



2014

State of Salmon in Watersheds Executive Summary



WASHINGTON STATE
RECREATION AND CONSERVATION OFFICE

Governor's Salmon
Recovery Office

2014 State of Salmon in Watersheds

Executive Summary

Washington State is a committed leader in salmon recovery. From neighborhoods to the state capital, Washingtonians have come together by the thousands in an unprecedented network of organizations, volunteers, businesses, local governments, elected officials, private landowners, farmers, fishers, and scientists, to work with state and federal agencies and Native American tribes to protect and restore what's good for all of us—salmon.

Salmon are special to the people of Washington. They provide jobs, food to eat, sport, and cultural identity. We know what salmon need to survive. They need cool, clean water, and lots of it. They need to be able to swim through rivers and streams to the ocean and back. They need habitat that is diverse, with lots of different kinds of plants, bugs, rocks, and trees so they have food to eat and places to hide when they are small. And sometimes they need our help through hatcheries and regulations to ensure wild salmon can survive to create the next generation.

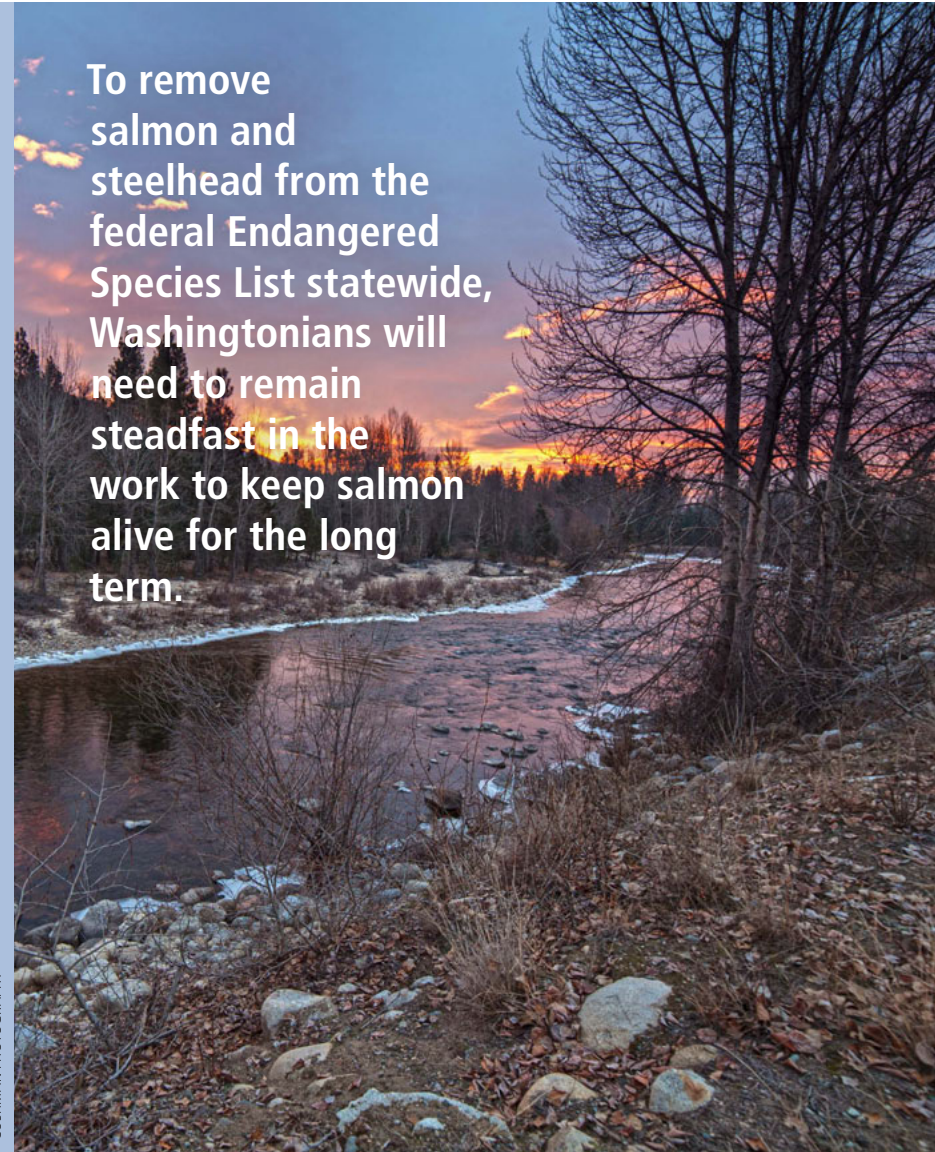
Washingtonians need and want the shorelines, rivers, and forests to be healthy enough for salmon. Our communities are made stronger when we invest in salmon recovery. In return, we get cleaner air and water, less flooding and erosion, healthier

shellfish, more fishing, better hiking, continued tourism, and salmon safe to eat. In parts of the state, we are seeing encouraging returns on salmon recovery investments with healthier rivers and forests, and indications that the fish are coming back in greater numbers. We recently saw record numbers of salmon populations returning to the Columbia River. However, in western Washington, serious concerns remain that more habitat is being destroyed than restored. To remove salmon and steelhead from the federal Endangered Species List statewide, Washingtonians will need to remain steadfast in the work to keep salmon alive for the long term.

Salmon recovery is a lifetime commitment. Washingtonians are changing how we live today so that we all will have the Washington we love in the future.

To remove salmon and steelhead from the federal Endangered Species List statewide, Washingtonians will need to remain steadfast in the work to keep salmon alive for the long term.

CUSHMAN PHOTOGRAPHY



How Did We Get Here?

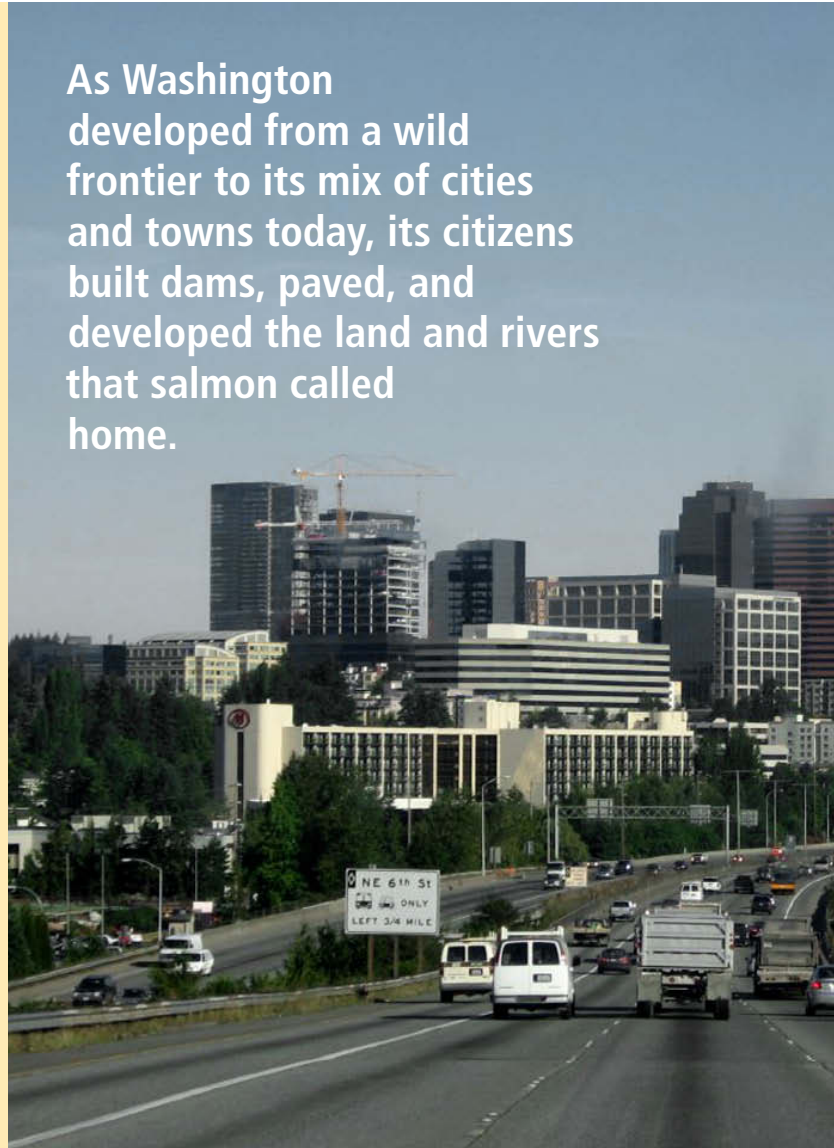
In 1875, the U.S. Fisheries commissioner identified overfishing, dams, and habitat degradation as the biggest threats to salmon. As Washington developed from a wild frontier to its mix of cities and towns today, its citizens built dams, paved, and developed the land and rivers that salmon called home. By the 1990s, the damage to our salmon was so great that the federal government put salmon and steelhead on the Endangered Species Act list. It was clear that fish numbers had decreased so much that salmon could disappear forever. People were moved to take action locally and to advocate for a broader, statewide approach to salmon recovery.

The Washington Way

The Washington State Legislature passed the Salmon Recovery Act in 1998, and communities began to write recovery plans. People didn't wait for the federal government to write the plans, but organized themselves across the state to address Endangered Species Act listings of salmon. This bottom-up approach and the scale of the efforts are unprecedented in the United States and have been dubbed "The Washington Way" by those involved in salmon recovery. The federal government approved the community-written plans in six of eight salmon recovery regions. Watershed groups called lead entities, tribes, recovery organizations, government agencies, and others are actively implementing those plans now. This report shows the progress and challenges in salmon recovery. The full report, data, maps, timelines, and more stories are available online at www.stateofsalmon.wa.gov.

As Washington developed from a wild frontier to its mix of cities and towns today, its citizens built dams, paved, and developed the land and rivers that salmon called home.

PHOTOGRAPH BY KEN LUND



Where Are We Today?

Restoring salmon and steelhead habitat in Washington is working. Much habitat has been restored and the numbers of fish have increased in some areas. There still is much more to do. Salmon numbers remain a fraction of what existed 100 years ago. In some areas, more habitat is being destroyed than restored. Salmon face other challenges as well, such as climate change. Our goal is ambitious: Restore natural systems that can support healthy, sustainably harvestable salmon populations.

Investments in Salmon Recovery Provide Multiple Benefits

INDICATORS OF SALMON RECOVERY

JOBS AND ECONOMY

Healthy salmon runs contribute to Washington's economy. Tourism and recreational fishing draw people to Washington, where they spend money on charter fishing excursions, hotels, restaurants, gear, and more. Commercial fishing creates jobs. Restoration projects improve our rivers, beaches, and forests, and they provide jobs in rural and economically depressed areas.

23,800

JOBS SUPPORTED



Every \$1 million spent on watershed restoration results in an average of 16.7 new or sustained jobs. Using that number, the 1,581 restoration projects funded by Recreation and Conservation Office grants and local match since 1999 have created 7,498 jobs. This conservative number doesn't include jobs created through other funding statewide.

Commercial and recreational fishing in Washington is estimated to support an additional 16,374 jobs and \$540 million in personal income as reported by a 2006 Washington Department of Fish and Wildlife study.

80%

OF GRANT MONEY STAYS IN COUNTY



80 percent of grant money is spent in the county where the project is located. Many salmon recovery projects are in remote or rural areas, and provide needed jobs there.

\$763

MILLION IN ECONOMIC ACTIVITY



For every \$1 million spent on watershed restoration, \$2.2 million to \$2.5 million is generated in total economic activity. Since

1999, salmon recovery funding has resulted in more than \$763 million in total economic activity.

ENVIRONMENTAL BENEFITS



When Washington's natural environment is restored for salmon, it also is improved for humans and other animals. Clean and reliably available water is essential for safe drinking, sustaining farms and gardens, swimming, and boating. Healthy forests absorb carbon and improve the air. They provide shade, cooler temperatures, and refuge for wildlife. Healthy forests hold water—essential for areas with shrinking snow pack. They provide economic opportunity for rural communities and recreation for hikers, packers, hunters, and foragers. Natural shorelines filter pollution, support shellfish, shelter salmon, and aid all species challenged by rising sea levels.

How do we know if salmon are recovering? This report attempts to answer that question by looking at three indicators:

The Numbers of Fish



This report tracks adult and juvenile salmon and steelhead to see if wild salmon are increasing in numbers.

The Health of their Watersheds



This report tracks habitat to see if it is healthy enough to support wild salmon. Is the water clean enough? Are freshwater and estuarine habitats healthy and productive? Do rivers have flows that support wild salmon? Are dams operating in fish-friendly ways?

Implementation of Recovery Plans



This report tracks progress of actions in recovery plans. Are streams being made accessible to wild salmon? Do hatchery and harvest management practices protect wild salmon?

Crews build logjams to improve habitat in Black Lake ditch in Tumwater.

Are Wild Salmon Increasing in Numbers?

The answer is mixed. In some areas of the state, fish are approaching abundance goals. However, in most areas of the state, fish are below their abundance goals with mixed trends from increasing to decreasing. The chart below illustrates broad trends in abundance for fish listed under the federal Endangered Species Act. "Abundance" represents the number of fish returning to spawn and is one key piece of information the National Oceanic and Atmospheric Administration (NOAA) uses to evaluate salmon recovery status. Additional attributes used to evaluate population status that are not shown in this report include productivity, life history, genetic diversity, and the spatial structure of the populations (i.e., where and when fish migrate and spawn). NOAA also considers threats and factors affecting the health of listed fish populations including habitat, hatcheries, harvest, and hydropower impacts.



The abundance of juvenile salmon is one of several measures that tell scientists about the health and productivity of freshwater rivers. Knowing how many wild fish return to spawn and how many of their offspring survive to reach the ocean allows scientists to separate survival into both freshwater and marine life stages. Juvenile abundance data are not collected for every population and regional or statewide rollups of freshwater productivity are not available; however, some summaries for individual populations or watersheds can be viewed in the online report.

Data Sources: The summary at left is a non-statistical evaluation of adult abundance trends for wild fish and is based on data provided by the Washington Department of Fish and Wildlife, tribes, and regional recovery organizations.

Near Abundance Recovery Goal

- Hood Canal summer chum
- Snake River fall Chinook

In some areas of the state, fish are approaching recovery goals. However, in most areas of the state, fish are below their recovery goals.

Below Abundance Recovery Goal

INCREASING

- Middle Columbia River steelhead
- Lake Ozette sockeye
- Snake River spring and summer Chinook
- Upper Columbia River steelhead

CONSISTENTLY LOW

- Lower Columbia River fall Chinook
- Lower Columbia River spring Chinook
- Lower Columbia River steelhead
- Snake River steelhead

DECREASING

- Lower Columbia River chum
- Puget Sound Chinook
- Upper Columbia River spring Chinook
- Puget Sound steelhead

INSUFFICIENT DATA

- Lower Columbia River coho

Is the Water Clean Enough for Salmon?

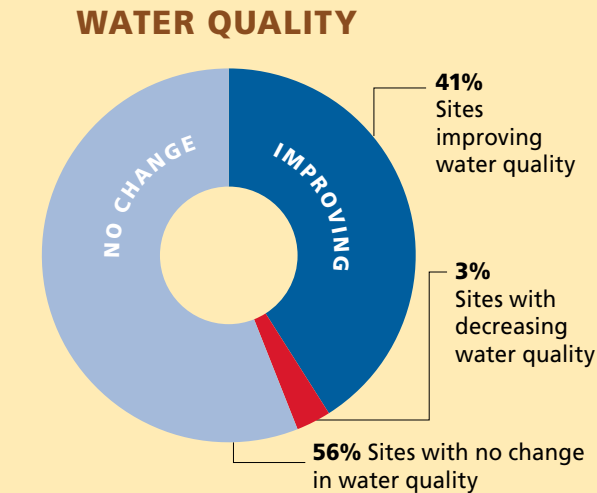
Water Quality

The overall quality of our state's waters, not considering toxics, has improved slightly since 1992. The water quality at 41 percent of long-term monitoring sites is improving. Declines were seen at only 3 percent of the monitoring sites.

Water Quantity

A common concern is that many streams are too warm for salmon. This can happen when trees are cut along the shorelines and no longer provide shade to cool the water. It also can happen when streams become shallower, either naturally or when water is siphoned out for irrigation, causing streams to heat up too much in the summer.

Measurements of the amount of water in streams and rivers show that 61 percent of the 46 monitoring stations assessed in western Washington and 70 percent of the 20 monitoring stations assessed in eastern Washington have stable or increasing flows. Federal and state agencies monitor water



flow at a limited number of rivers and streams. Research into effects on flow, such as climate patterns or human activities, would improve the assessment.

Also unclear is the effect on stream levels from an increasing number of domestic wells. State law allows residential and industrial property owners to use up to 5,000 gallons of groundwater every day without a permit, and sets no limits for how much they can use for watering livestock or irrigating up to half an acre of non-commercial lawns and gardens. The number of these permit-exempt domestic

wells in Washington has increased by about 17,800 wells since 2008, serving an estimated 10 percent of the state's population growth since 2008 (90 percent of the new arrivals are served by larger, permitted, public and municipal water systems). There is a concern that permit-exempt wells may harm threatened and endangered salmon species, especially when such wells are placed near headwater streams and streams with low summer flows. Lack of detailed analyses represents a significant knowledge gap for the state.

DATA SOURCE: WASHINGTON STATE DEPARTMENT OF ECOLOGY

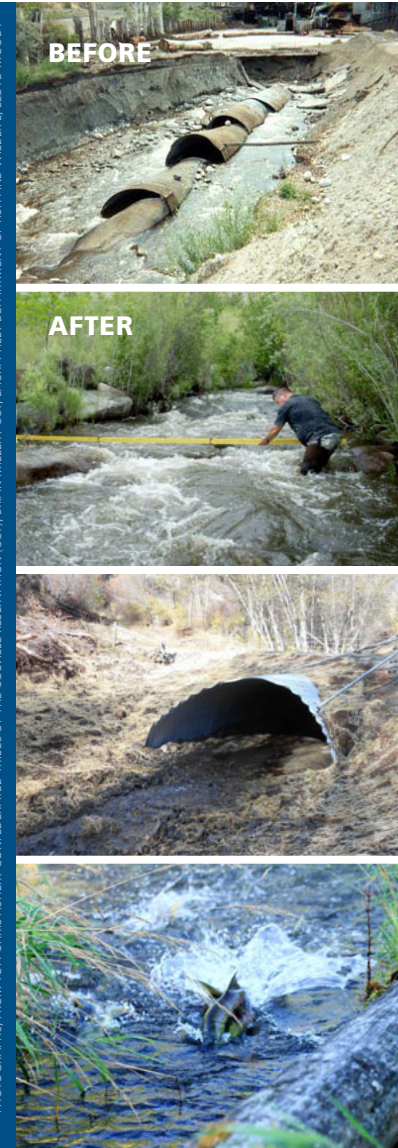
Are Streams Accessible to Wild Salmon?

Great progress has been made in fixing barriers to fish passage. This type of restoration is clearly beneficial for salmon and steelhead.

Fish passage barriers, such as inadequate culverts beneath road crossings and deteriorated fish ladders at dams, prevent salmon from reaching spawning habitat. When barriers are removed, salmon quickly return to their historical spawning grounds, which can provide an instant boost to salmon production and population stability into the future.

During the past 14 years, more than 5,600 fish passage barriers have been replaced with fish-friendly culverts and bridges in Washington streams. This work has opened more than 5,400 miles of fish-spawning habitat statewide. While a substantial number of barriers remain to be fixed, strong partnerships among regional recovery organizations, tribal governments, and state agencies continue to open hundreds of miles of habitat a year.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE



PHOTOGRAPHS, FROM TOP: CHRIS FISHER / CONFEDERATED TRIBES OF THE COVILLE RESERVATION (CCT); BRIAN MILLER / CCT; LAURA TILL / DEPARTMENT OF FISH AND WILDLIFE; LLOYD MOODY

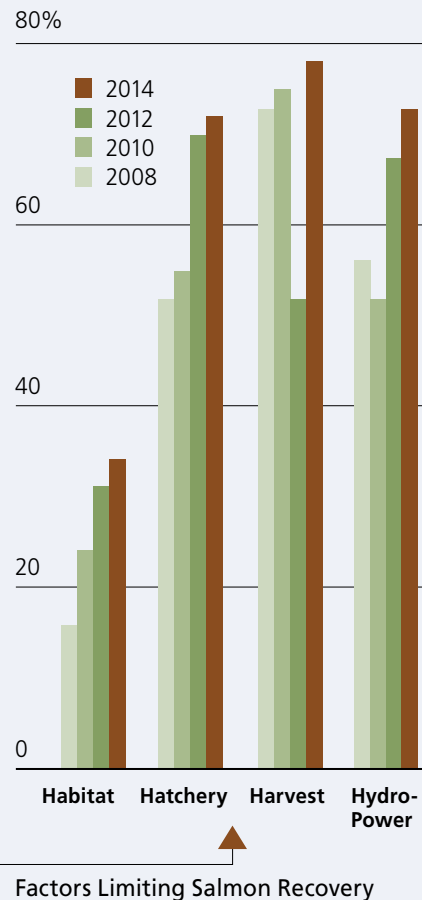
Are Recovery Plans Being Implemented?

Recovery Plan Implementation

Recovery work is progressing steadily across the state. The actions in recovery plans are carried out by recovery organizations, tribes, lead entities, agencies, non-profit organizations, and volunteers. Many people collaborate to restore and protect salmon habitat, improve hatcheries, manage fisheries, and make dams more fish friendly.

Data Sources: Regional salmon recovery organizations. Percentages are statewide averages based on estimates made by each recovery region of its progress implementing actions in recovery plans. These regional estimates are based on best professional judgment. The estimates describe progress in implementing recovery plan actions, and do not reflect the biological response of fish. The information is generated from the seven recovery regions that are implementing recovery plans. Because hydropower is not an issue in one region, that percentage is based on the remaining six regions. Two other regions do not have 2012 harvest data so the percentage is based on the remaining five regions.

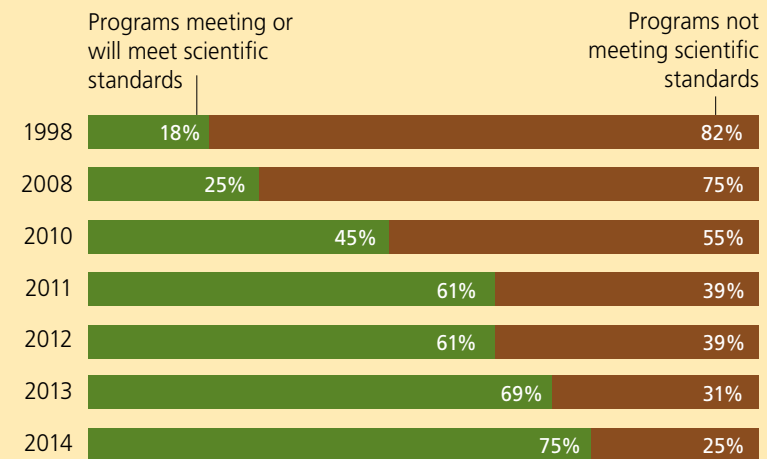
ESTIMATED PROGRESS IN IMPLEMENTING RECOVERY ACTIONS



Do Hatchery Practices Protect Wild Salmon?

HATCHERY PROGRAMS MEETING SCIENTIFIC STANDARDS

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
STATEWIDE HATCHERY PROGRAMS



Hatchery Status

Congress established a hatchery review initiative in 2000, in recognition of the role of hatcheries in meeting harvest and conservation goals for salmon and steelhead. The initiative's independent Hatchery Scientific Review Group made recommendations for improving hatchery programs in Washington. Washington Department of Fish and Wildlife's hatchery programs have made steady progress toward meeting scientific standards. The percentage of hatcheries meeting compliance increased to almost 80 percent by removing hatchery fish from spawning grounds, decreasing production of hatchery fish, and increasing use of naturally spawning fish where appropriate.

HATCHERY PROGRAMS DEPICTED REPRESENT ALL OF THE DEPARTMENT'S HARVEST AND CONSERVATION PROGRAMS, AND INCLUDE SOME HATCHERY CONSERVATION PROGRAMS THAT CURRENTLY ARE NOT EXPECTED TO MEET HATCHERY STANDARDS.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

Does Harvest Management Protect Wild Fish?

Washington manages fishing to ensure that salmon and steelhead species at risk of extinction are not overfished.

The Washington Department of Fish and Wildlife, in cooperation with tribal co-managers, federal agencies, and other states, sets rates for harvest and conservation of salmon and steelhead populations listed under the federal Endangered Species Act. These rates are specific to each fish population and limit the impact on each population. Harvest management strategies have focused on achieving sustainable fishing opportunities while meeting population-

specific conservation objectives. Preseason fishing plans are developed so that the conservation needs of all stocks of concern are met. This effectively means that the maximum allowable harvest in a particular area is set by the 'weakest link' present in that area.

Harvest outside of Washington—in Alaska, Canada, and in southern U.S. marine and freshwater—accounts for much of the total harvest of salmon returning to Washington waters. Harvest of salmon and steelhead in Washington primarily is of hatchery-origin populations.



PHOTOGRAPH BY MICHAEL RAYTON / CONFEDERATED TRIBES OF THE COLVILLE RESERVATION

How Much Money Has Been Spent?

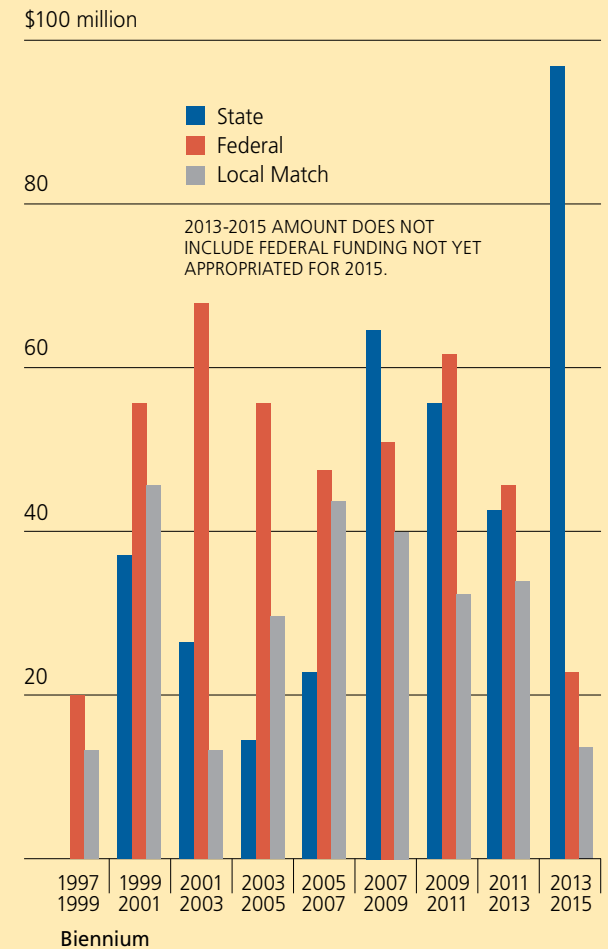
Recovering salmon takes a commitment and sustained resources. The investment provides multiple benefits for fish, people, businesses, and the environment.

Since 1999, the Salmon Recovery Funding Board and the Recreation and Conservation Office have distributed more than \$1 billion for salmon recovery from state, federal, and local sources. Salmon recovery work also is funded by others, such as the Bonneville Power Administration. Those dollars are not reported here.

The majority of the funding through the Salmon Recovery Funding Board has been for restoration projects to repair damaged habitat, followed by projects to acquire more pristine areas important for salmon. Other funding has been spent for monitoring, hatchery reform, and planning. Projects are developed by local organizations called lead entities and approved by citizen and technical committees to ensure they are consistent with recovery plans. Then they are reviewed by the Salmon Recovery Funding Board's panel of scientists and technical experts to ensure they are engineered properly and will benefit salmon. The board awards grants to projects during public meetings and presents detailed information online to ensure the funding process is visible and accountable to the public.

DATA SOURCE: WASHINGTON STATE RECREATION AND CONSERVATION OFFICE

SALMON RECOVERY FUNDING



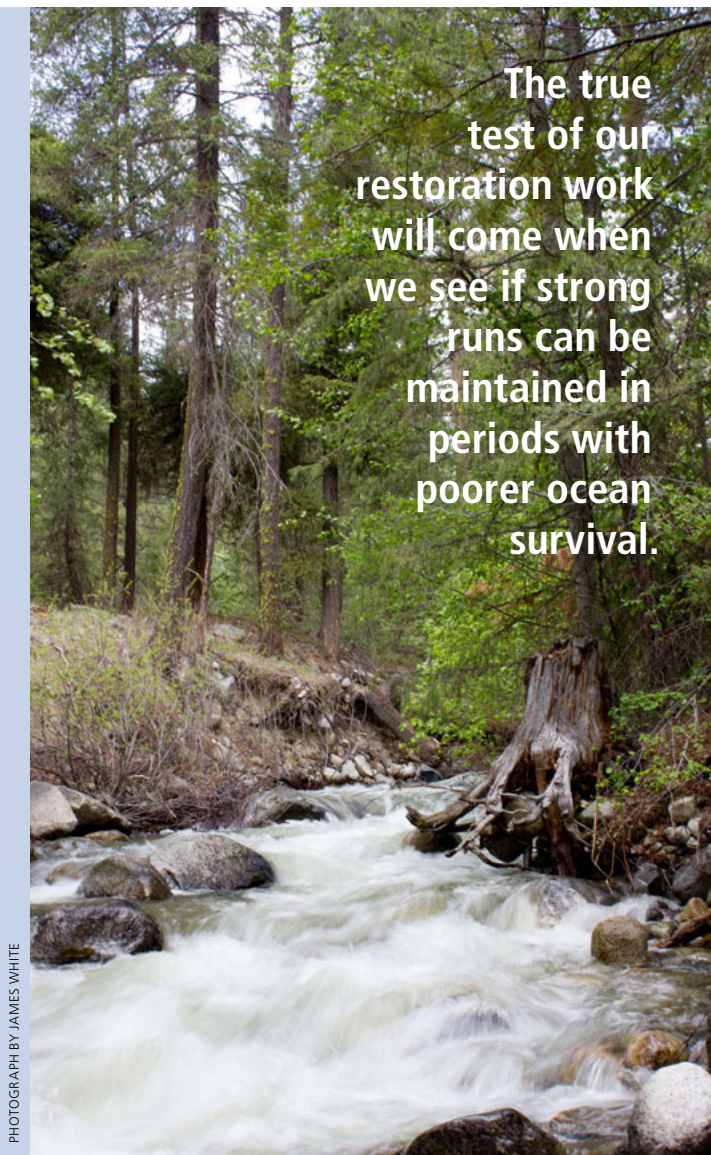


Is Habitat Improving to Support Salmon?

Salmon and steelhead need a variety of habitats for spawning, rearing, and transitioning to and from saltwater. A key question is how much habitat for salmon exists, how much is in good shape, and how much is being lost to development.

The Washington Department of Fish and Wildlife's 2012 analysis of land use, showed the rate of land changes from development in and near cities is similar in eastern and western Washington, but outside cities, the rate of change due to development is more than eight times higher in western Washington.

Forests provide many benefits to salmon such as cold, clean water and food. Fallen trees and logs provide shelter from predators and help slow down the current. In Puget Sound, the amount of forests is declining, but the rate of that loss has slowed. Why is unclear but may be tied to the economic downturn, which has slowed development. As the economy recovers and development increases, forest loss may rise. More work is needed to



PHOTOGRAPH BY JAMES WHITE

The true test of our restoration work will come when we see if strong runs can be maintained in periods with poorer ocean survival.

understand what factors, including salmon recovery efforts, land use policies, and economic growth, best explain forest conversion. Armoring is the practice of protecting shorelines from erosion using physical structures, such as concrete bulkheads or large boulders. Shoreline armoring in Puget Sound is increasing at the rate of about a mile a year. This substantially exceeds the amount of shoreline being restored. Recent studies report 1.1 miles of shoreline are armored annually while only 0.1 mile of armoring is removed. Hard shoreline armoring structures can deprive juvenile salmon of food and shelter.

In central and eastern Washington, habitat loss is a major contributor to the decline of salmon and steelhead. Losses were caused by both past and present land uses such as logging, farming, ranching, building forest roads, and developing floodplains. These actions often contribute to increased fires, floods, and drought, which further destroy habitat. While these practices have damaged habitat, it is possible

to restore habitat and still use natural resources with care. The development of hydroelectric dams on the Columbia River and its tributaries had a major impact on salmon and steelhead runs. In the past decade, significant investments have been made to improve passage through these dams, and salmon survival rates have improved.

Changes in ocean conditions have a large effect on how many fish return to the state. When ocean conditions are better, there is often a link to greater returns of fish. The reverse also is true. Factors affecting fish survival in the ocean include the temperature of the water and availability of food. Restoration work in tributaries and improving survival rates of migrants in the Columbia River have combined with the excellent ocean conditions in recent years to produce record runs for many Columbia River salmon and steelhead. The true test of our restoration work will come when we see if strong runs can be maintained in periods with poorer ocean survival.

Our Approach to Salmon Recovery

Recovering salmon from extinction is not work that can be done alone. A network of individuals, governments, tribes, lead entities, and other organizations are committed to this effort. By treaties between the tribes and the United States, we are honor-bound to recover salmon and support sustainable fisheries.

In 1998, the Salmon Recovery Act went into effect, setting our approach to recovering one of our most cherished natural and cultural resources. This act set in motion one of the most massive, comprehensive recovery planning efforts ever accomplished in the United States.

Seven regional salmon recovery organizations coordinate the work of hundreds of citizens to carry out the actions in locally developed recovery and sustainability plans. The regional salmon recovery organizations ensure that projects recommended for funding will implement their plans; and they monitor, evaluate, and report on their progress.

The regional organizations work with NOAA and the U.S. Fish and Wildlife Service to assure the recovery

plans are approved by the federal government. They also work to find resources for salmon recovery work, build commitments for projects, develop financing plans, and design monitoring and adaptive management activities. These groups work together, providing a cost-effective and efficient approach to salmon recovery.

COLUMBIA RIVER BASIN

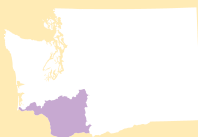
There are five salmon regions in the Columbia River basin. These regions work on issues related to dams, predation on fish as they pass through the lower Columbia River estuary on their way to and from the ocean, and complex fishing and hatchery activities involving neighboring states.



Restoring salmon and steelhead habitat in Washington is working. Much habitat has been restored and the numbers of fish have increased in some areas. There still is much more to do.

PHOTOGRAPH BY GREER MAIER

Lower Columbia River Salmon Recovery Region



The Lower Columbia River Salmon Recovery Region is home to five

Endangered Species Act-listed fish species: Chinook, chum, and coho salmon; steelhead; and bull trout. These listed species are comprised of 74 distinct populations, more than all the other Columbia basin recovery regions combined. Lower Columbia fish inhabit more than 2,300 river miles in 18 major rivers located in all of Cowlitz, Clark, Wahkiakum, and Skamania Counties and portions of Lewis, Pacific, and Klickitat Counties. Although information on these populations is lacking, nearly all are estimated to be at high to very high risk of extinction.

One of the challenges facing recovery in this region is fish passage. In 1998, there were ten dams in four rivers. In 2010, Hemlock Dam in Trout Creek, a tributary to the Wind River, was removed. This was followed by the removal of Condit Dam on the White Salmon in 2012. Removing these dams has opened more than 53 miles of pristine spawning and rearing habitat.

Middle Columbia River Salmon Recovery Region



In the Middle Columbia River Salmon Recovery Region,

steelhead are increasing toward recovery targets set under the Endangered Species Act, Chinook runs have improved, and once-extirpated coho and sockeye salmon are again returning. Implementation of the recovery plan for listed steelhead is underway, and a local action plan has been developed for listed bull trout in the Yakima River basin. Although the overall outlook is promising, significant challenges remain. Some bull trout populations are on the verge of disappearing, and continuing improvement for other species will require ongoing efforts to protect and enhance habitat. While fish passage is being restored in many tributaries, significant investments are needed to improve main stem flow and floodplain conditions, and provide full access to the headwaters. The effort to recover middle Columbia River steelhead is shared with the Snake River Salmon Recovery Region, where the Walla Walla and Touchet Rivers populations of the middle Columbia River steelhead reside.

In the middle Columbia region, steelhead are increasing toward recovery targets set under the Endangered Species Act.



BEFORE



AFTER

PHOTOGRAPHS BY MID-COLUMBIA FISHERIES ENHANCEMENT GROUP'S YAKIMA BULL TROUT TASK FORCE

ENSURING CAMPERS' DAMS DON'T BLOCK FISH

◀ Almost all of us have built a rock dam in a stream as kids, but the most impressive rock dams involve grownups using the winches on their jeeps to pull rocks into place. It surprises many people to learn that sometimes even a simple rock dam can create a temporary fish passage barrier. Bull trout travel upstream to their spawning grounds in the mountains in summer, right when stream flows are at their lowest and campgrounds are full. With everyone looking to play in the water to escape the heat, rock dams that act as passage barriers are surprisingly common. The last four summers, volunteers with the Mid-Columbia Fisheries Enhancement Group's Bull Trout Task Force have walked bull trout streams regularly, identifying where dams are commonly built, tearing down dams they find, and educating the people they meet along the way about how to recreate responsibly. The result of their hard work? Better passage for threatened bull trout.

Upper Columbia River Salmon Recovery Region



The upper Columbia region made significant progress in the past 15 years in alleviating threats and improving

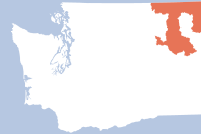
habitat quality and quantity for listed species. Although listed spring Chinook salmon and steelhead remain below recovery goals in all populations of the region, these populations continue to improve. Since 1999, investments in salmon recovery contributed to the completion of 350 projects to restore 28 miles of stream, 16 miles of off-channel habitat, and 202 acres of streamside forest; to remove 111 fish passage barriers, opening 308 miles of habitat; and to protect 3,403 acres of habitat and 48 miles of stream bank.

Science guides project development as the region learns about the habitat that fish need at specific times in their lives, and as opportunities arise to work with willing landowners to improve fish habitat. Regional success is built on a voluntary, non-regulatory approach to ensure habitat improvements continue to move the region closer toward recovery goals for listed salmon, steelhead, and bull trout. The *Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan* envisions an “All-H” (habitat, hatcheries, harvest, and hydropower) approach for success, and anticipates anywhere from 30-50 years to see real progress.

PHOTOGRAPHS, FROM TOP: KRIS BUELOW; THE YAKIMA BASIN FISH RECOVERY BOARD; CARL CHASTAIN; JAMES WHITE



Northeast Washington Salmon Recovery Region



Restoration benefits local communities in the northeast

region by providing jobs and stimulating the economy through the purchase of goods and services locally for restoration projects. These restoration activities also have precluded future listings of native fish species. Recovery groups are opening streams for fish and improving habitat for bull trout, a federally listed species. A federally adopted recovery plan is not yet in place and a regional salmon recovery organization has not formed in this region.

Snake River Salmon Recovery Region



Listed spring and summer Chinook salmon are increasing but along with

steelhead, are below their recovery goals in the Snake River region.

People are working together, improving water quality by reducing water temperature, restoring floodplains, and decreasing sediment in the water by less tilling of soil. Improved irrigation systems leave more water in the river for salmon. Large logs and tree root wads are installed to create more habitat in rivers. Dikes have been set back, allowing rivers to travel slower and store water in the banks for release in drier parts of the year. Fish passage barriers are being corrected to allow salmon to migrate up rivers to high quality habitat.

Salmon projects have helped cool the water and leave more water—with less silt and mud—in streams, and fish are responding. Habitat recovery actions are moving forward, making progress in addressing sediment, water temperature, and fish passage issues across the region.

Hood Canal Salmon Recovery Region



The Hood Canal area is in the Puget Sound

Salmon Recovery Region for Chinook and steelhead, but is a separate salmon recovery region for summer chum. Summer chum are on the rebound in Hood Canal, and there is good reason to believe they can be recovered. However, they still face many challenges from population growth, climate change, and habitat loss and degradation.

Estuaries next to spawning streams are critical salmon nurseries and a high priority for restoration.

AERIAL PHOTOGRAPH BY JIM FOX. TOP AND TRESTLE PHOTOGRAPHS BY NORTH OLYMPIC SALMON COALITION

FOR SUMMER CHUM, ESTUARIES ARE NURSERIES

Hood Canal and Strait of Juan de Fuca summer chum migrate to saltwater within hours of emerging from their redds (or nests). As a result, the estuaries next to their spawning streams are critical salmon nurseries and a high priority for restoration.

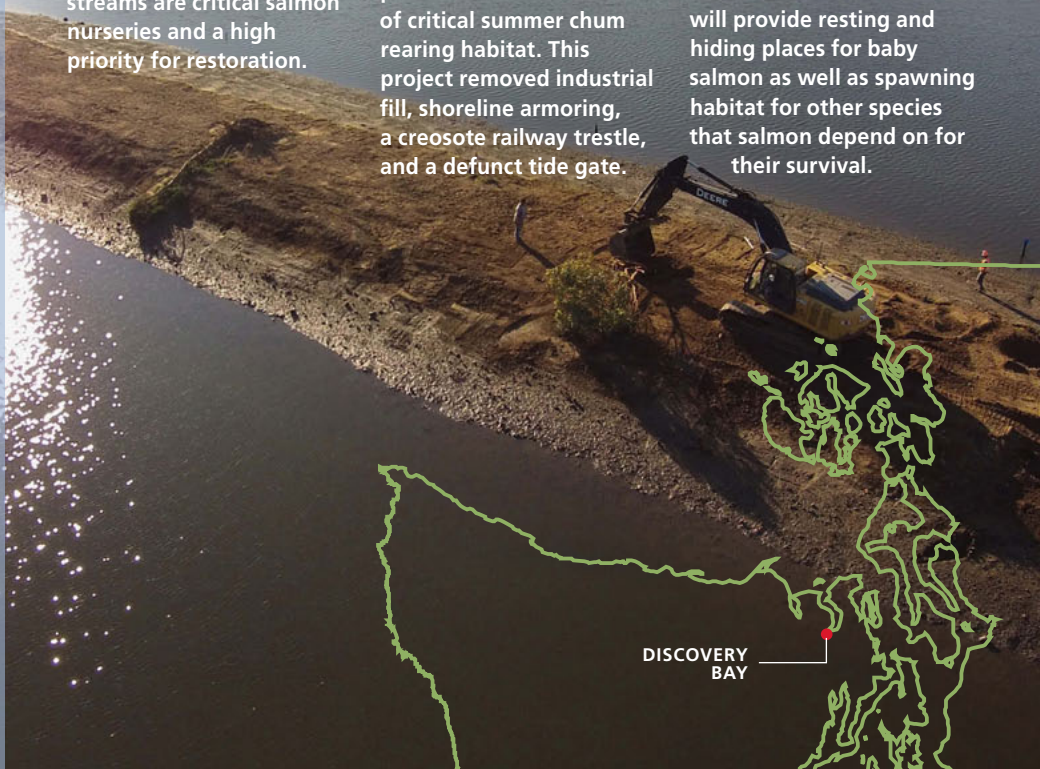
These fragile areas have been impacted by human made infrastructure, severely limiting summer chum fry survival.

Focus continues on the Snow-Salmon estuary in Discovery Bay where in 2014, the North Olympic Salmon Coalition and its partners restored 6 acres of critical summer chum rearing habitat. This project removed industrial fill, shoreline armoring, a creosote railway trestle, and a defunct tide gate.



Creosote railroad trestle that was removed.

The restored habitat will provide resting and hiding places for baby salmon as well as spawning habitat for other species that salmon depend on for their survival.



DISCOVERY BAY

Puget Sound Salmon Recovery Region



Puget Sound is home to two-thirds of Washington State's people,

which presents major challenges for salmon recovery. Puget Sound Chinook were listed as threatened in 1999 and Puget Sound steelhead were listed as threatened in 2007. A recovery plan was completed in 2007 for Puget Sound Chinook and work is underway to complete a Puget Sound steelhead recovery plan. Current Chinook population overall abundance remains very low and steelhead populations do not appear to be improving.

While the removal of the dams on the Elwha River has received a lot of attention and inspired many people, shoreline armoring in Puget Sound is increasing at a rate of 1.1 miles a year. For successful salmon recovery in Puget Sound, habitat protection actions must be significantly strengthened while continuing to restore habitat. The Puget Sound Partnership is working with salmon recovery watersheds developing a monitoring and adaptive management plan. NOAA requires this plan to evaluate progress in Chinook recovery.

Washington Coast Salmon Recovery Region



The Washington Coast Salmon Recovery Region is home to some of the healthiest

and most productive salmon rivers and fish populations in the country. Yet there are continued problems affecting salmon in the region, such as impacts from roads and the invasion of knotweed. Lake Ozette sockeye salmon and bull trout are both listed under the Endangered Species Act. So far, no other regional populations of salmon are listed in this region. Water quality continues to improve in the Chehalis River, and with the hatchery supplementation program and better monitoring of fish numbers and habitat use, wild sockeye salmon have increased at Lake Ozette. The federally approved *Lake Ozette Sockeye Recovery Plan* is being implemented. The *Washington Coast Sustainable Salmon Plan* for the entire region has been approved by the Governor's Salmon Recovery Office, and is being implemented.

Monitoring and Data

One challenge to salmon recovery is the lack of complete data about habitat. This limits the state's ability to determine long-term trends and the extent restoration actions are recovering salmon. The state's Salmon Recovery Funding Board directs a portion of salmon recovery funding to three monitoring programs that will provide some answers to these questions. The three programs are; project effectiveness monitoring, fish-in and fish-out monitoring, and Intensively Monitored Watersheds monitoring.

Project effectiveness monitoring addresses whether habitat restoration projects are effective in achieving their goals. By measuring environmental conditions, habitat characteristics, and biological indicators, scientists can begin to answer questions such as: Did planted trees provide shade for the stream? Did logjams increase channel complexity? This monitoring is critical for learning the degree to which certain types of projects achieve their goals. The results are used to help design better restoration projects.

Fish-in and fish-out (one type of status and trends monitoring), is the counting and tracking of adult salmon coming in

(fish-in) to spawn and the number of juvenile or young fish headed to sea (fish-out). Measuring this transition tells us the extent that freshwater habitat and marine habitat affect the salmon numbers overall.

The Intensively Monitored Watersheds program asks the question: Is restoration working to increase salmon numbers? Intensively Monitored Watersheds compare the number of salmon from streams where habitat restoration was done to similar nearby streams without such actions. This shows if changes in fish survival and productivity are due to restoration efforts or to other factors not related to stream restoration. This program has led to scientific findings about salmon life strategies and habitat needs and helps improve designs of restoration projects.

The information from the three monitoring programs together tells us how many fish there are and what actions are effective at both the project site, and at the larger, watershed level. We can't yet monitor everywhere we need to, but these programs are a good start.

Threats to Salmon Recovery

For 100 years, we put salmon at risk: We blocked fish passage with dams, withdrew water from rivers, let runoff carry pollutants into our waterways, and managed our forests primarily for logging.

The good news is that by correcting the mistakes of our past, we will be better prepared to meet the challenges of the future. Waters, forests, shorelines, and riverbanks healthy enough to support salmon also help communities be more resilient in the face of fluctuating temperatures, shrinking snowpack, wetter springs and winters, drier summers and falls, floods and forest fires, dead zones created by too little oxygen in our estuaries, and acidification of oceans caused by absorption of excess carbon from the atmosphere. The results of climate change and human demand for land are now the biggest threats to salmon recovery. Efforts are underway to address these and other threats, such as over-fishing, dams blocking migration, and some hatchery practices. It took a lifetime to bring salmon to the brink of extinction; it will take a lifetime to bring them back. This is a commitment.

Conclusions

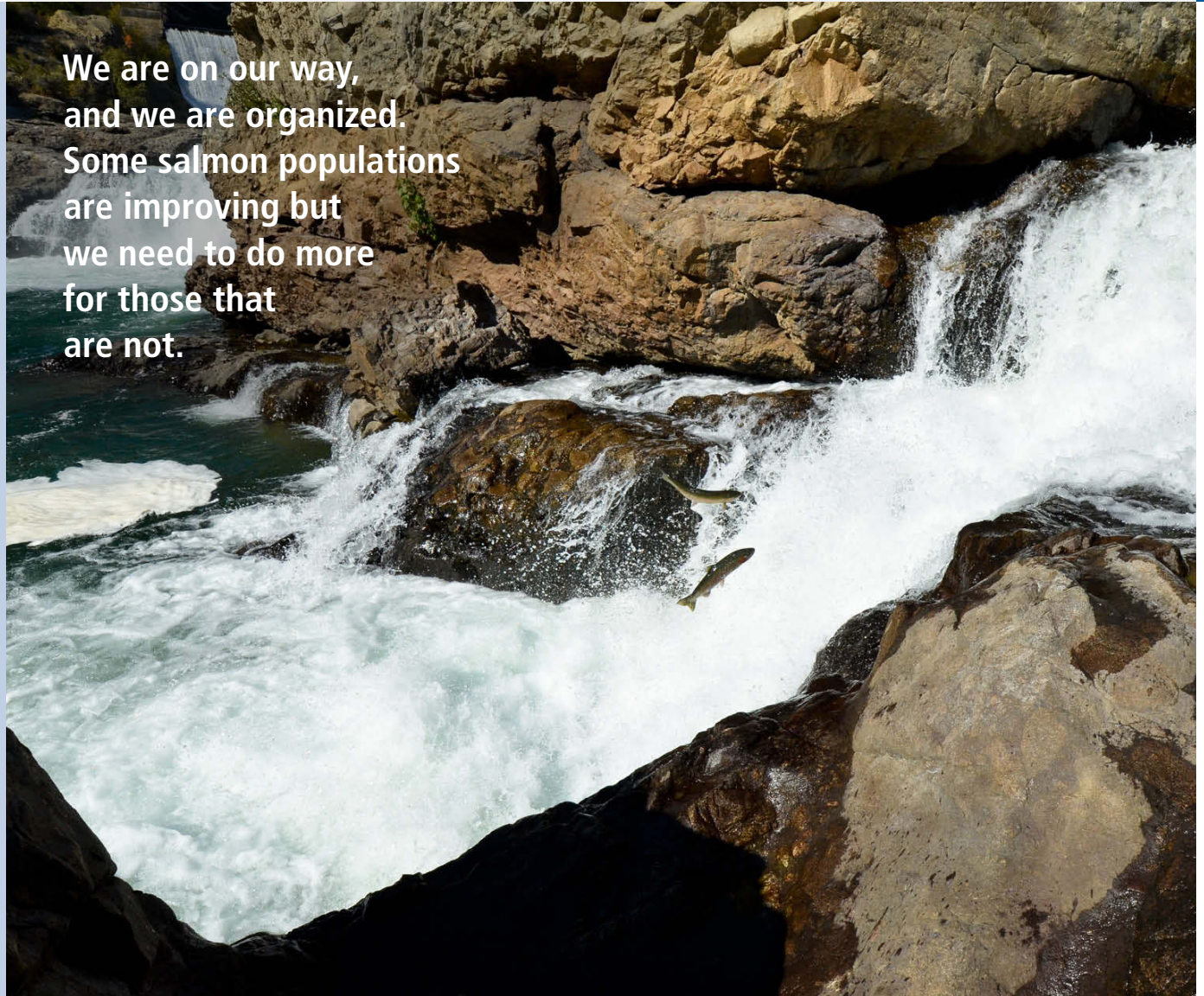
Salmon are a symbol of strength and survival in the dramatic and changing landscape we share. Our state continues to pull together at many levels, in different kinds of communities, and in different ways to recover salmon. We are on our way, and we are organized. Some salmon populations are improving but we need to do more for those that are not.

The challenges continue to grow, as does our dedication to this key resource. Our persistence, our willingness to partner with many different people, our vision of the majestic Washington we live in today sustained for many future generations, the generosity of many landowners who open their land to preserve salmon habitat, and the joy of fishing gives us the determination and inspiration we will need to continue this important work.

What we do for salmon, we do for ourselves. Recovering salmon is a win-win for our state's economy, cultural identity, natural beauty, and abundant recreation.

PHOTOGRAPH BY BRIAN MILLER / CONFEDERATED TRIBES OF THE COLVILLE RESERVATION

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Governor's Salmon Recovery Office
Recreation and Conservation Office
P.O. Box 40917
Olympia, Washington 98504-0917
Web sites: stateofsalmon.wa.gov and rco.wa.gov
E-mail: gsro@rco.wa.gov
Telephone: (360) 902-3000
TDD: (360) 902-1996

This publication was printed on recycled paper.
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Development of this report is not possible without data from many individuals. Especially significant are contributions from the Washington Department of Fish and Wildlife, Washington Department of Ecology, salmon recovery regions, lead entities, tribes, and the Salmon Recovery Funding Board.

About the cover: This smolt trap on the Entiat River is used to monitor juvenile fish on their way downstream. The trap floats in the river and funnels fish into a small trap at the end where they are counted, measured, and released. This monitoring provides information on fish population health over time and traits such as age, size, condition, timing, species, and genetics.

COVER PHOTOGRAPH BY CUSHMAN PHOTOGRAPHY. ICONS FROM THE NOUN PROJECT: GEAR ICON DESIGNED BY MARC ANDRE RATH, FISHING VESSEL AND MONEY ICONS DESIGNED BY LUIS PRADO, WORKER ICON DESIGNED BY OLIVIER GUIN, ENVIRONMENT ICON DESIGNED BY LEMON LIU. PUBLICATION DESIGN BY LUIS PRADO.



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