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State of Washington

Addendum to

**Upper Naches River and Cowiche
Creek Temperature TMDL**

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Reports available for Upper Naches River and Cowiche Creek Temperature Studies are these:

- [Upper Naches River and Cowiche Creek TMDL, Vol. 1: Water Quality Findings](#)¹
- [Upper Naches River and Cowiche Creek TMDL, Vol. 2: Recommendations and Implementation Strategy](#).²
- [Cowiche Creek Vegetation and Shade Study](#)³

Data for this project are available at Ecology's Environmental Information Management (EIM) website at www.ecology.wa.gov/eim/index.htm.

- Search this User Study Identification title: STEB0001.

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¹ <https://apps.ecology.wa.gov/publications/documents/0803036.pdf>

² <https://apps.ecology.wa.gov/publications/documents/0803036.pdf>

³ <https://apps.ecology.wa.gov/publications/documents/1903018.pdf>

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Activity Tracker Codes for Upper Naches River and Cowiche Creek temperature studies:

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- 04-002-02 – Naches temperature TMDL Groundwater Assessment (FY 2004)
- 13-051 – Mid-Yakima Tributary Studies, including NF Cowiche Creek Temperature (FY 2013)
- 13-051 – Cowiche Creek Vegetation and Shade Study (Combined with Mid-Yakima Tributary Studies (FY 2014)

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Addendum

Upper Naches River and Cowiche Creek Temperature TMDL

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Introduction

The [Upper Naches River and Cowiche Creek Temperature TMDL](#)⁴ was approved by the EPA in 2010. This TMDL comprises two separate sub-watersheds that are tributaries to the Lower Naches River. Both tributaries are on the Washington State List of Impaired Waters (303d list) for high temperatures. Reducing temperatures in both can play a major role in controlling stream temperatures in the mainstem Naches River, which is also listed for high temperatures. This addendum presents these refinements for effectively implementing TMDL recommendations:

- Extending the lower boundary of Cowiche Creek from the edge of US Highway 12, through the Naches floodplain, to the location of the confluence with the Naches River and Cowiche Creek (see Figure 1).
- Applying planting goals for riparian shade-producing vegetation and enhancement of bank coverage for the Mainstem, NF and SF of Cowiche Creek.
- Developing a Water Quality Implementation Plan (WQIP) for distilling recommendations from four published studies and sources into one cohesive and unambiguous plan for implementation.

Temperature goals have been set for restoration projects in both the Upper Naches River and Cowiche Creek in accordance with sensitive species requirements. The primary designated use of these watersheds is salmonid habitat ([Washington Administrative Code 173-201A-602](#))⁵.

Temperatures recommended in the TMDL are based on our best estimates of water temperatures that could be attained if streambanks still had mature riparian vegetation and natural channel shapes. The TMDL studies affirmed these temperature criteria:

- Upper Naches goals comprise 17.5°C (63.5°F) for reaches located outside Okanogan-Wenatchee Forest Lands, and 16.0°C (60.8°F) for reaches within.
- Cowiche Creek goal for the entire sub-watershed is 17.5°C (63.5°F).

Attainment of temperature goals also will require implementation of recommended changes to discharged wastewater from facilities. Volume 1 of the [Upper Naches River and Cowiche Creek Temperature TMDL](#)⁶ presents calculated temperature discharge limits – called Wasteload Allocations (WLAs) - for these facilities.

⁴ <https://apps.ecology.wa.gov/publications/documents/1010068.pdf>

⁵ <http://apps.leg.wa.gov/WAC/default.aspx?cite=173-201a>

⁶ <https://apps.ecology.wa.gov/publications/documents/0310063.pdf>

Five fresh fruit packer general permits and one wastewater treatment plan permit are currently in place. One WLA was abandoned when the facility closed, and will remain fallow. This addendum proposes no changes to WLAs.

Other sources of temperature presented greater challenges during planning for pollutant load reductions. These sources generally have no identified point of discharge. Also known as non-point sources, their potential is calculated as a Loading Allocation (LA). LAs represent the potential reduction in pollution that can be gained as remedies are applied to non-point sources. Examples of non-point sources in the Upper Naches and Cowlitz sub-watersheds include increases in temperature where lack of protective riparian vegetation banks, which allows water heating from exposure to sun, and reaches where water diversions reduce flows to unnaturally shallow and slow waters that can concentrate heat quickly.

Adjustments to the TMDL Boundary

When the TMDL was approved in 2010, the mouth of Cowiche Creek was identified as the edge of the floodplain for the Naches River, on the north side of the US Highway 12 levee (see Figure 1). Cowiche Creek flows in a channel under US Highway 12, and across the floodplain to the Naches River. Under high storm and snowmelt conditions, the Naches River can be very active, sometimes filling portions of the floodplain. However, most of the year the upper terraces of the floodplain rarely flood, and Cowiche Creek flows within its own banks. Figure 1 shows farm houses and warehouses constructed in the Naches floodplain, and historic roads and orchards, which have existed there for more than 70 years.

Cowiche Creek flows in a well-defined riparian channel through the Naches floodplain for approximately 1,800 feet before joining the River on the north and east side of the basin. It may be possible that the Naches River will meander toward the west side in the future. Until

The current location of the point of confluence has been stable for more than 90 years, even though repeated cycles of 100-year floods that could have redefined the Cowiche's channel many times. Restoring trees and shrubs on the banks of Cowiche Creek will make the banks more resilient to flow forces.

Extending the boundary will also increase opportunities for cooling the lower reaches of Cowiche Creek by enhancing riparian bank plantings and protecting adjacent wetlands. These measures can include forming partnerships with local groups for salmonid habitat restoration, and comprehensive grant projects for improving watershed functions.

Restoring Buffers and Shade

Creating shade throughout the Cowiche sub-watershed by restoring stream bank trees and shrubs is a critical strategy for cooling streams (Ecology, 2008). The [Cowiche Creek Vegetation and Shade Study](#)⁷ was conducted to support estimating the effort it will take to restore plant distribution within two ecosystems in Cowiche Creek: a matrix of Shrub-Steppe and Evergreen-Forested riparian systems. Upper Naches River plant distributions are described in Volume 2 of the [Upper Naches River and Cowiche Creek Temperature TMDL](#)⁸. The Water Quality Implementation Plan we are developing for the Upper Naches River and Cowiche Creek will be applying both Volume 2 and the Cowiche Creek Vegetation and Shade Study for developing lists of plants that are adapted to Shrub-Steppe and Evergreen-Forested riparian ecosystems.

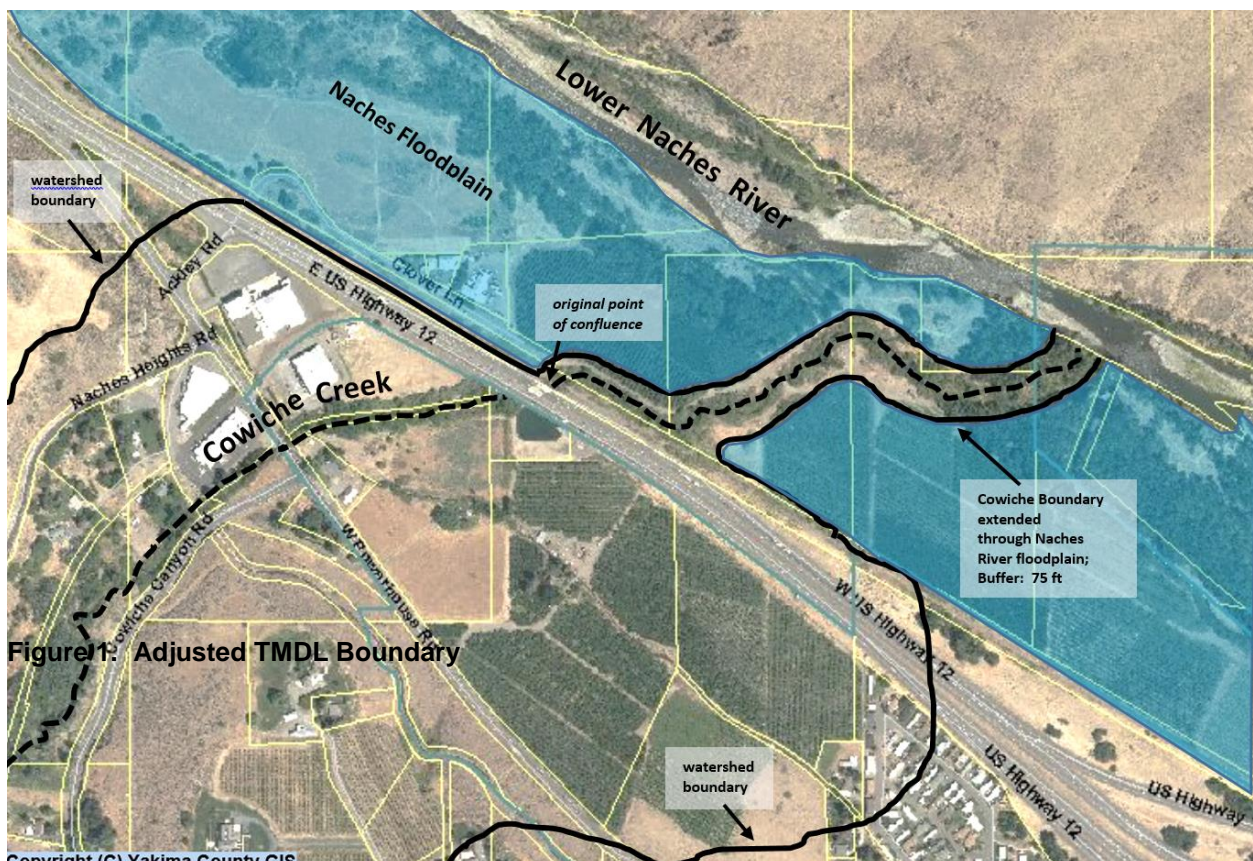


Figure 2 New Cowiche Creek Boundary

⁷ <https://apps.ecology.wa.gov/publications/documents/1903018.pdf>

⁸ <https://apps.ecology.wa.gov/publications/documents/1010068.pdf>

Restoring riparian plant communities involves more than replanting the banks. The concept of creating protective buffers also engages restored conditions. The protective function of vegetated buffers is only effective if the bank is sufficiently wide, and plant distributions reflect natural conditions. During summer, direct exposure to sun and hot air can generate a flux of 2-6°C in stream temperatures on a daily basis in the Naches watershed (Ecology, 2008). Portions of Cowiche Creek can heat up to 23.8°C during July-September. Buffering effects would include shading water and cooling air under an overstory of trees and shrubs, and the presence of deep pools that cool off when exposed to shaded earth around the roots of trees along the shoreline. Restoring shade-producing trees and shrubs to the banks is essential for reducing temperatures in the creek.

The amount of vegetation cover needed for effective shade is different from one riparian ecosystem to the next. For example, early estimates for riparian shading for both sub-watersheds were focused on Evergreen-Forested ecosystems that are primarily found in the Upper Naches basin and high-elevation headwaters of Cowiche Creek (Ecology 2008 and 2010). A stream that flows through evergreen forest is likely to have Douglas Fir, Western Red Cedar, Big-leaf Maple, and Vine Maple. These plant assemblages will not grow in Shrub-Steppe conditions found in the lower reaches of Cowiche Creek. These areas may require plantings dominated by Cottonwood and Pacific Willow overstory, with an understory of short willows, Snowberry and Red-osier dogwood shrubs. The additional Cowiche shade assessment was completed in 2014 for guiding Shrub-Steppe planting plans Cowiche Creek. New revegetation estimates are now available for implementation.

Local fish and wildlife interests consider Reynold's Creek, and South Fork and Mainstem Cowiche Creek as having the highest potential for fish habitat restoration. Buffers play an essential role in habitat for fish. Coho Salmon (*Oncorhynchus kisutch*) and Steelhead (*Oncorhynchus mykiss*) have been found intermittently in the SF and lower reaches of Cowiche Creek. Fisheries biologists are hopeful that Spring Chinook Salmon can be supported, too. The headwaters of these creeks are still relatively unaltered. Fully restored headwater ecosystems will support fry emergence and juvenile rearing and foraging. Large woody debris may also need to be re-introduced in some reaches.

Water Quality Implementation Plan

A water quality implementation plan (WQIP) will be written to establish one management approach that integrates four sources of direction for meeting temperature goals in the Upper Naches River and Cowiche Creek. Shade recommendations from the Cowiche Vegetation and Shade Study were presented above. The additional three sources of guidance are these:

- Volume 1 of the [Upper Naches River and Cowiche Creek Temperature TMDL⁹](#) presented the findings of field investigations, and established discharge limits (wasteload allocations) for permit holders in the basin.
- Volume 2 of the [Upper Naches River and Cowiche Creek Temperature TMDL¹⁰](#) provided application of data, recommendations for temperature reduction, and analysis of best management practices.
- Finally, there are portions of these sub-watersheds that are located within US Forest Service jurisdiction. The [Wenatchee National Forest Water Temperature TMDL Technical Report¹¹](#) sets specific goals for implementing agreements between Ecology and the Naches Forest Ranger District. The technical report applies to water flowing from upper tributaries of the Naches Watershed that are located in the Wenatchee-Okanogan National Forest.

⁹ <https://apps.ecology.wa.gov/publications/documents/0310063.pdf>

¹⁰ <https://apps.ecology.wa.gov/publications/documents/1010068.pdf>

¹¹ <https://apps.ecology.wa.gov/publications/documents/0310063.pdf>

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