

Watershed Streams Too Warm

Snoqualmie streams need our help. Cool water is important to protect the most sensitive beneficial uses of Snoqualmie waters: salmon and trout spawning, rearing of young, and fish migration. Fortunately, many things we can do to lower temperature also have other benefits, such as reducing erosion, ensuring cleaner water for people and livestock, and supporting wildlife.



Summer water temperatures are too high, causing fish to become physically stressed, more susceptible to predators, and more likely to get diseases. Also, warm water holds less oxygen than colder water and causes fish to “breathe harder.” Temperatures above 23°C (73°F) can be lethal for salmon and trout.

Federal and state laws require corrective actions to reduce high water temperatures. More importantly, Washington citizens take seriously our responsibility to protect and restore our waterways now and for those in the future.

What causes high stream temperatures?

Natural and human factors can affect stream temperatures. These include:

- Sunlight, which heats air and water, and varies by latitude, season, time of day, cloud cover, and how much shade is available;
- Stream depth, width, flow rate, and overall water volume;
- Availability of cooler groundwater flowing into streams.

Streamside vegetation is the key!

Trees and shrubs create shade (and windbreaks, too) and help form a cool air zone, called microclimate. Otherwise, the sun warms the water.

WHY IT MATTERS

Warm water holds less oxygen and can harm fish and other aquatic creatures. Parts of the Snoqualmie River and its tributaries serve as important migration corridors and spawning and rearing areas for salmon species that require cold waters for optimum health and survival. Additionally, warm water may be a factor in the presence of bacteria, viruses, and other human pathogenic organisms.

These water bodies are too warm, fail Washington’s water quality standards, and cause thermal stress to fish during various life stages. Affected species include Puget Sound Chinook, Bull Trout, Steelhead Trout (each are “threatened” under the Endangered Species Act), coho, chum, pink, sockeye, and rainbow and cutthroat trout.

Ecology is seeking comment on the plans for improving these streams thru June 17, 2011 and will hold a public meeting May 26 at 6:30 p.m. at the Carnation Public Library.

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Special accommodations

If you need this document in a format for the visually impaired, call the Water Quality Program at 425-649-7105.

Persons with hearing loss, call 711 for Washington Relay Service. Persons with a speech disability, call 877-833-6341.

The absence of trees is the *major* factor resulting in increased stream temperatures. Tree removal also allows invasive grasses to thrive in agricultural waterways, reducing effective drainage and increasing maintenance costs. Other factors include:

Loss of cool groundwater: In the dry late-summer and early fall, groundwater feeds the Snoqualmie River. Groundwater is cool when it enters a stream, but warm air and sunlight warms these flows.

Wetland loss, early draining of groundwater through ditching, creation of impervious surfaces (roads, roofs and parking lots), and forest-clearing can all contribute to a net loss of groundwater during summer. Reduced summer groundwater discharges result in higher water temperatures. Wetland loss and excessive stormwater from impervious surfaces can hit a watershed with a “double-whammy,” reducing groundwater flows and sometimes increasing flood severity and frequency.



Loss of natural stream processes: Moving streams – for housing, roads, or agriculture -- usually removes some of the valuable characteristics that keep waters cool. The many twists and turns in an undisturbed stream provide more opportunities for groundwater to enter and for cooler deepwater pools to develop. Where it is practical, adding back natural stream shapes and placements of large wood can benefit stream temperatures.

Erosion: Poorly-managed forest lands, agricultural areas, or construction sites can result in bank deterioration, landslides, and discharge of eroded soils. In addition to the direct loss of usable property to erosion, resulting sediment can make streams shallower and wider, hinder groundwater exchange, and allow more sun on the water. This reduces salmon spawning habitat and groundwater inputs, and increases maintenance needed in downstream agricultural waterways

Water withdrawals: Less water means warmer water. Water withdrawals for various purposes, including irrigation, reduce the amount of cool water stored in the ground to feed the local creeks during the summer when flows are already critically low. Reduced water makes streams slower and shallower, allowing them to become warmer during the dry summer months.

Snoqualmie River and watershed needs more shade, . . . waiting won't help!

Nearly 900 acres of the Middle Fork and mainstem Snoqualmie need to be planted with trees to achieve a healthier streamside forest over time. More than 90 per cent of that need occurs below Snoqualmie Falls. Under current conditions, temperatures in the lower river could reach near-lethal levels for salmon and trout during warm periods. Even if we could plant all of this area

tomorrow, it would still take many decades until those trees mature and provide their maximum benefit.

Tributary streams throughout the watershed also need more shade. Because they are much narrower than the mainstem river, improved streamside vegetation along these waterways will reduce water temperatures more quickly. This in turn will provide benefits to the many cold-water fish in the Snoqualmie Watershed. The lack of shading in floodplain tributaries has also caused a proliferation of reed canary grass in agricultural waterways, which defeats the purpose of those drainage facilities.

The Snoqualmie River was once one of the most prolific salmon rivers in the state. Right now, Chinook salmon and steelhead trout populations are in serious trouble. Improving water temperatures will help increase salmon resources.

Understanding and correcting problems

When a stream is too warm, Ecology collects data to confirm the problem and collaborates with others to understand ways to restore water quality. Ecology performed detailed monitoring of the watershed then developed several computer models to explain where problems exist and how much better the water can get. Streamside vegetation, sunlight, wind speed, and stream flow were all considered as they relate to stream temperatures.



Computer models predicted that improving riparian vegetation along the mainstem Snoqualmie River, combined with meeting the minimum standards for tributary streams, will reduce the “worst-case” water temperatures by 2.8°C (5°F). Under typical ‘warmest-week’ conditions, temperatures will fall by 2.2°C (4°F). What might not seem like a lot to us makes a big difference to fish health!

What can we do to reduce stream temperatures in the Snoqualmie Watershed?

By acting now and taking at least one of the following actions, citizens, organizations, and local governments can help reduce water temperatures and protect and restore water quality.

Protect and restore streamside vegetation: Get involved in restoration projects to improve streamside (riparian) areas where trees have been removed. Trees shade the water, create cool microclimates, act as windbreaks, and increase stream bank stability. Restoration projects can help re-establish connections with the natural floodplain and cool groundwater resources. Woody debris, plant material, and insects that fall into water can also provide habitat and food for fish. Where feasible, streams that have been straightened and had large wood removed should be restored to a state closer to their natural shape to improve natural processes.

Protect or enhance groundwater resources: If you have a wetland, protect it. If you have land that was once a wetland, consider restoring it. Wetlands store water and release it slowly during the summer months. Wherever runoff water is created by roofs, roads, or parking lots, it should be infiltrated to the maximum extent possible. Creating as little impervious surface as needed also helps more water to infiltrate into the soil. This recharges and conserves water in the ground and supports streams during summer. Water allowed to infiltrate during storms does not run off to waterways so quickly and helps reduce flooding.

Conserve water: Increased flow in streams helps keep the water cool. Practice wise use of water near streams to help protect flows during late-summer, low-flow conditions. Reduce lawn areas for watering or use less-consumptive irrigation methods. Use deep soaks early in the morning or late in the evening to minimize evaporation and leave more water in the stream or in groundwater resources that ‘recharge’ stream flows.

Please help improve water temperatures in the Snoqualmie Watershed

Ecology’s plan to bring down stream temperatures needs to be developed and carried out with help from local agencies, tribal authorities, nonprofit organizations, businesses, and residents. We have worked with many organizations to develop a draft plan for review and realize it is very large and contains a significant amount of technical material designed to explain our work to scientists. However, the “Implementation Plan” section of the report is designed to be readable by nonscientists and is now available for local review and comment through June 17, 2011.

We have made copies of our report available at each of the reference desks at public libraries in Carnation, Duvall, Fall City, North Bend, and Snoqualmie. You can also find an electronic version of the report at: www.ecy.wa.gov/programs/wq/tmdl/TMDLsbyWria/tmdl-wria07.html

The plan is now available for local review and comment through June 17, 2011
Send comments to: Ralph Svrjcek 3091 160th Ave. SE, Bellevue, WA 98008-5452
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Please consider coming to a public meeting to learn more:
Carnation Public Library -- May 26 at 6:30 p.m.