



Fish and Wildlife

Operations for Resident Fish Species

Operations for ESA-listed resident fish species

- ▶ Kootenai River White Sturgeon
 - Flow pulse and outflow temperature management during spring at Libby Dam to support spawning and egg incubation
- ▶ Bull Trout
 - Minimum flow requirements and flow fluctuation restrictions at Libby and Hungry Horse dams
 - Pre-drafting storage projects when high flows anticipated to avoid high total dissolved gas



Operations for non-listed resident fish species

- ▶ Kokanee
 - Minimum reservoir elevation for Grand Coulee Dam in Fall to improve access to tributaries for spawning and support zooplankton production (an important food source for kokanee)
 - Stable lake elevation during fall at Albeni Falls to support spawning
 - Minimize spill during spring at Dworshak to keep kokanee in the reservoir
- ▶ Burbot
 - Flow temperature management during winter at Libby Dam to aid upstream migration to spawning areas in the Kootenai River



Predation on Anadromous Fish in the Columbia River Basin

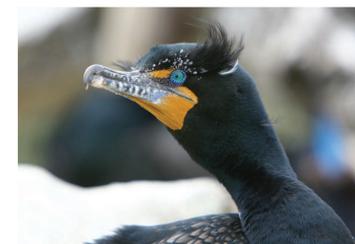
Fish Predators

- ▶ Northern pikeminnow predation on juvenile salmon has been reduced by about 40 percent (4.5 million) since 1990



Avian Predators

- ▶ Actions are underway in the estuary to reduce Caspian tern and double-crested cormorant predation on juvenile salmon
- ▶ Actions are underway inland to reduce Caspian tern predation on juvenile salmon
- ▶ Hazing occurs at dams to discourage gull and other avian predation on juvenile salmon as they pass the dams

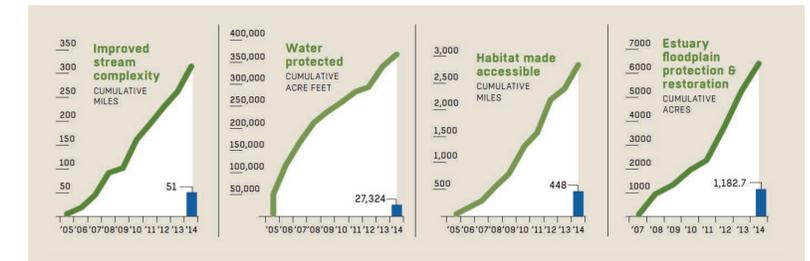


Pinnipeds (Sea lions)

- ▶ Pinniped predation on returning adult salmon has increased sharply in recent years below Bonneville Dam to the mouth of the Columbia River
- ▶ The U.S. Army Corps of Engineers enumerates pinnipeds immediately below Bonneville Dam and installs barriers each year to prevent the sea lions from entering fish ladders at the dam
- ▶ The Tribes actively haze pinnipeds below Bonneville Dam to discourage predation on adult salmon
- ▶ NOAA and the states of Oregon and Washington are actively managing and removing sea lions from the tailrace of Bonneville Dam



Fish and Wildlife Habitat Improvements



Actions in the tributaries from 2007 to 2015:

- ▶ Protected over 373,000 acre feet of water which is roughly 186,500 Olympic swimming pools of water
- ▶ Opened access to over 3,300 miles of fish habitat, which is about equal to 1.2 times the distance from Los Angeles to New York City
- ▶ Restored 400 miles of stream habitat complexity, which is the equivalent of restoring a stream channel that followed I-84 from Portland to Boise

Actions in the estuary from 2007 to 2015:

- ▶ Protected or restored over 7,700 acres of floodplain = 12.1 square miles
- ▶ Restored or enhanced over 42 miles of estuarine tidal channels

Fish and wildlife

- ▶ About a million acres of land have been put under conservation easement for fish and wildlife

