Northwest RiverPartners is an alliance of farmers, utilities, ports and businesses that promotes:

• the economic and environmental benefits of the Columbia and Snake rivers; and
• fish and wildlife policies and programs based on sound science.

RiverPartners’ 120 member organizations represent more than 4 million electric utility customers, 40,000 farmers, thousands of port employees, and large and small businesses that provide hundreds of thousands of Northwest jobs.

RiverPartners promotes all of the benefits of these working rivers, including fish and wildlife, clean and renewable hydropower, water for agriculture, flood control, river commerce and recreation.

For a list of the RiverPartners’ board of directors and members, and facts and news on the Northwest’s hydropower system, salmon and related issues, go to www.nwriverpartners.org and www.cleanhydro.com.
The Northwest today is an oasis of clean, renewable energy, the result of its hydro heritage.

- Northwest dams provide nearly 60 percent of the region’s electricity under normal rain and snow conditions. Almost two-thirds of that output comes from federal hydroelectric projects on the Columbia and Snake Rivers.

- Overall, Northwest dams produce about 14,000 average megawatts of electricity every year under normal precipitation, equivalent to powering more than 11 cities the size of Seattle on average every year.

- About 95 percent of the region’s hydroelectric power supply comes from Columbia River Basin dams.

*Actual production depends on water conditions and many other factors.*

**Northwest Utility Firm Resources**

Source: 2013 PNUCC Northwest Regional Forecast (average water conditions)
Columbia River Basin

Map Source: http://www.lrf.org/AboutLR/ColBasinMap.html
• The Columbia River is the largest river in the Pacific Northwest flowing from the Rocky Mountains in Canada into Washington before emptying into the Pacific Ocean. Its drainage basin is roughly the size of France extending into seven U.S. states and a Canadian province.

• The dams on the Columbia River and its tributaries produce more electricity than any other North American river.

• The Snake River is the largest tributary of the Columbia River. Its drainage encompasses parts of six U.S. states.

• There are more than 100 private dams in the Northwest. The federal government owns and operates 31; the remaining dams are owned by private and public utilities.

• The federal dams on the Columbia and Snake rivers are operated by the U.S. Army Corps of Engineers and the Bureau of Reclamation, and the Bonneville Power Administration markets the power they produce to Northwest utilities and throughout the West.

• The eight federal dams on the lower mainstem Columbia and Snake rivers alone provide the region with about 4,300 megawatts of firm (consistently available) energy under normal precipitation, enough to power almost four cities the size of Seattle.
Hydropower’s Many Attributes

**Renewable and Clean**

- Hydroelectricity is the original northwest renewable resource. Dams store water from melting snow and rainfall in reservoirs, which is then released and passes through turbines to generate electricity. The water (fuel) is reused over and over as it moves downriver through multiple dams.

- Hydropower produces no carbon emissions. As a result, the Northwest’s carbon footprint is half that of other parts of the country.

- Hydropower is more efficient than any other form of electricity generation. It is capable of converting 90 percent of the available energy into electricity. Coal or natural gas plants are about 50 percent efficient. Wind turbines are 33 percent efficient at best.

- The “marine highway” created by the Columbia and Snake river dams is the most environmentally friendly way to move cargo. Barging keeps 700,000 trucks off Northwest highways every year. The fuel efficiency for barges is an impressive 576 ton-miles per gallon compared with rail at 413 ton-miles and trucking at 155 ton-miles per gallon.
Flexible, Reliable and Affordable

- Hydro is a flexible resource available nearly instantaneously to meet the ups and downs in electricity demand. Hydro is there at the flick of a switch.

- Hydropower is a reliable energy source because the rivers are forever flowing. Even in low water conditions, hydropower can still be relied on to meet the energy needs of Northwest citizens.

- In the Northwest, hydro is also a tool used to back-up intermittent generators, like wind or solar. Hydro generation can be quickly adjusted to follow changes in wind production.

- Hydropower helps to stabilize the transmission system and keep it reliable. High-voltage transmission lines require a steady back and forth electric flow, and flexible hydro generation meets changing conditions to ensure reliability.

- The Northwest has some of the lowest power rates in the country because of its hydropower. The “fuel” is free, coming from mountain snowpack and rain.

- Electricity from Northwest hydropower facilities typically cost three to 10 times less (per megawatt hour) than nuclear, coal, and natural gas plants. It’s also far cheaper than wind and solar.
The rivers and dams keep clean, reliable and affordable electricity flowing into our homes and businesses, provide irrigation, control catastrophic flood waters, and help move locally grown food and other products destined for the Northwest and the world.

Agriculture

- The Northwest has a rich agricultural landscape with a variety of farmed crops including wheat, barley, potatoes, corn, peas, lentils, alfalfa, apples, grapes and more.

- Six percent of the Columbia River Basin’s yearly runoff is used to irrigate about 7.8 million acres of Northwest farmland. Idaho has the region’s most irrigated acreage with over 3 million acres. Washington and Oregon have a combined 3.3 million acres of irrigated farmland.

- Greater irrigation efficiency in the Columbia River Basin has decreased water use by 10 to 25 percent per acre over the last decade.

- The Northwest’s economy is greatly enhanced by irrigated agricultural land that would otherwise be too dry to farm successfully. Northwest crops are nurtured with water stored behind dams. The region is the third largest grain exporter in the United States.

- Annual net earned income from Northwest agriculture production exceeds $8 billion.
Commerce and Jobs

• High technology firms such as Intel, Google and Facebook are locating facilities in the Northwest because of the availability of reliable, clean hydropower, creating jobs and boosting local economies.

• Traditional energy-intensive industries, such as timber, paper, chemical, food processing, aluminum and manufacturing, all representing hundreds of thousands of Northwest jobs, continue to rely on low-cost hydro to stay in business and grow.

• The Columbia and Snake rivers provide a 465-mile navigable river highway, with 36 deep water and inland ports, for transporting Northwest goods and products, fueling the Northwest’s economy. Locks provide a route for goods past the eight mainstem dams.

• More than 42 million tons of commercial cargo, valued at over $20 billion, is moved down the Columbia and Snake rivers annually.

• The Northwest is ranked as the nation’s #1 U.S. export gateway for wheat and barley, #1 on the West Coast for wood exports and #2 on the West Coast for automobile imports.

• Tourism from river cruise ships brings $15 to $20 million annually to local economies.

• A study by the Columbia River ports identified 40,000 port-related Northwest jobs. Firms that ship cargo via the Columbia River employ an additional 59,000 workers.
Flood Control

• Prior to the federal dams on the Columbia and Willamette rivers, Portland and other cities and towns were subject to severe flooding. Controlling flood waters in the Columbia River became a high priority in 1948 when Vanport, Oregon was destroyed in a late spring deluge.

• The Army Corps of Engineers responded to the devastation by developing a reservoir storage plan for the Columbia River Basin.

• A 1964 treaty with Canada led to the development of millions of acre-feet of water storage for flood control and power generation. Reservoir storage in the Northwest and British Columbia is used to prevent floods in the Columbia River Basin.

• In February, 1996, when floods threatened Portland, Oregon, dam operations kept the river level a foot to a foot and a half lower than it would have been otherwise. Estimates show that flood control operations saved the region $3.2 billion from what would have been devastating flood damage.
The four federal dams on the lower Snake River provide clean renewable energy to meet Northwest power needs, stabilize the region’s transmission system and keep carbon emissions down. Yet, some have called for their removal. Consider the facts:

- Together, the Snake River dams supply 12 percent of all the energy produced on average by the entire federal hydro system and 5 percent of the Northwest’s total hydro energy.

- According to the Northwest Power and Conservation Council, without the Snake River dams 3.0 million tons of CO2 would be added into the air every year.

- Without the Snake River dams, there would be little opportunity for large-scale irrigation in most of eastern Oregon and Washington.

- Enough energy to serve a city about the size of Seattle is generated by the Snake River dams.

- The Snake River dams help in dealing with power emergencies providing 2,650 megawatts of energy for 10 hours a day up to five days. They also help keep the Northwest’s transmission system stable.

- It would take two nuclear, three coal-fired, or six gas-fired power plants to replace the average annual power produced by the four lower Snake River dams.
Strong Laws to Protect Fish and Wildlife

Dam operators are required by several laws to lessen the impact of hydro practices on fish, wildlife, water quality and the surrounding environment. As examples:

- The 1980 Northwest Power Act calls for moderating the impacts of construction and operation of the federal dams on fish and wildlife.

- The Mitchell Act of 1938 requires fish hatcheries be built and maintained throughout the Northwest to compensate for the impacts dams have had on commercial, sport and tribal salmon harvests.

- The 1972 Clean Water Act provided the Environmental Protection Agency with authority to address river pollutants, temperatures, and dissolved gas levels (created by high river flows and spilling water over the dams) that can be harmful to fish and wildlife.

- The 1973 Endangered Species Act requires dam operators to address impacts of operations on species listed for protection. There are 13 species of Columbia Basin salmon and steelhead listed under the ESA.
The Salmon Plan

The 2008/2010 federal salmon plan (called the Federal Columbia River Power System Biological Opinion) was developed and is being implemented in collaboration with federal and state agencies and Northwest tribes to protect listed salmon, even while it continues to be challenged in U.S. District Court, District of Oregon.

The comprehensive plan is comprised of many actions. Highlights include:

• New fish protection technologies are installed at all eight dams, including fish bypass systems, screens and slides to help young fish migrate downstream to the ocean.

• Hydro system operations have been modified to increase flows and the spill of water through the dams to move young fish downstream faster, as well as barging young fish around the dams.

• $100 million a year goes to Northwest states and tribes for habitat improvements in river tributaries and the Columbia River estuary to repair and enhance spawning and rearing grounds for salmon.

• The plan calls for improvements to hatcheries to address adverse impacts they can have on salmon. Currently over $45 million is spent annually for hatcheries to support commercial, sport and tribal harvest.

Northwest families and businesses pay for fish and wildlife mitigation activities through their electricity bills. About 10 to 20 percent of a typical bill goes to fish and wildlife programs; the actual percentage varies from utility to utility.
Great Outlook for Salmon

Many factors have contributed to declines in Northwest salmon populations. Overfishing, lack of passage at dams, loss of habitat from logging and urban growth, poor ocean conditions and harmful hatchery practices have been major culprits in overall salmon declines. It will take a comprehensive approach to restore the runs. But there is also good news.

- Today there are more fish in the Columbia River than at any time since the first lower Columbia mainstem dam was built at Bonneville in 1938. Many are hatchery fish, but wild populations are trending upward too.

- In 2012, young salmon survived the downstream trip through each of the eight federal dams at a high survival rate of 97% on average.

- This decade has seen record and near-record salmon runs as improvements at the dams, hydro operations, and good ocean conditions worked together to benefit salmon.

Adult and jack salmon/steelhead returns to Bonneville Dam

[Graph showing returns in millions from 1935 to 2010, with a 10-year rolling average line.]

- Combined Salmon Returns
- 10-Year Rolling Average
• From 1938 until 1986, total adult salmon counts at Bonneville Dam never exceeded 1 million. Since 2001, runs have remained above 1 million, with the exception of 2007.

• In 2001, nearly 2.2 million adult fish passed Bonneville Dam, setting new record levels since counts began in 1938.

• Most recently, total 2012 returns to Bonneville Dam reached nearly 1.4 million. Of that, over 500,000 adult sockeye returned to the upper Columbia basin, the largest run since Bonneville dam was built in 1938.

• Snake River sockeye, on the brink of extinction in the 1990s, have been rebuilding with over 1,500 returning in 2011, a banner year, and nearly 500 in 2012.

For fish run data, go to www.cbr.washington.edu/dart.

Salmon life cycle and habitat
Northwest RiverPartners
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For additional resources, go to