System Operations Overview

Managing a Complex System

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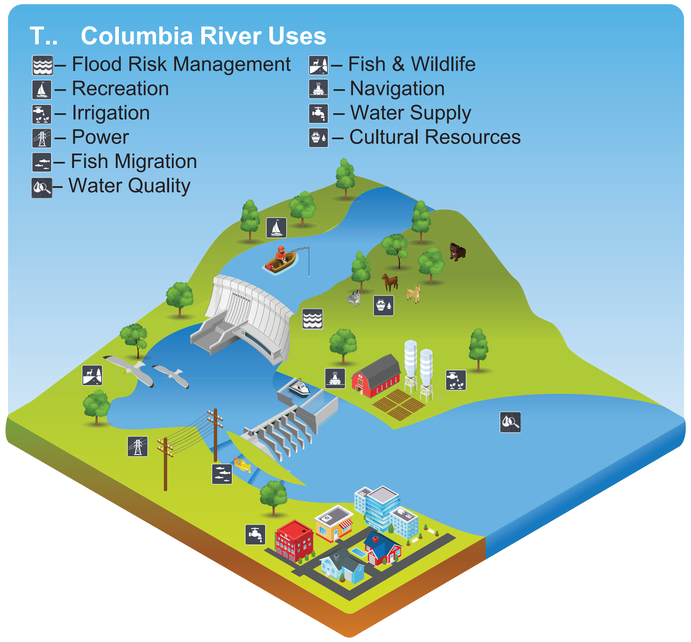
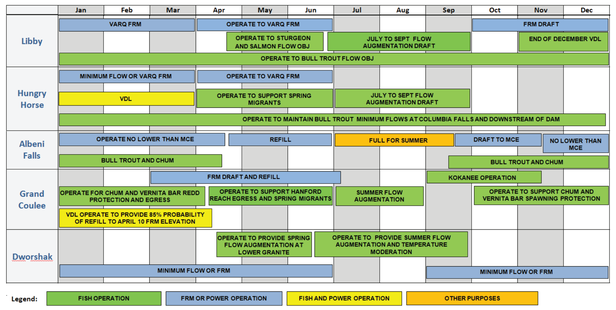
The Columbia River Basin is a large and complex system with variable stream flows and weather patterns. The economic vitality of the region and its tribes, communities, industries, and fish and wildlife species. all depend on the system's ability to provide for multiple uses, including flood risk management, hydropower, navigation, irrigation, recreation, water quality, and fish and wildlife.

Project Authorizations

The federal Columbia River Basin projects (dams, reservoirs, and other associated facilities) are operated to meet many authorized purposes. These multiple uses must be considered and balanced in operational decisions. Actions that benefit one use or resource can have the opposite effect on others.

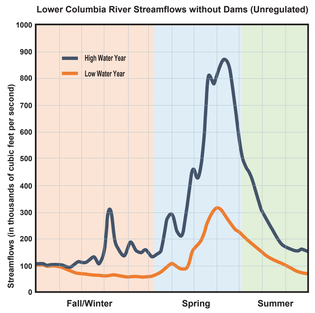


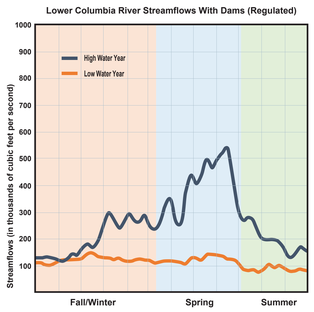
The people of the Northwest use the Columbia River in many ways. The water projects make up a multiple-use system.



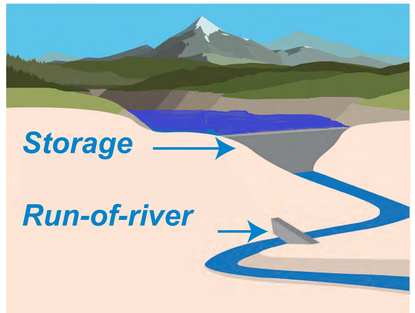
How do dams change river flows?

The Columbia River Basin experiences a wide range in runoff from year to year, from floods to droughts. Each water year poses different challenges for operators. Without the dams in place, the spring months would experience very high flows from melting snow while fall, winter, and summer flows would be low. The dams store water in the spring, reducing potential flooding from damaging river levels downstream. Once reservoirs fill in the summer, some storage projects are drafted (water is released) to augment naturally low summer flows in the lower river. This is done to improve river conditions for migrating fish. In the fall and winter, reservoirs water levels are lowered in preparation for flood risk management operations to capture the spring runoff. This also provides more water in the rivers and generates power and helps meet winter demand for electricity.





Storage vs. Run-of-River

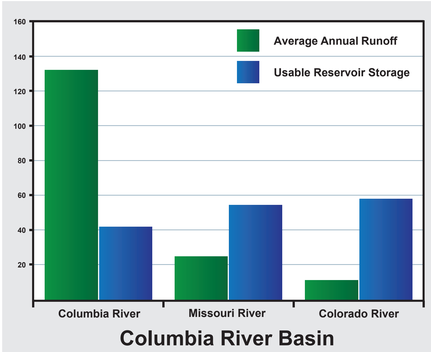


Storage projects hold water in reservoirs and reshape the river's flow patterns to meet a variety of authorized project purposes. Water from rain and snowmelt is stored until it is needed. This water is later released through turbines to generate electricity, to meet irrigation needs and provide flows for fish migration. Storage helps regulate flows, reducing potentially damaging floods downstream, while providing valuable water during dry periods.

Run-of-river projects have limited storage. They allow water to pass the dam at about the same rate it enters the reservoir. They provide power generation and may give sufficient water depth over rapids and other obstacles to permit barge navigation through navigation locks and reservoirs.

Where is the storage?

The Columbia River Basin storage projects primarily lie higher in the basin near the mountains where they can strategically catch snowmelt to help provide flood-damage reduction downstream.



The Columbia River Basin storage projects can only store about 30 percent of the annual runoff. For this reason, reservoirs can be used to change the timing of flows within the year, but cannot store enough water to change a dry year into a wet year.