

# Hydropower and the Environment

*There is an environmental impact whenever electricity is generated.*

*The hydropower industry continues to innovate and collaborate to deploy environment-friendly technologies and strategies to address impacts.*

*Since 1978, federal investments to support fish and wildlife needs are more than \$7.5 billion. In addition, billions of dollars are being invested by public utilities and private operators.*

## INNOVATION AND COLLABORATION TO MEET ENVIRONMENTAL RESPONSIBILITIES

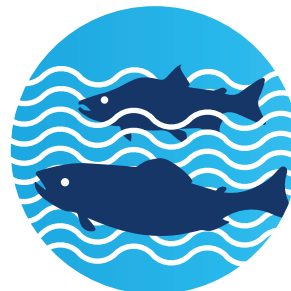
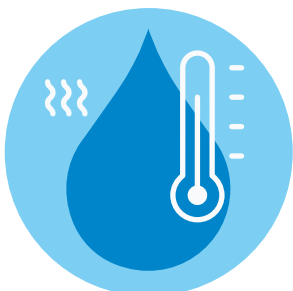
These examples highlight some of the environmental protection, mitigation and enhancement activities found at many hydropower projects across the Northwest. Many are collaboratively developed and/or managed with tribes, private landowners, and local, state and federal agencies.

**Snohomish County PUD** helps the growth and productivity of fish in the Sultan River by using their **Culmback Dam** to blend warm water near the reservoir surface with cold water near the reservoir bottom. This provides optimal water temperatures during a typical summer, or under drought and climate change scenarios when water becomes too warm for the fish.

**Seattle City Light** manages river flows through their three **Skagit Project dams** to support downstream salmon. Flows through the dams are adjusted on a seasonal, monthly, and daily basis to supply the right amount of water for spawning, incubation, and protection of juvenile salmon.

**Tacoma Power** releases chinook, coho, steelhead and sea-run cutthroat at two hatcheries that are part of their **Cowlitz River Project**, and they stock kokanee in Alder Lake as part of their **Nisqually River Project**.

At **Grant County PUD's Wanapum and Priest Rapids projects**, fish bypass facilities allow downstream migrating juvenile salmon to pass by each dam without going through a spillway or turbine, thus ensuring more than 95 percent of smolts successfully pass each dam.



When avoiding impacts is not possible, protection, mitigation, and enhancement are three broad strategies used by hydropower generators to meet their environmental responsibilities.

- **Protection** preserves areas that are ecologically important, healthy and intact, e.g.—protecting natural spawning grounds and wetlands to help with overall watershed health.
- **Mitigation** offsets losses where environmental impacts are unavoidable, e.g.— building a fish hatchery.
- **Enhancements** improve preexisting project conditions, e.g.—planting riparian areas lacking vegetation to stabilize streambanks.

When demand for power generation affects river flows, hydropower operators use these strategies and technology to balance water quality, fish, and other environmental needs. For instance, as water passes through a dam and powerhouse, technologies are employed to address water quality effects to temperature and dissolved gases like nitrogen and oxygen.

Successfully using these strategies to meet environmental responsibility is made much more complicated by other human practices like farming, fishing, logging, cattle grazing, mining, and land development occurring adjacent to or upstream of a project. This is one reason natural resource managers often take a watershed planning approach to characterize conditions, prioritize needs, create management objectives, and implement protection and restoration strategies. 🌍

The **Pend Oreille PUD** collaborates with the **Pend Oreille Conservation District** to provide landowners with technical and financial assistance for bank stabilization projects. This effort collaboratively addresses erosion control along the **Box Canyon Reservoir**.



**Chelan County PUD** works collaboratively to support and fund projects that protect and enhance salmon and steelhead habitat in the **mid-Columbia** and its tributaries. Projects include bank and shoreline restoration, removing fish migration barriers, native riparian plantings, constructing in-stream habitat structures and acquiring conservation easements.



**Douglas County PUD's Wells Hydroelectric Project** Wildlife and Botanical Management Plan protects and enhances the habitat of rare, threatened and endangered wildlife and botanical species on Project lands. The PUD funds an additional 8,000+ acres known as **Wells Wildlife Area** that is managed by the **Washington Department of Fish and Wildlife** to protect and enhance mule deer winter range, upland bird habitat and waterfowl winter food resources. Bald eagle perching opportunities are also protected and increased around the Reservoir.



In 2020, the **U.S. Army Corps of Engineers** installed advance turbines at **Ice Harbor Lock and Dam** on the Snake River. Early testing showed a juvenile Chinook salmon survival rate of a little more than 98 percent. Combined with passage through fish bypass facilities, spillways and other methods, 93 to 96 percent of all young salmon and steelhead now survive passage at each dam in the Federal Columbia River Power System.

