

# EPA Releases Final Columbia River Cold Water Refuges Plan

January 2021

Region 10 of the U.S. Environmental Protection Agency has published the **Columbia River Cold Water Refuges Plan** ([www.epa.gov/columbiariver/columbia-river-cold-water-refuge](http://www.epa.gov/columbiariver/columbia-river-cold-water-refuge)). The Lower Columbia River serves as the border between Washington and Oregon. In this stretch of river, average August water temperatures are between 21-22°C (70-72°F). Historically, temperatures were 2 to 2.5°C cooler. This warm section of the river — the corridor through which all adult Columbia Basin salmon must begin their upstream migration to their natal spawning grounds — is the focus of EPA’s Cold Water Refuges Plan. EPA worked with the States of Oregon and Washington, NOAA Fisheries, tribes, and others to develop this plan, including receiving valuable input from about twenty contributing parties on an October 2019 draft.

## Background

Every year, about 700,000 to 2-million adult salmon and steelhead return from the ocean and migrate up the Columbia River past Bonneville Dam. Roughly 40% of these fish that migrate in the summer months experience river temperatures of 20°C or higher.

These warm conditions can be harmful to these cold-water fish. As they migrate up the river, many salmon and steelhead move into areas of cooler water for temporary relief.

These areas are called *cold water refuges*. In the Lower Columbia River, these refuges are found where cooler tributaries flow into the river. As river temperatures continue to warm from climate change, protecting and restoring these refuges will become even more important to the survival of migrating salmon and the recovery of salmon populations.

*Chinook Salmon – NOAA Photo* →



## The Columbia Cold Water Refuges Plan

This plan is a scientific document with recommendations for actions. By issuing this plan, EPA is meeting its responsibilities under the Endangered Species Act, associated with its approval of Oregon’s temperature standards for the Columbia River. This plan also serves as a reference for EPA’s Columbia and Snake Rivers Temperature Total Maximum Daily Load (TMDL). The Columbia Cold Water Refuges Plan:

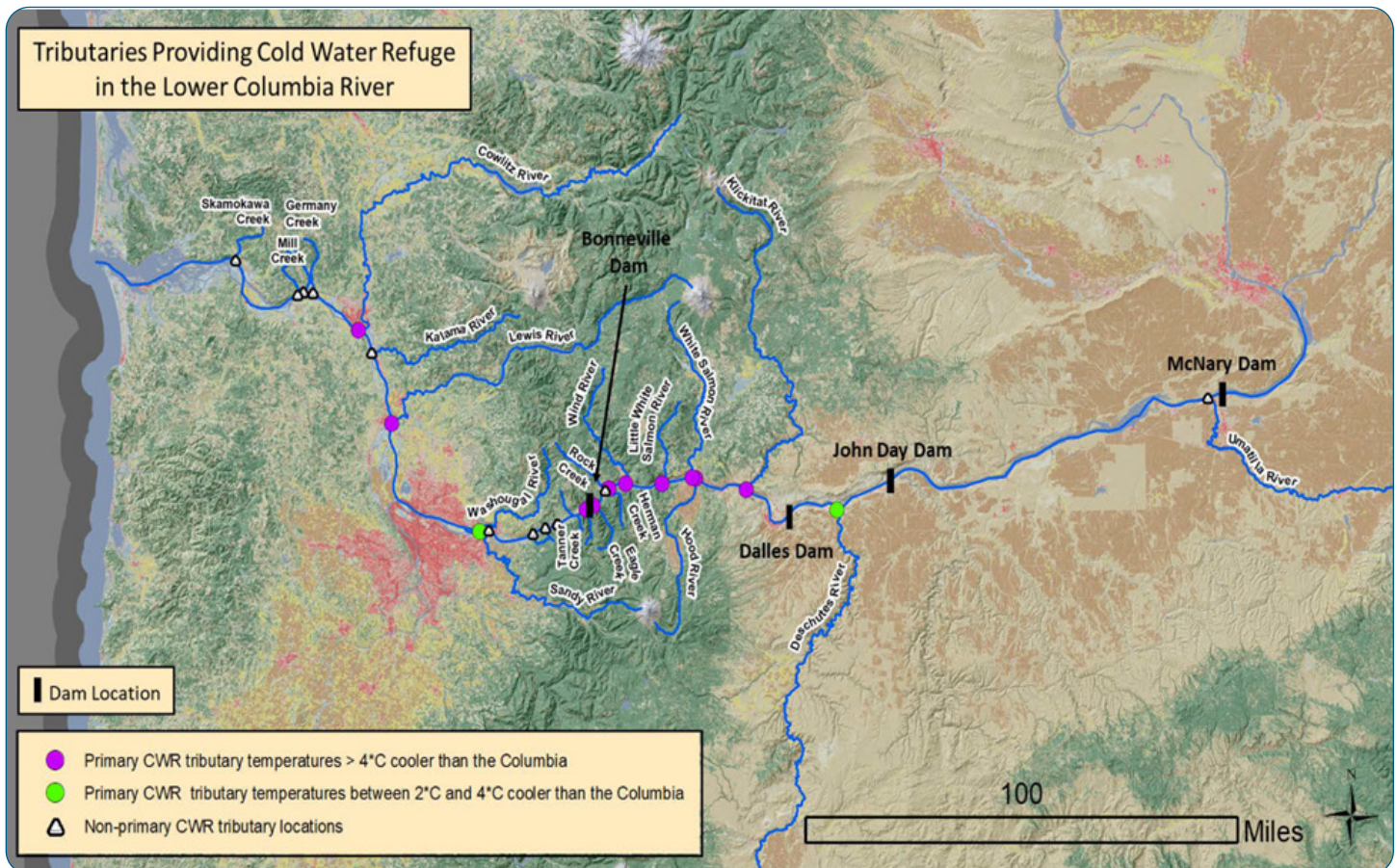
- Describes available cold water refuges (CWR) in the Lower Columbia River,
- Characterizes how salmon and steelhead use CWR,
- Assesses the amount of CWR needed to attain Oregon’s Clean Water Act CWR narrative water quality standard,
- Identifies actions to protect and restore CWR, and
- Recommends future CWR studies.

*Continued* ⇨

## Findings

Here is a summary of some of the plan's main findings:

- EPA identified 23 cold water refuges in the Lower Columbia River. Twelve of these are primary refuges and make up 98% of the total volume of available refuge.
- Adult steelhead and fall Chinook salmon use refuges the most because they migrate when Columbia River temperatures are warmest.
- Sockeye salmon, which died in large numbers in 2015 due to warm early summer Columbia River temperatures, do not appear to benefit from or use refuges in the Lower Columbia River. They are most successful migrating upstream before river temperatures warm.
- When temperatures rise above 21°C, about 80% of steelhead and 30% of fall Chinook salmon move into the refuges.
- In an average year, about 65,000 steelhead and 5,000 fall Chinook are in eight refuges between the Bonneville Dam and The Dalles Dam during the end of August.
- The warmer the river, the more fish use the cold water refuges. EPA concludes this use is an adaptation to rising Columbia River temperatures. With summer river temperatures predicted to rise over time from climate change, fish will likely use refuges more in the future.
- Using cold water refuges appears to benefit the fish by reducing their exposure to high river temperatures and associated loss of energy, stress, disease, and mortality. However, fish that use refuges do not have higher survival rates to upstream waters primarily due to fishing in the refuges.
- EPA concludes that maintaining the volume of 12 primary cold water refuges and increasing the amount of refuge provided by the Umatilla River is necessary to meet Oregon's cold water refugia narrative criteria. In addition, EPA recommends restoration of other tributaries to create more cold water refuge in light of predicted continued warming of the Lower Columbia River.



## Watershed Snapshots

The plan includes assessments, or “snapshots,” of 12 primary refuge tributary watersheds. The snapshots discuss watershed features and temperature trends, opportunities to cool the tributaries, current restoration efforts, and actions to protect and restore refuges. The plan includes similar snapshots for two watersheds with the potential to provide additional refuge in the Lower Columbia River, if restored: the Umatilla River and Fifteenmile Creek.



*Herman Creek: One of twelve primary cold water refuges*

## Recommendations

Following are highlights of the plan’s recommendations.

- The plan underscores the importance of existing protection measures in 12 primary watersheds to maintain summer flows and cool temperatures. Measures include ongoing work with federal and state forest plans, state forest practice regulations, and state programs to manage water and groundwater withdrawals. Additional measures include County land use protections near streams and applying state Clean Water Act standards to prevent warming of rivers.
- The plan recommends restoration actions within the 12 primary refuge watersheds to maintain or enhance current refuge volumes and offset predicted future warming. The plan’s recommended actions align with plans already in place, such as federal forest plans, NOAA Fisheries ESA recovery plans, Northwest Power and Conservation Council basin plans, and TMDL implementation plans that serve to restore river function and restore cool flows. The plan recommends similar restoration actions in the two restoration watersheds as well as the other non-primary refuge tributary watersheds.
- The plan highlights the importance of maintaining the Deschutes River refuge and cooling the Umatilla River to provide increased refuge. These rivers are relatively warmer than other tributaries that provide refuge, and they are the only refuges along the 100 mile stretch from the Dalles Dam to McNary Dam.
- The plan recommends that dam operations on the Cowlitz, Lewis, Sandy (Bull Run), and Deschutes Rivers maintain or enhance release of cool water from late July to mid-September.
- The plan recommends studies on the removal of built up sediment at the confluence of several of the refuge tributaries. Sediment deposition at river mouths may reduce volume and make it hard for fish to access the cold water refuges.
- The plan recommends studies, installation of temperature and flow monitoring, and the installation of PIT-tag detectors to address key uncertainties and track trends on cold water refuge use.

The plan is available to Oregon and Washington for consideration of future updates to fishing regulations in cold water refuges during warm periods.



*Aerial view of Deschutes River confluence with Columbia River*

## For More Information

**THE PLAN:** [www.epa.gov/columbiariver/columbia-river-cold-water-refuges](http://www.epa.gov/columbiariver/columbia-river-cold-water-refuges)

**CONTACTS:**

**John Palmer**, Project Lead

• 800-424-4372, Ext. 6521 • 206-553-6521 • [palmer.john@epa.gov](mailto:palmer.john@epa.gov)

**Jenny Wu**

• 800-424-4372, Ext. 6328 • 206-553-6328 • [wu.jennifer@epa.gov](mailto:wu.jennifer@epa.gov)

If you need materials in an alternative format, please contact Andrea Lindsay at 800-424-4372, ext. 1896.

☎ TTY users please call the Federal Relay Service at 800-877-8339 and ask for Andrea.



*Steelhead trout -- US Fish and Wildlife Service*