

FCRPS Biological Opinion

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Location

Columbia River Basin

Species

- Upper Columbia River spring Chinook & Steelhead
- Snake River fall Chinook, spring/summer Chinook, steelhead, and sockeye
- Middle Columbia River Steelhead

Partners

- Bonneville Power Administration
- U.S. Army Corps of Engineers
- NOAA Fisheries
- Bureau of Reclamation



Spill on the Columbia River

Water, Water Everywhere: Spring Runoff and Salmon Migration

May 2011

This year, Columbia River Basin weather is influenced by La Niña conditions. In the Northwest, La Niña usually results in above-normal precipitation and below-normal temperatures during the snow accumulation season. As a result, snowpack in central Idaho is 119 percent of normal thus far, while in northwestern Montana, it is 150 percent of normal. This season is now forecast to be the largest runoff since 1999.

Isn't all this water a good thing?

Yes – to a point. More water will be available for all uses, including flows for young salmon migrating to the Pacific. However, high rates of runoff pose challenges because water managers must determine how to move all of that water down the river. The reservoirs are drafted to provide space to reduce the risk of flood damage, but they can only hold so much runoff. The remaining water must then be released. Water is released through the turbines, spillways, bypass facilities, and other outlet structures at each dam.

How does this spill affect fish?

Spill is a key component of the Federal Columbia River Power System (FCRPS) Biological Opinion because it generally provides the safest route of passage for young

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www.SalmonRecovery.gov

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salmon. From April through August, when young salmon and steelhead are migrating down the Snake and Columbia rivers, the FCRPS BiOp calls for water to be released through the spillways or spillway weirs to help fish pass safely.

However, high spill levels can increase dissolved gas levels in the water below the dam because as water flows over the spillway, air becomes trapped by the spill flow. When high amounts of total dissolved gas (TDG) are present, it can cause a condition in fish called gas bubble trauma, with symptoms ranging from minor injuries to death.

Under normal water conditions, symptoms of gas bubble trauma are generally limited to 1–2 percent of the juvenile fish exhibiting minor symptoms. As TDG levels rise above 120 percent, gas bubble trauma risk to fish increases (Schneider 2008; Weitkamp 2008). In the Columbia River Basin, TDG levels and fish symptoms have been monitored since the mid-1990s. This information helps dam operators to manage to the TDG standards set by the states for the river stretch just below the dam.

In high flow conditions, it may be necessary to spill more than required for fish passage. When this happens, spill is spread among the dams in the Columbia River Basin to help avoid localized high TDG concentrations and remain within state water quality standards to the extent possible. States and federal agencies recognize that during periods of high flow, involuntary spill may be required, which may cause TDG level to exceed state standards.

How do the agencies work together to manage spill and protect salmon?

NOAA Fisheries, the U.S. Army Corps of Engineers, Bonneville Power Administration and the Bureau of Reclamation regularly collaborate with regional parties through oversight groups, technical committees, and other public forums to protect salmon in the Columbia River Basin.

NOAA Fisheries is responsible for the FCRPS BiOp, which specifies that spill levels for fish passage during the April through August fish migration season will be managed to state standards.

The Corps manages spill for fish passage at the dams to state standards for TDG. To lower the TDG levels created by spill, the Corps has retrofitted FCRPS projects with spillway flow deflectors. Flow deflectors reduce TDG levels when passing the same volume of water through spillways. Another way the Corps has helped to ensure safer passage for fish is through the installation of spillway weirs at several of the dams on the Columbia and Snake rivers. Spillway weirs allow juvenile salmon and steelhead to pass the dam near the water surface under lower accelerations and lower pressures, providing a more efficient and less stressful dam passage route.

BPA markets hydroelectric power from the FCRPS dams. During periods of high runoff, if there is insufficient demand for the hydropower that would have been generated through the turbines, the remaining water is spilled. BPA is taking steps to balance the region's energy production and consumption to minimize excess spill and protect fish from excess TDG. For more information please go to www.bpa.gov and click on "Overgeneration."