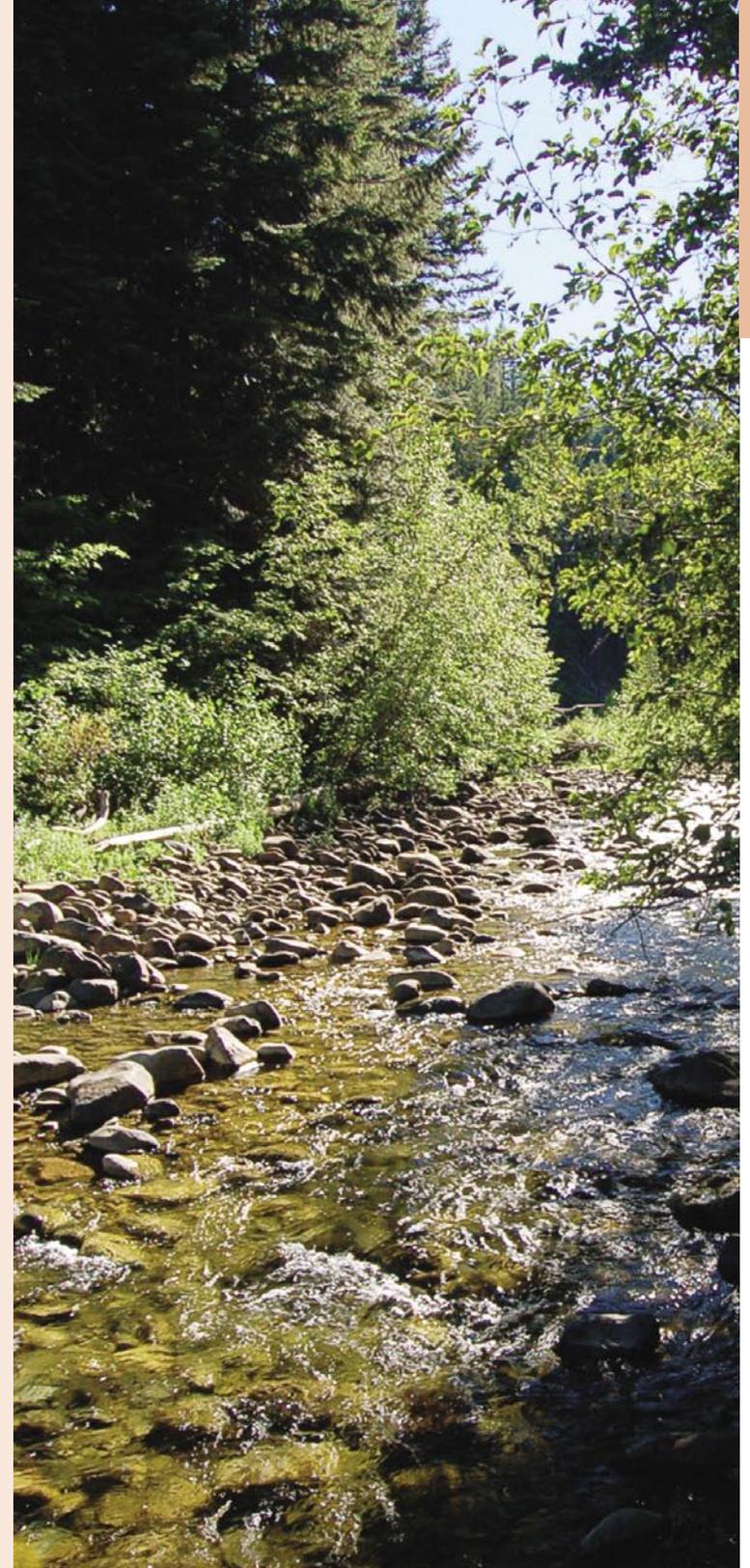
Fish Status



**Steelhead Wild Adult Abundance²⁰
Yakima MPG**



**Steelhead Wild Juvenile Production²¹
Since Listing**





MIDDLE COLUMBIA
SALMON RECOVERY
REGION

UPPER YAKIMA
BASIN



WATER
RESOURCE
INVENTORY
AREA

Watershed Watch Upper Yakima Basin WRIA 39



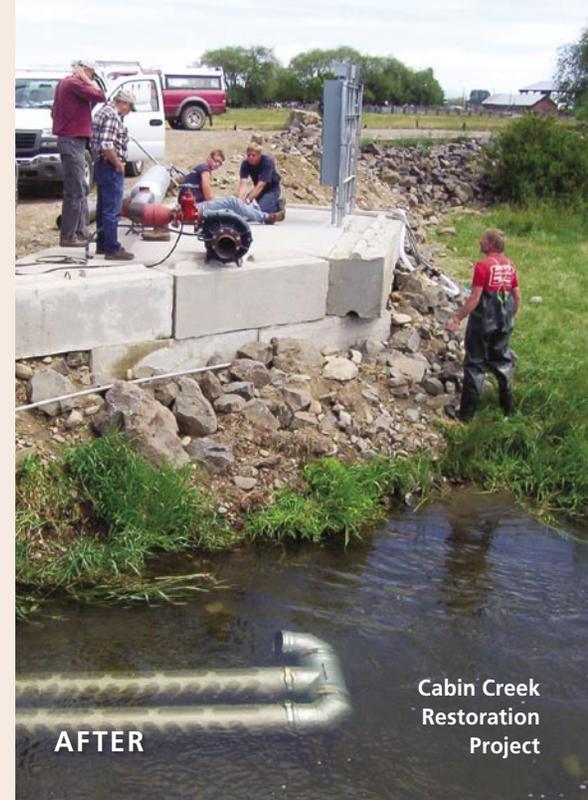
The upper Yakima River watershed, located in Kittitas and Yakima Counties, drains almost 2,135 square miles (1,366,400 acres) of land. The river, nearly 100 miles long, has a gentle gradient and once supported extensive floodplains, channels, and headwater lakes; however, three large storage reservoirs have radically changed the nature of the river systems.

About 47% of the watershed is in federal ownership, including Forest Service and military, and 11% is under state management. Around 16% is zoned agricultural, not including rangelands which are significant. Population in the watershed exceeds 55,000 people. Kittitas County and its cities, such as Ellensburg, Cle Elum, Ronald, and Roslyn, are experiencing considerable population growth from new development. In rural areas and smaller cities, this development is mostly conversion of forested lands to residential development. Near Ellensburg, agricultural lands are being converted to residential, commercial, and industrial uses.



Community Work
Party at Holmes Floodplain
Restoration

PHOTOS BY YAKIMA BASIN FISH & WILDLIFE RECOVERY BOARD



AFTER

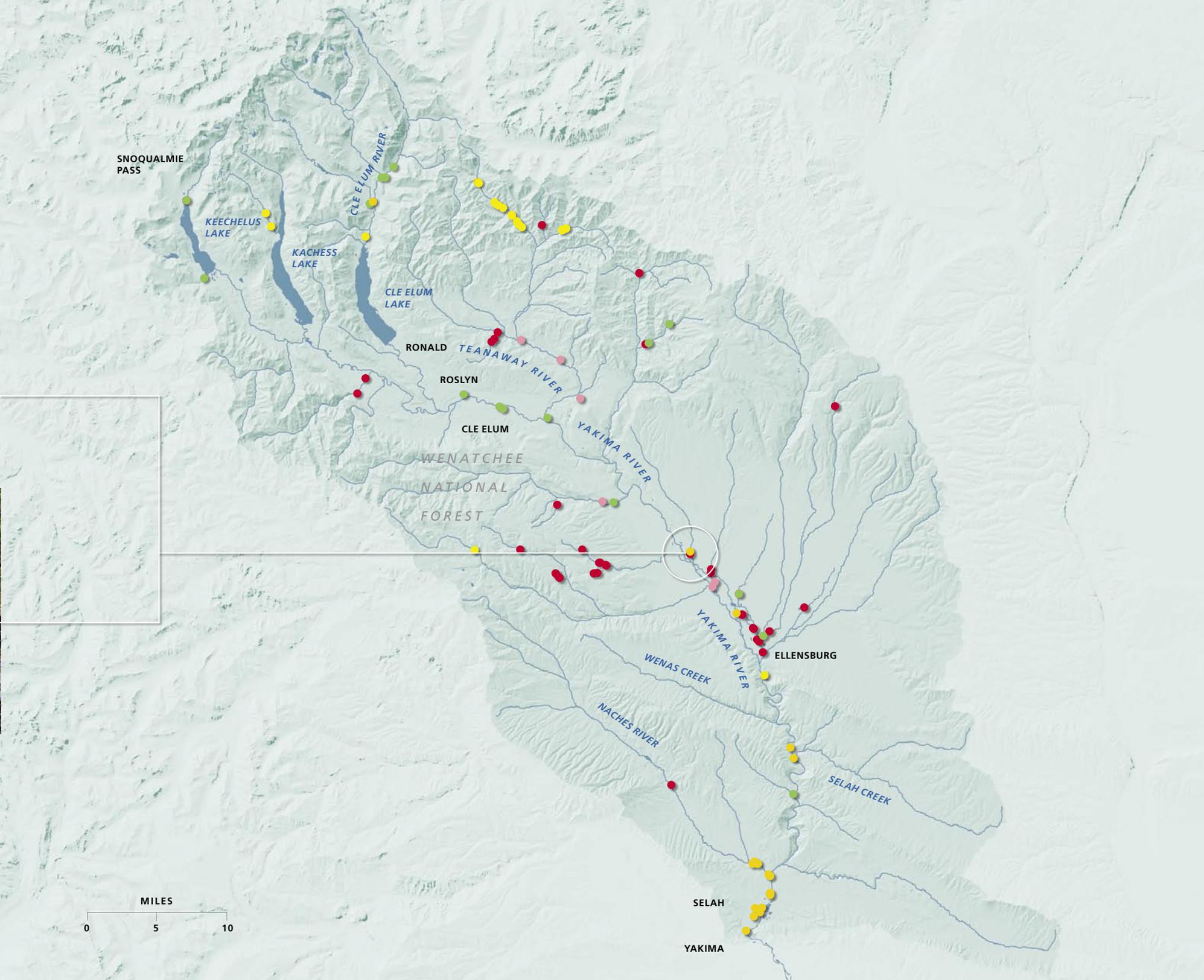
Cabin Creek
Restoration
Project



BEFORE

RESTORATION PROJECTS

- Fish Passage
- Riparian
- Instream Habitat
- Instream Flows
- Estuary
- Upland
- Miscellaneous





MIDDLE COLUMBIA
SALMON RECOVERY
REGION

UPPER YAKIMA
BASIN



WATER
RESOURCE
INVENTORY
AREA

UPPER YAKIMA BASIN WRIA 39 RECOVERY QUESTIONS

Are hydroelectric facilities operating in a “fish friendly” manner?

Indicator	Measured Results
FERC-licensed facilities	There are no FERC-licensed facilities in WRIA 39

Are streams accessible to wild salmon?

Indicator	Measured Results				
Inventory of major blockages	<table border="1"> <thead> <tr> <th>Complete barriers</th> <th>Partial barriers</th> </tr> </thead> <tbody> <tr> <td>8</td> <td>18</td> </tr> </tbody> </table>	Complete barriers	Partial barriers	8	18
Complete barriers	Partial barriers				
8	18				
Miles of anadromous waters inaccessible	Not available				

Are listed populations abundant and productive?

Indicator	Measured Results				
Run size achieved, 5 year average pre- and post listing. Wild component of Yakima Major Population Group.	<table border="1"> <thead> <tr> <th>Pre-listing</th> <th>Post-listing</th> </tr> </thead> <tbody> <tr> <td>938</td> <td>2,963</td> </tr> </tbody> </table>	Pre-listing	Post-listing	938	2,963
Pre-listing	Post-listing				
938	2,963				
Juvenile production achieved (baseline mean)	36,966				

Is water clean enough to support wild salmon?

Indicator	Measured Results															
Water quality index parameters	<table border="1"> <thead> <tr> <th>Fecal coliform</th> <th>Stream segments meeting standard</th> <th>Stream segments not meeting standard</th> </tr> </thead> <tbody> <tr> <td>14</td> <td>4</td> <td></td> </tr> <tr> <td>Dissolved oxygen</td> <td>19</td> <td>2</td> </tr> <tr> <td>pH</td> <td>26</td> <td>1</td> </tr> <tr> <td>Temperature</td> <td>45</td> <td>28</td> </tr> </tbody> </table>	Fecal coliform	Stream segments meeting standard	Stream segments not meeting standard	14	4		Dissolved oxygen	19	2	pH	26	1	Temperature	45	28
	Fecal coliform	Stream segments meeting standard	Stream segments not meeting standard													
	14	4														
	Dissolved oxygen	19	2													
pH	26	1														
Temperature	45	28														

Do rivers and streams have flows that support wild salmon?

Indicator	Measured Results
Instream flows set	No state instream flows set; basin is managed via federal basin adjudication process
Percent of time flow met during fish critical period August 1 to September 30	Not applicable. Flow regimes are negotiated annually to meet available water supply

Does harvest management protect wild salmon?

Indicator	Measured Results												
Wild spawners 5 year average pre- and post listing (Yakima MPG scale)	<table border="0"> <tr> <td>Pre-listing</td> <td> 840</td> <td></td> </tr> <tr> <td>Post-listing</td> <td> 2,801</td> <td></td> </tr> <tr> <td></td> <td></td> <td>RECOVERY PLAN ESCAPEMENT GOAL</td> </tr> <tr> <td></td> <td></td> <td> 5,750</td> </tr> </table>	Pre-listing	840		Post-listing	2,801				RECOVERY PLAN ESCAPEMENT GOAL			5,750
Pre-listing	840												
Post-listing	2,801												
		RECOVERY PLAN ESCAPEMENT GOAL											
		5,750											
Percent of wild salmon run that is harvested, 5 year average pre- and post listing (Yakima MPG scale)	Pre-listing 10% Post listing 5%												

Do hatchery practices meet the needs of wild salmon?

Indicator	Measured Results				
Does a scientific evaluation of practices exist?	No WDFW hatchery in this watershed. WRIA 37 hatchery reconditions kelt for this watershed; recovery plan actions begun. Hatchery Scientific Review Group review pending.				
If so, what actions have been accomplished?	<table border="0"> <tr> <td></td> <td></td> </tr> <tr> <td>Ongoing</td> <td>Not Begun</td> </tr> </table>			Ongoing	Not Begun
Ongoing	Not Begun				

Upper Columbia Salmon Recovery Region



PHOTOS BY CHRIS DRIVDAHL

The Upper Columbia River Salmon Recovery Region in north central Washington includes the Columbia River and its tributaries upstream of the confluence of the Yakima River to the base of Chief Joseph Dam. River valleys are deeply incised and maintain low gradients except in headwaters. The climate includes extremes in temperatures and precipitation, with most precipitation falling in the mountains as snow. Melting snowpack, groundwater, and runoff maintain stream flows.

A large portion of the Upper Columbia Basin is publicly owned. The first draft recovery plan was completed in June 2005; subsequent drafts led to a Federal Register posting in September 2006, currently under review. The plan addresses Upper Columbia spring Chinook and steelhead, and three “core” areas supporting bull trout populations.

Key Facts

LISTED FISH

Steelhead (threatened)
Spring Chinook (threatened)
Bull trout (threatened)

MAJOR FACTORS LIMITING RECOVERY

- ▶ Hydropower system mortality on Columbia River
- ▶ Impaired stream flows in tributaries
- ▶ Barriers to fish passage in tributaries
- ▶ Excessive sedimentation
- ▶ Degraded riparian habitat
- ▶ Degraded water quality and temperature
- ▶ Altered flood plain and channel morphology
- ▶ Harvest

RECOVERY PLANNING STATUS

Draft recovery plan for Chinook, steelhead, and bull trout posted in Federal Register September 2006.

REGIONAL RECOVERY ORGANIZATION

Upper Columbia Salmon Recovery Board.

FEDERALLY RECOGNIZED TRIBES

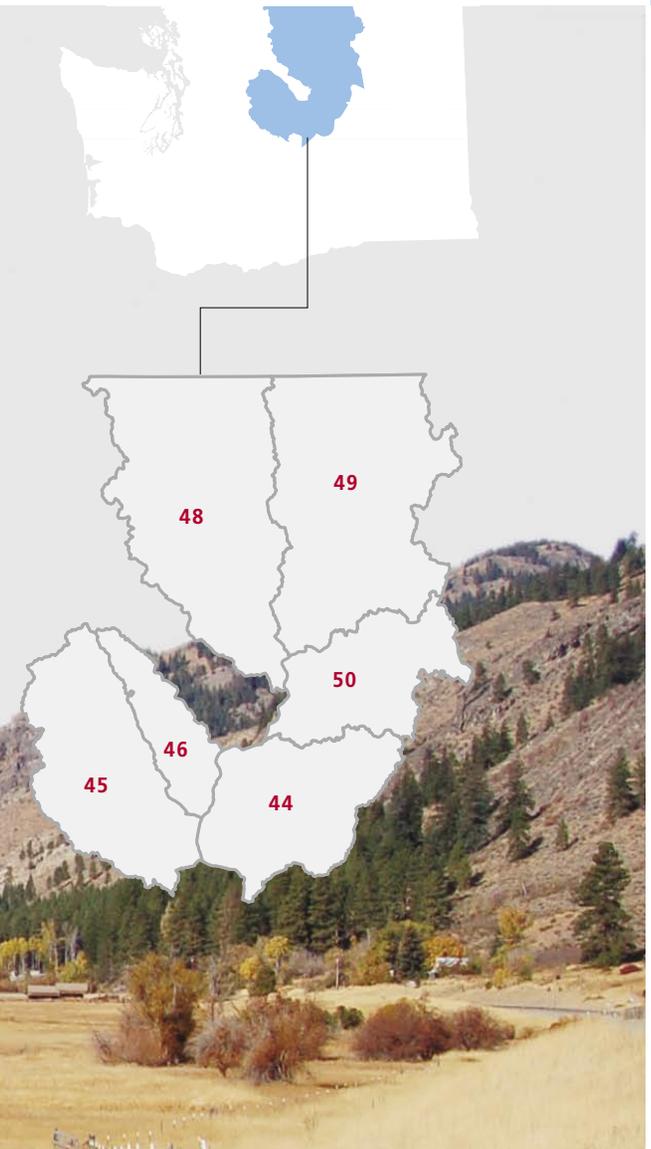
Colville Confederated Tribes, Yakama Nation.

COUNTIES

Chelan, Douglas, Okanogan.

WATER RESOURCE INVENTORY AREAS (WRIAs)

- 44 Moses Coulee
- 45 Wenatchee
- 46 Entiat
- 48 Methow
- 49 Okanogan
- 50 Foster



UPPER COLUMBIA SALMON RECOVERY REGION

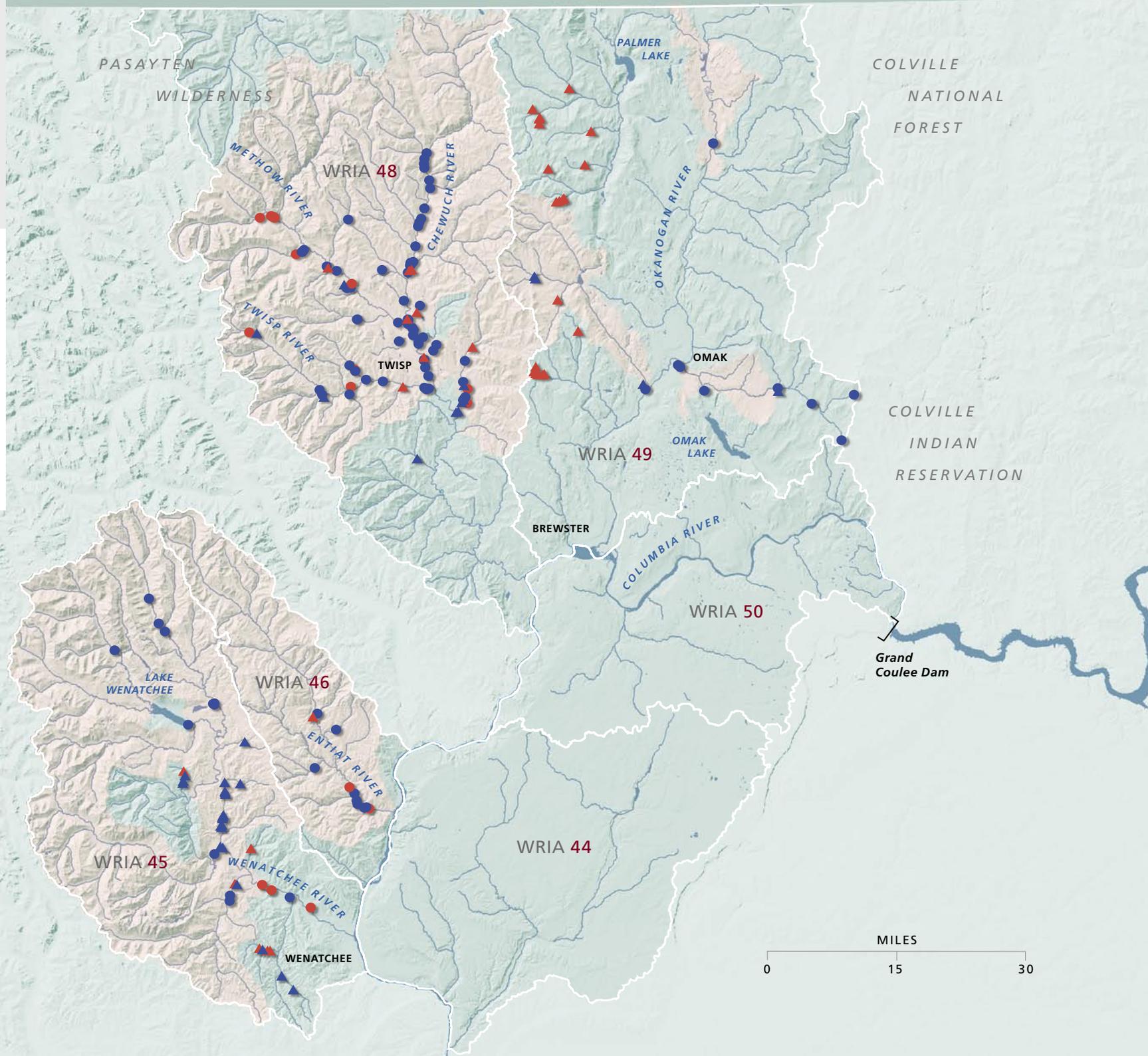
Fish Passage Projects

- ▲ 2004 to Present
- ▲ Pre 2004

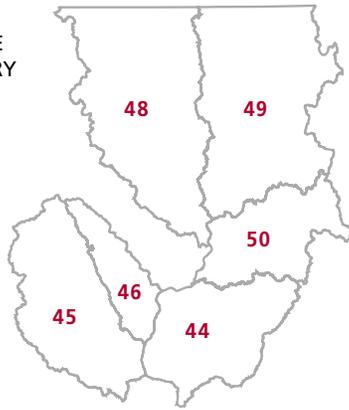
Habitat Projects

- 2004 to Present
- Pre 2004

Priority Habitat Areas



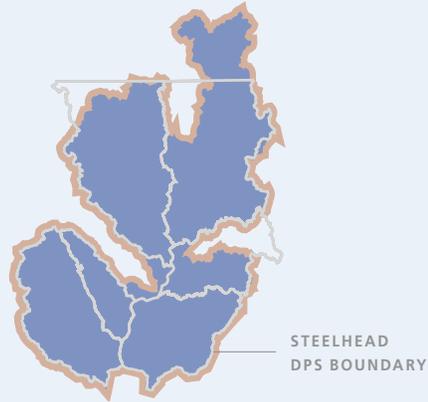
WATER RESOURCE INVENTORY AREAS (WRIAs)



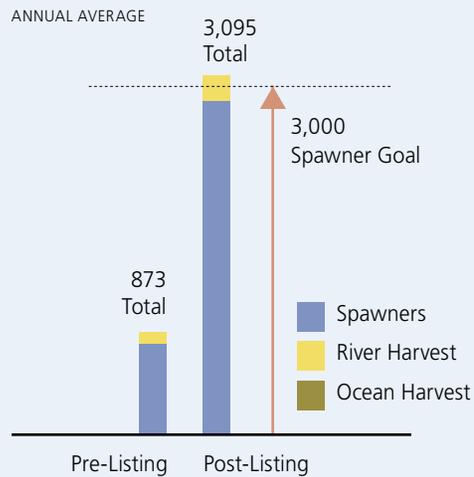
Watershed Cleanup Plans



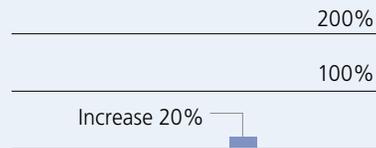
Fish Status



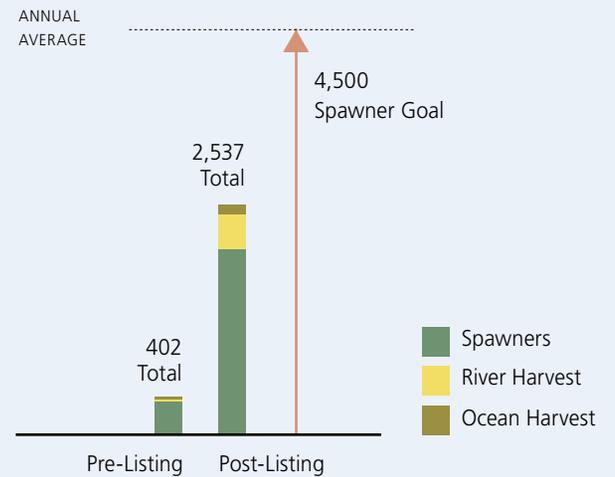
Steelhead Wild Adult Abundance DPS Scale²²



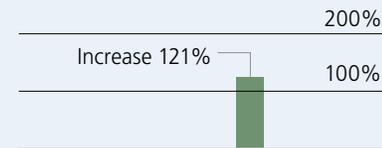
Steelhead Wild Juvenile Production²³ Since Listing



Chinook Wild Adult Abundance ESU Scale²²



Chinook Wild Juvenile Production²⁴ Since Listing





UPPER COLUMBIA
SALMON RECOVERY
REGION

Watershed Watch

Wenatchee Basin WRIA 45



The 1,370 square mile (854,000 acre) Wenatchee watershed lies completely within Chelan County. Federal and State lands comprise over 90% of the WRIA. Chiwawa, White, and Little Wenatchee Rivers along with the lower and upper Wenatchee River are the main watercourses, with numerous smaller creeks. Less than 10% of the

watershed is in private ownership, most of which is concentrated along valley bottoms. Land uses in rural areas of the watershed are primarily forest management and production, orchard production, scattered residences, lodging facilities, agricultural support facilities, and small home-based industries.

Currently orchards comprise one of the largest private land uses (by acreage) in the WRIA. Approximately 23,850 people reside within the watershed on a full- or part-time basis, and the population in the WRIA is projected to increase approximately 2.4% per year between 2000 and 2025, primarily on privately owned land in the lower elevations and valley bottoms along the Wenatchee River and its major tributaries.

WENATCHEE BASIN



WATER
RESOURCE
INVENTORY
AREA

PHOTOS BY CHELAN COUNTY LEAD ENTITY



Floodplain
Riparian Protection
Project at
Wenatchee River



White River Habitat
Acquisition



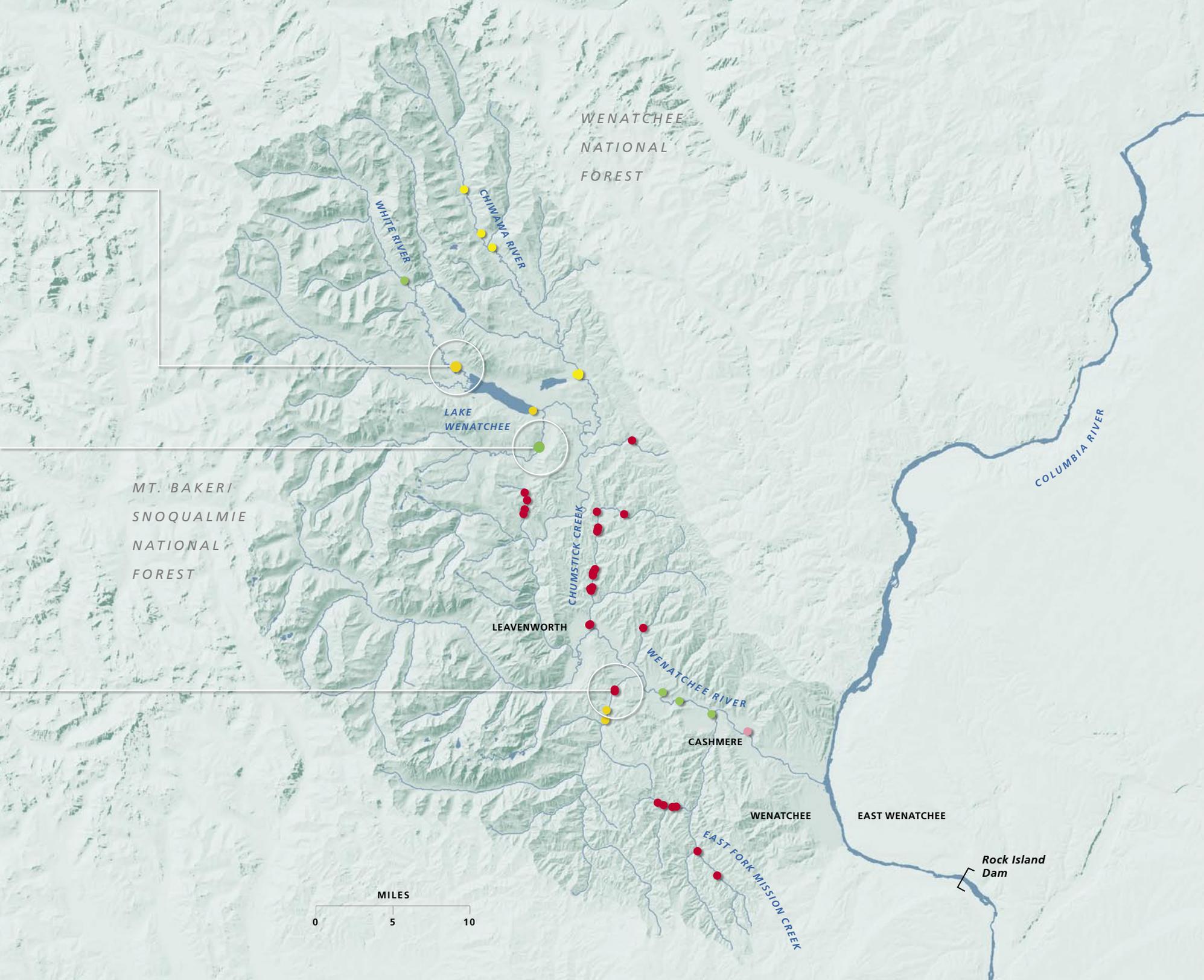
Nason Creek
Off-Channel Habitat
Restoration



Peshastin
Creek Fish Barrier
Removal

RESTORATION PROJECTS

- Fish Passage
- Riparian
- Instream Habitat
- Instream Flows
- Estuary
- Upland
- Miscellaneous





UPPER COLUMBIA
SALMON RECOVERY
REGION

WENATCHEE BASIN



WATER
RESOURCE
INVENTORY
AREA

WENATCHEE BASIN WRIA 45 RECOVERY QUESTIONS

Are hydroelectric facilities operating in a “fish friendly” manner?

Indicator	Measured Results
FERC-licensed facilities	There are no FERC-licensed facilities in WRIA 45

Are streams accessible to wild salmon?

Indicator	Measured Results				
Inventory of major blockages	<table border="1"> <thead> <tr> <th>Complete barriers</th> <th>Partial barriers</th> </tr> </thead> <tbody> <tr> <td>14</td> <td>17</td> </tr> </tbody> </table>	Complete barriers	Partial barriers	14	17
Complete barriers	Partial barriers				
14	17				
Miles of anadromous waters inaccessible	Not available				

Are listed populations abundant and productive?

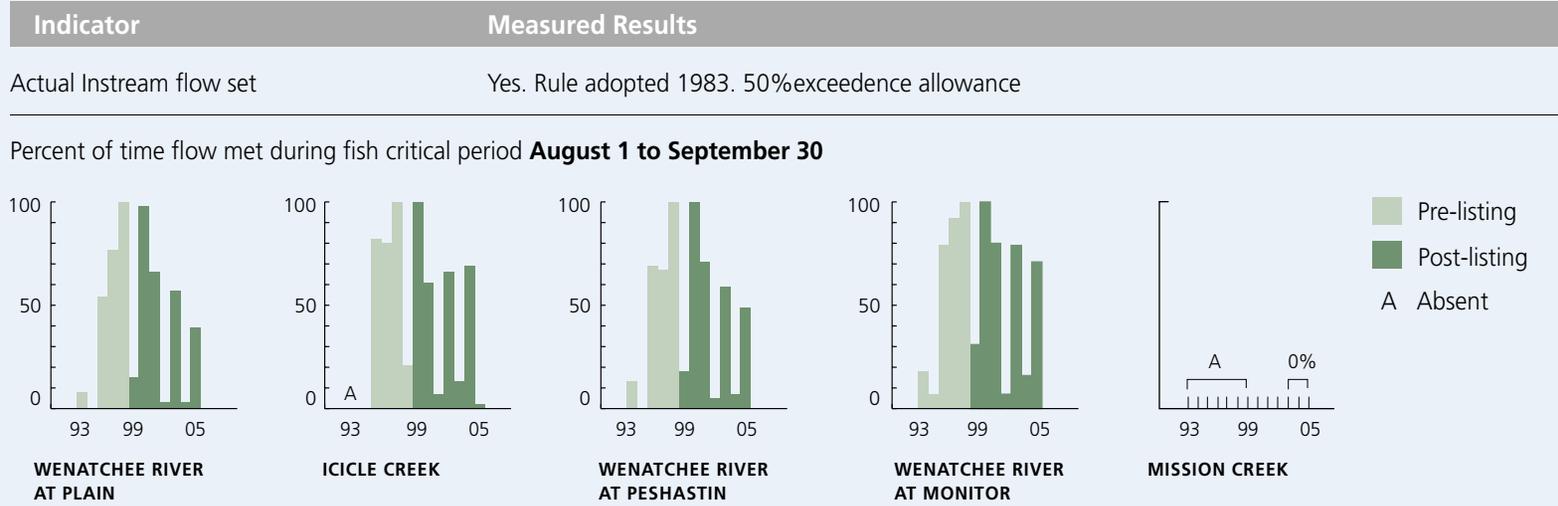
Indicator	Measured Results	
Run size achieved, 5 year average pre- and post listing. Wild component of Wenatchee-Methow Major Population Group.	Steelhead	Pre-listing 873
		Post-listing 3,095
	Chinook	Pre-listing 402
		Post-listing 2,537
Juvenile production achieved (baseline mean)	Steelhead: 36,211 Chinook: 22,261	

Is water clean enough to support wild salmon?

Indicator	Measured Results	
Water quality index parameters	Fecal coliform	35 (meeting) / 31 (not meeting)
	Dissolved oxygen	58 (meeting) / 3 (not meeting)
	pH	66 (meeting) / 8 (not meeting)
	Temperature	39 (meeting) / 70 (not meeting)

Legend: ■ Stream segments meeting standard ■ Stream segments not meeting standard

Do rivers and streams have flows that support wild salmon?



Does harvest management protect wild salmon?

Indicator	Measured Results												
Recovery plan spawner escapement goal (ESU scale)	Steelhead: 3,000 Chinook: 4,500												
Wild spawners 5 year average pre- and post listing (ESU scale)	<table border="0"> <tr> <td>Steelhead</td> <td>Pre-listing</td> <td>764</td> <td>Chinook</td> <td>Pre-listing</td> <td>354</td> </tr> <tr> <td></td> <td>Post-listing</td> <td>2,856</td> <td></td> <td>Post-listing</td> <td>2,030</td> </tr> </table>	Steelhead	Pre-listing	764	Chinook	Pre-listing	354		Post-listing	2,856		Post-listing	2,030
Steelhead	Pre-listing	764	Chinook	Pre-listing	354								
	Post-listing	2,856		Post-listing	2,030								
Percent of wild salmon run that is harvested 5 year average pre- and post listing (ESU scale)	<table border="0"> <tr> <td>Steelhead</td> <td>Pre-listing</td> <td>12%</td> <td>Chinook</td> <td>Pre-listing</td> <td>12%</td> </tr> <tr> <td></td> <td>Post-listing</td> <td>8%</td> <td></td> <td>Post-listing</td> <td>20%</td> </tr> </table>	Steelhead	Pre-listing	12%	Chinook	Pre-listing	12%		Post-listing	8%		Post-listing	20%
Steelhead	Pre-listing	12%	Chinook	Pre-listing	12%								
	Post-listing	8%		Post-listing	20%								

Do hatchery practices meet the needs of wild salmon?

Indicator	Measured Results						
Does a scientific evaluation of practices exist?	Recovery plan recommendations complete; Hatchery Scientific Review Group pending						
If so, what actions have been accomplished?	<table border="0"> <tr> <td>29</td> <td>18</td> <td>11</td> </tr> <tr> <td>Implemented</td> <td>Ongoing</td> <td>Not Begun</td> </tr> </table>	29	18	11	Implemented	Ongoing	Not Begun
29	18	11					
Implemented	Ongoing	Not Begun					

Snake River Salmon Recovery Region



The Snake River Salmon Recovery Region is located in the southeastern corner of Washington. Rolling, semi-arid crop and pasture lands are flanked by the forested Blue Mountains to the south. The Columbia, Snake, Grande Ronde, Tucannon, and Walla Walla Rivers drain the recovery region. The Snake River is a major transportation corridor for many of the region's products, which are barged downstream to Columbia River ports.

The recovery region is sparsely populated, with residents scattered throughout the area in communities of less than 1,000 people or clustered in a few larger cities. The draft recovery plan was completed in June 2005 and posted in the Federal Register in March 2006. The plan covers portions of the middle Columbia steelhead, Snake River steelhead, fall/spring/summer Chinook salmon, and bull trout.

Key Facts

LISTED FISH

Steelhead (threatened)
Sockeye (endangered)²⁵
Chinook (threatened)
Bull trout (threatened)

MAJOR FACTORS LIMITING RECOVERY

- ▶ Hydropower system mortality on Columbia River
- ▶ Impaired stream flows in tributaries
- ▶ Barriers to fish passage in tributaries
- ▶ Excessive sedimentation
- ▶ Degraded riparian habitat
- ▶ Degraded water quality and temperature
- ▶ Altered channel morphology
- ▶ Harvest

RECOVERY PLANNING STATUS

Draft recovery plan completed in June 2005 and posted in Federal Register in March 2006.

REGIONAL RECOVERY ORGANIZATION

Snake River Salmon Recovery Board.

FEDERALLY RECOGNIZED TRIBES

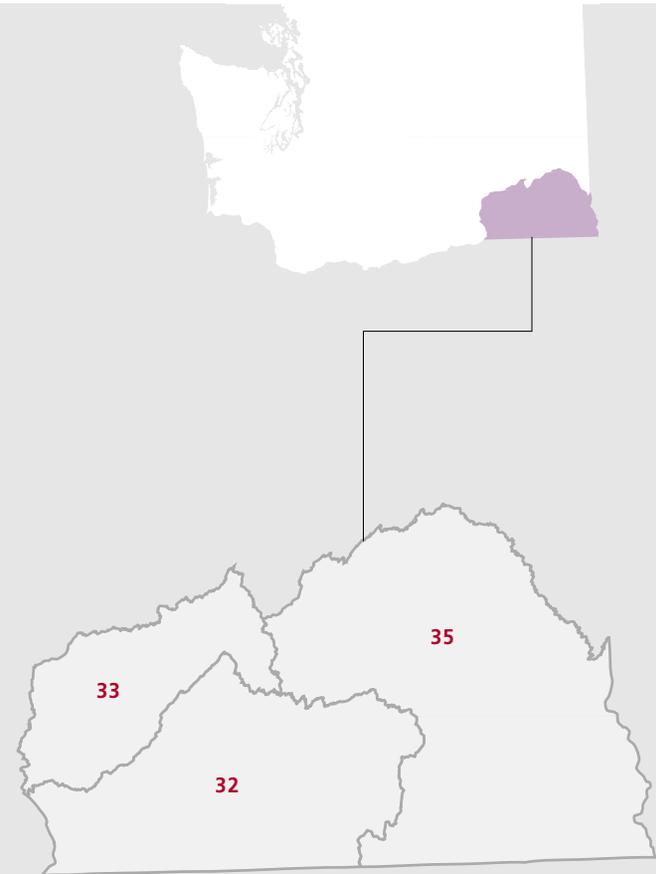
Nez Perce and Confederated Tribes of the Umatilla Reservation.

COUNTIES

Walla Walla, Columbia, Garfield, Asotin, and portions of Whitman.

WATER RESOURCE INVENTORY AREAS (WRIAs)

- 32** Walla Walla
- 33** Lower Snake
- 35** Middle Snake



**SNAKE RIVER
SALMON RECOVERY
REGION**

Fish Passage Projects

- ▲ 2004 to Present
- ▲ Pre 2004

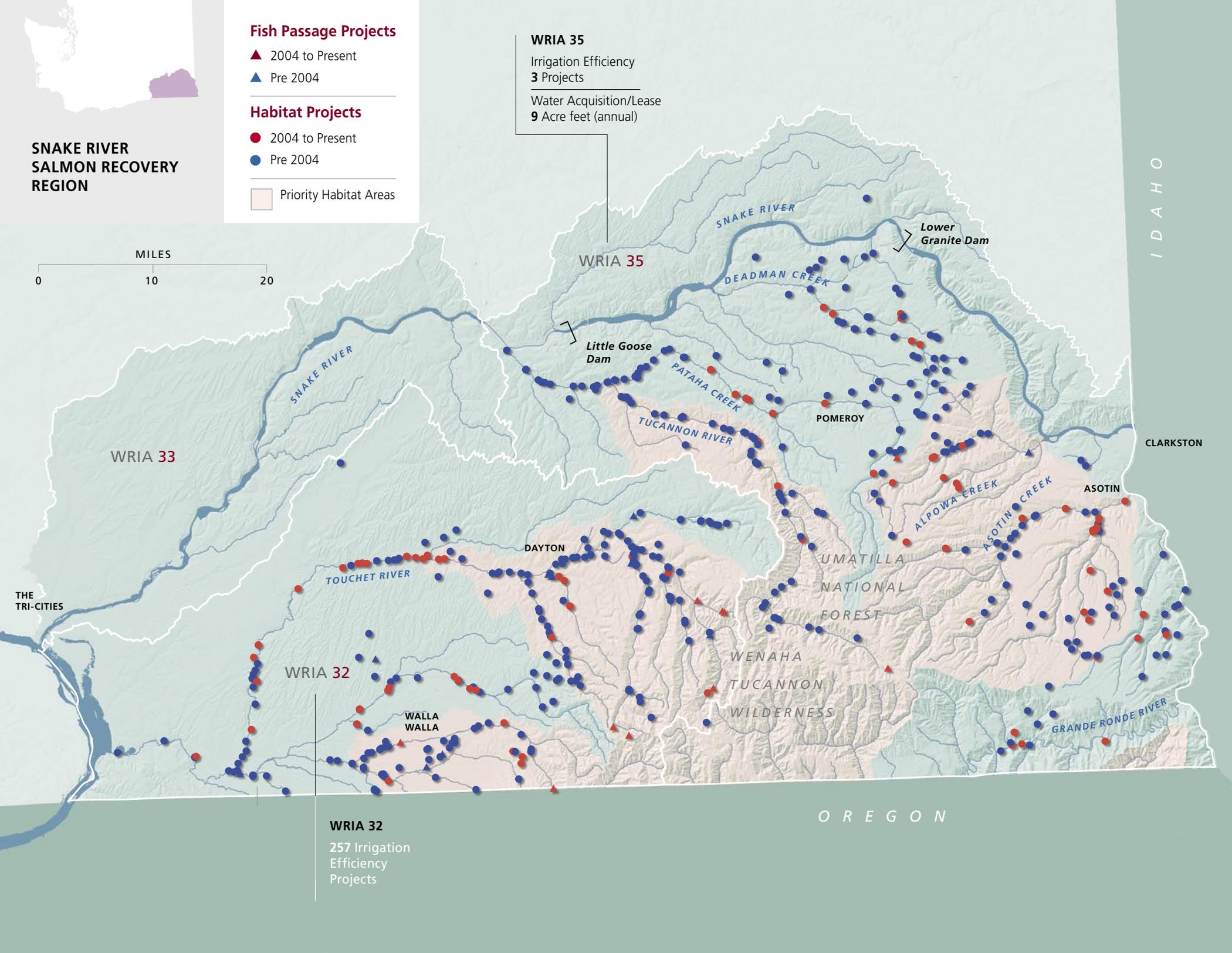
Habitat Projects

- 2004 to Present
- Pre 2004

□ Priority Habitat Areas

WRIA 35

Irrigation Efficiency
3 Projects
Water Acquisition/Lease
9 Acre feet (annual)



WRIA 33

WRIA 35

WRIA 32

WRIA 32
257 Irrigation
Efficiency
Projects

O R E G O N

I D A H O

CLARKSTON

ASOTIN

UMATILLA
NATIONAL
FOREST

WENAHA
TUCANNON
WILDERNESS

DAYTON

POMEROY

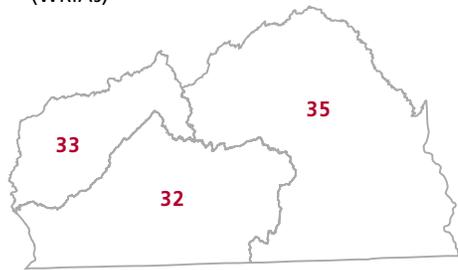
THE
TRI-CITIES

WALLA
WALLA

Lower
Granite Dam

Little Goose
Dam

WATER RESOURCE INVENTORY AREAS (WRIAs)

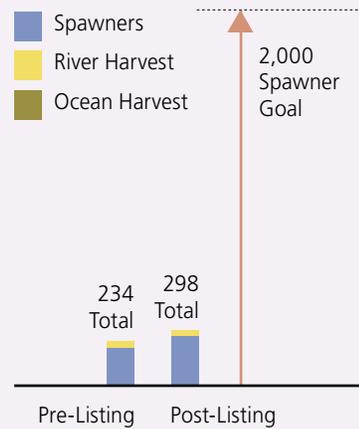


Watershed Cleanup Plans

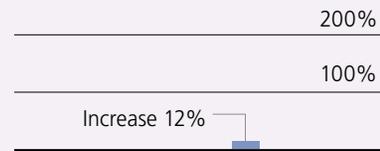


Snake River Steelhead Wild Adult Abundance Lower Snake MPG

ANNUAL AVERAGE

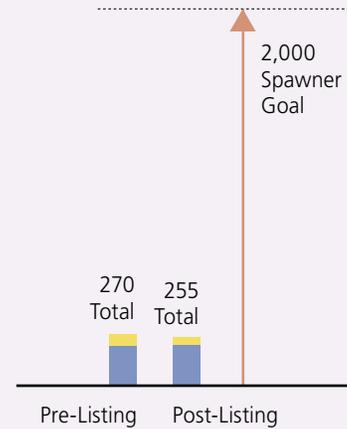


Steelhead Wild Juvenile Production²⁸ Since Listing



Mid-Columbia Steelhead Wild Adult Abundance Walla Walla MPG²⁶

ANNUAL AVERAGE



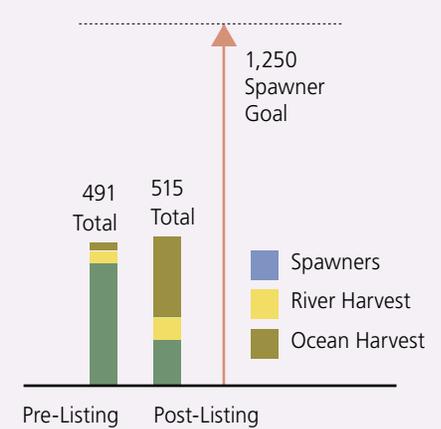
Steelhead Wild Juvenile Production Since Listing

Data Not Available

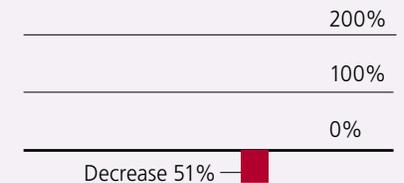


Spring Chinook Wild Adult Abundance Lower Snake MPG²⁷

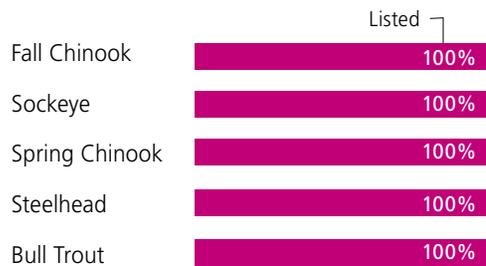
ANNUAL AVERAGE



Spring Chinook Wild Juvenile Production²⁸ Since Listing



Fish Status





Snake River
Salmon Recovery
Region

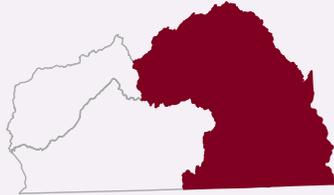
Middle Snake
(Tucannon) Basin

WRIA
35

Water
Resource
Inventory
Area

Watershed Characterization

Middle Snake (Tucannon) Basin WRIA 35



The Middle Snake watershed is located in the extreme southeast corner of Washington, bordered by Oregon to the south and Idaho to the east. The basin drains approximately 2,250 square miles (1,440,000 acres) within the state. Elevation ranges from 6,500 feet to 650 feet above sea level, while precipitation ranges from over 40 inches per year at higher elevations to 7 inches per year along the Snake River. The watershed encompasses portions of Asotin, Whitman, Garfield, and Columbia Counties. Most of Asotin County's 20,551 people live in Asotin or Clarkston and neighboring communities.

Whitman County and Columbia County portions of the basin do not have major population centers, and the city of Pomeroy is the most populated area in Garfield County with 1,517 residents. Population growth has been slow. Private land comprises 1,711 square miles (76%) of the WRIA, while the federal government manages 436 square miles (19%), and the state of Washington manages 103 square miles (~5%). Primary surface water bodies include the Snake River, Tucannon River, Asotin Creek, and Pataha Creek. Little Goose and Lower Granite Dams impound the Snake River, backing water upstream for about 40 miles to the city of Asotin. From Asotin to Hells Canyon Dam, about 100 miles, the river is free-flowing.

About 43% of the land area has been converted to crop and livestock production, with grazing occurring on about 37% of the watershed. Non-irrigated row crops, primarily wheat, are found on roughly 37% of land in the watershed. Coniferous forests cover approximately 20%, while a mixture of shrubs and trees covers 7%. Recent wildfires have burned more than 100,000 acres of the WRIA, or nearly 7% of the total area.

SALMON RECOVERY FUNDING BOARD



George
Creek
Instream and
Riparian
Projects

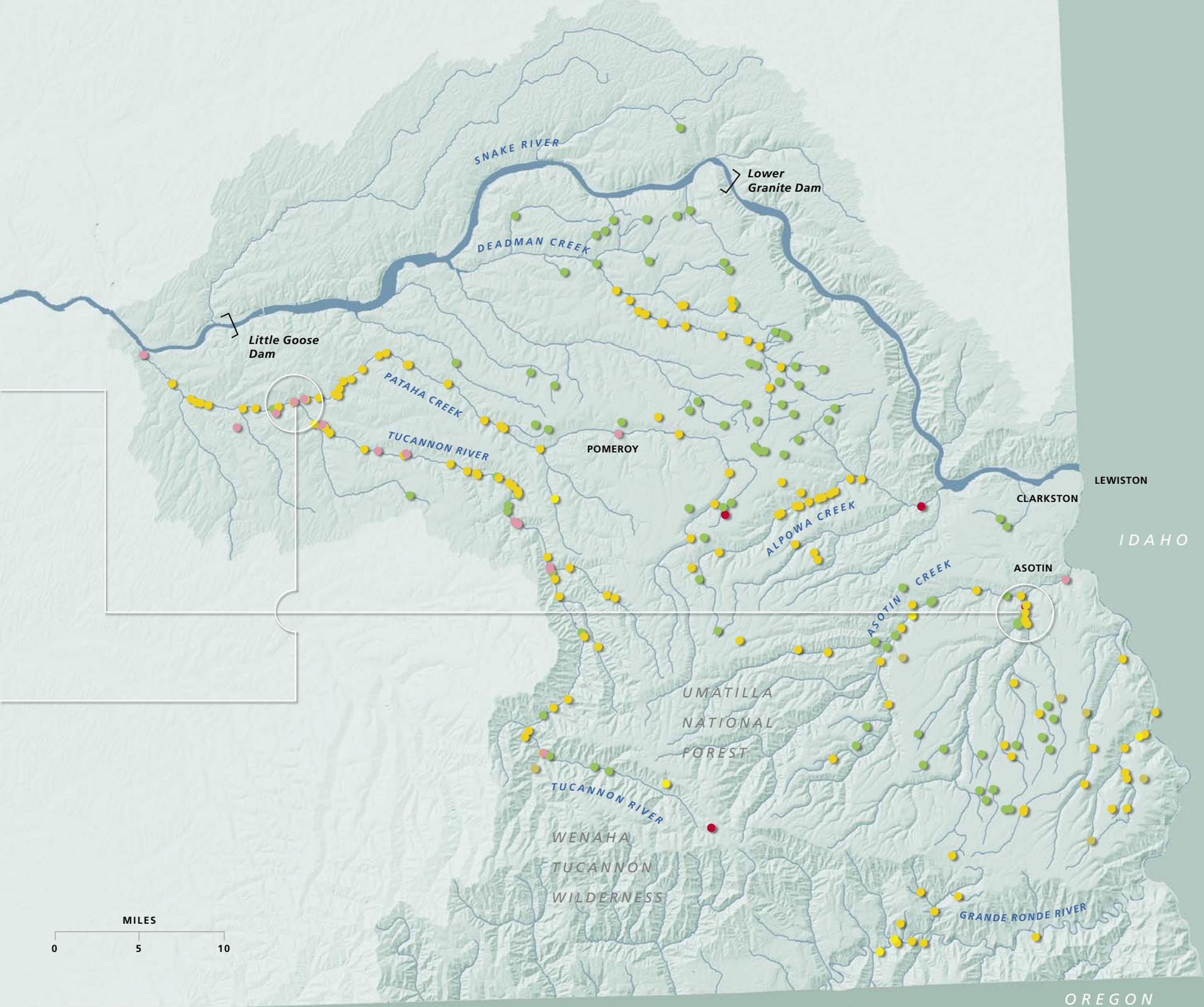
Snake River Salmon Recovery Board



Tucannon
River Diversion
Screen Project

RESTORATION PROJECTS

- Fish Passage
- Riparian
- Instream Habitat
- Instream Flows
- Estuary
- Upland
- Miscellaneous



MIDDLE SNAKE (TUCANNON) BASIN WRIA 35 RECOVERY QUESTIONS

Are hydroelectric facilities operating in a “fish friendly” manner?

Indicator	Measured Results
FERC-licensed facilities	There are no FERC-licensed facilities in WRIA 35

Are streams accessible to wild salmon?

Indicator	Measured Results				
Inventory of major blockages	<table border="1"> <thead> <tr> <th>Complete barriers</th> <th>Partial barriers</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>13</td> </tr> </tbody> </table>	Complete barriers	Partial barriers	3	13
Complete barriers	Partial barriers				
3	13				
Miles of anadromous waters inaccessible	Not available				

Are listed populations abundant and productive?

Indicator	Measured Results				
Run size achieved 5 year average pre- and post listing. Wild component of Major Population Group indicated.	Snake River Steelhead (Lower Snake MPG) <table border="1"> <thead> <tr> <th>Pre-listing</th> <th>Post-listing</th> </tr> </thead> <tbody> <tr> <td>234</td> <td>298</td> </tr> </tbody> </table>	Pre-listing	Post-listing	234	298
	Pre-listing	Post-listing			
234	298				
Mid-Columbia Steelhead (Walla Walla MPG) <table border="1"> <thead> <tr> <th>Pre-listing</th> <th>Post-listing</th> </tr> </thead> <tbody> <tr> <td>270</td> <td>255</td> </tr> </tbody> </table>	Pre-listing	Post-listing	270	255	
Pre-listing	Post-listing				
270	255				
Spring Chinook (Lower Snake MPG)	Pre-listing 1,375				
	Post-listing 515				
Juvenile production achieved (baseline mean)	Steelhead: 20,984 Fall Chinook: 7,529 Spring Chinook: 43,433				

Is water clean enough to support wild salmon?

Indicator	Measured Results				
Water quality index parameters	Fecal coliform <table border="1"> <thead> <tr> <th>Stream segments meeting standard</th> <th>Stream segments not meeting standard</th> </tr> </thead> <tbody> <tr> <td>15</td> <td>15</td> </tr> </tbody> </table>	Stream segments meeting standard	Stream segments not meeting standard	15	15
	Stream segments meeting standard	Stream segments not meeting standard			
	15	15			
	Dissolved oxygen <table border="1"> <thead> <tr> <th>Stream segments meeting standard</th> <th>Stream segments not meeting standard</th> </tr> </thead> <tbody> <tr> <td>7</td> <td>3</td> </tr> </tbody> </table>	Stream segments meeting standard	Stream segments not meeting standard	7	3
Stream segments meeting standard	Stream segments not meeting standard				
7	3				
pH <table border="1"> <thead> <tr> <th>Stream segments meeting standard</th> <th>Stream segments not meeting standard</th> </tr> </thead> <tbody> <tr> <td>9</td> <td>9</td> </tr> </tbody> </table>	Stream segments meeting standard	Stream segments not meeting standard	9	9	
Stream segments meeting standard	Stream segments not meeting standard				
9	9				
Temperature <table border="1"> <thead> <tr> <th>Stream segments meeting standard</th> <th>Stream segments not meeting standard</th> </tr> </thead> <tbody> <tr> <td>11</td> <td>72</td> </tr> </tbody> </table>	Stream segments meeting standard	Stream segments not meeting standard	11	72	
Stream segments meeting standard	Stream segments not meeting standard				
11	72				

SNAKE RIVER
SALMON RECOVERY
REGION

MIDDLE SNAKE
(TUCANNON) BASIN



WATER
RESOURCE
INVENTORY
AREA

Do rivers and streams have flows that support wild salmon?

Indicator	Measured Results
Instream flows set	Flow recommendations under negotiations
Percent of time flow met during fish critical period August 1 to September 30	Not available.

Does harvest management protect wild salmon?

Indicator	Measured Results																
Wild spawners 5 year average pre- and post listing (MPG scale)	<table border="0"> <tr> <td rowspan="2">Snake River Steelhead (Lower Snake MPG)</td> <td>Pre-listing</td> <td> 198</td> <td rowspan="2">Spring Chinook (Lower Snake MPG)</td> <td>Pre-listing</td> <td> 418</td> </tr> <tr> <td>Post-listing</td> <td> 258</td> <td>Post-listing</td> <td> 281</td> </tr> <tr> <td colspan="2"></td> <td style="text-align: center;">2,000 RECOVERY PLAN ESCAPEMENT GOAL</td> <td colspan="2"></td> <td style="text-align: center;">750 RECOVERY PLAN ESCAPEMENT GOAL</td> </tr> </table>	Snake River Steelhead (Lower Snake MPG)	Pre-listing	198	Spring Chinook (Lower Snake MPG)	Pre-listing	418	Post-listing	258	Post-listing	281			2,000 RECOVERY PLAN ESCAPEMENT GOAL			750 RECOVERY PLAN ESCAPEMENT GOAL
	Snake River Steelhead (Lower Snake MPG)		Pre-listing	198		Spring Chinook (Lower Snake MPG)	Pre-listing	418									
		Post-listing	258	Post-listing	281												
		2,000 RECOVERY PLAN ESCAPEMENT GOAL			750 RECOVERY PLAN ESCAPEMENT GOAL												
<table border="0"> <tr> <td rowspan="2">Mid-Columbia Steelhead (Walla Walla MPG)</td> <td>Pre-listing</td> <td> 207</td> </tr> <tr> <td>Post-listing</td> <td> 281</td> </tr> <tr> <td colspan="2"></td> <td style="text-align: center;">2,000 RECOVERY PLAN ESCAPEMENT GOAL</td> </tr> </table>	Mid-Columbia Steelhead (Walla Walla MPG)	Pre-listing	207	Post-listing	281			2,000 RECOVERY PLAN ESCAPEMENT GOAL									
Mid-Columbia Steelhead (Walla Walla MPG)		Pre-listing	207														
	Post-listing	281															
		2,000 RECOVERY PLAN ESCAPEMENT GOAL															
Percent of wild salmon run that is harvested 5 year average pre- and post listing (MPG scale)	<table border="0"> <tr> <td rowspan="2">Snake River Steelhead</td> <td>Pre-listing</td> <td>15%</td> <td rowspan="2">Mid-Columbia Steelhead</td> <td>Pre-listing</td> <td>23%</td> </tr> <tr> <td>Post-listing</td> <td>13%</td> <td>Post-listing</td> <td>18%</td> </tr> </table>	Snake River Steelhead	Pre-listing	15%	Mid-Columbia Steelhead	Pre-listing	23%	Post-listing	13%	Post-listing	18%						
	Snake River Steelhead		Pre-listing	15%		Mid-Columbia Steelhead	Pre-listing	23%									
		Post-listing	13%	Post-listing	18%												
<table border="0"> <tr> <td rowspan="2">Spring Chinook</td> <td>Pre-listing</td> <td>15%</td> </tr> <tr> <td>Post-listing</td> <td>17%</td> </tr> </table>	Spring Chinook	Pre-listing	15%	Post-listing	17%												
Spring Chinook		Pre-listing	15%														
	Post-listing	17%															

Do hatchery practices meet the needs of wild salmon?

Indicator	Measured Results				
Does a scientific evaluation of practices exist?	Recovery plan recommendations complete; Hatchery Scientific Review Group pending				
If so, what actions have been accomplished?	<table border="0"> <tr> <td> 3</td> <td> 1</td> </tr> <tr> <td style="text-align: center;">Actions Implemented</td> <td style="text-align: center;">Ongoing</td> </tr> </table>	3	1	Actions Implemented	Ongoing
3	1				
Actions Implemented	Ongoing				

Northeast Salmon Recovery Region



The Northeast Washington Salmon Recovery Region includes parts of Lincoln, Spokane, Ferry, Stevens, and Pend Oreille Counties. It encompasses the mainstem Columbia River and tributaries above Chief Joseph Dam to the Canadian border, Spokane River and its tributaries upstream to Post Falls Dam, and the Pend Oreille River and its tributaries from the Canadian border upstream to Albeni Falls Dam. It includes mountain ranges with elevations from 5,000 to 7,000 feet.

Major river valleys include the Spokane, Pend Oreille, Colville, Kettle, San Poil, and Columbia. The Pend Oreille River is the second largest river in Washington and flows for 155 miles from its headwaters at Lake Pend Oreille to the confluence with the Columbia River in British Columbia. The region is mostly rural with large areas of forested mountains and valleys of open pasture. There is no regional recovery group at present, but efforts are underway to evaluate whether local tribes, stakeholders and governments want to establish some type of regional organization to work towards recovery of listed bull trout.

Key Facts

LISTED FISH

Bull trout (threatened).

RECOVERY PLANNING STATUS

Federal bull trout draft recovery plan; 5-year status review under way.

REGIONAL RECOVERY ORGANIZATION

A regional recovery organization has not formed, but discussions are under way.

FEDERALLY RECOGNIZED TRIBES

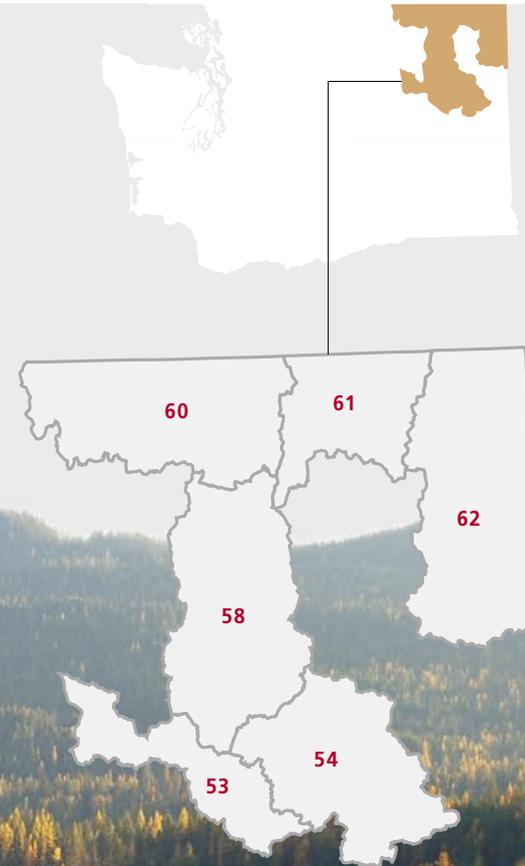
Colville, Spokane, Kalispel, Coeur d' Alene, Kootenai.

COUNTIES

Portions of Ferry, Lincoln, Okanogan, Pend Oreille, Spokane and Stevens counties.

WATER RESOURCE INVENTORY AREAS (WRIAs)

- 53** Lower Lake Roosevelt
- 54** Lower Spokane
- 58** Middle Lake Roosevelt
- 60** Kettle
- 61** Upper Lake Roosevelt
- 62** Pend Oreille



CANADA

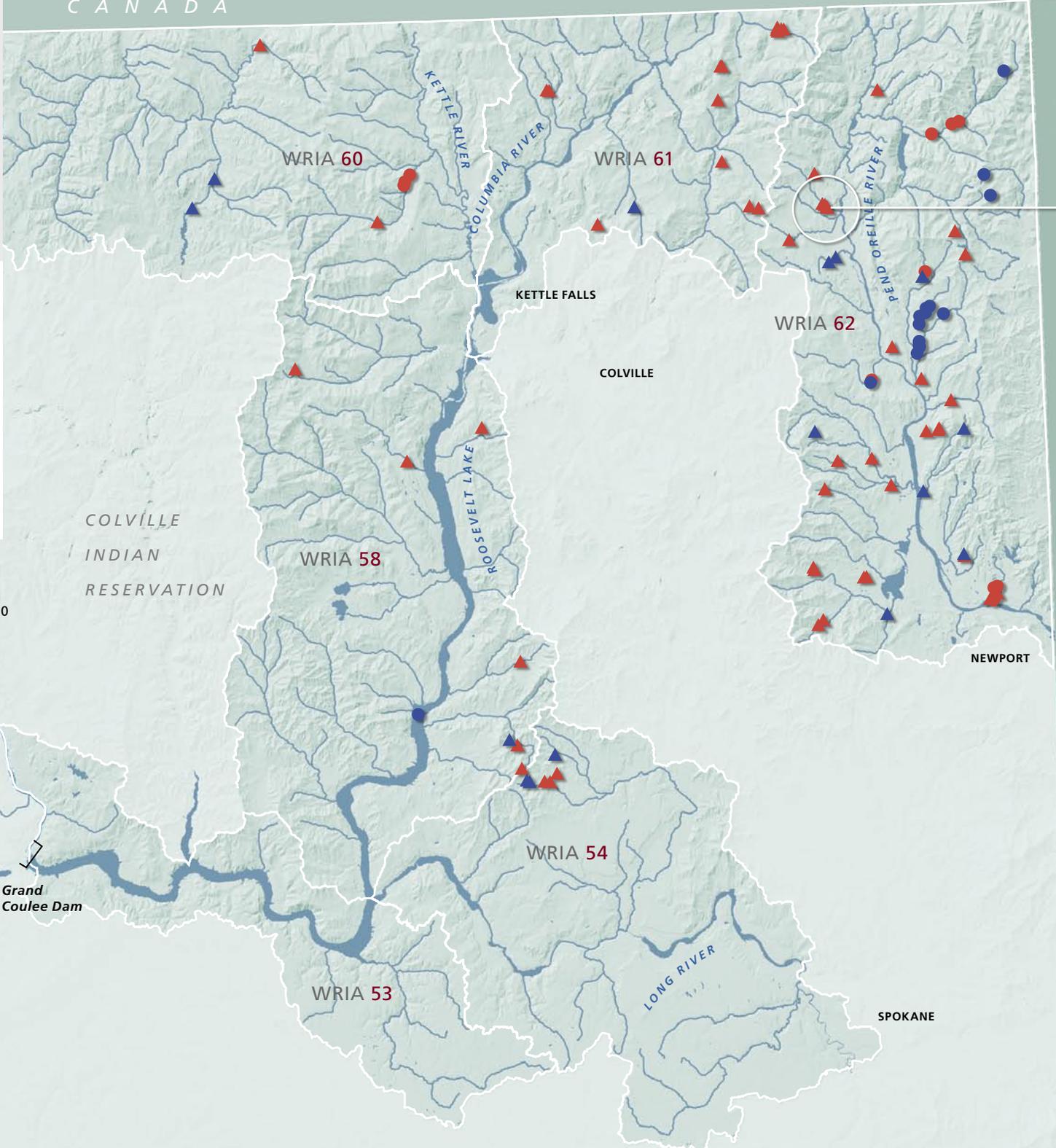
NORTHEAST SALMON RECOVERY REGION

Fish Passage Projects

- ▲ 2004 to Present
- ▲ Pre 2004

Habitat Projects

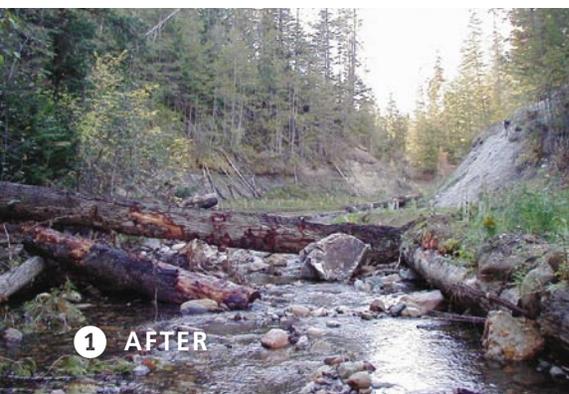
- 2004 to Present
- Pre 2004



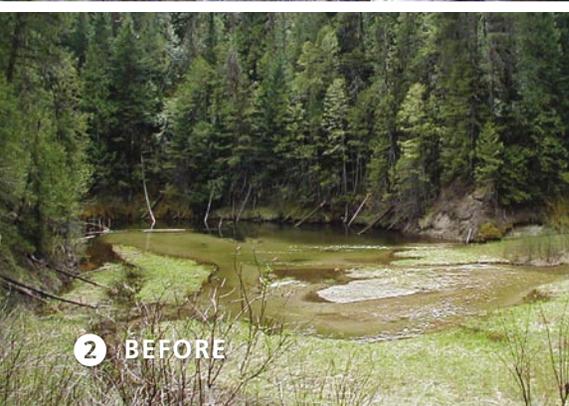
IDAHO



1 BEFORE



1 AFTER



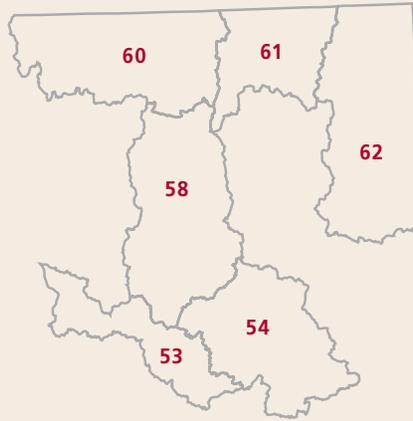
2 BEFORE



2 AFTER

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

WATER RESOURCE INVENTORY AREAS (WRIAs)



Cedar Creek Dam (1) and Reservoir (2) Removal

Watershed Cleanup Plans

	Plans Underway or Completed	Plans Needed
WRIA 53	2	7
WRIA 54	17	15
WRIA 58	4	4
WRIA 60	4	7
WRIA 61	4	14
WRIA 62	22	35

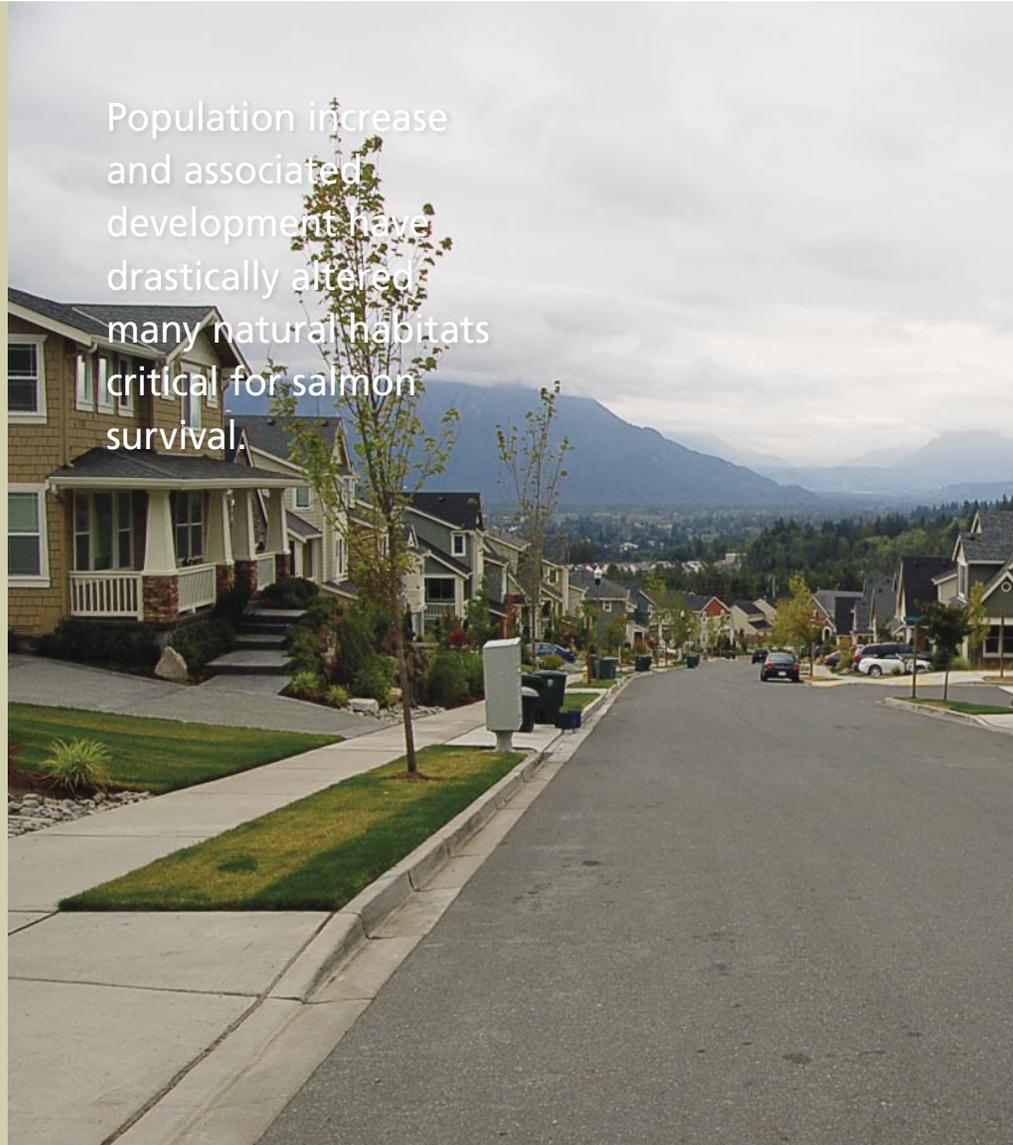
Fish Status



Threats to Salmon Recovery

To achieve our goals of restoring salmon to healthy and harvestable levels, diverse and abundant salmon populations are necessary across the state. Our recovery plans give us guidance on what types of things need to be done and where, but we must also recognize the forces which contributed to salmon decline are continuing to exert pressures. These stresses are commonly called “threats” and will make salmon recovery more difficult if we don’t understand them and account for their potential.²⁹ They range from global issues such as climate change and habitat conversion, to more local problems as managing population growth without impacting economic growth. We have selected a few threats that could have particular significance in our efforts to recover salmon in Washington.

Population increase and associated development have drastically altered many natural habitats critical for salmon survival.



CHRIS DRIVDAHL

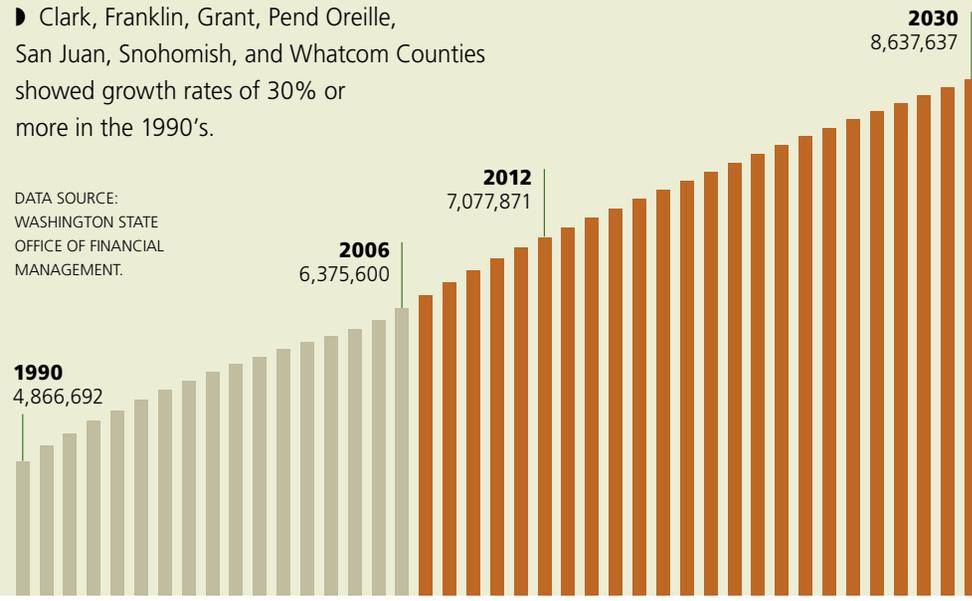
The Impact of a Growing Population



Population increase and associated development have drastically altered many natural habitats critical for salmon survival. The State Office of Financial Management's Forecasting Division estimates show:

- ▶ The state's population has grown by 20% every 10 years since the 1960's.
- ▶ The state reached 5.9 million in 2000 and will approach 7.6 million by 2020.
- ▶ During the 1990's, 4 westside counties each gained over 100,000 people and no county declined in population.
- ▶ Clark, Franklin, Grant, Pend Oreille, San Juan, Snohomish, and Whatcom Counties showed growth rates of 30% or more in the 1990's.

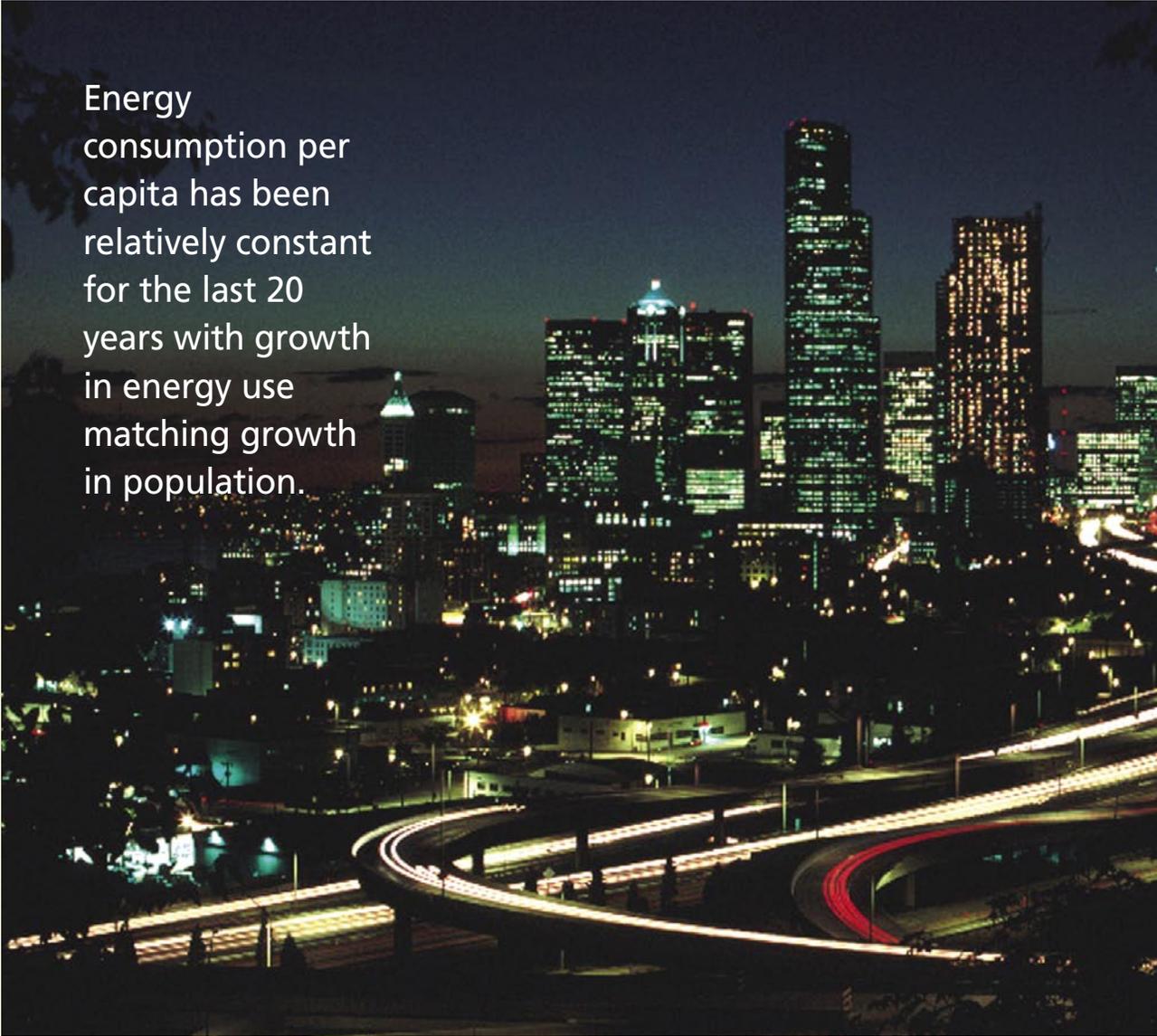
POPULATION FORECAST



Energy Use

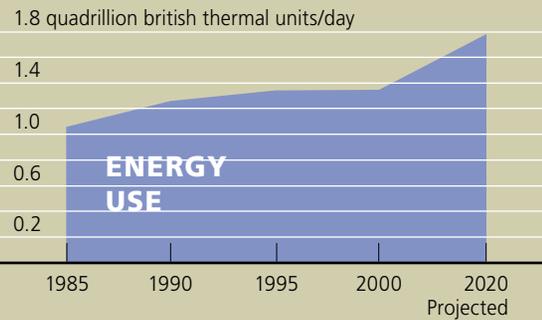
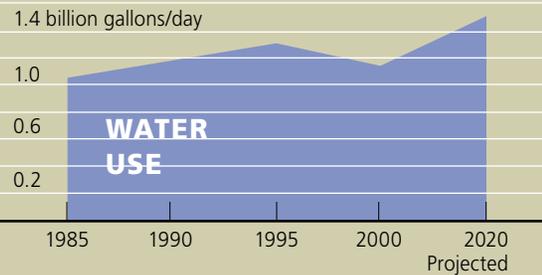
Energy use has a profound impact on our environment. Although we have lessened our impact on natural resources in many ways, population growth and concomitant energy uses will affect the long-term sustainability of our land and water habitats. Consider these figures:

- ▶ End use energy consumption in Washington was 54% higher in 2001 than in 1970.
- ▶ Energy use in the transportation sector has more than doubled since 1970.
- ▶ Growth in household electricity consumption has slowed in the last 20 years, while growth in use of natural gas has accelerated.
- ▶ Energy consumption per capita has been relatively constant for the last 20 years with growth in energy use matching growth in population.
- ▶ If we maintain energy consumption at 2001 per capita rates, by 2020 we will increase the total use 29%; to keep usage effects consistent with 2001 levels, we will need to reduce our present rate of per capita consumption by 23%.



Energy consumption per capita has been relatively constant for the last 20 years with growth in energy use matching growth in population.

Water Use



DATA SOURCE: US GEOLOGICAL SURVEY, WSU EXTENSION ENERGY PROGRAM, AND WASHINGTON COMMUNITY, TRADE, AND ECONOMIC DEVELOPMENT.

As our population grows, the consumption of natural resources usually rises as well. For example,

- ▶ In 1985, total public supply and domestic water use was 1052.96 million gallons per day (MGD).
- ▶ In 2000, that number had risen to 1140.88 MGD, an increase of 8% at a time when the population increased by 33%.
- ▶ This means that per capita use declined by 19% over this 15 year period.
- ▶ If we want to keep the effects of water use in 2020 consistent with today's environment, our per capita use number will need to decline another 25%.
- ▶ Maintaining our current per capita use of water—193.5 GPD—in 2020 will result in an increase in total use of water of 31% more than today.



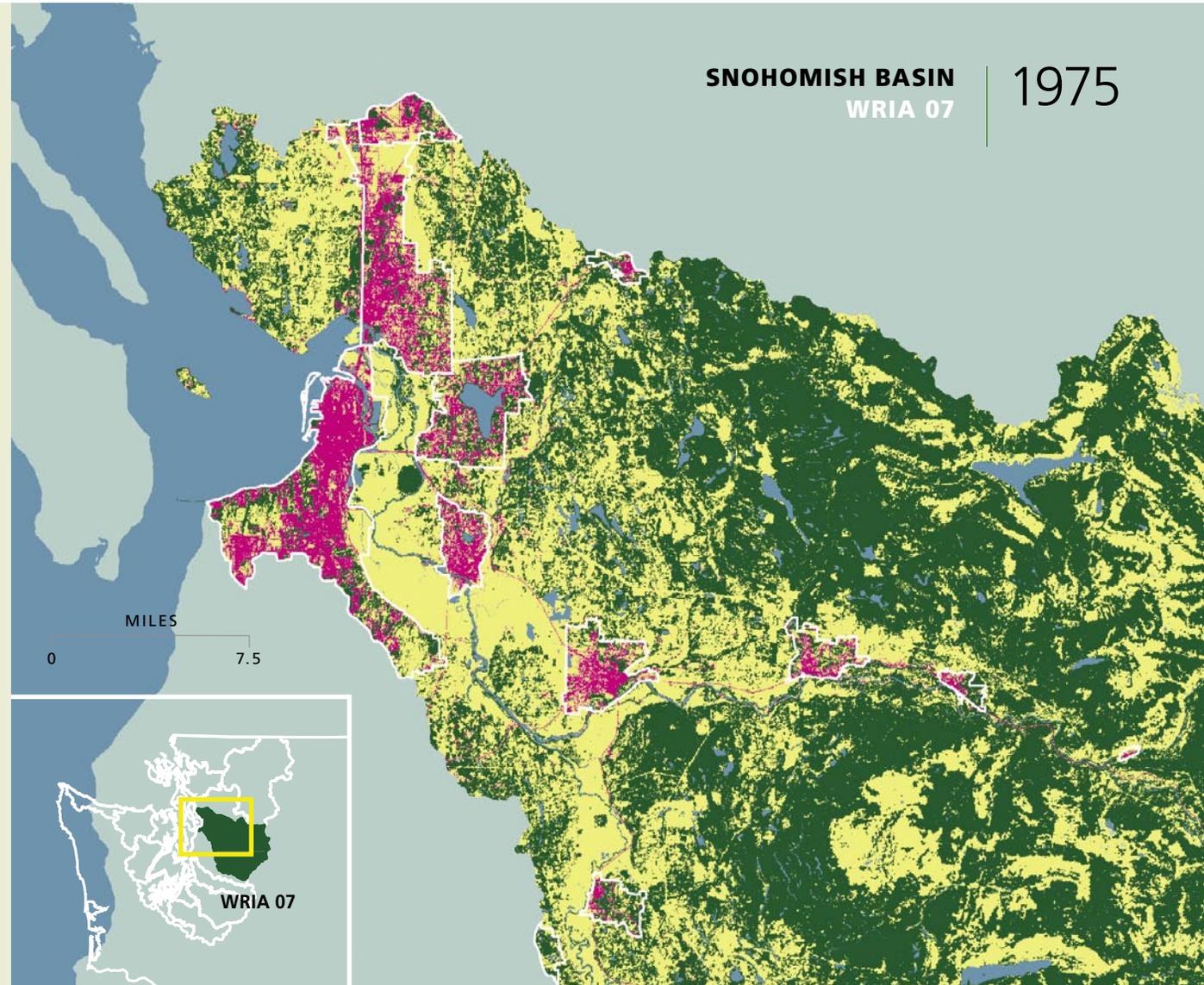
© ROLLIE GERPERT

▶ If we want to keep the effects of water use in 2020 consistent with today's environment, our per capita use number will need to decline another 25%.

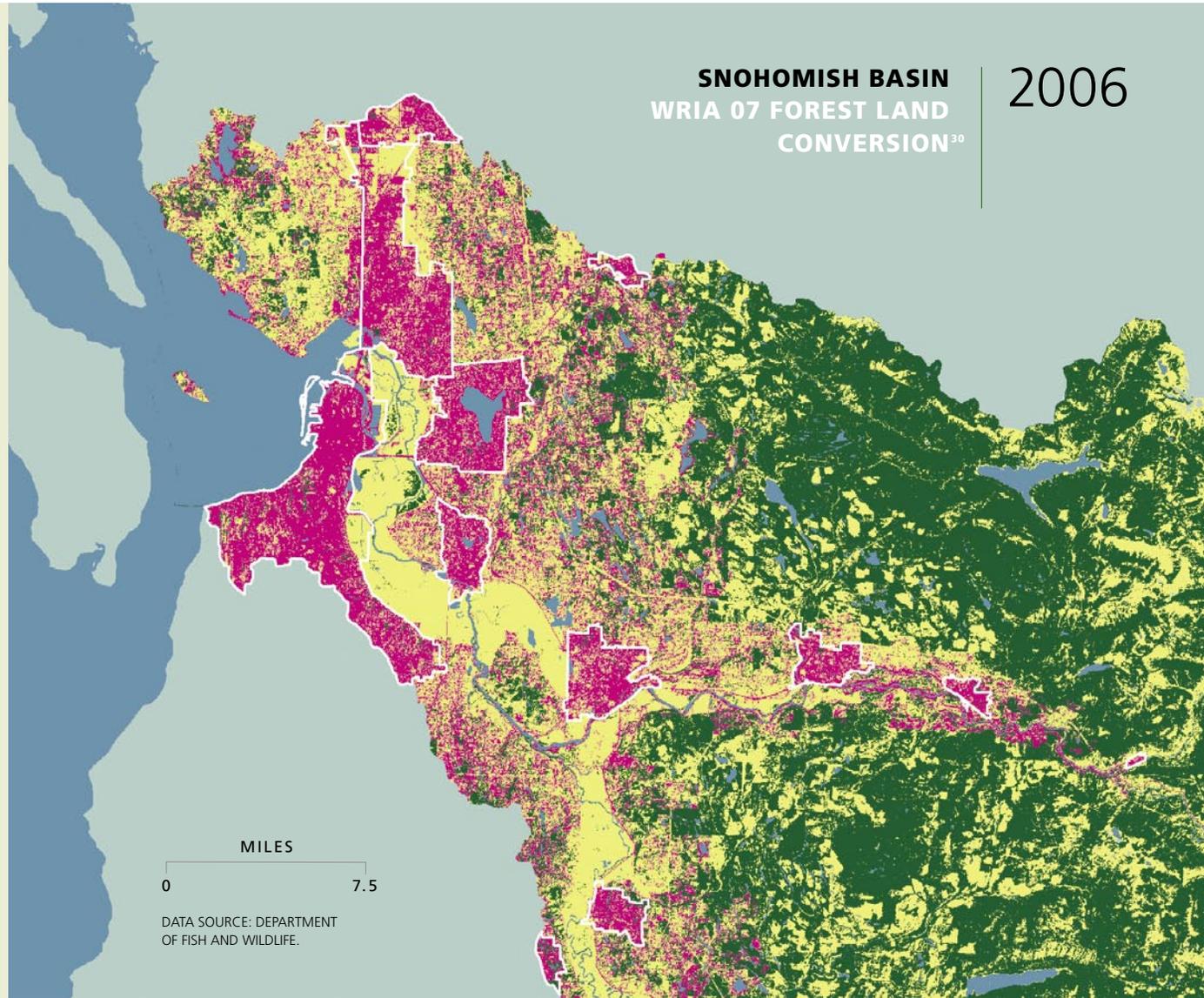
The Impact of Habitat Conversion

As our population grows, we build houses, offices, and other buildings. Habitat fragmentation and loss begin to change ecological communities, some of which are fundamental to the continued existence of salmon:

- ▶ Between 45-62% of Washington's estuarine habitats have been lost to diking, channelization, dredging, and/or filling.
- ▶ More than 90% of the wetlands in urban areas have been lost to development.
- ▶ Impervious surface cover increased by more than 7% in an 8 year period in the Puget Sound in the 1990's.
- ▶ In 1970, Washington had 23.1 million acres of forests; in 1992, there were 20.9 million acres. Nearly 10% of our state's forests were converted to other uses over 20 years.
- ▶ By 1979, Washington had lost an estimated 70% of the estuarine wetlands that existed prior to 1800; coastal urban areas have lost 90-98%.



- Conifer Forest
- Developed / Impervious Surface
- Urban Growth Boundary
- Other Land



AGRICULTURAL LAND CONVERSION IN WENATCHEE BASIN WRIA 45



- Agricultural Land
- Agricultural Land Converted to Development



The Impact of a Changing Climate³¹

Climate change is projected to affect the Pacific Northwest (PNW) and its salmon in significant ways. Research conducted by the Climate Impacts Group at the University of Washington projects changes in average annual temperature on the order of 2°F by the 2020s and 3°F by the 2040s. Increases in temperature are expected during all seasons with the largest increases occurring during the summer months (June-August). Changes in precipitation are less certain than temperature, but most climate models project modest increases (0-10%) in precipitation with most of the increase coming during the winter (October–March).

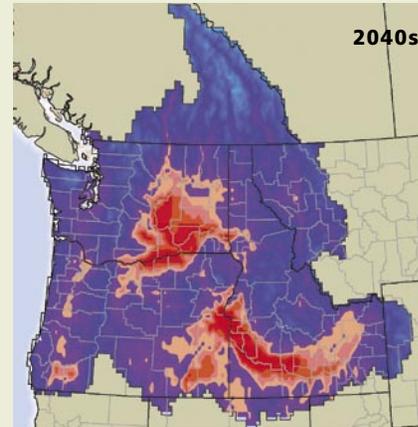
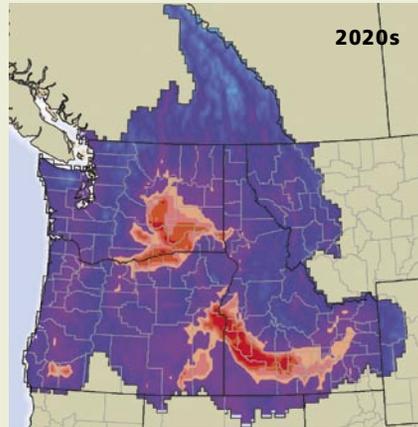
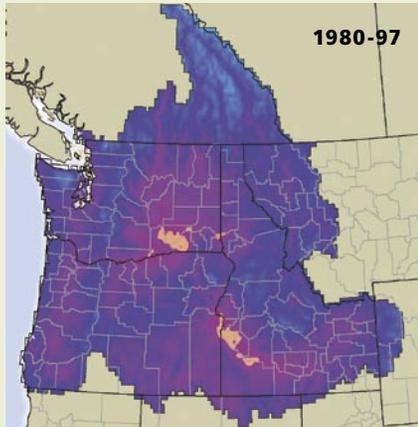
Warmer winter temperatures will have a major impact on PNW snowpack and streamflow. Warmer temperatures will cause more winter precipitation to fall as rain rather than snow, particularly in mid-elevation river basins where average winter temperatures are currently near freezing. This shift in temperature and precipitation will contribute to less winter snow accumulation (see next page below), higher winter streamflows, earlier spring snowmelt, earlier peak spring streamflow, and lower summer streamflows. Warmer summer temperatures are also likely to increase summer streamflow temperatures (see next page above).

The projected changes in streamflows and water temperature will have diverse impacts on PNW salmon due to salmon's complex lifecycle, and will compound existing stresses from lost and degraded habitat, harmful hatchery practices, dams, and fishing. While some impacts may be positive—warmer winter temperatures may benefit some salmon populations by increasing their growth rates and/or food availability in some streams—climate change impacts on salmon in freshwater are likely to be overwhelmingly negative for many stocks. For example:

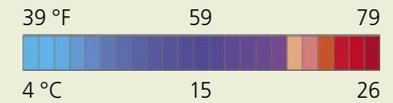
- ▶ Increased winter streamflows and earlier peak streamflows can increase the frequency of redd-scouring and juvenile-flushing flood events;
- ▶ Lower summer streamflows and warmer stream temperatures may reduce the extent and quality of rearing habitat for juveniles, and may increase the potential for physical and thermal barriers to upstream adult migration in summer and early fall;
- ▶ Warmer summer streamflow temperatures can increase thermal stress for salmon at all life stages; and
- ▶ Warmer spring and summer water temperatures can lead to changes in freshwater food web dynamics that negatively affect salmon.

Climate change impacts on the marine environment are also important but are currently not well understood. Research on past variability tells us, however, that warmer ocean temperatures lead to changes in the marine food web that are generally unfavorable to PNW salmon. These changes are due in part to increased coastal ocean stratification, which reduces food-web productivity by inhibiting upwelling of nutrients from deeper, colder ocean depths. Warm ocean temperatures also allow warm-water predators such as Pacific hake and mackerel to expand their range into the coastal waters of the PNW. The combination of reduced food-web productivity, increased predation, and increased competition has historically caused severely reduced ocean survival rates for many PNW salmon stocks (especially coho and Chinook). Increased ocean acidification due to rising concentrations of atmospheric carbon dioxide may also negatively affect the upper ocean food webs on which salmon depend, but at this time the food web consequences are largely unknown.

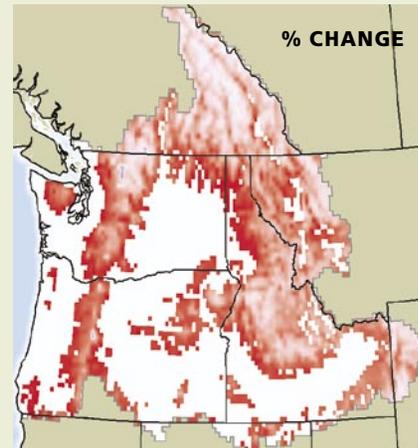
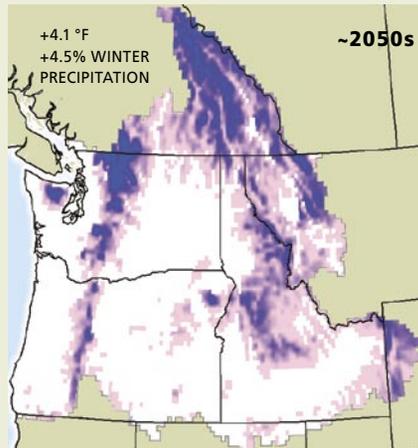
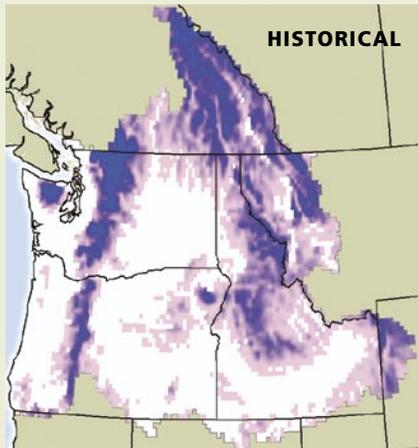
► While some impacts may be positive—warmer winter temperatures may benefit some salmon populations by increasing their growth rates and/or food availability in some streams—climate change impacts on salmon in freshwater are likely to be overwhelmingly negative for many stocks.



AUGUST MEAN SURFACE AIR TEMPERATURE



DATA SOURCE: CLIMATE IMPACTS GROUP, UNIVERSITY OF WASHINGTON.



APRIL 1 SNOWPACK



DATA SOURCE: CLIMATE IMPACTS GROUP, UNIVERSITY OF WASHINGTON.

The Importance of Tracking Our Progress

Monitoring is the fulcrum for success in salmon recovery. It is essential for analyzing and understanding watershed health and helping set restoration priorities. The state's 2002 Comprehensive Monitoring Strategy identified the most important monitoring activities agencies should do for salmon recovery and watershed health. In addition, NOAA has produced a decision framework that clarifies the things we will need to know for delisting to occur.

As mentioned earlier in this report, recovery plans have been completed that reflect great strides in identifying structures and processes for adaptive management and monitoring that will track and report progress toward recovery goals and milestones.

CHELAN COUNTY LEAD ENTITY



// What gets measured gets done. If you don't measure results, you can't tell success from failure... If you can't recognize failure, you can't correct it. If you can demonstrate results, you can win support. // OSBORNE & GRAEBLER, 1993

All regional recovery plans emphasize tracking implementation of actions, trends in salmon and their viability, and habitat condition. They also commit to using that information to make mid-course corrections, called adaptive management.

As we increasingly strive to improve alignment of salmon and watershed health monitoring measures and activities—from the bottom up, top down, and across watershed, regional, and statewide scales—we have identified limitations and information gaps. These gaps are particularly noticeable at the watershed scale, where the number of watersheds and the costs of monitoring them limit our ability to have sufficient data.

Some examples are:

- No monitoring capability or information on the status and trends of salmon habitat condition or water quality in watersheds at the regional and statewide scales
- Information on juvenile and adult salmon is often not available in the same watersheds
- Estimates of the number of miles inaccessible to salmon above blockages are currently unavailable
- Harvest data are often not translatable into units and measures useful to recovery planners

The Governor's Forum on Monitoring made progress in helping coordinate and resolve technical and policy issues in support of salmon recovery monitoring and reporting at the regional and statewide scales. The Forum produced its first biennial report of activities and recommendations in April 2006. Also in 2006, the Forum coordinated an effort by state agencies to develop recommendations to the Governor and legislature for improving monitoring related to salmon recovery and watershed health.

Both sets of recommendations included:

- Initiating collaborative habitat and water quality status and trend monitoring to serve the needs of watershed, regional, and statewide interests
- Bolstering salmon abundance monitoring systematically across the state in to fill key data gaps for recovery, in alignment with proposed habitat condition monitoring
- Improving management of data

Interest in documenting our collective performance and outcomes of recovery actions will only increase as regional plans are implemented. By example, the Governor's Government Management and Accountability (GMAP) approach represents a broad effort to improve accountability of state government to citizens. Such principles will also have a key role in salmon recovery and watershed health monitoring and reporting. Working with our regional recovery partners on monitoring issues, sharing the problem and forming solutions together will be essential.

Data Gap Analysis in Water Resource Inventory Areas (WRIAs)

WATERSHED	PRIMARY FISH POPULATION? ³²	WDFW HATCHERY ³³	HARVEST ³⁴	HYDRO ³⁵	WATER QUANTITY ³⁶	WATER QUALITY ³⁷	JUVENILE PRODUCTION ³⁸	BARRIERS SURVEYED ³⁹	MILES OF ANADROMOUS WATERS INACCESSIBLE ⁴⁰
WRIA 01	Yes	●	●	○	●	◐	◐	◐	○
WRIA 02	Yes	NA	NA	○	○	○	NA	◐	○
WRIA 03	To be determined	●	◐	◐	●	◐	●	◐	○
WRIA 04	To be determined	●	◐	○	○	◐	●	◐	○
WRIA 05	To be determined	●	●	Unknown	●	◐	●	◐	○
WRIA 06	To be determined	NA	NA	○	○	○	NA	◐	○
WRIA 07	To be determined	●	● ◐	○	●	◐	●	◐	○
WRIA 08	To be determined	●	◐	◐	○	◐	●	◐	○
WRIA 09	To be determined	●	●	NA	○	◐	●	◐	○
WRIA 10	Yes	●	● ◐	NA	○	◐	● ○	◐	○
WRIA 11	Yes	●	●	○	○	◐	○	◐	○
WRIA 12	No	●	NA	○	○	○	NA	◐	○
WRIA 13	No	●	NA	NA	○	◐	◐	◐	○
WRIA 14	No	NA	NA	NA	○	○	NA	◐	○
WRIA 15	Yes	●	NA	○	●	○	NA	◐	○
WRIA 16	Yes	●	● ◐	○	○	◐	○	◐	○
WRIA 17	Yes	●	●	Unknown	●	○	○	◐	○
WRIA 18	Yes	●	● ◐	○	●	◐	◐	◐	○
WRIA 24	Yes	◐	● ◐ ○	○	●	◐	NA	◐	○
WRIA 25	Yes	◐	◐ ○ ○	NA	●	○	● ◐ ○	◐	○
WRIA 26	Yes	◐	● ◐ ○ ○	◐	●	◐	● ◐ ○ ○	◐	○

Note: Data availability may vary within a Water Resource Inventory Area (WRIA), dependent on either species or river.

● Sufficient data | ◐ Some data | ○ No sufficient data | ○ No data | NA: Not applicable

WATERSHED	PRIMARY FISH POPULATION?	WDFW HATCHERY	HARVEST	HYDRO	WATER QUANTITY	WATER QUALITY	JUVENILE PRODUCTION	BARRIERS SURVEYED	MILES OF ANADROMOUS WATERS INACCESSIBLE
WRIA 27	Yes								
WRIA 28	Yes			NA					
WRIA 29	Yes	NA		NA					
WRIA 32	Chinook: No			NA					
	MC Steelhead: Yes								
	SR Steelhead: No								
WRIA 33	Chinook: Yes		NA	NA					
	MC Steelhead: Yes								
	SR Steelhead: Yes								
WRIA 35	Chinook: Yes			NA					
	MC Steelhead: Yes								
	SR Steelhead: Yes								
WRIA 37	To be determined	NA		NA					
WRIA 38	To be determined	NA		NA					
WRIA 39	To be determined	NA		NA					
WRIA 44	No	NA	NA				NA		
WRIA 45	Yes			NA					
WRIA 46	Yes	NA		NA					
WRIA 48	Yes			NA					
WRIA 49	Yes			Unknown					
WRIA 50	No	NA	NA				NA		

End Notes

1 Maps are courtesy WDFW. Project locations are from IAC-SRFB (PRISM), United States Forest Service, some Conservation Districts, some Regional Fisheries Enhancement Groups, and Bonneville Power Administration. Priority habitats are reported from regional recovery plans developed in 2004. Many projects outside priority areas were developed prior to adoption of recovery plans.

2 *The Washington Comprehensive Monitoring Strategy for Watershed Health and Salmon Recovery* (2002) recommends using the number of days annually during which minimum instream flows are met and the volume of water restored to streams where water availability and flows are limiting factors (as well as several other parameters) as indicators for our efforts to protect and restore rivers for salmon.

3 Instream flows are adopted into rule (Administrative Code) for a specific volume of water to be in the stream for a specific time, measured at a designated location. An instream flow is essentially a water right with the priority date being the date of the rule adoption. The instream flow would limit or constrain junior water rights (i.e. those water rights issued after the adoption date of the instream flow), but NOT senior water rights (those water rights issued before the adoption date of the instream flow). Instream flows are sometimes not met due to natural fluctuations in stream flow. Stream flow is the amount of water you would see in a stream if you went out and looked at the stream.

4 We have chosen the two months of most salmon returns for spawning (August 1 – September 30) to look at whether we are meeting the instream flow rules adopted by Ecology.

5 Water quality and quantity data reflect Department of Ecology information only. Many local governments, federal agencies, and tribal organizations also collect water information. At this time, the data are not correlated or compared with state information so we have not included them in the report. This is an area of monitoring where information certainly exists, and future documents should bring the important aspects together for a more comprehensive picture.

6 There are 73,886 miles of rivers and streams statewide, and 2,943 miles of marine estuaries. Approximately 4000 miles of streams were assessed, representing about 5% of the total, while only 3% or marine waters were. Washington has adopted a new approach to water quality assessment. The new method changes the number of assessed segments, so the number of Total Maximum Daily Load (TMDL) plans needed, or completed may not correspond to previous reports. The latest comprehensive assessment included over 30,000 assessed segments, compared to 2,362 segments in the 2004 State of Salmon Report. This results in an increased number of plans needed.

Categories used for basin water quality measure:

► **Clean up plans needed.** These are polluted waters that require a TMDL and are part of the traditional 303(d) list of impaired water bodies.

Placement in this category means that Ecology has data showing that the water quality standards have been violated for one or more pollutants and there is no TMDL or pollution control plan.

► **Clean up plans completed or underway.**

These include waters that have pollution problems that are being solved either through a TMDL that is actively being implemented, or a pollution control plan that is expected to solve the problems, or waters that are impaired by causes that cannot be addressed through a TMDL.

7 Fish information is from the Department of Fish and Wildlife. Where possible, data were verified and correlated with recovery plans. Recovery goals are from regional recovery plans submitted to NOAA-Fisheries. A status and trends monitoring request has been submitted to the Legislature for funding that will greatly enhance the accuracy of future reports.

8 Baselines are smolt (juveniles) production resulting from spawners from the pre-listing fisheries management and habitat conditions, if available. For ocean type Chinook, 1992-2000 for 1999 listings or through 1 year after listing year. For stream type Chinook, coho, and steelhead 1992-2001 for 1999 listings or 2 years after listing year.

9 Records kept for harvest management were used in this report, but they are not easily converted to useful measures of “fish in” abundance for watersheds. For example, steelhead harvest data are translated from “steelhead management units” to major population

groups or distinct population segments as much as possible, but conversion errors may exist because harvest management units are not necessarily coincident with recovery units. Many times data were available for certain populations but not the entire Major Population Group (MPG) or Evolutionarily Significant Unit (ESU). Unless otherwise noted, pre-listing and post-listing numbers are five-year averages.

10 All numbers are reported by Evolutionarily Significant Unit (ESU) or Major Population Group (MPG). NMFS considers an ESU a “species” under the Endangered Species Act. These are genetically distinct population groups that have evolved over time based on geography and other factors. For steelhead, this is known as a Distinct Population Segment (DPS). The term MPG is used to refer to groups of populations within an ESU that are geographically and genetically cohesive. These MPGs are a level of organization between independent populations and ESUs.

11 WDFW has undertaken summer chum supplementation and reintroduction programs in several streams using indigenous broodstocks to reduce short-term extinction risk to existing wild populations and to increase the likelihood of recovery. Supplementation programs began contributing to summer chum returns in 1995, prior to ESA-listing in 1999. In recent years, supplementation-origin fish have accounted for an average of 25% of returning adult summer chum. These supplementation-origin fish are treated no differently from natural-origin fish, meaning that they return to spawn in the wild, unlike returns to more traditional hatchery programs.

12 Data are not available to estimate BC and AK proportion of harvest

13 Chum spawners extrapolated from hatchery returns, 2003-2005 data only.

14 Chum harvest commercial fishery only—no recreational or tribal harvest.

15 Chum peak run counts only available; area under the curve used to convert peak run size to total run size. Prior to 2002 population was considered to be 100% wild; after 2002 about 10% is part of a supplementation program.

16 Chum smolt data are from Duncan Creek.

17 Steelhead smolt data are from Kalama River and Cedar Creek.

18 Coho total wild run size is preliminary data from WDFW and does not include Gorge MPG.

19 Coho recovery goal under development by Lower Columbia Fish Recovery Board and fish agencies.

20 The Middle Columbia steelhead Distinct Population Segment (DPS) is located in the middle Columbia Region, part of which (Yakima MPG) is covered by the Yakima Fish and Wildlife Recovery Board, and a second part that is in the Snake River Region and covered by the Snake River Salmon Recovery Board. NOAA-Fisheries is completing a recovery plan for the Klickitat MPG portion of the DPS, but goals and priority habitats were not available at publication time.

21 Smolt data include production from the upper Yakima, Tieton, Satus Creek and Toppenish populations.

22 Harvest data are not available on an MPG scale.

23 Data for steelhead are from Wenatchee River.

24 Smolt data for spring Chinook are calculated from Chiwawa River.

25 Although listed in Washington, Snake River sockeye are not resident and are not covered by this report.

26 Middle Columbia steelhead harvest data available only for Walla Walla MPG.

27 Spring Chinook harvest data not available for Asotin Creek and Washington portion of Wenaha River. Adult hydropower passage mortalities not included in Spring Chinook total run size.

28 Smolt data for spring Chinook, fall Chinook, and steelhead from the Tucannon River.

29 The University of Michigan’s Ecosystem Management Initiative Evaluation Sourcebook notes it is possible for a circumstance to be both a threat and an asset. For example, funding if you have it is an asset and a threat if you don’t.

30 Landsat data for WRIA 7 in Snohomish and King Counties were analyzed to estimate the amount of land converted from agriculture and forest lands into development and impervious surfaces. Urban and residential development increased from

End Notes

approximately 13,000 acres to almost 50,000 acres during 1972-2006. Most (74%) of the lands within the urban growth boundaries were developed by 2006. Over 80% of the developed landscape in 1972 was within the urban growth boundaries, whereas 44% of the developed landscape in 2006 was within the urban growth boundaries.

31 Material provided by Climate Impacts Group, Center for Science in the Earth System University of Washington. Citations for material available at <http://www.governor.wa.gov/gso/publications/default.htm>.

32 Primary Fish Population: As identified in a recovery plan, this is a fish population that must achieve a low risk of extinction (i.e., a low risk of not meeting viability criteria).

33 Hatchery:

● Recovery plan complete and Hatchery Scientific Review Group or other scientific recommendations complete

◐ Recovery plan complete and can make qualitative assessment of progress towards recovery, but hatchery scientific review is underway but not complete

○ Recovery plan not complete and no scientific recommendations begun

NA No WDFW hatcheries

34 Harvest:

● ESA standards set, preseason targets estimated, and data are available for a post- season evaluation

◐ ESA standards set, preseason targets estimated but data are insufficient for post- season evaluations and/ or post-season evaluations based on logical surrogates

○ ESA standards set but significant harvest components assignable only by applying harvest data across multiple ESUs/DPSs/MPGs

○ ESA standard not set or measured or production negligible

35 Hydropower:

● Passage goals at FERC-license projects are established and annually monitored and reported

◐ Passage goals at FERC-licensed projects are set and some data are available, but not assessed against goals

○ No passage goals established, no monitoring done

NA No FERC-licensed projects

36 Water Quantity:

● Gages exist in the watershed and are monitored

○ No gages in the watershed

37 Water Quality:

● Some long- and short-term stations are monitored in the watershed

○ No long-term stations present, some short term are monitored

38 Juvenile Fish Production:

● Smolt monitoring sufficient to estimate juvenile production

◐ Smolt monitoring insufficient to estimate juvenile production

○ No smolt monitoring

NA No need to do monitoring

39 Barriers Surveyed:

◐ We have some knowledge of major blockages from data contained in the FPDSI and WDFW databases delineated from known, presumed, and potential habitat layers as of 08/06.

40 Miles of Anadromous Waters Inaccessible:

◐ Some estimates have been made in recovery plans, but most data are still under development



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