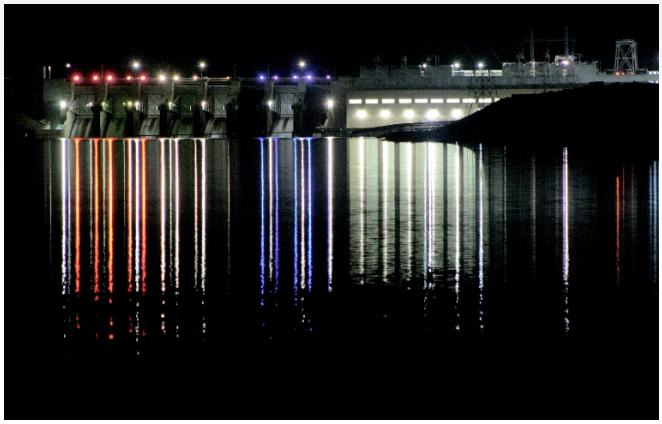
US Army Corps of Engineers ®
Walla Walla District

FACT SHEET
WATER COOLING SYSTEMS FOR FISH
LOWER GRANITE DAM & Little Goose Dam along the lower Snake River

The U.S. Army Corps of Engineers Walla Walla District's scientists, biologists and engineers are developing systems to keep fish cooler on the lower Snake River.

Lower Granite Lock and Dam



Little Goose Lock and Dam

Background:

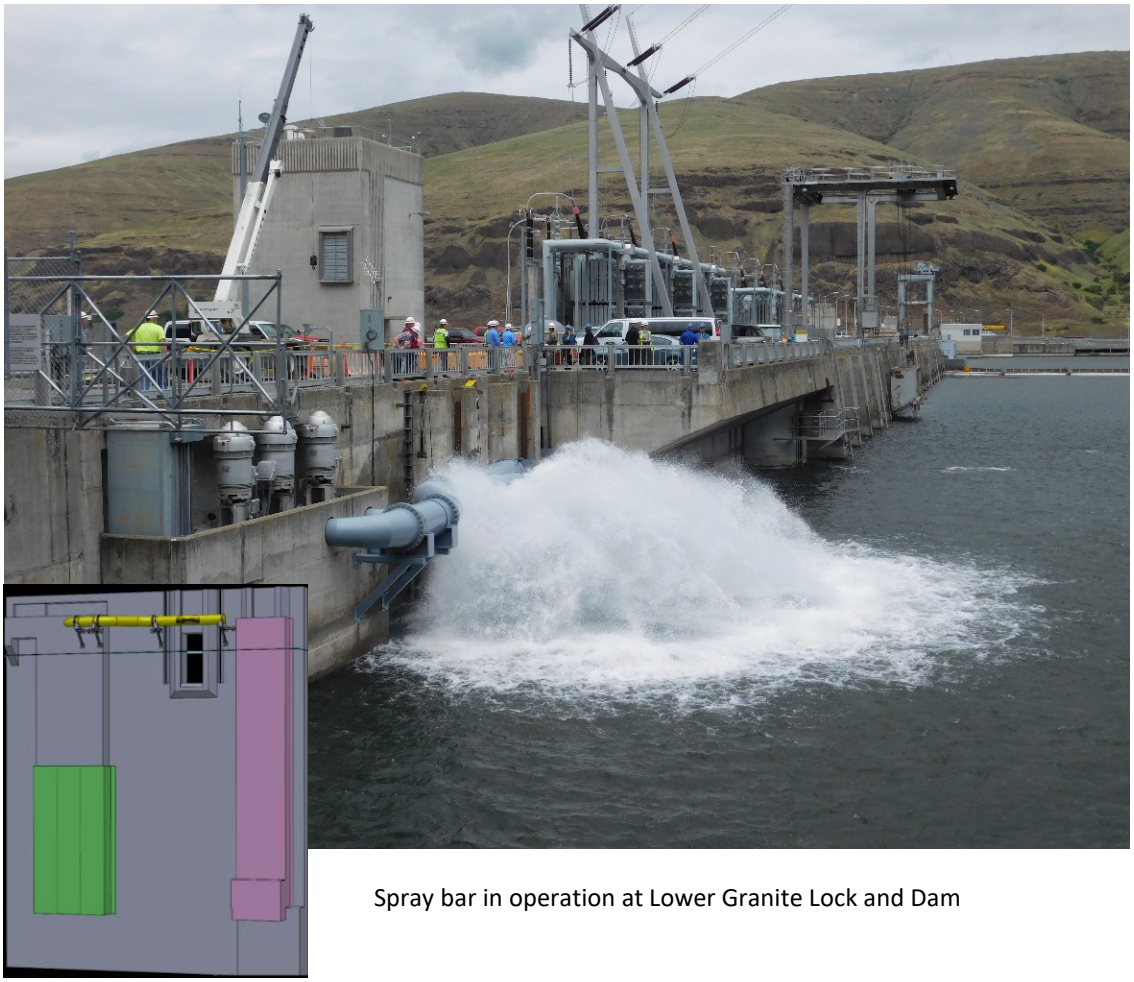
The four lower Snake River dams are multiple-use facilities that provide navigation, hydropower, recreation and fish and wildlife conservation benefits. When the dams were constructed the Corps built adult fish ladders to allow adult salmon and steelhead to swim through the dams as they return to their natural spawning areas.

Warming Weather:

Eastern Washington gets hot in the summer and 2015, 2016 and 2017 were the hottest on record. That can cause water temperatures to rise.

Water temperatures above 68 degrees aren't good for salmon and steelhead in the Columbia and Snake river systems.

Keeping fish cool during hot summers requires engineering expertise – the type of expertise that the men and women of the U.S. Army Corps of Engineers' Walla Walla District display every day.



Spray bar in operation at Lower Granite Lock and Dam

System Operations:

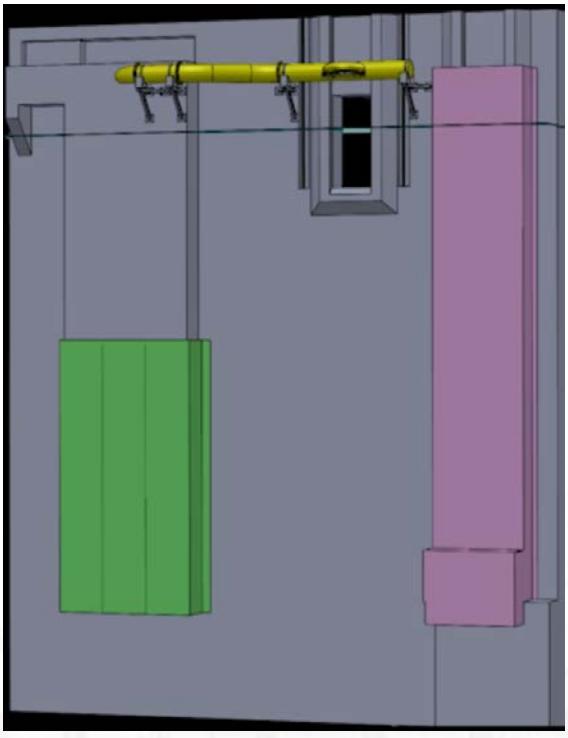
When summer temperatures spiked, Walla Walla District's scientists, biologists and engineers responded by developing water cooling systems at Lower Granite and Little Goose dams on the Snake River.

The system cools the lower Snake River by augmenting it with flows from Dworshak Dam. Additional systems were incorporated to further cool the water in Lower Granite and Little Goose Dams' fish ladders.

The photograph to the right shows the upstream face of Lower Granite Dam during construction.

The fish ladder exit and makeup water intake are located near the normal water surface elevation.

The ladder pumps and intake, originally designed for emergency operations during flood conditions, allow adult fish passage to continue even when the forebay was drawn down. The original project design allowed the reservoir to be lowered up to 18 feet to prevent flooding at Lewiston, Idaho.



To reduce water temperatures, a large chimney with an open top and bottom was designed to surround the makeup water intake and draw cooler water from 60 feet beneath the surface.

To improve conditions for the ladder exit and the nearby forebay environment, a large spray bar was developed which incorporated the use of the emergency fish ladder pumps. The pumps were re-orientated and plumbed into the spray bar and the original intake structure was also extended to a depth of 60 feet like the makeup water.

The spray, which is centered directly over the ladder exit, accounts for twice as much flow as what is entering the exit during normal forebay operation. This surplus cooler water is then allowed to mix within the immediate forebay area with the intent to create a gradual transition for salmon and steelhead entering the forebay environment.

The Corps is committed to fish recovery in the Columbia and Snake river basins. Pioneering the most advanced fish recovery technology like these water cooling systems demonstrates one of the many ways the Corps supports environmental stewardship.

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