# Managing Water Temperatures in the Columbia and Lower Snake Rivers

April 2018

**The EPA is working with Idaho, Oregon, and Washington, the Confederated Tribes of the Colville Reservation, and the Spokane Tribe of Indians to develop water quality improvement plans — called *total maximum daily loads* (or TMDLs) — for temperature in the Columbia River and lower Snake River.**

Water temperatures in the Columbia and lower Snake Rivers sometimes approach the upper limits of tolerance for cold water fishes, including salmon and steelhead. These warmer temperatures are higher than temperature water quality standards established for the Columbia and lower Snake Rivers by Oregon, Washington, Idaho, and the Colville and Spokane Tribes. Because of these temperature standard exceedances, both rivers are included on the Clean Water Act §303(d) lists of impaired waters established by Oregon, Washington and Idaho. The locations of these impaired waters are illustrated in Figure 1.

Scientific studies indicate that temperature conditions in the Columbia River basin are affected by many factors, including:

- Natural variation in weather and river flow.
- Construction of the dam and reservoir system (the large surface areas of reservoirs and the resulting slower river flow both contribute to higher water temperatures).
- Increased temperatures of tributaries.
- Water management by dams and diversions for irrigated agriculture.
- Point source discharges such as cities and industries.
- Climate change.

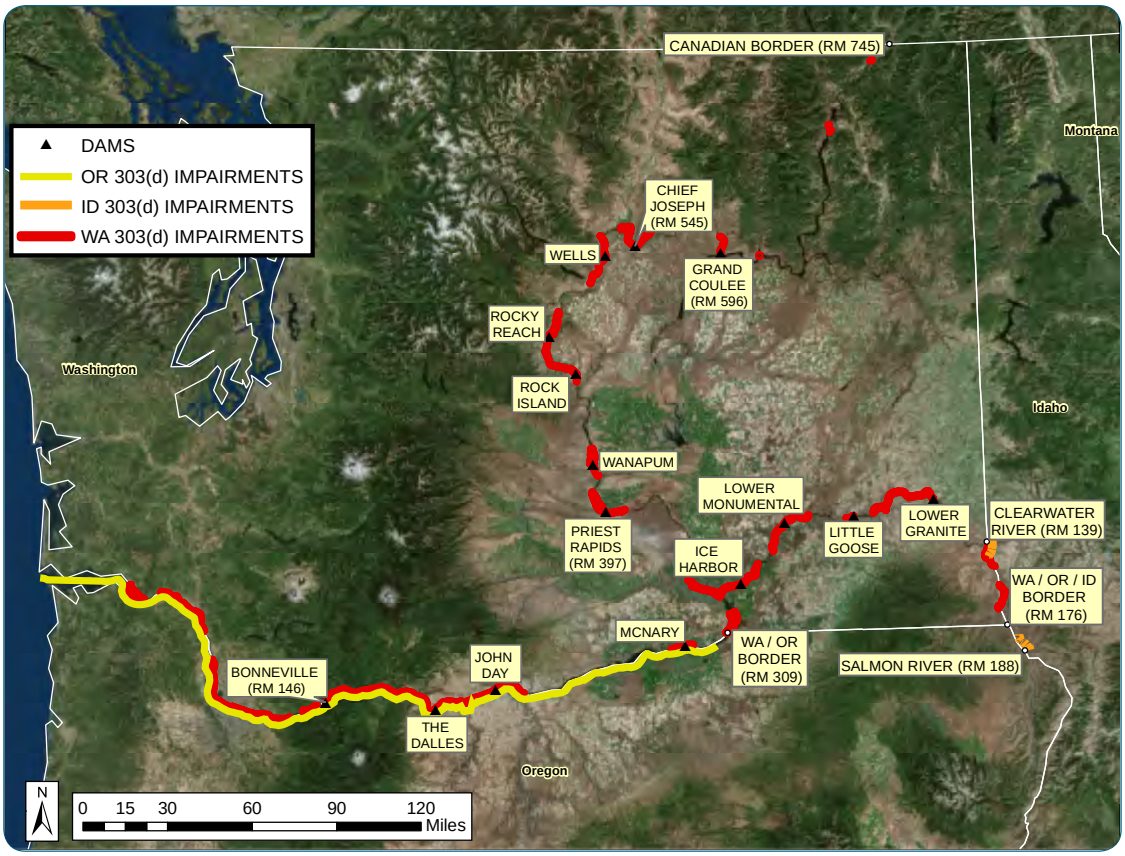


***Figure 1 –*** *Temperature Impairments in the Columbia and Lower Snake Rivers*

# What is a TMDL?

Federal law requires that total maximum daily loads (TMDLs), or water quality improvement plans, be completed for lakes, rivers and streams that are identified on the 303(d) list as not meeting water quality standards. A TMDL defines the maximum allowed pollution that can be present in a river, lake or stream; and allocates pollutant "loads" among the sources. In these TMDLs, EPA will evaluate sources of heat that contribute to temperature impairments using temperature monitoring data and water quality modeling. EPA will then estimate the heat reductions needed to achieve water quality standards for temperature. TMDLs are important planning tools because identification of the sources of impairments helps prioritize actions. In 2000, EPA signed a Memorandum of Understanding (MOU) with Oregon, Washington and Idaho that outlines each agency's role in developing temperature TMDLs for the Columbia and Snake Rivers. In August 2017, EPA indicated its interest in renewing efforts to develop temperature TMDLs for the Columbia and lower Snake Rivers. EPA will lead TMDL development in coordination with the states and tribal governments and will rely on the states to take a leadership role for the implementation plan.

# Why is water temperature a problem?

Water temperatures significantly affect the distribution, health, and survival of native fish species in the Pacific Northwest. In the lower portions of the Columbia and Snake Rivers, warm water temperatures in the summer can adversely affect migrating juvenile and adult salmon and steelhead, and warm temperatures in the fall can adversely affect salmon spawning. When temperatures exceed 18°C (64°F) in the summer, migrating juveniles can experience decreased growth, increased disease, increased competition with warm water fish, and lethality; and migrating adults can experience increased disease, migration delay, loss of energy reserves, and lethality.

The severity of these effects increases as temperatures rise into the 20-24°C range. Summer water temperatures in the lower portions of the Columbia and Snake Rivers are warmer today than they were historically, which has decreased the number of adult and juvenile salmon that migrate through these rivers in mid-summer. NOAA Fisheries has identified warm summer temperatures in the Columbia and Snake Rivers as a limiting factor to the recovery of several ESA listed salmon and steelhead populations. In the fall, ideal spawning temperatures for salmon are 13°C (55°F) and below. Warm temperatures prior to and during spawning can result in decreased egg and fry survival.

# Columbia and Lower Snake River Temperature TMDLs

EPA will complete this work through transparent information sharing and collaborative engagement with state and tribal governments, federal agencies, public utility districts and other interested parties via webinars, public workshops, and other public outreach opportunities.

As part of TMDL development, EPA will incorporate findings from the following ongoing efforts:

- **Environmental Impact Statement (EIS)** – In response to a 2016 U.S. District Court requirement, federal agencies (Corps of Engineers, Bonneville Power Administration, and Bureau of Reclamation) are developing an EIS for the Columbia and Snake Rivers (visit www.crso.info). EPA is a cooperating agency in the development of the EIS.
- **Cold Water Refuges** – EPA's study of cold water refuges along the lower Columbia River is specified by the NOAA Biological Opinion on the Oregon temperature standard. The study will assess current refuge conditions and potential improvements in refuges based on restoration actions. A final report is expected late fall 2018.

# Getting to Implementation

A TMDL is the critical first step for achieving water quality standards and provides an analytic underpinning for future watershed decisions. As a part of the 2000 Federal Columbia River Power System Biological Opinion, EPA worked with federal, state, and tribal governments to identify a list of 23 potential actions that can be taken at Columbia and lower Snake River dams and in the Columbia River (i.e. protection of cold water refugia) to reduce water temperatures. This list, known as the "Water Quality Plan" was intended to serve as an implementation plan for the TMDL and still serves as a viable source of information for potential actions which may be taken in the future. http://pweb.crohms.org/tmt/wq/studies/wq_plan/wq200814.pdf

Implementation is key for actual water quality improvement, and the states carry the responsibility for planning and directing implementation and will develop implementation plans.

## For More Information

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## *Look Inside for*

- ***What is a TMDL?***
- ***Why is water temperature a problem?***
- ***Getting to implementation***