

Salmon and Hydropower: A Power System to Keep Salmon Safe

Northwest families and businesses have been making investments for decades to help fish and wildlife affected by construction of the large federal dams on the Columbia and Snake rivers. In the early 1990s, these efforts ramped up dramatically, fueled by the listing of 13 species of salmon and steelhead under the Endangered Species Act. A major hydro system overhaul, including physical modifications to dams and changes in how they are operated, has taken place in recent years.

Many factors contributed to the decline in native Northwest salmon and steelhead populations.

- Overharvest to supply commercial canneries decimated runs in the early 1900s.
- Development of the federal dams, starting in 1938, put further pressure on the runs.
- Habitat destruction on tributaries and streams hastened the downturn.
- Hatchery fish, raised to mitigate for the development of the dams and to feed harvest, continue to affect survival of wild stocks.

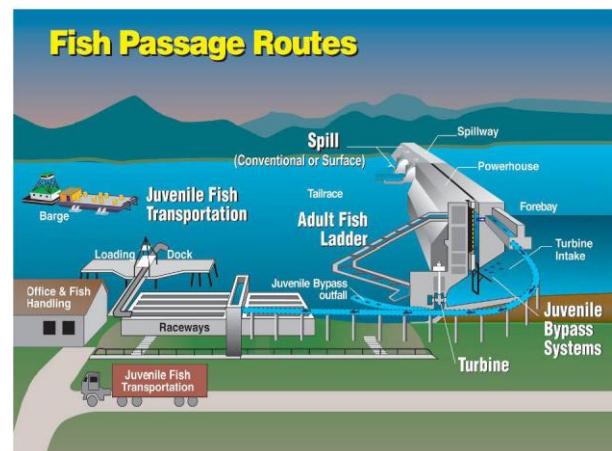
The Northwest has plenty of salmon and steelhead, - with over 200 million hatchery fish produced each year. But the number of wild or native fish has declined, and ESA listings are the driving force behind today's extensive efforts and enormous investment to turn the tide.

Federal agencies and utilities that own and operate dams have stepped up to find and carry out solutions for the listed stocks. And the region's citizens, through their electricity bills, have shouldered enormous investments on behalf of the fish. Nearly \$12 billion has been invested in measures to protect fish since 1978. In 2008, over \$940 million was spent and future program costs are expected to range from \$750 to over \$900 million a year. Between 20 and 30 percent of the typical electricity bill for a Northwest family or business goes to pay for fish and wildlife programs.

Protecting Salmon

Fish ladders to move returning adult fish upstream exist at all federal dams on the Snake River below Hells Canyon and on the Columbia below Grand Coulee. The billions of dollars invested in the past 20 years have focused on improving survival of young fish migrating downriver. More recently, investments have improved habitat and spawning grounds, as well as the Lower Columbia estuary, and carry out programs that deter predators.

Changes in the hydro system include physical modifications at all eight of the dams. Results are encouraging, with young fish survival at 95 percent or higher.



- **High efficiency turbine upgrades** result in survival rates of more than 95 percent for young fish moving downstream.
- **Mechanical bypass systems** installed in front of turbine intakes divert between 70 and 95 percent of juvenile fish into protected routes past a dam.
- **Fish Slides** or removable spillway weirs (RSWs) pass fish through and over the dams with survival rates in the high 90s to 100 percent. All four lower Snake River dams, and McNary and John Day dams have been outfitted with spillway weirs.
- **A spill wall** at The Dalles Dam makes for safer travels for young fish passing that project.
- **A corner collector** at Bonneville Dam, another type of surface bypass, achieves 100 percent survival for fish passing through that system.

The federal Columbia River hydro system was once operated primarily for power production and flood control, but no longer. Today, power operations take a backseat to ESA-listed fish.

- **Hydropower operations** are modified during the migration season and other times to ease fish past the dams. Operators increase and decrease flows, depending on what biologists call for, to aid passage and provide protection for spawning and rearing habitat.
- **Pushing large volumes of water through and over the dams “(known as spill)”** in the spring and summer is another tool to aid passage survival. In late summer, when water is scarce and few fish are in the river, spill provides few benefits and is extremely costly.
- **Transportation** has been part of the federal fish passage program for decades. Barging fish to below Bonneville Dam keeps them alive; young fish survive at a rate of 98 percent.
- **Predator control** saves millions of migrating young fish each year. Programs remove salmon-eating predators, such as Northern pikeminnow, Caspian terns, and sea lions.

RiverPartners supports operations based on sound science to protect salmon. We take issue with operations, like summer spill, that rob the Northwest of renewable hydropower generation and do little or nothing for fish.

Dam operators estimate they lose at least 1,000 average megawatts of energy annually to accommodate migrating fish. The loss of this clean renewable power amounts to hundreds of millions of dollars in lost power revenues and less hydropower to back up intermittent wind resources.

Salmon Numbers Trending Up

Uncertainty and annual variability are hallmarks of the adult salmon and steelhead returns to the Columbia River. Ocean conditions are the biggest factor in returns. But indications are that in-river changes are having an effect. The 10-year average returns at Bonneville Dam show an upward trend.

More information on this success is available in the [Columbia River Progress Report](#) released by the U.S. Army Corps of Engineers, Bonneville Power Administration and the Bureau of Reclamation.

Northwest RiverPartners is a partnership of farmers, electric utilities, ports, and large and small businesses in the Pacific Northwest. We are dedicated to ensuring the Columbia and Snake remain living, working rivers to benefit families and businesses in the region.