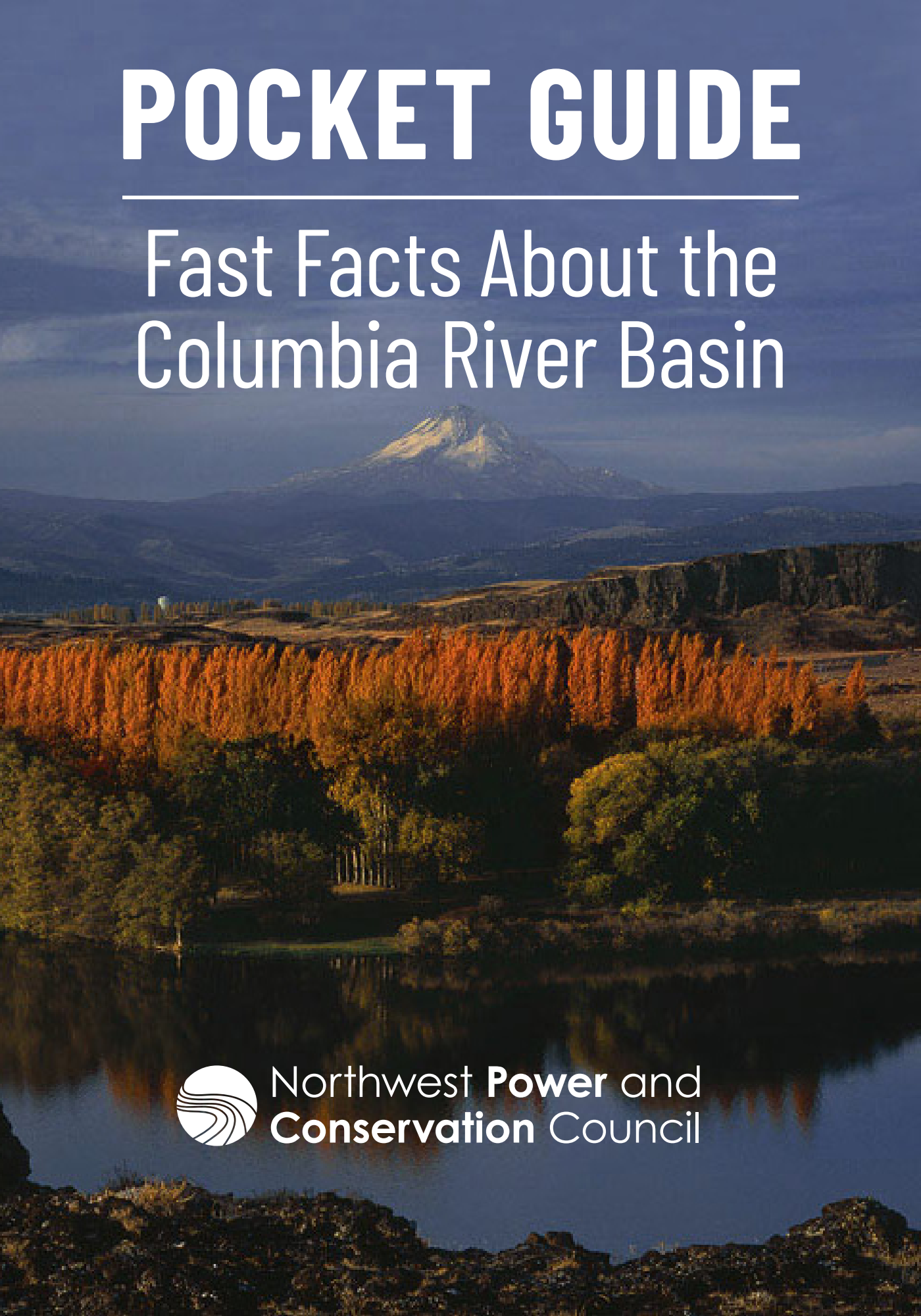
POCKET GUIDE

Fast Facts About the Columbia River Basin



Northwest **Power** and **Conservation** Council

The Northwest Power and Conservation Council was authorized by Congress through the 1980 Pacific Northwest Electric Power Planning and Conservation Act (Northwest Power Act) to give the citizens of **Idaho, Montana, Oregon,** and **Washington** a stronger voice in determining the future of key resources common to all four states – namely, the electricity generated at, and fish and wildlife affected by, the Columbia River Basin hydropower dams.

The Council is a unique organization that helps the Pacific Northwest make critical decisions that balance the multiple uses of the Columbia River and its tributaries.

Public Responsibilities

The principal duties of the Council under the Act are to:

1. Develop a regional power plan that guides the Bonneville Power Administration's resource acquisition to ensure an adequate, efficient, economical, and reliable power supply.
2. Develop a fish and wildlife program as part of the power plan to protect, mitigate, and enhance fish and wildlife affected by hydroelectric development in the Columbia River Basin, and make annual funding recommendations to the Bonneville Power Administration for projects to implement the program.
3. Encourage broad public participation in these processes and inform the public about regional issues.

Council Organization

The Council was authorized by Congress through enactment of the 1980 Northwest Power Act (Public Law 96-501) and approved by a vote of the legislatures in all four states. The governor of each state appoints two members to serve on the Council.

The Council is funded by wholesale power-sales revenues from the Bonneville Power Administration, the federal agency that markets the electricity generated at federal dams in the Columbia River Basin.

The plans the Council develops and approves are implemented by numerous agencies, including: Bonneville; the U.S. Army Corps of Engineers; the Bureau of Reclamation; the Federal Energy Regulatory Commission; electric utilities; and state fish and wildlife and energy regulatory agencies.

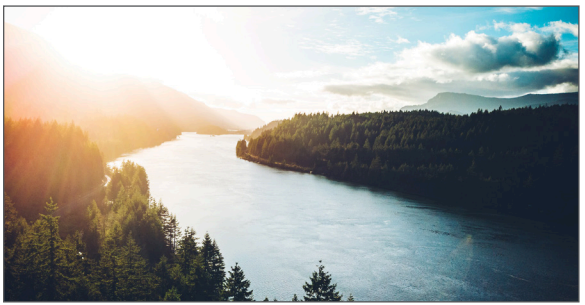
State, tribal, and local governments work closely with the Council as it develops its power plan and fish and wildlife program. The plan and program are updated at least every five years.

Council Priorities

- In addition to developing the power plan, the Council works with regional interests to meet energy efficiency and generating resource goals, and analyzes: 1) regional electricity demand, capacity, flexibility, and reliability; 2) the regional electricity market; and 3) interactions between fish and wildlife and the Columbia River hydropower system.
- In addition to developing the fish and wildlife program (implementation is approximately $250 million annually supporting over 300 projects), the Council utilizes panels of independent scientists to inform decision-making and improve the region's efforts to protect and restore fish and wildlife.
- The Council develops and maintains comprehensive programs to educate and inform the public about major regional power and fish and wildlife issues and obtain feedback, and encourages regional cooperation on activities that support the Power Act.

Columbia River Basin

- The Columbia River Basin includes parts of Washington, Oregon, Idaho, Montana, Wyoming, Utah, Nevada, and British Columbia – 259,000 square miles (671,000 square kilometers), an area the size of France.
- The river and its tributaries are the dominant water system in the Pacific Northwest.
- The Columbia originates at Columbia Lake, British Columbia, and is 1,243 miles (2,000 kilometers) long, flowing into the Pacific Ocean about 10 miles west of Astoria, Oregon.



- The average annual flow, measured near the mouth of the river, varies from about 167-192 million acre-feet (an acre-foot fills an Olympic pool). Of this, about 40 percent comes from Canada with a significant portion contributed by rivers in northwestern Montana.
- The largest tributary is the Snake River, which is 1,036 miles (1,670 kilometers) long.
- The highest volumes of water flow between April and September. The lowest volumes are from December to February.
- From its source at 2,650 feet (808 meters) above sea level, the river falls an average of more than two feet per mile before reaching the ocean.
- Humans have lived along the river for more than 10,000 years, with a large increase in population when Euro-American settlers arrived in the early and mid-1800s.
- Fourteen dams span the mainstem Columbia from Bonneville Dam at river mile 146 to Mica Dam in British Columbia at river mile 1,018.
- Dams in the Columbia River Basin (U.S. and British Columbia) are capable of storing 55.88 million acre-feet of water (42 million acre-feet is releasable), or about 29-33 percent of the average annual flow of the river at the mouth.

Fish and Wildlife

Five species of Pacific salmon – chum, sockeye, coho, Chinook, and from time to time a small number of pink salmon – and two species of anadromous (ocean-going) trout – steelhead and sea-run cutthroat – are found in the Columbia River Basin.

Ocean-going (anadromous) fish have existed in the river for about 12 million years. Historic runs of salmon and steelhead to the Columbia River Basin were believed to have numbered 10-16 million annually.

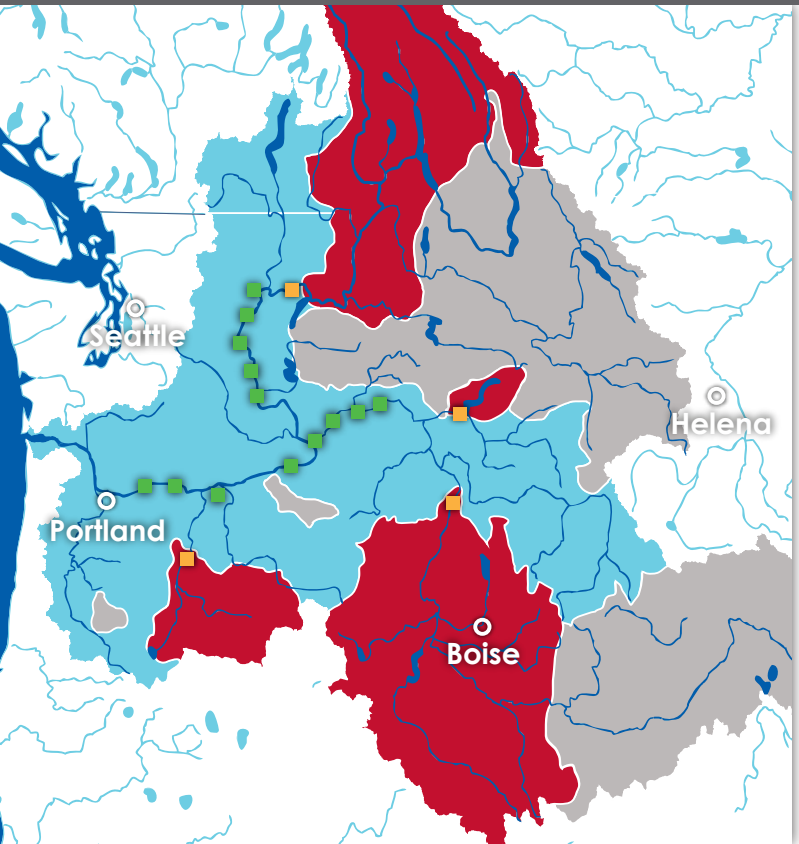
Different factors have affected and continue to affect salmon and steelhead runs over time. Beginning in the late 1800s and early 1900s, land uses (such as logging and mining) and high levels of harvest resulted in a dramatic decline in salmon and steelhead returns to the basin. This harvest fueled one of the largest salmon-canning industries in the

world in the lower Columbia River, with an average harvest of 25 million pounds annually. By the early 1900s, runs of salmon and steelhead to the basin declined by nearly half of historic levels, largely due to unmanaged overharvest and habitat alteration impacts from mining and logging. In response to these declines, the basin's first hatcheries opened to restore fish runs and support harvest, and by the mid-1900s, harvest and land management were refined to be more protective of fish. Although harvest and altered habitat contributed to the

significant decline of salmon and steelhead, the development (1911-1975) and operation of hydropower facilities likely had the greatest impact. Hydropower facilities in the Columbia River Basin either did not include fishways or initially included structures that were poorly designed for safe fish passage. Many decades would pass before the facilities would be improved. For dams that did not provide passage, fish needing to move past the dams were lost forever. Hydropower development also affected a diverse mixture of other fish species (e.g., Pacific lamprey, sturgeon, cutthroat trout, bull trout, and kokanee) and wildlife (e.g., songbirds, deer, elk, moose, turtles, squirrels, rabbits, and many other species).

Today, the runs of salmon and steelhead usually total between 1.5 and 2.5 million fish at Bonneville Dam, the first dam inland from the ocean. Over the last four decades, the region's states, tribes, and federal agencies have worked to restore habitat, implement passage and flow improvements at the dams, and carefully manage harvest and hatcheries.

Map of the Columbia River Basin



Of the original salmon and steelhead habitat available in the Columbia River Basin, **55%** of the area and **31%** of the stream miles have been blocked by dam construction.

- Areas blocked by dams
- Areas blocked by natural obstructions
- Areas open to anadromous fish
- Major dams that block fish passage
- Major dams that allow fish passage

The Council's fish and wildlife program supports efforts that mitigate the effects of the hydropower system on fish and wildlife, largely focusing on habitat restoration and complemented by development of hatchery programs that support conservation and fisheries. In addition, the Council designated 44,000 miles of river and stream reaches in the Pacific Northwest as protected areas where hydroelectric development is prohibited in order to protect fish and wildlife.

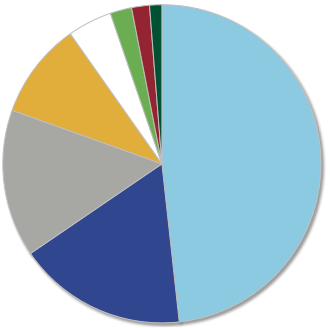
Regional Power System

In this guide we rely on two terms to measure electricity generation and supply: capacity and annual energy. Capacity is the maximum rate that a power plant can generate electricity at full-load operation. Annual energy is the quantity of electricity that a power plant produces over the course of a year. Capacity is measured in million-watt units called megawatts. Annual energy is measured in units called average megawatts. One average megawatt is one million watts delivered continuously 24 hours a day for a year, or 8,760 (24 × 365) megawatt-hours. One average megawatt is enough electricity to power about 730 Northwest homes for a year.

In total, interconnected power plants in the Pacific Northwest can provide 73,254 megawatts of capacity. About 48 percent (35,005 megawatts) is from hydroelectric dams. These same power plants can provide about 39,202 average megawatts of annual energy (42 percent, or about 16,503 average megawatts, is from hydropower). The Federal Columbia River Power System includes 31 dams and one non-federal nuclear power plant. This system provides about 22,442 megawatts of the regional capacity and about 7,482 average megawatts of the annual energy.

Pacific Northwest Generating Capacity

- Hydropower (48%)
- Wind (17%)
- Natural Gas (15%)
- Coal (10%)
- Nuclear (5%)
- Solar (2%)
- Biomass (2%)
- Other (1%)

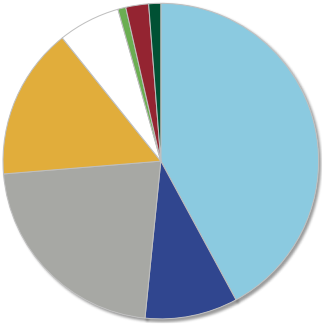


73,254 total megawatts

This chart shows the maximum possible contribution of each resource to the regional power supply.

Pacific Northwest Annual Energy Generation

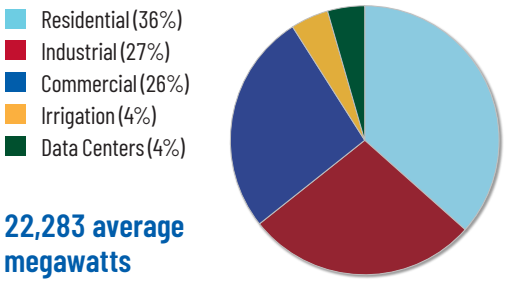
- Hydropower (42%)
- Wind (10%)
- Natural Gas (22%)
- Coal (16%)
- Nuclear (6%)
- Solar (1%)
- Biomass (2%)
- Other (1%)



39,202 average megawatts

- Approximately 95% of the region's hydroelectric power supply comes from dams in the Columbia River Basin, federal and non-federal combined.
- It takes about 1,100 average megawatts of electricity to power a city the size of Seattle.
- Grand Coulee Dam (1941) has the greatest generating capacity of any dam in the United States at 6,809 megawatts.
- The Pacific Northwest is one of the best wind resource areas in North America, particularly in central Montana.

Pacific Northwest Energy Loads by Sector



22,283 average megawatts

- Wind turbines account for over 12,478 megawatts of capacity and 3,725 average megawatts of energy (including wind plants in Wyoming that serve load in the Northwest).
- The Bonneville Power Administration owns and operates more than three-fourths of the high-voltage transmission grid in the Pacific Northwest.
- The total transmission system in circuit miles is 15,108.

Energy Efficiency

Since 1978, the region has reduced electricity demand by more than 7,600 average megawatts through energy-efficiency measures.

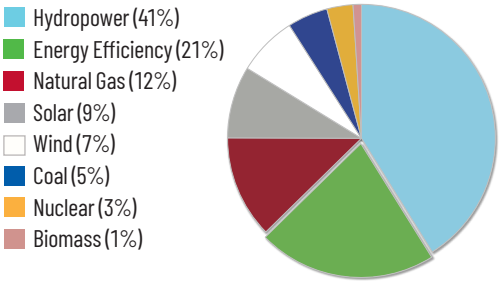
Expressed as electricity, 7,600 average megawatts is enough to meet the annual energy consumption of around 6.1 million homes, or more than enough to serve all of Montana and Idaho. This efficiency saves Northwest ratepayers more than $4.8 billion per year

Since 2016, Northwest utilities have invested an average of $463 million dollars per year on energy efficiency, supporting programs to encourage efficient purchases and practices and conducting research to ensure effective use of ratepayer dollars.

In the 2021 Regional Power Plan, the Council estimated that at least 2,400 average megawatts of remaining cost-effective energy efficiency potential exists in the Northwest. This energy efficiency will complement low cost, renewable energy to help ensure the system continues to remain adequate, efficient, economical, and reliable.

The region employs over 100,000 people in energy efficiency across utility programs, state agencies, and as trade allies and contractors delivering services.

Pacific Northwest Energy Resources, Including Energy Efficiency



35,750 average megawatts

compared to the average cost of generated electricity and lowers regional carbon dioxide emissions by an estimated 24.4 million metric tons annually.

Energy efficiency is the second-largest electricity resource in the Northwest.

The chart on the facing page shows the average annual contribution to the regional power supply by major resources, including energy efficiency.

Agriculture

According to the U.S. Department of Agriculture (2018 Census), Idaho has the most irrigated acres of the four Northwest states, 3.3 million. Next is Montana, 2 million, followed by Washington, 1.8 million, and Oregon, 1.3 million.

In 2021, Washington ranked 16th in the nation in the total value of its agricultural products

($11.3 billion); Idaho was in 20th place ($9.1 billion); Oregon 28th ($6.1 billion), and Montana 30th ($4.5 billion).

The four states are among the top 10 producers in the nation of a variety of products, including tree fruits, nuts, grains, grass seed, hay, milk, and Christmas trees.

Navigation

The Columbia and Snake rivers form a 465-mile transportation system with 36 deep-water and inland barge ports.

The 43-foot-deep navigation channel for ocean-going vessels extends 105 miles from the ocean to Vancouver, Washington on the Columbia River, and at 40 feet for an additional 11 miles on the Willamette River into Portland.

A 359-mile inland barge system carries cargo upriver from Vancouver into eastern Washington and Idaho.

According to the Pacific Northwest Waterways Association, more than 50 million tons of international trade goods worth at least $23 billion were transported through the Columbia/Snake river system in 2018. The system is the nation's single largest wheat export gateway, transporting over 60% of all U.S. wheat to markets overseas. The Columbia River is second in the nation for soy exports, with over 8.4 million metric tons transported in 2020, and is also a national leader for auto imports and exports. As well, the Columbia is the top West Cost export gateway for bulk mineral shipments, including potash, soda ash, bentonite clay, and chemicals.

Flood Control

In 1948, flood control became a priority after Vanport, Oregon, north of Portland along the Columbia River, was destroyed in a flood in late May and early June. The U.S. Army Corps of Engineers responded by developing a multiple-use reservoir storage plan for the Columbia River Basin.

In February 1996, the region was reminded of the importance of flood control when heavy rains combined with warm temperatures and nearly saturated soil from more than three months of above-normal precipitation caused severe flooding west of the Cascade Mountains, particularly along the Willamette and Columbia rivers. Government agencies and non-federal dam operators worked together to reduce flood damage by an estimated $3.2 billion.

Major flood-control dams in the Columbia River Basin are Mica, Keeneyside, and Duncan in British Columbia, and Libby, Hungry Horse, Grand Coulee, and Dworshak in the United States.

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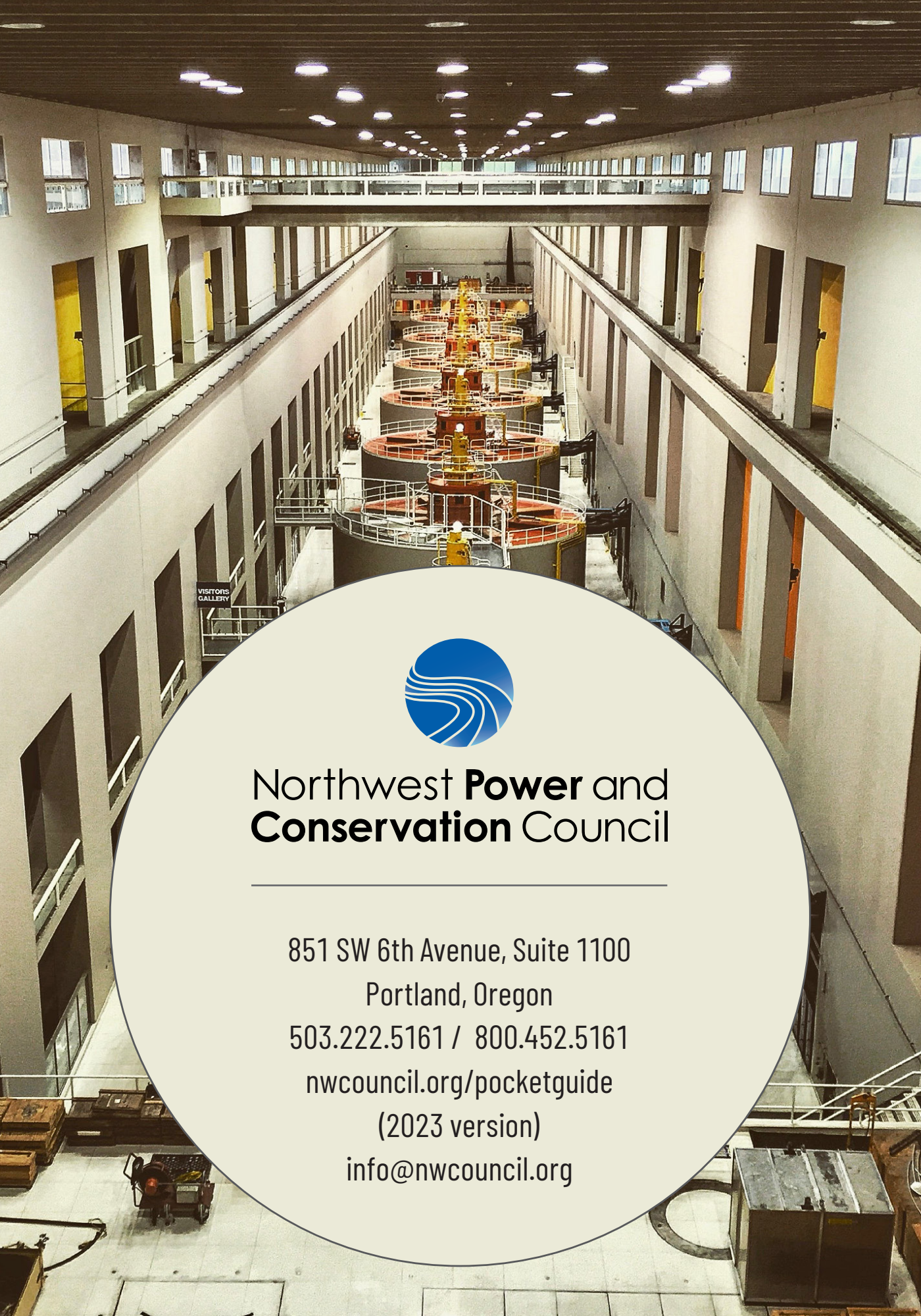

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