

Basin Report: Columbia River

The Columbia River is the fourth largest river in North America, rising in the Rocky Mountains of British Columbia, Canada, and flowing 1,243 miles to the Pacific Ocean through Washington and Oregon. The river system has more than 400 dams that provide hydroelectricity, irrigation, flood control, stream flow regulation, and storage and delivery of water. These projects provide up to 80% of the electrical needs in the Northwest, 39.7 million acre-feet of storage space for flood control, locks and other infrastructure for navigation of 17 million tons of cargo annually, and irrigation for 7.8 million acres of land and recreational opportunities for hundreds of thousands of Americans. To protect these critical resources, Reclamation and stakeholders must continually evaluate the risks and impacts of climate change and identify appropriate adaptation and mitigation strategies by utilizing the best available science.



Future Changes in Climate and Hydrology

Reclamation's 2016 SECURE Water Act Report identifies climate challenges the Columbia River Basin will likely face:

- Climate projections indicate that temperatures throughout the Columbia River Basin above The Dalles Dam may increase steadily by 6–7 °F during the 21st century.
- In the Columbia River Basin average annual precipitation is projected to remain variable over the next century with a slight increase in the higher elevation areas by 2070.
- In the Columbia River Basin moisture falling as rain instead of snow at lower elevations will increase the wintertime runoff with decreased runoff during the summer.

Future Impacts for Water and Environmental Resources

Historical and projected climate changes have potential impacts for the basin:

- Increased winter runoff and reductions in spring and summer runoff is likely to translate into water supply reductions for meeting irrigation demands, adversely impacting hydropower production, and increasing wintertime flood control challenges.
- Warmer conditions might cause increased stress on fisheries, reduce salmon habitat, increase electricity demand, increase water demands for instream ecosystems and thermoelectric power production, and increase invasive species infestation potential.
- Increased plant growth induced by increased spring precipitation, combined with warmer and drier summers. will increase forest and range fire risk, further impacting basin hydrologic processes.

Columbia River Basin Water Resource Studies

Adequate and safe water supplies are fundamental to the health, economy and ecology of the United States, and global climate change poses a significant challenge to the protection of these resources. Reclamation is taking a leading role in assessing risks to western U.S. water resources and is dedicated to mitigating risks to ensure long-term water resource

sustainability. To accomplish this Reclamation has conducted or initiated five climate impact and basin studies since 2009 in the Columbia River Basin under its WaterSMART program:

- **Columbia River Basin Impact Assessment** – Reclamation is conducting a Columbia River Basin Impact Assessment to evaluate the potential impact of future climate change on flows at more than 300 locations across the basin. This assessment will determine baseline risks to water supplies and demands to establish a foundation for more in-depth analyses and the development of adaptation strategies.
- **Yakima River Basin Study** – Reclamation partnered with the Washington Department of Ecology, Office of Columbia River, to fund the study. The study area is located in south-central Washington.
- **Henry's Fork of the Snake River Basin Study** – Reclamation partnered with the Idaho Water Resource Board to fund the study. The study area is located upstream of the confluence of the Henry's Fork and the Snake River in central Idaho.
- **Hood River Basin Study** – Reclamation partnered with the Hood River County Water Planning Group to fund the study. The study area encompasses a 339-square-mile region in Hood River County in north-central Oregon.
- **Upper Deschutes Basin Study** – Reclamation partnered with the Deschutes Basin Board of Control to fund the study. The study area includes surface water and groundwater upstream of the confluence of the Deschutes, Crooked, and Metolius river systems in Oregon's Deschutes Basin.

Moving Forward: Adaptation and Coordination

Where opportunities exist, Reclamation participates in coordinated adaptation actions in response to climate stresses, as well as changes in land use, population growth, invasive species and others. These activities include extending water supplies, water conservation, hydropower production, planning for future operations, and supporting rural water development. Specific examples of coordination and adaptation in the Columbia River Basin include:

- The **River Management Joint Operating Committee (RMJOC)** is comprised of representatives from Bonneville Power Administration, U.S. Army Corps of Engineers, and Reclamation and functions as a forum for the coordination of dam operations and other river management activities within the Columbia River Basin. Reclamation works with the RMJOC on the continued development of up-to-date climate change projections in support of long-range planning activities performed by federal agencies, states, tribes, local governments and nonprofits.
- In 2009, Washington Department of Ecology (DOE) and Reclamation brought representatives from the Yakama Nation, irrigation districts, environmental organizations, other federal, state, and local stakeholders to develop a consensus-based solution to the current and future water issues. The group agreed upon a proposed approach to improving water management, an **Integrated Water Resources Management Plan**.

