

# State of Salmon in Watersheds

EXECUTIVE SUMMARY

# 2024



WASHINGTON STATE  
RECREATION AND CONSERVATION OFFICE

Governor's Salmon  
Recovery Office



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This is an executive summary of the online report on salmon recovery and watershed health required by the Washington Salmon Recovery Act.

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Development of this report would not have been possible without contributions from state agencies, Tribes, and salmon recovery partners. Special thanks to: Columbia River Inter-Tribal Fish Commission, Northwest Indian Fisheries Commission, Upper Columbia United Tribes, regional salmon recovery organizations and boards, salmon recovery lead entities, Washington Department of Ecology, and Washington Department of Fish and Wildlife.

This report also would not have been possible without funding from the National Oceanic and Atmospheric Administration's National Marine Fisheries Service and the U.S. Fish and Wildlife Service.

**About the cover:** Cedar River Chinook salmon photographed by Jess Newley, Friends of the San Juans.

ALL OTHER PHOTOGRAPHS ARE FROM THE RECREATION AND CONSERVATION OFFICE UNLESS NOTED OTHERWISE.

PUBLICATION DESIGN BY LUIS PRADO.



PRINTED ON RECYCLED PAPER, 2025

ROGER TABOR, U.S. FISH AND WILDLIFE SERVICE

Salmon throughout Washington are making modest progress but many challenges remain.



Chum salmon  
at McAllister Springs,  
Thurston County

# Modest Progress but Challenges Remain

## EXECUTIVE SUMMARY



Salmon have shaped the Pacific Northwest for millions of years. They are vital to Tribes and Treaty Rights, the economy, the health of waterways, orcas and other wildlife, and Washington's way of life. Few other species are so deeply embedded in the culture, so connected to the land and water, or invoke such inspiration through their long-distance migrations from mountain streams to the Pacific Ocean and back again.

Salmon are resilient creatures. They have endured through a century and a half of obstacles from habitat loss, blocked migration, overharvest, and polluted waterways. Today, salmon continue to persist in the face of past and current challenges including climate change and population growth. Their resiliency has given them a chance at recovery.

While far too many salmon species still are in crisis across the state, there are signs of modest improvements for some salmon species. This is good news and suggests that progress is possible. The question is whether these modest improvements can be sustained for those species and whether progress is possible for other species in the state.

PHOTO: JOHN McMILLAN / NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION'S NORTHWEST FISHERIES SCIENCE CENTER



Juvenile coho salmon

## Why Recover Salmon?

Recovering salmon is important because Washingtonians rely on healthy populations of salmon to support a robust economy, feed iconic orcas, enrich a cultural heritage and way of life, and fulfill obligations to Tribes.

In addition, the Endangered Species Act requires the federal government to protect animals that are in danger of extinction or likely to become so. Since 1991, the federal government has declared twenty-eight salmon species across the West, including fourteen species of salmon and steelhead in Washington, as at risk of extinction.



# What's at Stake

Scientists estimate 138 species of wildlife, from whales to insects, depend on salmon for their food.<sup>4</sup>



## Economy and Recreation

Salmon contribute directly and indirectly to the economy. An

estimated \$1.5 billion is spent annually by people harvesting fish and shellfish recreationally in Washington,<sup>1</sup> supporting many rural families and businesses. This results in nearly twenty-three thousand jobs in Washington with salmon harvest alone worth almost \$14 million a year.<sup>2</sup> In addition, every \$1 million invested in habitat restoration projects generates up to \$2.6 million in economic activity.<sup>3</sup>

## Environment

As a keystone species, salmon reflect the health of the environment. Scientists estimate 138 species of wildlife, from whales to insects, depend on salmon for their food.<sup>4</sup> Even trees and shrubs use marine-derived nutrients from salmon as fertilizer.

## Culture and Way of Life

Salmon are an icon of the Pacific Northwest. Residents gather by the thousands annually at festivals throughout the state to welcome salmon home from the ocean. Salmon have long been a part of many family fishing traditions and fishing businesses.



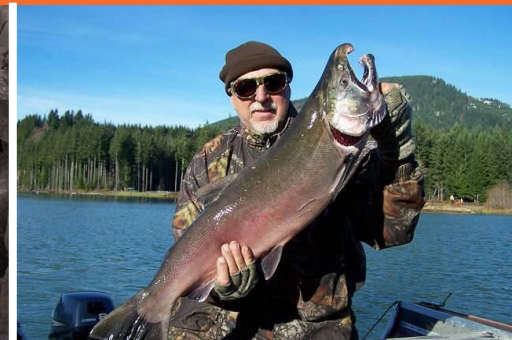
## Tribal Rights and Co-Management

From the earliest times, people of the Northwest have identified themselves with salmon. Tribes, the state's first inhabitants, defined themselves as the Salmon People.<sup>5</sup> Salmon are woven throughout Tribal lives as a source of food, work, art and literature, heritage, and celebration.

Through treaties with the federal government in the mid 1850s, many Tribes exchanged land for guaranteed, perpetual access to fishing areas. Other Tribes in Washington never ceded their claims to ancestral lands and still rely on salmon. Washington State is obligated to uphold fishing rights for Tribes and has a duty to ensure salmon are abundant enough for harvest. Tribes co-manage the state's salmon with the Washington Department of Fish and Wildlife and work with the federal government to set fishing seasons.

Tribes are foundational for salmon recovery in Washington. Tribes have thousands of years of knowledge, expertise, and insight into salmon stewardship. They have led salmon recovery efforts throughout the state, serve on salmon recovery boards, and work with partners to advance recovery priorities. Tribes have led many of the largest restoration efforts in the state. And Tribes employ a range of scientists and policy staff who advocate for salmon recovery, lead planning and implementation efforts, and monitor progress toward recovery.

CLOCKWISE FROM TOP LEFT: U.S. FISH AND WILDLIFE SERVICE; JAMES POWELL / WASHINGTON DEPARTMENT OF FISH AND WILDLIFE; NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION; RECREATION AND CONSERVATION OFFICE





# Salmon Recovery in Washington



In response to the federal Endangered Species Act listings in the 1990s, Washington State passed the Salmon Recovery Act in 1998 and crafted a first-of-its-kind statewide salmon recovery strategy in 1999 called *Extinction is Not an Option*.

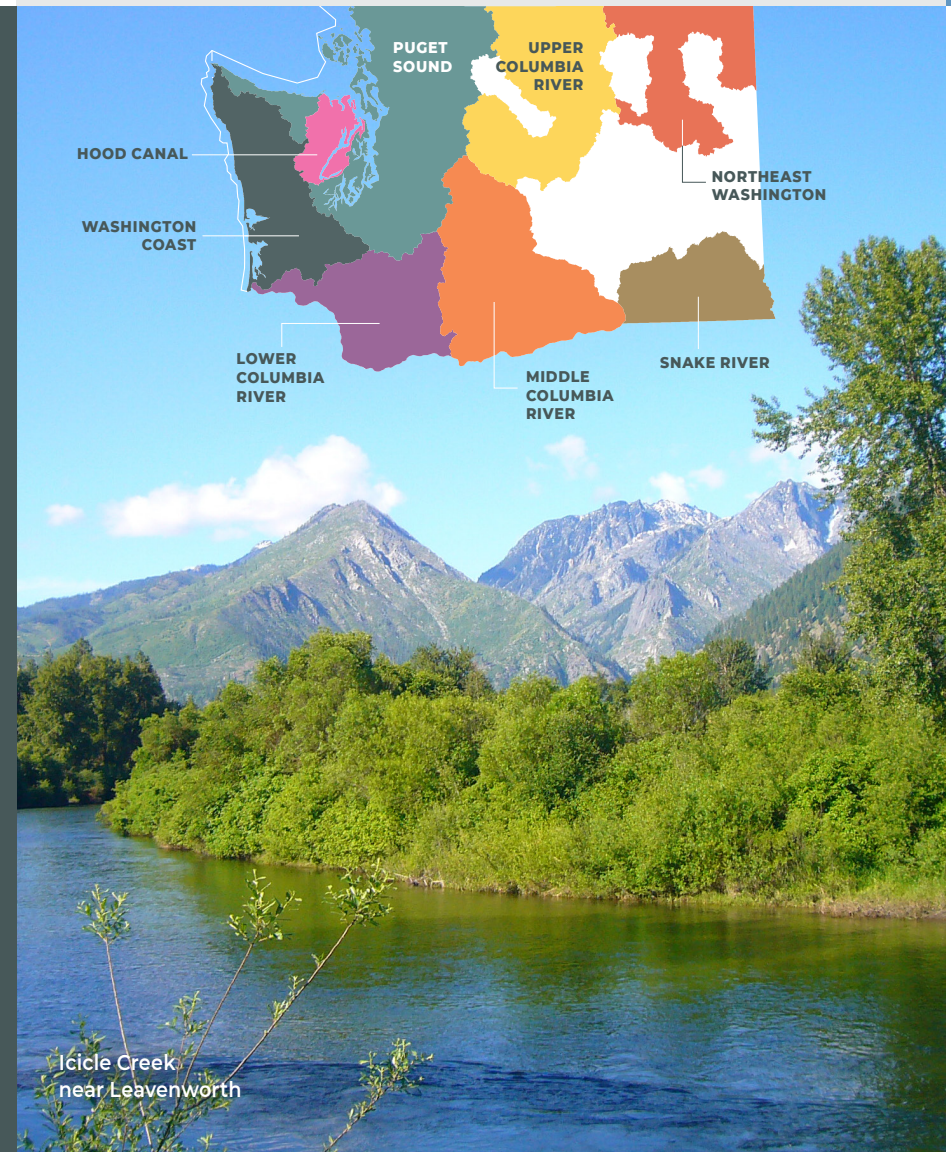
Washington took a unique approach and based its plan around watersheds and local communities. Washington is the only state in the country where the federal Endangered Species Act recovery plans were developed locally by regional salmon recovery organizations and approved and adopted by the federal government. The regional salmon recovery plans guide state, federal, and local salmon recovery efforts.

This locally led effort during the past three decades brought thousands of people across the state together with state and federal agencies, Tribes, regional recovery organizations, lead entities, and nonprofits to recover salmon stream by stream, watershed by watershed.

In 2021, the State updated its statewide salmon strategy and reconvened the Natural Resources Subcabinet to coordinate state agency implementation of the strategy. The Legislature directed the Governor's Salmon Recovery Office to develop a biennial work plan that aligns state agency priorities with the statewide strategy, regional salmon recovery plans, and Tribal priorities. This work is ongoing and informs state budget and policy priorities for salmon recovery.

**Washington is the only state in the country where the federal Endangered Species Act recovery plans were developed locally by regional salmon recovery organizations and approved and adopted by the federal government.**

## SALMON RECOVERY REGIONS



Icicle Creek,  
near Leavenworth



# Salmon Status in Washington



Today, fourteen species of salmon and steelhead are listed as at risk of extinction under the Endangered Species Act. The chart here provides a snapshot of abundance, one measure for recovery of these species.

Overall, there are some modest signs of improvement. More species are approaching their abundance goals or showing signs of progress and fewer species are not keeping pace with recovery.

However, there are still far too many salmon in crisis or not keeping pace with recovery. It will take increased efforts to improve the status of species in crisis and to maintain progress especially in the face of ongoing challenges from climate change and population growth.

The National Oceanic and Atmospheric Administration (NOAA) evaluates attributes not shown in this report such as productivity, life history, genetic diversity, and the spatial structure (geographical spread) of the populations. NOAA also considers threats and factors affecting the health of fish including habitat, hydropower, hatchery, and harvest impacts. NOAA's analysis, called the five-year biological status review, determines if a species is healthy enough to be removed from the Endangered Species Act list. The chart here does not replace NOAA's status review.

This report does not address salmon and steelhead species not listed under the federal Endangered Species Act, such as salmon on the Washington Coast. Keeping these species off the Endangered Species Act list will require increased attention and due diligence. Salmon recovery is a statewide investment.

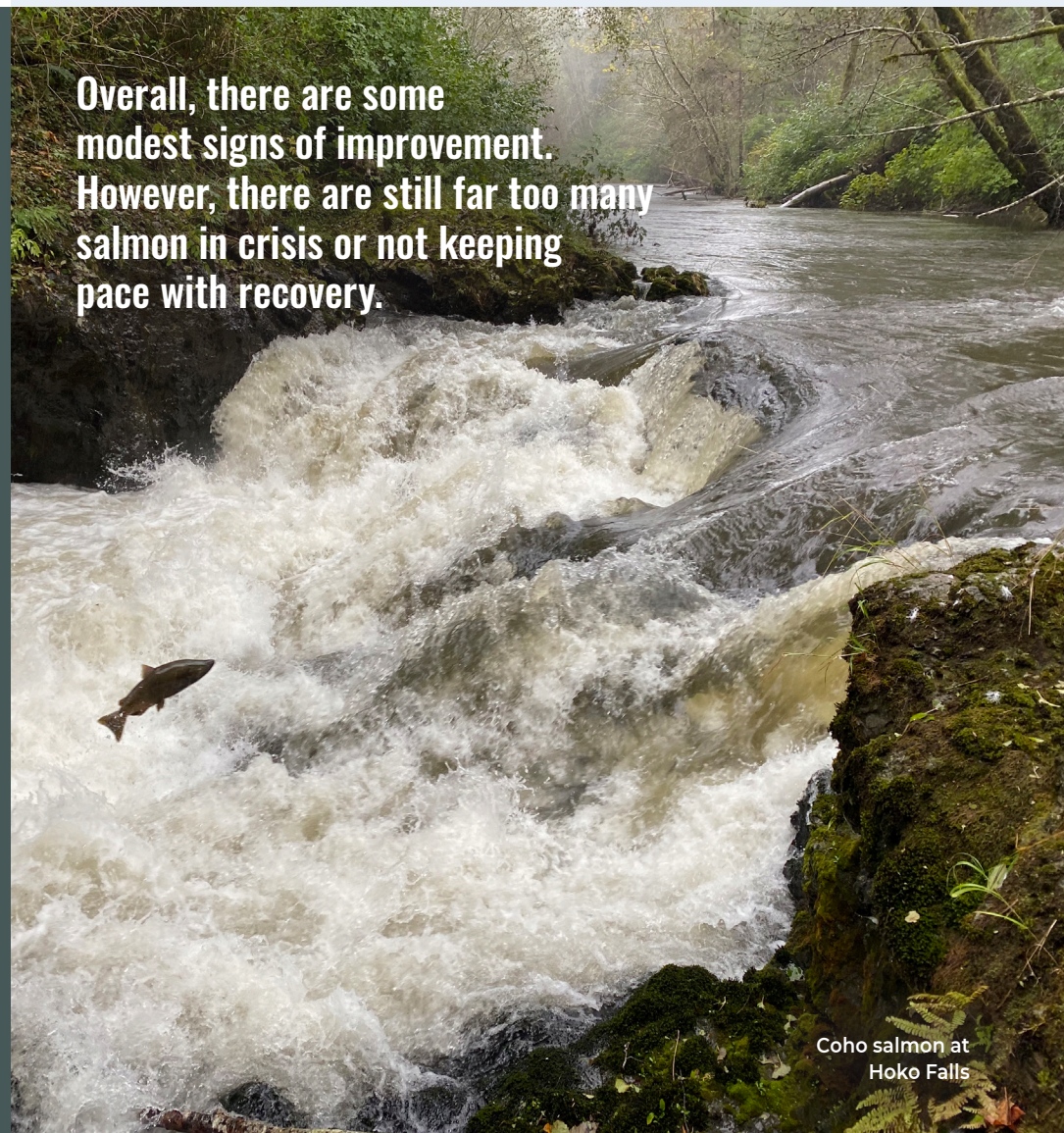


Sockeye salmon

Today, fourteen species of salmon and steelhead are listed as at risk of extinction under the Endangered Species Act.

**Overall, there are some modest signs of improvement. However, there are still far too many salmon in crisis or not keeping pace with recovery.**

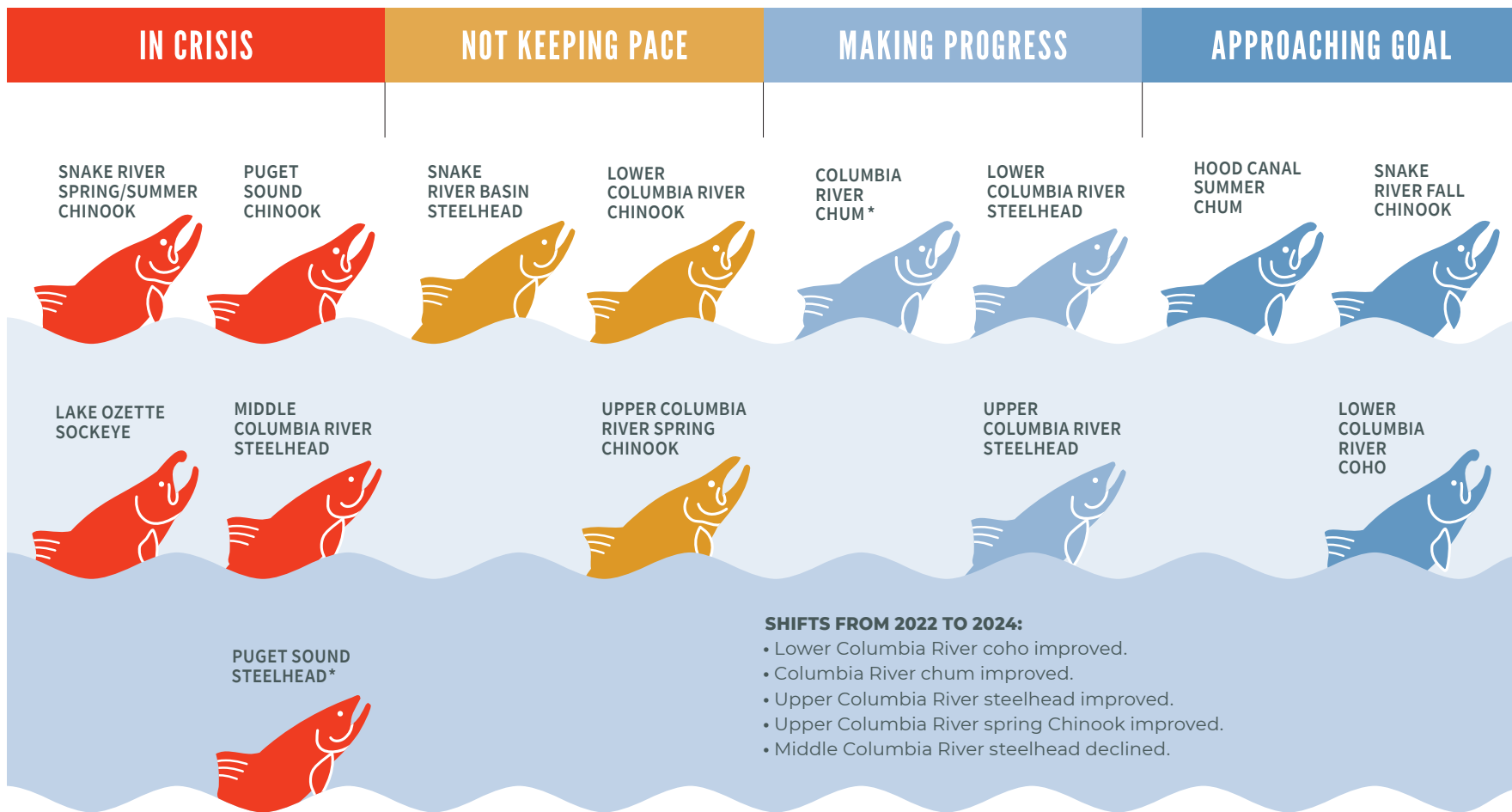
RIGHT: KEVIN LONG / NORTH OLYMPIC SALMON COALITION; INSET (TOP): JOHN P. MC MILLAN, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION'S NORTHWEST FISHERIES SCIENCE CENTER



Coho salmon at Hoko Falls



# Salmon Abundance | 2024



\* Lacks complete data.

Data and analysis by Washington Department of Fish and Wildlife

# Funding



Rebuilding healthy, harvestable salmon populations requires funding to restore and protect salmon habitat and address threats to salmon. This chart

focuses on funding provided through grants administered by the Washington State Recreation and Conservation Office.

A 2011 study<sup>6</sup> pegged the statewide cost of implementing habitat-related elements identified in regional salmon recovery plans for 2010-2019 at \$4.7 billion in 2011 dollars. To date, \$2.1 billion has been invested. While there has been progress and an increase in funding recently, overall funding continues to lag behind what is needed. As construction costs increase and habitat continues to decline, increased investment will be needed.

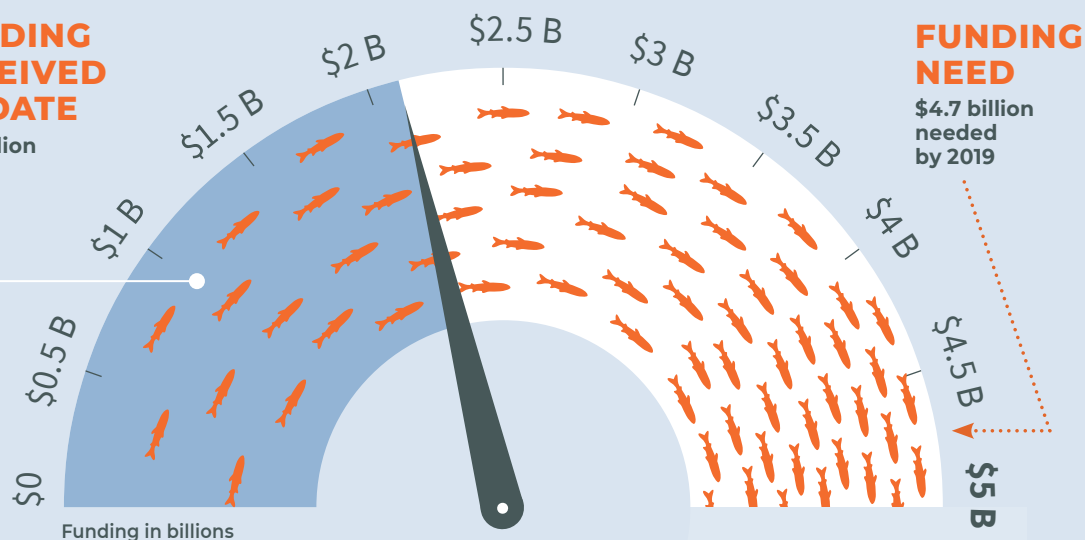


Shoreline restoration along Puget Sound.

A 2011 study<sup>6</sup> pegged the statewide cost of implementing habitat-related elements identified in regional salmon recovery plans for 2010-2019 at \$4.7 billion in 2011 dollars. To date, \$2.1 billion has been invested.

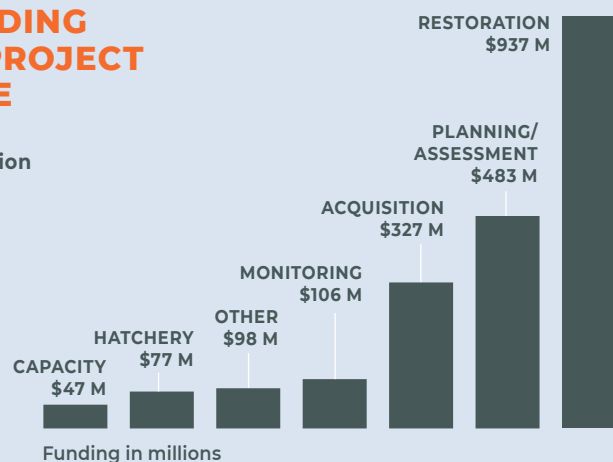
## FUNDING RECEIVED TO DATE

\$2.1 billion



## FUNDING BY PROJECT TYPE

Total:  
\$2.1 billion



**As construction costs increase and habitat continues to decline, increased investment will be needed.**



# Why Salmon Struggle

Salmon have complicated lives, which helps make them resilient to change, but also makes them vulnerable to human activities.

9

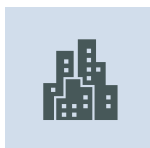


Salmon face many obstacles during their lives. Recovering salmon runs will require addressing these obstacles, including degraded habitat, barriers to migration, poor water quality, low water levels in the summer, climate change, predation, food availability, hatchery effects, and fishing.

The number of large fires has doubled between 1984 and 2015 in the western United States.<sup>7</sup>



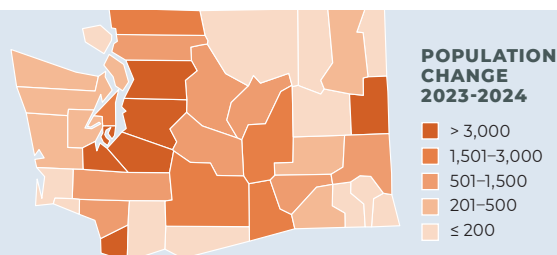
# Habitat Loss



Habitat protection and restoration is one of the most important

factors for salmon recovery. Salmon need cool, clean rivers and streams, estuaries (where rivers meet saltwater), and healthy oceans through the different stages of their lives. In Washington, this habitat has been degraded severely in the past 150 years. Beginning in the 1800s, humans straightened streams, cleared logs and root wads (which biologists later discovered were important habitat for salmon), and built roads, levees, and ditches that disconnected rivers and floodplains. While a lot has been learned and progress made to rectify past practices, there remains much work ahead to undo the past.

Washington's population reached eight million in 2024, nearly doubling the state's population since 1980,<sup>8</sup> and is expected to pass nine million by 2038.<sup>9</sup>



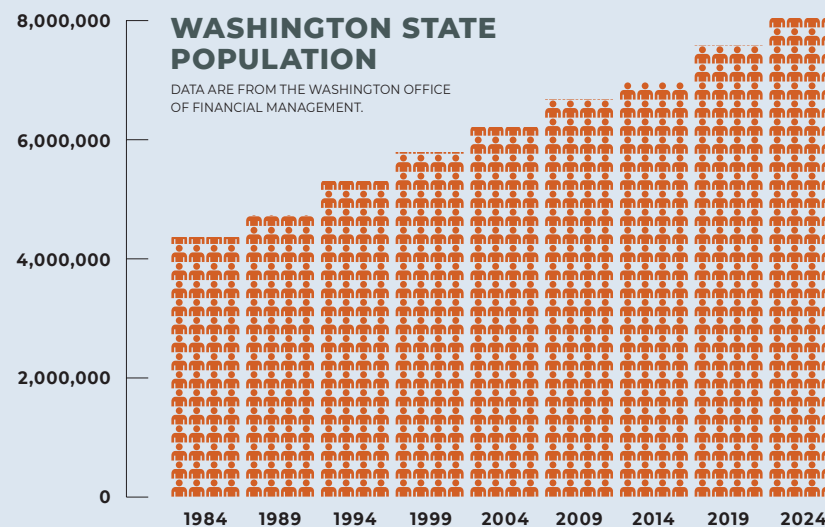
## Human Population Growth and Development

Washington's population reached eight million in 2024, nearly doubling the state's population since 1980,<sup>8</sup> and is expected to pass nine million by 2038.<sup>9</sup> In Washington, land-use planning and development decisions are made primarily by local governments with technical assistance and funding support from the State. Working with local governments on local land-use decisions to accommodate the expected growth will be important for people and salmon. Growing areas are still losing more habitat than what is being restored. In 2023, the Legislature funded a salmon recovery planning grant program to improve local growth policies for salmon. The Department of Commerce is the state lead for this effort and awarded the first round of grants in 2024, which provided funding for five planning projects to better integrate salmon recovery priorities into comprehensive planning and development regulations.



King County has grown more than 30,000 people a year on average since 2010.

ROBERT RITCHIE / UNSPLASH



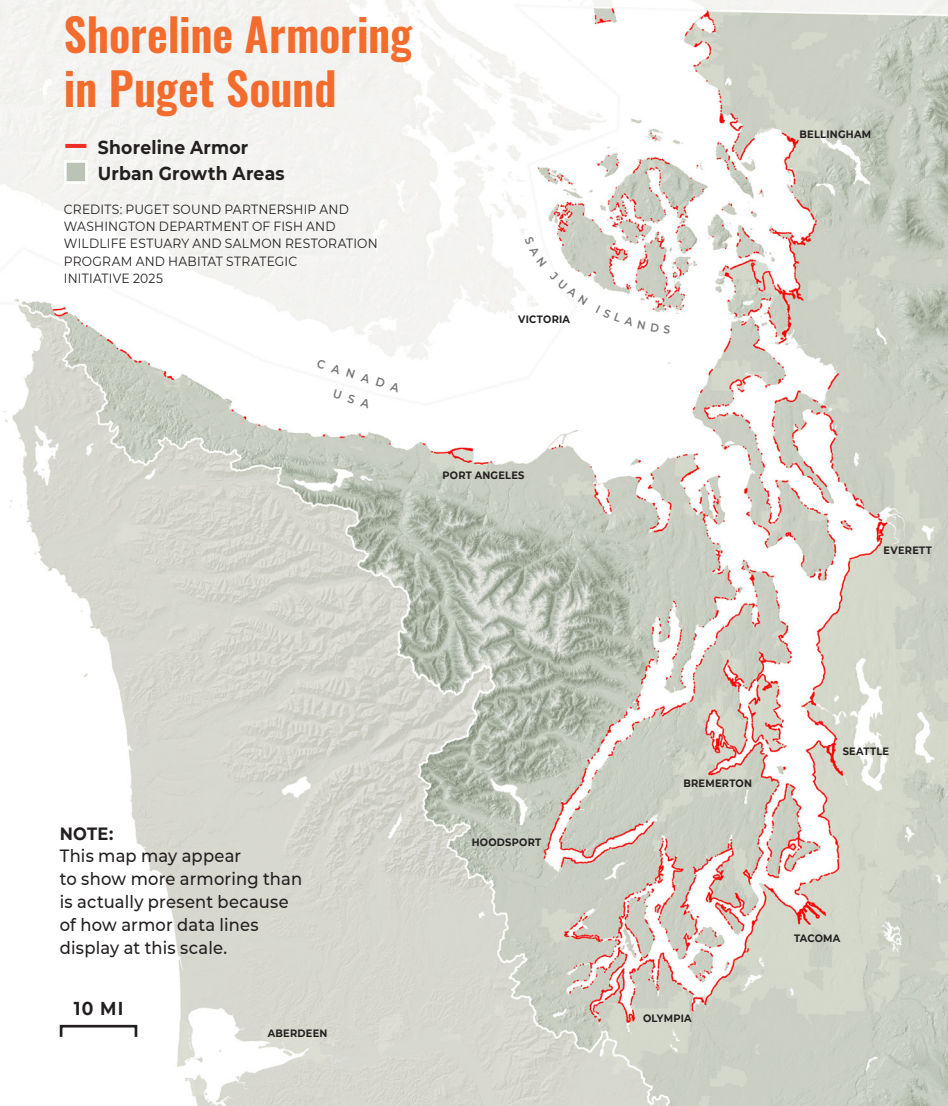




## Shoreline Armoring in Puget Sound

- Shoreline Armor
- Urban Growth Areas

CREDITS: PUGET SOUND PARTNERSHIP AND WASHINGTON DEPARTMENT OF FISH AND WILDLIFE ESTUARY AND SALMON RESTORATION PROGRAM AND HABITAT STRATEGIC INITIATIVE 2025



Puget Sound has lost habitat function across one-third of its twenty-five hundred miles of shoreline to armoring.<sup>10</sup>



### Shorelines

Puget Sound has lost habitat function across one-third of its twenty-five hundred miles

of shoreline to armoring.<sup>10</sup> Armoring includes bulkheads, seawalls, and other structures built on the shoreline. These hardened shorelines alter habitat used by salmon and the fish they eat and significantly impact natural processes. Armor prevents waves from eroding bluffs to create beaches, where salmon find the insects and other fish they eat. Puget Sound has seen a decline in permitted shoreline armoring but the amount of armoring across Puget Sound still is impeding recovery.



### Riparian Areas and Floodplains

More than a century of heavy human use and activity created simplified,

straightened, high-energy rivers and streams that carry water swiftly from mountains to ocean. People straightened and simplified rivers and removed vegetation along streams to reduce flooding and increase the amount of land for farming, homes, and industry. This efficient transportation of water disrupted the natural processes and habitats needed to support salmon. Riparian land (areas alongside streams and other waterways) and floodplains slow and store water during all times of the year, provide shelter and food for young fish, and buffer communities against floods.

Most of the efforts to restore river, riparian, and floodplain habitats are being addressed through voluntary restoration programs. These programs are funded with state and federal dollars and coordinated through regional and local partnerships in collaboration with willing landowners, local governments, and Tribes. Since 2000, there have been 3,443 miles and 39,447 acres of riparian habitat along waterways restored, and 13,918 acres of estuaries and near-shore habitats restored.

The amount of armoring across Puget Sound still is impeding recovery.

# Climate Change



Changes in climate affect salmon and their habitats in many ways. The average annual air temperature

across Washington increased by 1.8 degrees Fahrenheit between 1960 and 2023,<sup>11</sup> a trend that scientists expect to continue. As the air warms, so do the streams and rivers that salmon depend on, meaning that more fish are impacted by high temperatures and less cold-water habitat is available. At the same time, glaciers are diminishing and mountain snowpack is shrinking as air temperatures warm. As water from glaciers and snowmelt decreases, the flow in streams and rivers decreases. More streams go dry in the summer and that means fewer places for fish to return to in the summer and a greater likelihood their offspring will not survive.<sup>12</sup>

The changing climate also is bringing rain instead of snow to lower mountains in Washington. With more rain, the average amount of water in streams during winter will increase by 25-34 percent by the 2080s, increasing the likelihood of severe flooding.<sup>13</sup> Severe flooding becomes catastrophic for people and salmon when floodplains, which are natural storage areas for flood water, can no

**The average surface water temperatures off Washington's coast have been warming during the past fifty years,<sup>15</sup> making it less hospitable for salmon.**

longer serve this function because of degradation or development.<sup>14</sup> Loss of floodplains and severe flooding in rivers can destroy salmon nests and eggs directly or push young salmon out of the rivers before they are large enough to survive.

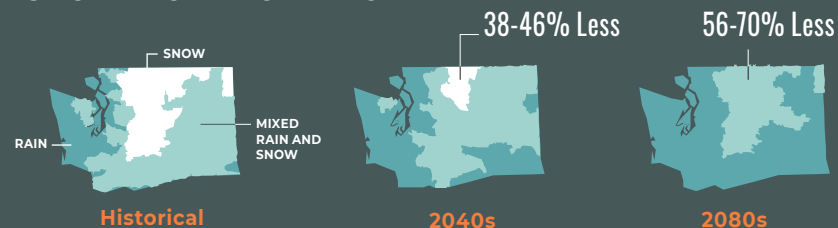
The warmer climate also impacts ocean temperatures. The average surface water temperatures off Washington's coast have been warming during the past fifty years,<sup>15</sup> making it less hospitable for salmon. Warmer water cannot support the types of food that young salmon need to thrive, which means that fewer young salmon grow to adulthood.

## Less and Warmer Water

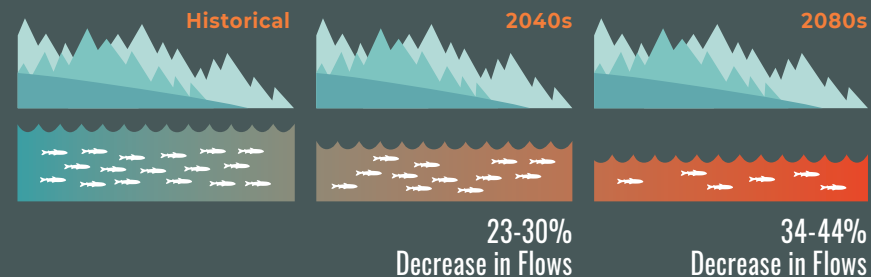
### STATEWIDE AVERAGE FREEZING ELEVATION GOING UP



### SNOWPACK DECLINING<sup>13</sup>



### SUMMER STREAMFLOWS DECREASING AND WARMING<sup>13</sup>







Severe flooding becomes catastrophic for people and salmon when floodplains, which are natural storage areas for flood water, can no longer serve this function because of degradation or development.<sup>14</sup>



### Climate Change Affects Salmon at all Life Stages

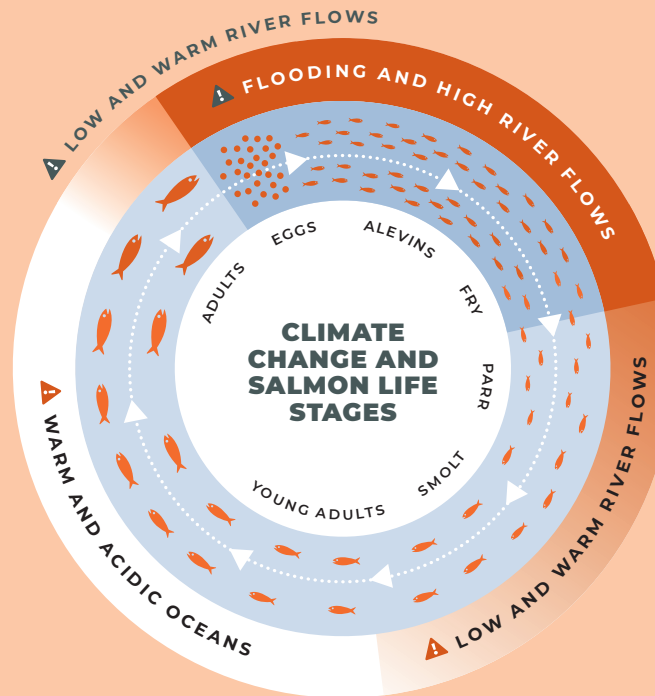
Salmon are affected by climate change throughout

their lives. In the winter, less snow in the mountains, earlier snow melt, and heavier rain increase the number and severity of floods. Strong floods hit salmon hardest when they are young by scouring riverbeds and riverbanks and stirring up sediment that can bury and suffocate salmon eggs in gravel. The strong floods also can flush young fish downstream before they are ready, leading to more deaths.

In the summer, less water and warmer water in streams harms both young and adult salmon. Young salmon that spend a year or more in freshwater must find cooler water, avoid getting trapped in isolated pools, and avoid predators. For adults returning to spawn, the warm waters can hinder migration upstream, increase disease, increase vulnerability to predation, and can kill them directly if they get trapped in warm water.

### Salmon need healthy places to live.

This means rivers with cool, clean water and a variety of habitats that allow them to rest, hide from predators, spawn, and travel in unobstructed pathways to and from the ocean.



#### Low and warm river flows

hinder migration and increase disease and the chances that salmon will get eaten or die.



#### Flooding and high river flows

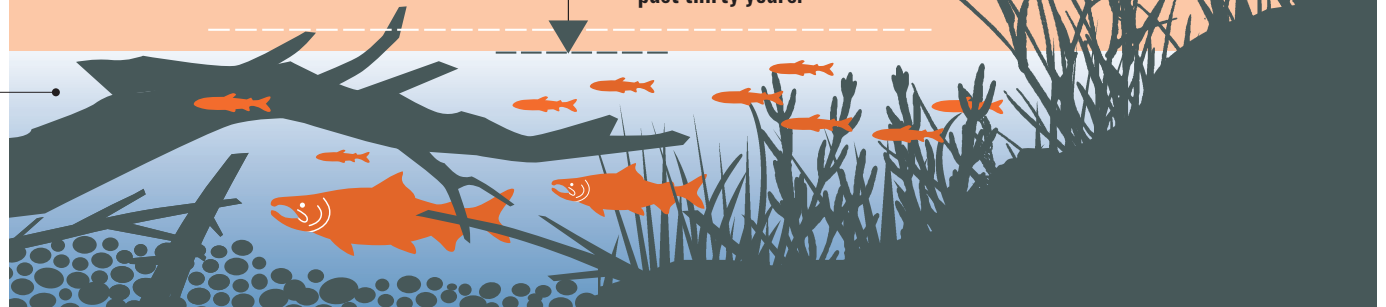
smother eggs and flush eggs and young salmon downstream too early.



#### A warm and acidic ocean

inhibits salmon's growth and limits their food supply.

Low flow days increased 11% in the past thirty years.<sup>16</sup>



# Water Quantity and Quality

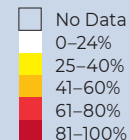
Human activities that alter stream flow, increase pollution, and warm the water affect salmon directly and indirectly.



## Low Flows

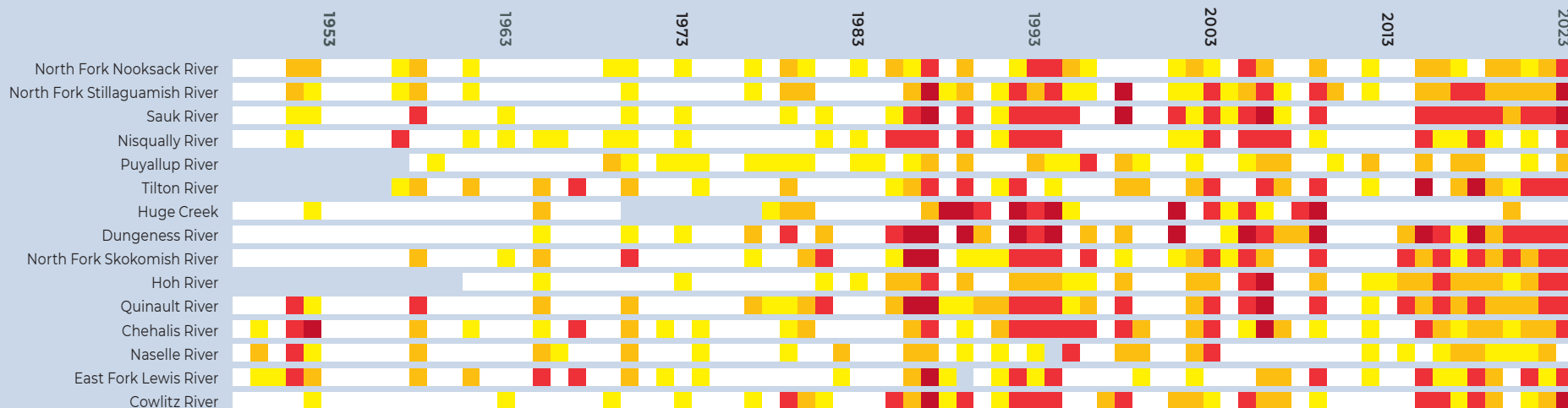
Low levels of water in streams (low flows) can prevent fish from migrating or cause water to get too hot, killing the fish. Decades of data show that low flows in the summer are becoming lower, warmer, and longer-lasting. The figure below shows how low summer flows are becoming more common in sampled Washington streams, especially since 1985. While some years still have good flow for salmon during summer, dangerously low flows are becoming more frequent and will have increasingly negative impacts for salmon going forward.

## Water Temperature Trends in Low-Flow Conditions

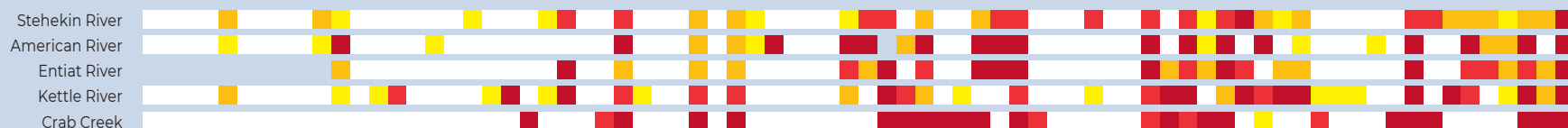


The colors are based on the percent of days each year between July 15 and October 31 where the mean daily flow was below normal (i.e., below the 1948-1998 baseline 25th percentile).

Data: Washington State Department of Ecology

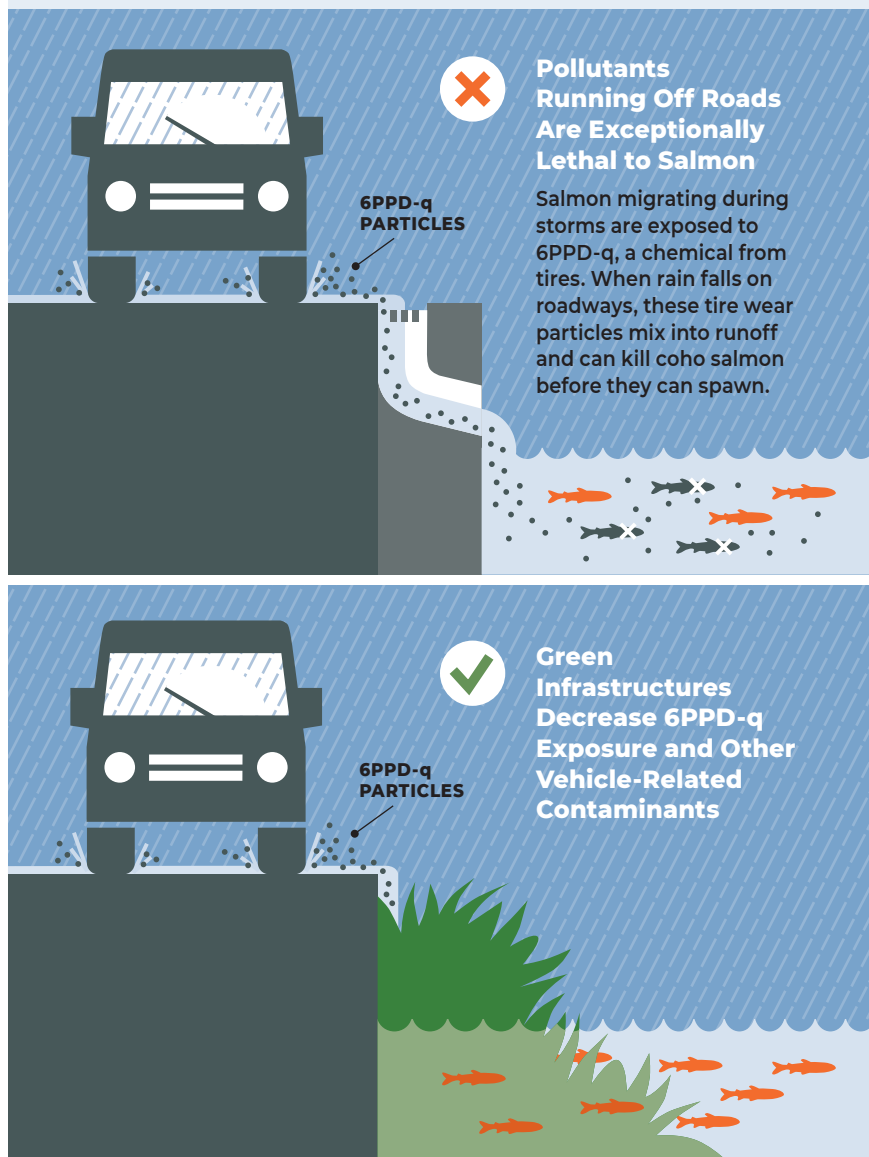


WESTERN WASHINGTON STREAMS



EASTERN WASHINGTON STREAMS





## Adding stormwater treatments to roads is one important tool that benefits salmon recovery and improves water quality for everyone.



### Stormwater Runoff

Stormwater running off roads, structures, and parking lots is important across the state and one of the most significant pollution sources impacting Puget Sound.<sup>17</sup> Without proper protections, stormwater carries pollution from neighborhoods and industrial areas, vehicles and roads, agriculture, and other sources, harming waterbodies and the fish and other animals that live there such as salmon and Southern Resident orcas. Unmanaged stormwater also can increase flooding and stream temperatures and decrease oxygen levels, destroying important salmon habitat. As cities and suburbs have expanded, these impermeable hard surfaces have increased, making the problem worse. Some pollutants running off roads are exceptionally lethal to salmon. For example, 6PPD-quinone (6PPD-q), a chemical that gets into stormwater from tires, can kill coho salmon before they can spawn.

Stormwater impacts, including pollutants like 6PPD-q, can be addressed by advancing science, reducing and eliminating pollutants from household products, planning collaboratively, adopting local regulations, implementing best management practices, and

retrofitting stormwater facilities. Adding stormwater treatments to roads is one important tool that benefits salmon recovery and improves water quality for everyone.

In 2022, the Washington State Legislature authorized \$500 million to the Washington State Department of Transportation to be used in the next sixteen years to mitigate 6PPD-q and other stormwater pollution. The department is advancing science by studying stormwater treatment effectiveness and prioritizing its stormwater retrofit projects as funding becomes available.

The Washington State Department of Ecology leads the state in managing stormwater runoff and has updated stormwater permit requirements to require local communities to retrofit some existing development and ensure that new development manages runoff to protect salmon and their habitats. Ecology also is funding research to improve stormwater treatment options, identify safer alternatives to toxic chemicals in tires, and guide effective ways to prevent 6PPD-q from reaching water.

# Fish Passage Barriers

## Why Salmon Struggle



Many areas that used to be salmon habitat in Washington are blocked today by roads, dams, railroads, tide gates, or water diversions for farms. The

Washington Department of Fish and Wildlife estimates that at least twenty thousand barriers either partially or fully block salmon from reaching their spawning grounds in Washington.<sup>18</sup> Since 2005, more than 3,866 barriers have been corrected using grants managed by the Recreation and Conservation Office, reopening more than 5,100 miles of habitat to salmon and steelhead. The state Department of Fish and Wildlife also is developing guidance for new overwater structures such as bridges and docks to prevent future barriers.

Barrier corrections also are being addressed through state regulations and a federal court order. The 1999 Forests and Fish Law in Washington resulted in the correction of more than nine thousand barriers including many that are higher in watersheds. The 2013 U.S. District Court culvert injunction requires state agencies to correct barriers by 2030. To date, more than 320 barriers have been removed, opening more than 670 miles of habitat.

Since 2005, more than 3,866 barriers have been corrected.



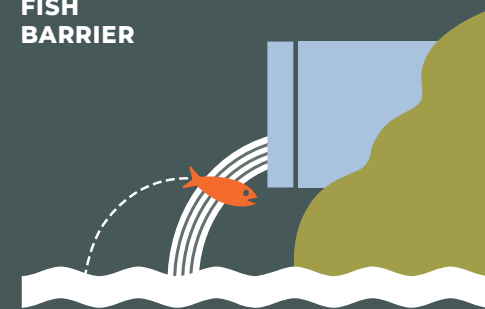
Bridges like this one, installed over Little Spokane River, allow fish passage. They allow streams to move more naturally under roads, making it easier for fish to travel.

**Proper fish passage culverts should be wide enough to maintain a natural flow.**

**NON-BARRIER**



**FISH BARRIER**





# Predation



## Predation

Human activities in the past century and a rapidly changing climate altered natural systems

dramatically, which affected the number and type of predators that eat salmon. Some examples include increased concentrations of seals and sea lions at dams and docks, human-made reservoirs that entice fish predators, and human-made islands or bridges that attract bird colonies. Some studies indicate that up to one-third of steelhead may be lost to harbor seals in Puget Sound, and predators may have equal or higher impacts than fishing.<sup>19</sup> Across the Columbia River basin, seals and sea lions, birds, and native and non-native fish are known to be major factors limiting recovery.

State and Tribal co-managers in Washington and Oregon have started removing sea lions in the Columbia River near dams where sea lions have become accustomed to eating large numbers of salmon. The U.S. Army Corps of Engineers manages extensive programs to reduce the number of salmon eaten by birds in the Columbia River estuary and the middle Columbia River. In addition, a bounty program that pays recreational anglers to capture pikeminnow is credited with significantly reducing the number of salmon eaten by pikeminnow. In the marine environment, researchers are

working to identify areas where juvenile salmon may be especially vulnerable to seal and sea lion predation. Early evidence suggests that enhanced sea lion removal programs in the Columbia River and Willamette River may reduce extinction risk by as much as 11 percent and models suggest that predation may be reduced by up to fifty thousand adult salmon.<sup>20</sup>

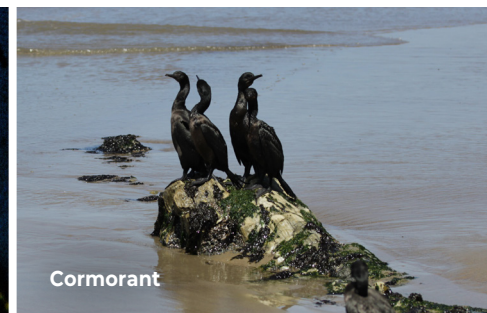
## Forage Fish and Food Webs

Forage fish are small, schooling fish that salmon and many other species eat in near-shore marine waters. Pacific herring, Pacific sand lance, and surf smelt are some of the most common forage fish species found in Washington. Human activities, development, and climate change have degraded the places forage fish live, resulting in fewer forage fish and impacts to the food web in Puget Sound and elsewhere. Recently, the number of spawning herring, an important forage fish, has been above its ten-year average in some areas. However, herring spawning in key areas, such as Cherry Point in north Puget Sound and Squaxin Pass in south Puget Sound, remain well below their long-term baselines. In 2023 and 2024, there was no evidence of herring spawning at Cherry Point. Ongoing funding is vital to support herring surveys and to better assess trends of other important forage fish species.

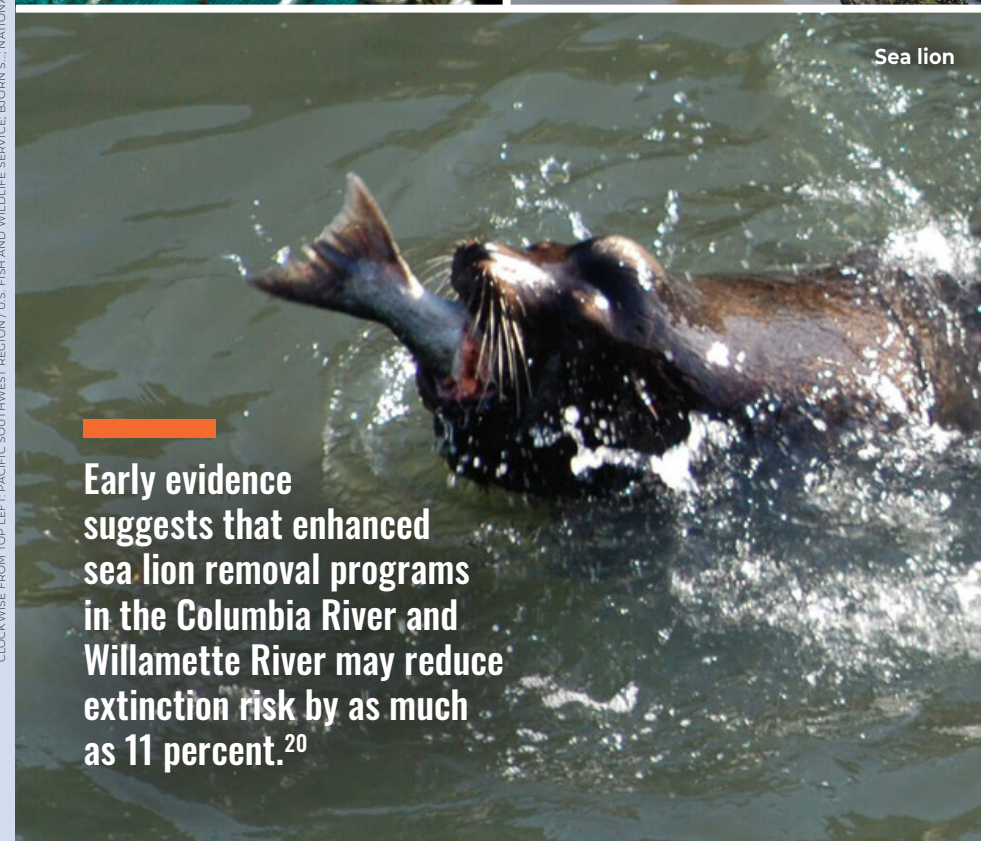
CLOCKWISE FROM TOP LEFT: PACIFIC SOUTHWEST REGION / U.S. FISH AND WILDLIFE SERVICE; BROWN S.; NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



Northern  
pikeminnow



Cormorant



Sea lion

Early evidence suggests that enhanced sea lion removal programs in the Columbia River and Willamette River may reduce extinction risk by as much as 11 percent.<sup>20</sup>

Up to one-third of steelhead may be lost to harbor seals in Puget Sound, and predators may have equal or higher impacts than fishing.<sup>19</sup>

# Harvest

## Why Salmon Struggle



The federal government identified persistent overfishing as one of the primary factors in the 1990s leading to Endangered

Species Act listing of many salmon and steelhead populations as threatened or endangered. Current harvest is managed by Tribal, state, and federal governments through treaties, agreements, congressionally established management councils, and compacts. Harvest is highly coordinated and closely monitored and managed to protect threatened and endangered salmon.

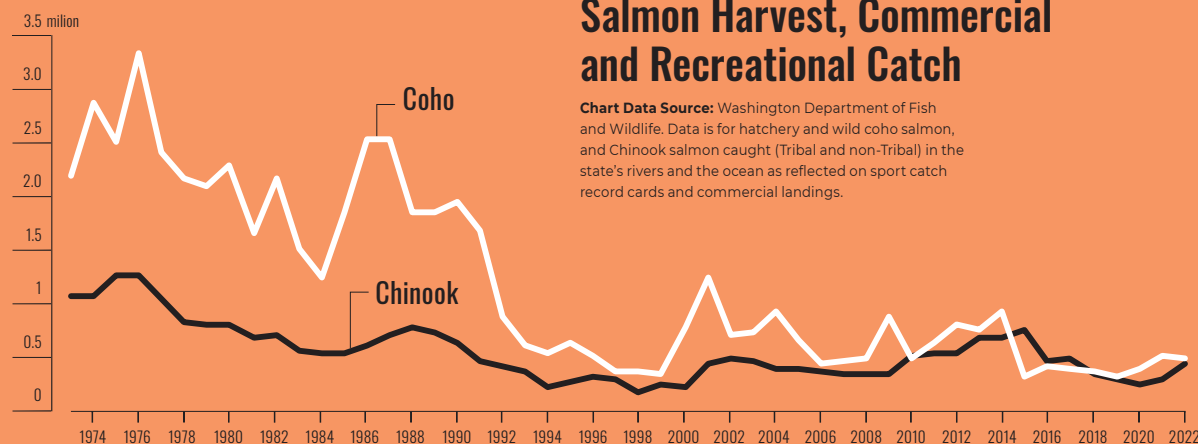
Salmon fishing in Washington has decreased by 58 percent for Chinook salmon and 77 percent for coho salmon since the early 1970s, affecting Tribal fishing, Tribal treaty obligations, recreational anglers, and commercial fishing.

Effective co-management between the State and Tribes has reduced harvest impacts in Washington on threatened or endangered salmon. Fishing is sustained by some healthy wild populations and many abundant hatchery origin runs. Effectively catching hatchery fish while avoiding at-risk wild populations is a key harvest management priority.

KENNETH JOHN GILL/KA GILL/PHOTO



Harvest is highly coordinated and closely monitored and managed to protect threatened and endangered salmon.





# Hydropower



Hydropower dams in Washington provide affordable, reliable power for the Pacific Northwest with low

carbon footprints but impact rivers and salmon. Washington has more than 1,345 dams, including about 145 large power-generating dams owned or regulated by the federal government.<sup>21</sup> Hydropower dams block large areas of salmon habitat, particularly in the Columbia River and its tributaries.

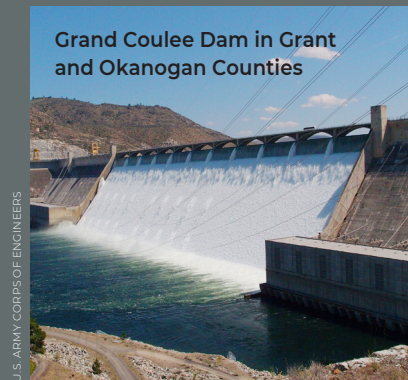
Hydropower systems are highly regulated and highly mitigated to offset impacts and improve fish passage survival. Government agencies, industry, Tribes, and nonprofits have worked to address the impacts of dams, while attempting to preserve the benefits that dams provide for people, such as flood control, carbon neutral power, shipping assistance, and irrigation of farmland.



Several recent efforts have focused on restoring salmon and steelhead affected by dams across Washington, such as the following:

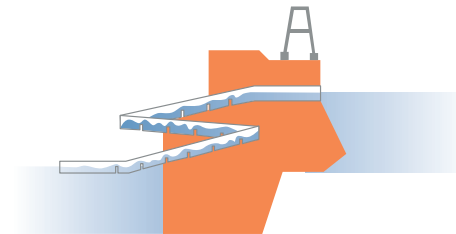
- Downstream juvenile fish passage was improved on the Cle Elum River in Kittitas County and Howard A. Hanson Dam on the Green River in King County.
- Efforts to reintroduce salmon above Chief Joseph and Grand Coulee dams in the upper Columbia River have begun.
- Agreements between state, Tribal, and federal governments on the Columbia River and its tributaries are focused on fish passage and survival through the dams.

Grand Coulee Dam in Grant and Okanogan Counties



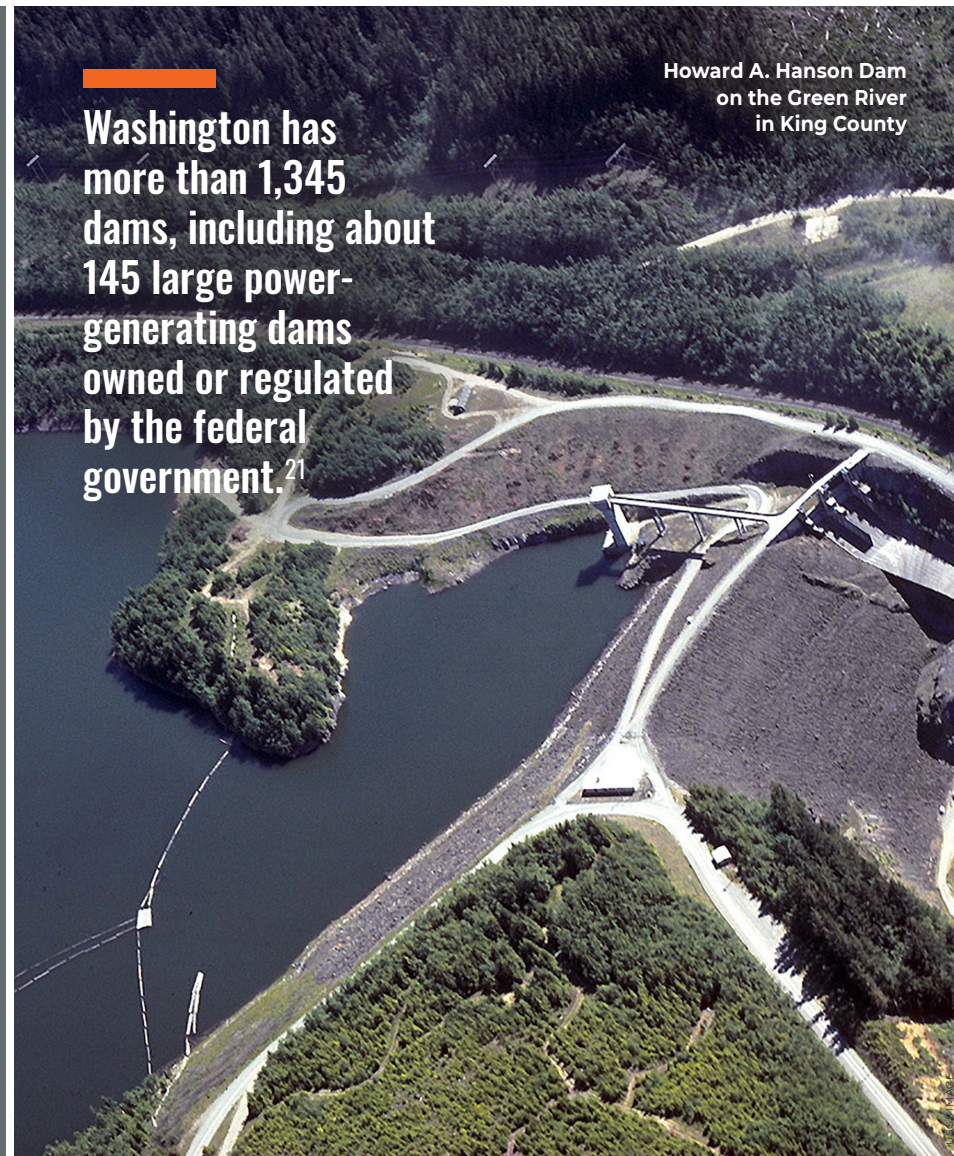
U.S. ARMY CORPS OF ENGINEERS

**Fish ladders, right,** are a series of gradual steps that enable fish to swim around or over a dam. Ladders are in place at all federal projects on the lower Columbia and lower Snake Rivers.



**Washington has more than 1,345 dams, including about 145 large power-generating dams owned or regulated by the federal government.<sup>21</sup>**

Howard A. Hanson Dam on the Green River in King County



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# Hatcheries



Salmon hatcheries are used to bolster and augment natural salmon runs and to produce fish for

recreational, commercial, and Tribal fishing. More than 80 percent of the salmon caught by recreational, commercial, and Tribal fishing come from hatcheries.<sup>22</sup> Until habitat conditions improve, hatcheries are necessary to meet Tribal fishing and treaty obligations, support local and regional businesses that rely on fishing and outdoor recreation, and provide critical food for orcas, other wildlife, and humans.

To support salmon recovery, hatchery programs are monitored, evaluated, and adaptively managed to limit risks to wild populations. Hatchery managers in Washington are working to develop specific goals for hatchery programs that align with conservation and harvest needs. They are using the best available science and adaptive management practices to help achieve these goals.

In 2023, the federal government pledged more than \$500 million for maintenance projects and upgrades required to meet federal mitigation obligations. This includes \$260 million dedicated to state and federal



hatcheries in the Columbia River for retrofits and modernization upgrades to meet Endangered Species Act requirements. It also includes \$240 million provided to the Tribes for Tribal and state hatchery upgrades. These investments will not fully resolve the statewide hatchery maintenance backlog but will allow for many upgrades that benefit salmon recovery, fishing, and environmental quality.

**Top:** Crews handle chum salmon at the Washington Department of Fish and Wildlife hatchery in Hoodsport.

PHOTOS ON THIS PAGE BY WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

Of the salmon caught in the Pacific Northwest, 70-80 percent are estimated to have started their lives in hatcheries.<sup>22</sup>



**Adult salmon being corralled in the hatchery before spawning**



## HABITAT RESTORATION

# Accomplishments 2005-2024

Habitat is one of the most important factors affecting salmon recovery. Washington's local watershed-based approach to salmon recovery and habitat restoration relies on Tribes, local partners, counties, cities, and state and federal agencies all working together. This history and partnerships restored thousands of acres across the state.



Habitat is one of the most important factors affecting salmon recovery.



3,866

FISH PASSAGE BARRIERS  
CORRECTED

39,447

RIPARIAN ACRES  
RESTORED

5,102

MILES OF STREAM MADE  
ACCESSIBLE TO SALMON

13,918

ACRES OF ESTUARIES  
AND NEAR-SHORE AREAS  
RESTORED

3,443

RIPARIAN MILES  
RESTORED

# Endnotes

1. Mojica, J., and Fletcher, A., 2020. Economic Analysis of Outdoor Recreation in Washington State, 2020 Update. Earth Economics. Tacoma, WA.
2. National Marine Fisheries Service. (2022). Fisheries Economics of the United States, 2019. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-229A, 236 p.
3. Nielsen-Pincus, M., and Moseley, C., 2010. Ecosystem Workforce Program Briefing Paper 24: The Economic and Employment Impacts of Forest and Watershed Restoration in Oregon. University of Oregon Institute for Sustainable Environment, Eugene, OR. 11 p.
4. Cederholm, C.J., Johnson, D.H., Bilby, R.E., Dominguez, L.G., Garrett, A.M., Graeber, W.H., Greda, E.L., Kunze, M.D., Marcot, B.G., Palmisano, J.F., Plotnikoff, R.W., Percy, W.G., Simenstad, C.A., and Trotter, P.C. (2000). Pacific Salmon and Wildlife—Ecological Contexts, Relationships, and Implications for Management. Special Edition Technical Report, Prepared for D. H. Johnson and T. A. O'Neil (managing directors), Wildlife-Habitat Relationships in Oregon and Washington. Washington Department of Fish and Wildlife, Olympia, WA.
5. Smithsonian National Museum of the American Indian, Native Knowledge 360°, Pacific Coast Region, <https://americanindian.si.edu/nk360/pnw-history-culture-regions/pacific-coast#:~:text=Native%20Nations%20of%20the%20Pacific,salmon's%20sacrifice%20in%20special%20ceremonies,> accessed on March 14, 2025.
6. Cauty, D. (2011). *Funding for Salmon Recovery in Washington State*. Evergreen Funding Consultants, Olympia, WA.
7. Department of Ecology web page, Wildfire risks caused by climate change: Environmental influences. [https://ecology.wa.gov/air-climate/responding-to-climate-change/wildfire-risks,](https://ecology.wa.gov/air-climate/responding-to-climate-change/wildfire-risks) accessed on March 11, 2025.
8. Washington State Office of Financial Management (2024a) April 1 postcensal estimates of population: 1960-present. [https://ofm.wa.gov/washington-data-research/population-demographics/population-estimates/historical-estimates-april-1-population-and-housing-state-counties-and-cities,](https://ofm.wa.gov/washington-data-research/population-demographics/population-estimates/historical-estimates-april-1-population-and-housing-state-counties-and-cities) accessed November 15, 2024.
9. Washington State Office of Financial Management (2024b) State Population Forecast (November 2024). [https://ofm.wa.gov/washington-data-research/population-demographics/population-forecasts-and-projections/state-population-forecast,](https://ofm.wa.gov/washington-data-research/population-demographics/population-forecasts-and-projections/state-population-forecast) accessed November 15, 2024.
10. Puget Sound Partnership. (2022) 2022-2026 Action Agenda for Puget Sound, Puget Sound Partnership, Olympia, WA. p. 40. <https://pspwa.box.com/shared/static/8zak4wiakdy94vc6104er8l3kn9bdxkw.pdf>.
11. Office of the Washington State Climatologist. (2024) *PNW Temperature, Precipitation, and SWE Trend Analysis Tool*. <https://climate.washington.edu/climate-data/trendanalysisapp/>, accessed on September 25, 2024.
12. Mauger, G.S., Casola, J.H., Morgan, H.A., Strauch, R.L., Jones, B., Curry, B., Busch Isaksen, T.M., Whitely Binder, L., Krosby, M.B., and Snover, A.K. (2015). State of Knowledge: Climate Change in Puget Sound. Report prepared for the Puget Sound Partnership and the National Oceanic and Atmospheric Administration. Climate Impacts Group, University of Washington, Seattle. [http://cses.washington.edu/picea/mauger/ps-sok/PS-Sok\\_2015.pdf](http://cses.washington.edu/picea/mauger/ps-sok/PS-Sok_2015.pdf), accessed December 12, 2022.
13. Snover, A.K., Mauger, G.S., Whitely Binder, L.C., Krosby, M., and Tohver, I. (2013) *Climate Change Impacts and Adaptation in Washington State: Technical Summaries for Decision Makers*. Climate Impacts Group, prepared for the Washington State Department of Ecology by University of Washington Climate Impacts Group.
14. Crozier, L., McClure, M., Beechie, T., Bograd, S., Boughton, D., Carr, M., Cooney, T., Dunham, J., Greene, C., Haltuch, M., Hazen, E., Holzer, D., Huff, D., Johnson, R., Jordan, C., Kaplan, I., Lindley, S., Mantua, N., Moyle, P., and Willis-Norton, E. (2019). Climate vulnerability assessment for Pacific salmon and steelhead in the California Current Large Marine Ecosystem. *PLoS ONE* 14(7).
15. Jacox, M., Alexander, M., Mantua, N., Scott, J., Hervieux, G., Webb, R., and Werner, F. (2018). Forcing of Multiyear Extreme Ocean Temperatures that Impacted California Current Living Marine Resources in 2016. *Bulletin of the American Meteorological Society*. 99(1).
16. Mauger, G.S., Casola, J.H., Morgan, H.A., Strauch, R.L., Jones, B., Curry, B., Busch Isaksen, T.M., Whitely Binder, L., Krosby, M.B., and Snover, A.K. (2015). State of Knowledge: Climate Change in Puget Sound. Report prepared for the Puget Sound Partnership and the National Oceanic and Atmospheric Administration. Climate Impacts Group, University of Washington, Seattle. [http://cses.washington.edu/picea/mauger/ps-sok/PSSok\\_2015.pdf](http://cses.washington.edu/picea/mauger/ps-sok/PSSok_2015.pdf), accessed December 12, 2022.
17. Washington State Department of Ecology and King County. (2011) Control of Toxic Chemicals in Puget Sound: Assessment of Selected Toxic Chemicals in the Puget Sound Basin, 2007-2011. Washington State Department of Ecology, Olympia, WA and King County Department of Natural Resources, Seattle, WA. Ecology Publication No. 11-03-055. [www.ecy.wa.gov/biblio/1103055.html](http://www.ecy.wa.gov/biblio/1103055.html).
18. Washington State Fish Passage web page. <https://geodataservices.wdfw.wa.gov/hp/fishpassage/index.html>, accessed August 23, 2024.
19. Chasco, B. E., Kaplan, I. C., Thomas, A. C., Acevedo-Gutiérrez, A., Noren, D. P., Ford, M. J., Hanson, M. B., Scordino, J. J., Jeffries, S. J., Pearson, S., Marshall, K. N., & Ward, E. J. (2017b). Estimates of Chinook salmon consumption 50 in Washington State inland waters by four marine mammal predators from 1970 to 2015. *Canadian Journal of Fisheries and Aquatic Sciences*, 78(8), 22., <https://doi.org/dx.doi.org/10.1139/cjfas-2016-0203>.
20. Fritsch, M., Northwest Power and Conservation Council Briefing Memo, Washington Department of Fish and Wildlife, December 6, 2022, [https://www.nwcouncil.org/fs/18114/2022\\_1213\\_2.pdf](https://www.nwcouncil.org/fs/18114/2022_1213_2.pdf).
21. Washington Department of Ecology (2022) Dam Safety Web site. <https://ecology.wa.gov/Water-Shorelines/Water-supply/Dams>, accessed December 4, 2022.
22. National Marine Fisheries Service (2024). Fisheries of the United States, 2022. U.S. Department of Commerce, NOAA Current Fishery Statistics No. 2022, <https://www.fisheries.noaa.gov/national/aquaculture/us-aquaculture>.



Salmon need cool, clean water and free migration routes to the ocean. Thousands of people are working across the state to provide just that.

Crews replace two side-by-side pipes in Starbird Creek in the Skagit River watershed that partially blocked fish access to 3.6 miles of habitat.





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