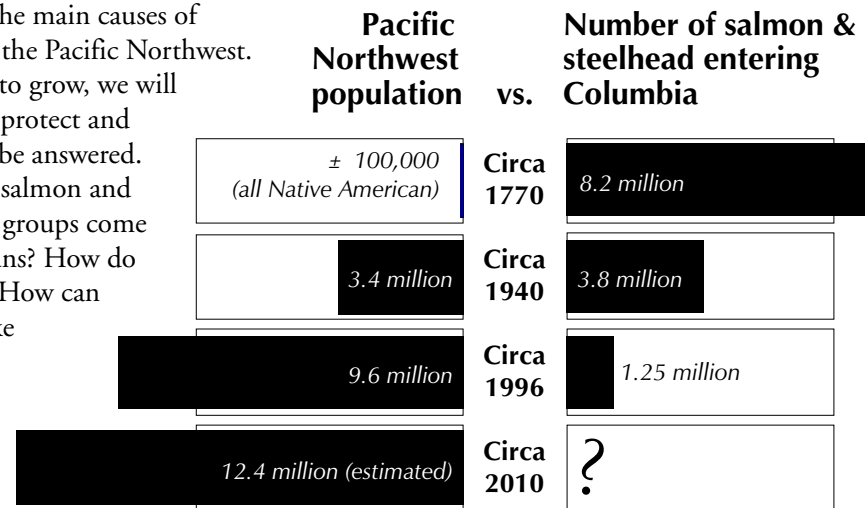


The graph to the right demonstrates one of the main causes of salmon decline: the increasing population of the Pacific Northwest. Since the population will probably continue to grow, we will need to make significant changes in order to protect and restore salmon. Many questions still need to be answered. How do our values affect our relationship to salmon and the environment? How can different interest groups come together to discuss ways to protect salmon runs? How do climate and ocean conditions affect salmon? How can dams best be managed? How do land uses like agriculture, forestry, and cities affect habitat? How do hatcheries affect wild salmon? What are the effects of human fishers and animal predators? How much do we need to know before we can act?



For Further Information

GOVERNMENTS AND AGENCIES:

National Oceanic and Atmospheric Administration. (202) 482-6090. www.noaa.gov/
 National Marine Fisheries Service. Fax (206) 526-6426. www.nmfs.gov/
 Pacific States Marine Fisheries Commission. (503) 650-5400. www.psmfc.org/
 Northwest Power Planning Council. (800) 222-3355. www.nwppc.org/
 Northwest Indian Fisheries Commission (Washington tribes). (360) 438-1180. www.nwifc.wa.gov/
 Columbia River Inter-Tribal Fish Commission. (503) 238-0667. www.critfc.org/
 Oregon Department of Fish and Wildlife. (503) 872-5268. www.dfw.state.or.us/
 Oregon Coastal Salmon Restoration Initiative. www.dfw.state.or.us/ODFWhtml/SalmonInit/SalmonInit.html
 Washington Department of Fish and Wildlife. (360) 902-2200. www.wa.gov/wdfw/
 Idaho Department of Fish and Game. (208) 334-3700. www2.state.id.us/fishgame/fishgame.html
 Montana Fish, Wildlife and Parks. (406) 444-2535. www.fwp.mt.gov/
 Environment Canada. www.ec.gc.ca/envhome.html
 Bonneville Power Administration. (503) 230-3000. www.bpa.gov/
 For the Sake of the Salmon. (a regional initiative). (503) 650-5447. www.4sos.org/
 US Army Corps of Engineers, Portland District. (503) 808-4510. www.nwp.usace.army.mil/

ACTIVIST/USER GROUPS:

Columbia River Alliance (agriculture, direct-service industries). (203) 238-1540. www.cra1.org
 Pacific Coast Federation of Fishermen's Associations (commercial fishing). www.pond.net/~pcffa/
 Salmon for All (gillnetting). (503) 325-3831
 Save Our Wild Salmon. (800) SOS-SALMON. www.desktop.org/sos
 Pacific Rivers Council. (541) 345-0119. www.pacrivers.org/
 Direct Service Industries, Inc. www.teleport.com/~dsiinc/

GENERAL INFORMATION:

Army Corps of Engineers Pacific Salmon Coordination Office (passage reports, etc.). www.nwd.usace.army.mil/ps/
 El Niño Theme Page. www.pmel.noaa.gov/toga-tao/el-nino/home.html
 FishNET. www.newsdata.com/enernet/fishnet/fishnet.html
 Oregon Sea Grant. seagrant.orst.edu/
 University of Washington Columbia Basin Research. www.cqs.washington.edu/index.html
 Watershed Education Resources on the Internet. www.igc.apc.org/green/resources.html
 Columbia River Data Access in Real Time (DART) (adult fish passage, etc.) www.cqs.washington.edu/dart/dart.html
 Riverdale School Salmon Page. www.riverdale.k12.or.us/salmon.html
 Northwest Power Planning Council's Directory of Organizations. www.nwppc.org/doo.htm

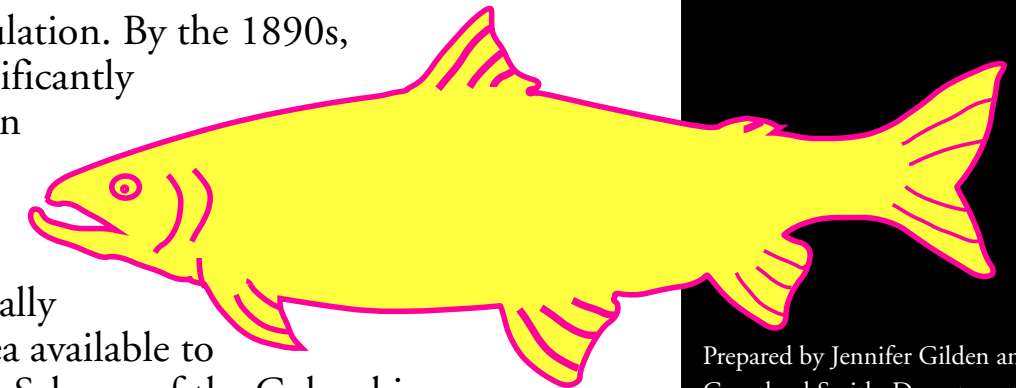
A Changing Columbia Basin

Since the 1700s, when the human impact on salmon was limited to native fisheries, salmon have been increasingly affected by the Northwest's growing population and economy.

The first major European impact on the natives of the Columbia River occurred in the 1770s. By the mid-1800s, European diseases had reduced their population by 90% and the Columbia's resources were being exploited for the benefit of the European population. By the 1890s, dams were significantly affecting salmon runs. Hydro-electric and flood-control projects eventually reduced the area available to salmon by half. Salmon of the Columbia are also affected by grazing, irrigation, logging, mining, overfishing, pollution, urbanization, ocean conditions, and predators.

As the Northwest's population and economy grow, the future of wild salmon is uncertain. Plans for improving the status of salmon have become increasingly common, but many projects simply undo the damage caused by previous generations of well-intentioned developers. A historical perspective is essential for understanding the current and future status of salmon and steelhead in the Columbia Basin.

How has the Columbia changed from 1770 to the present? These maps and graphs illustrate how humans have altered the river and how these alterations have affected salmon survival.



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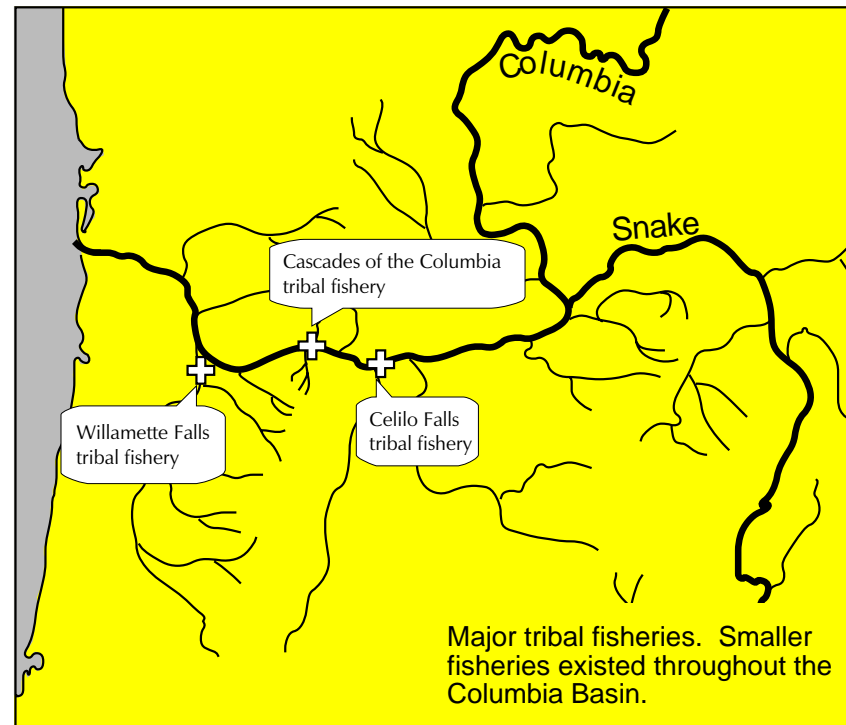
Three centuries of change in the Columbia Basin

1770

“... We were but few, while the white men were many... we could not hold our own with them. We were like deer. They were like grizzly bears... We were contented to let things remain as the Great Spirit Chief made them. They were not; and would change the rivers and mountains if they did not suit them.” —Chief Joseph of the Nez Percé, c. 1879

Salmon mortality circa 1770

Natural mortality of salmon is due to several factors: **natural death** after spawning; **predators**, including mammals, birds, and other fish; and naturally occurring **population fluctuations** caused by ocean and river conditions. Tribal fisheries are the only human effects at this time.

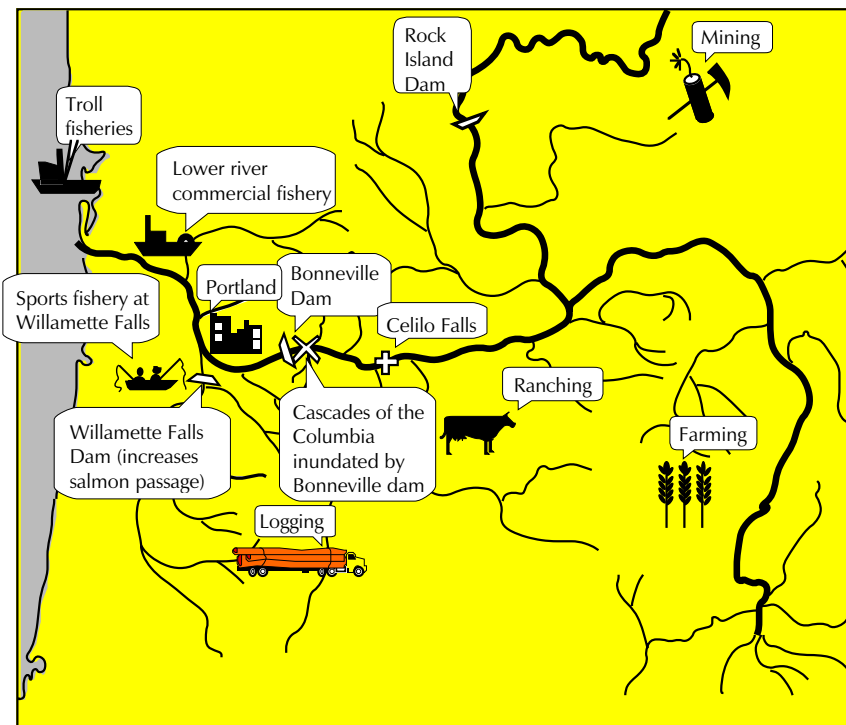


1940

“To build an industrial empire from the wasted power of the Columbia... They moved mountains and froze a landslide... Bonneville and Grand Coulee are only the beginning. Ten million horsepower of new energy swiftly can be harnessed on America’s mightiest stream. Tame the hazardous rapids. Open the Columbia waterway to navigation 500 miles inland. Provide endless water power... Reclaim another million acres of dry but fertile land.” —BPA film *The Columbia*, 1949

Salmon mortality circa 1940

The ratio of natural mortality declines because of **commercial fishing**. **Trapping of beaver**, begun in the 19th century, reduces rearing habitat in beaver ponds. **Overgrazing** damages streamside vegetation. River corridors and estuaries are affected by **urbanization**. The use of **splash dams** for logging destroys stream beds. **Hydroelectric facilities** and **irrigation dams** on tributaries block access to spawning areas. **Water drawn** for irrigation, industry, cities, and towns reduces river flow, and **water quality is degraded** by a wide variety of activities.



1998

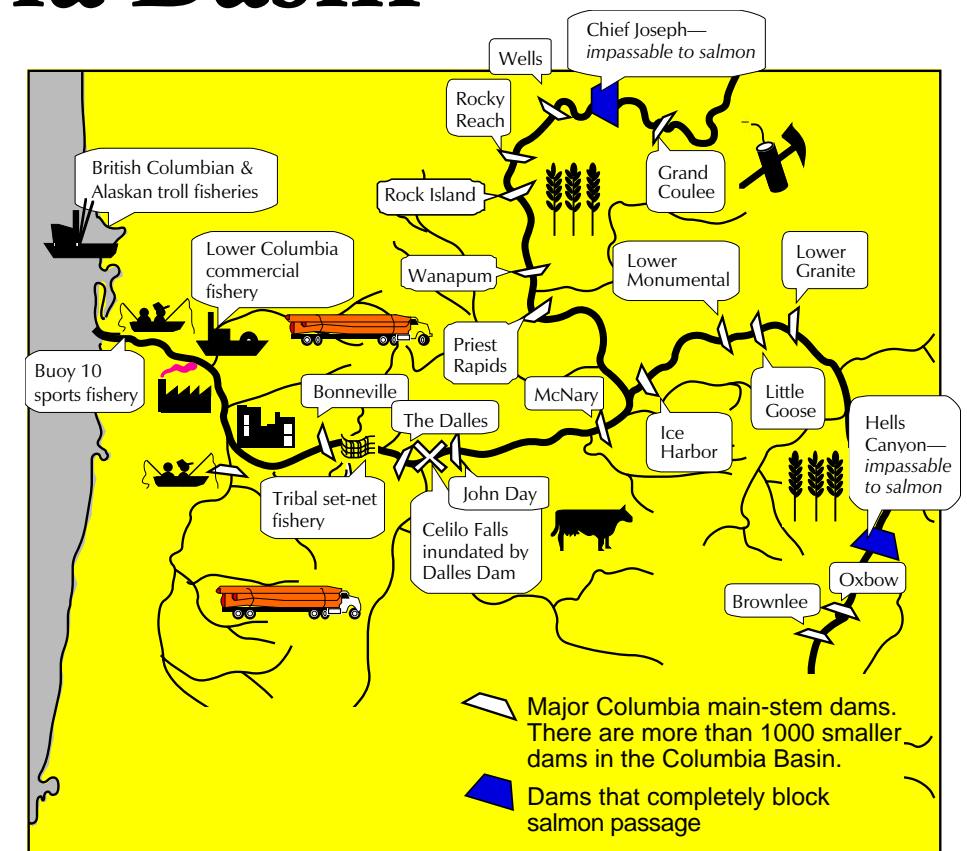
“The salmon is the ultimate symbol of the Pacific Northwest. These stalwarts have fought all the obstacles we’ve put before them in order to return to the spawning grounds of their birth. We ought to be ashamed of ourselves if we can’t save them.” —Cecil Andrus. “If the lands and waters of the Northwest, their ancestral home, are no longer fit to sustain the salmon, how bright and interesting can our own future be?” —Dale Pearson

Salmon mortality circa 1998

Mortality in the ocean increases with El Niño conditions and **ocean trolling** in Alaska and British Columbia. The **Chief Joseph and Hells Canyon dams** block passage to large areas of habitat. **Other large dams** cause 5% or more mortality (per dam) for smolts descending to the sea and adult salmon returning to spawn. Dams also **change water temperatures**, **reduce flow of rivers**, **increase local nitrogen levels**, and allow more **predation** by squawfish and other predators. The **destruction and filling of wetlands** and estuaries reduces habitat. **Logging** increases silt, reduces shade, and disturbs spawning beds. The **spread of cities, roads, and other development** reduces habitat and increases pollution. Irrigation for **agriculture** reduces flow of rivers. **Unscreened water diversions** trap fish in ditches (in 1990, less than 5% of the diversions in Oregon were screened). **Hatchery fish** may increase disease rates and reduce diversity of wild stocks. **Grazing livestock** harm inland spawning habitat by destroying vegetation and polluting streams. Out of approximately 1000 native anadromous stocks in Oregon, Washington, and California, 106 are extinct and 314 are at risk of extinction. Currently, hatcheries produce two-thirds of the salmon in the Columbia.

Attempts to improve salmon survival

Efforts to increase salmon survival include **improved passage facilities at dams**; **streamside buffers** in logged areas; **barging** or trucking of salmon smolts past dams; **habitat enhancement**; a **squawfish bounty** to reduce predation; **regulation of commercial and recreational catches**; **drawdowns** of river levels to increase flow speed during smolt outmigration and to promote more natural riverbeds; and **improved hatchery practices**.



Who manages the Columbia Basin?

Management of the Columbia Basin and its associated fisheries is extremely complex and lacks a unified plan. Salmon migrate across local, national, and international boundaries, and are affected by fishery and land use laws in each jurisdiction. Currently, the National Marine Fisheries Service (NMFS) has authority over salmon runs listed under the Endangered Species Act. The Northwest Power Planning Council consults with NMFS, but must abide by NMFS’s biological opinion. Tribal and state governments, the Bureau of Land Management, the Army Corps of Engineers, the Bonneville Power Administration, the Environmental Protection Agency, and many other agencies, governmental units, and coalitions are involved in Columbia Basin management. Many have developed their own management plans. Although approximately \$3 billion has been poured into restoration efforts, results have been disappointing. Efforts to streamline the management system and studies of how best to manage the river are currently underway.