

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, irrigation for 7.8 million acres of land and recreational opportunities for hundreds of thousands of Americans. To protect these critical resources, Reclamation must continually evaluate the risks and impacts from a changing climate and identify appropriate adaptation and mitigation strategies utilizing the best available science in conjunction with stakeholders.



Future Changes in Climate and Hydrology

To this end, Reclamation's 2011 SECURE Water Act Report identifies the following climate challenges that the Columbia River Basin could likely face:

- Projections show that temperatures throughout the Columbia River Basin above The Dalles Dam may increase steadily by 6–7 °F during the 21st century.
- Average annual precipitation, including subbasins such as the Yakima and Snake, are projected to increase from 3.9% to 6.2% over the basin by 2050.
- The decreased snowpack could result in decreased groundwater infiltration, runoff and ultimately lower base flows in the rivers during the summer.
- Mean annual runoff is projected to increase by from 1.2 to 3.7% by the year 2050.
- 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 wintertime runoff and reductions in runoff during the spring and summer 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, drier summers will increase forest fire risk.

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 mitigate risks to ensure long-term water resource sustainability. To accomplish this, Reclamation is refining these preliminary Columbia Basin results through detailed basin studies on the Yakima and Snake Rivers, tributaries to the Columbia, under its WaterSMART program.

Where opportunities exist, Reclamation has begun 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. For example, the Lewiston Orchards Project is exploring options to maintain stream flows required on the Nez Perce Indian Reservation for the Endangered Species Act-listed steelhead as the traditional water supply has shifted from a snowpack-driven system to a system dependent primarily on rainfall. Finally, the Department of the Interior High Priority Goal for Climate includes activities of the Landscape Conservation Cooperatives and Climate Science Centers, assessing vulnerabilities to the natural and cultural resources management by the Department and activities to adapt to the stresses of climate change.

This fact sheet contains information from the SECURE Water Act Section 9503(c) - Reclamation Climate Change and Water 2011, Section 3 - Basin Report: Columbia. The full report may be read online at www.usbr.gov/climate.