2019 | BONNEY LAKE

Pierce Conservation District
Annual Stream Team Report

PIERCE CONSERVATION DISTRICT
CONSERVING PIERCE COUNTY NATURAL RESOURCES SINCE 1949

PIERCE CONSERVATION DISTRICT

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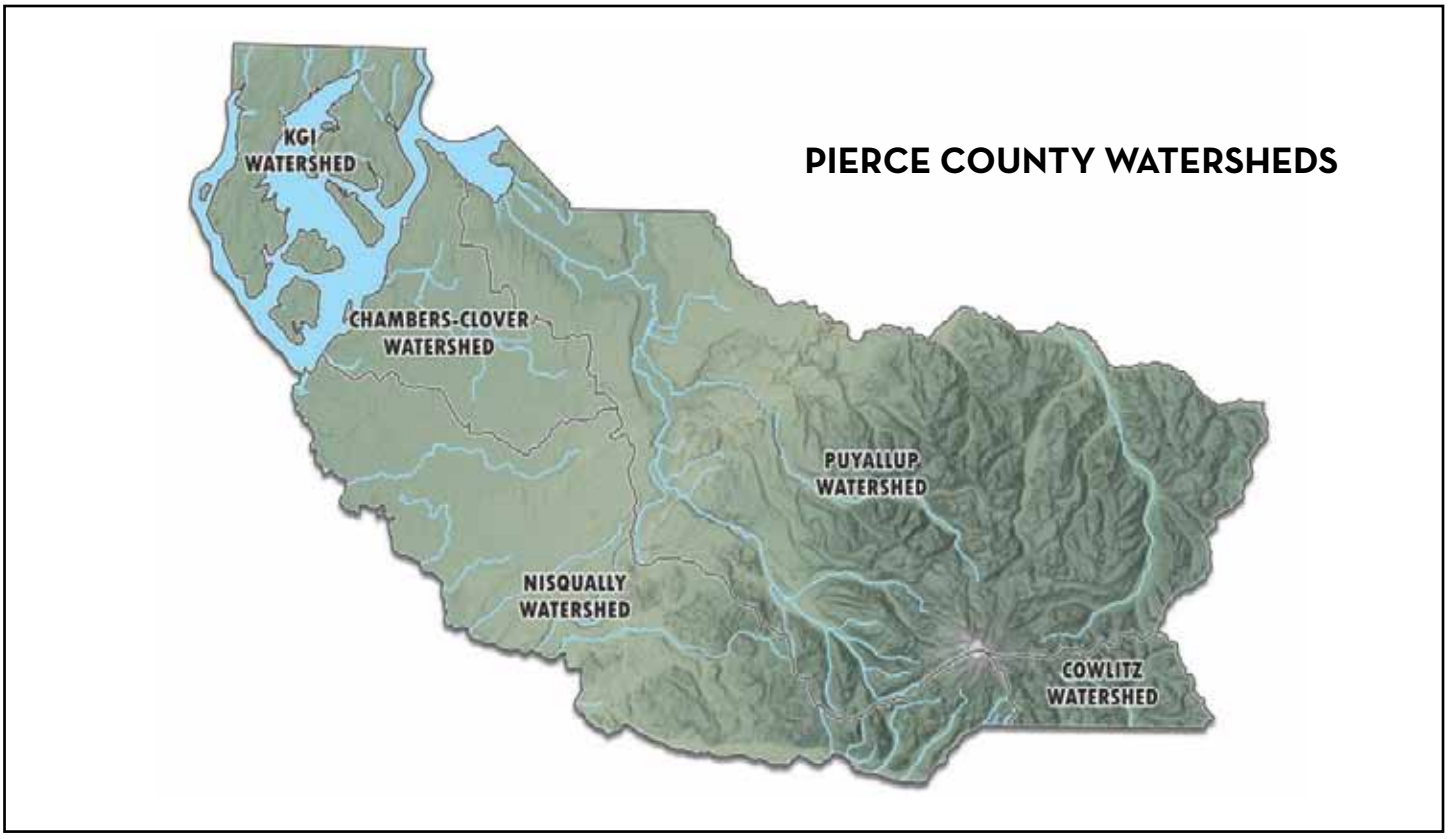
NATURAL RESOURCES CONSERVATION SERVICE
Puyallup Field Office (253) 845-9272

CONTACT US

PIERCE CONSERVATION DISTRICT
308 Stewart Avenue | Puyallup, WA 98371
P: (253) 845-9770 | TF: (866) 845-9485

EMAIL: info@piercecd.org
MAIL: PO BOX 1057 | Puyallup, WA 98371

ANNUAL STREAM TEAM REPORT



STREAM TEAM PROGRAM GOALS

- Watershed education
- Involve community in citizen science monitoring
- Increase available water quality data
- Identify areas of concern

WHAT DO OUR STREAM TEAM MONITORS DO?

- Measure dissolved oxygen, air and water temperature, pH, nitrate-nitrogen, and turbidity
- Measure stream flow
- Conduct an annual habitat assessment
- Provide observations of stream site

The Pierce Conservation District has coordinated a volunteer stream monitoring program, Stream Team, in all four watersheds in Pierce County since 1994. Since that time PCD has engaged over 2,000 citizens in this program and currently more than 70 volunteers are actively involved with this effort. Stream Team has 39 sites currently, 22 of which are prioritized by jurisdictional partners. The goals of this program are to provide education to Pierce County residents about local streams, and the impact of our daily lives on stream water quality and habitat; as well as provide information on current stream conditions.

WHY IS MONITORING IMPORTANT?

Monitors raise awareness of potential pollution areas and problem stream sites, learn about pollution prevention, provide data for streams that are usually unassessed, and increase the amount of water quality information available to local communities and decision makers.

HOW DOES THIS PROGRAM WORK?

Local citizens are recruited from the community through the PCD newsletter, schools, Facebook page, and other media. Volunteers attend a three-hour training focused on the basics of watershed health, stream ecology; why we monitor; water quality testing for dissolved oxygen, nitrates, pH, and turbidity; flow measurement; and a habitat assessment with time for participants to practice sampling techniques.

Monitoring sites have been selected on jurisdictional preference for particular stream(s) and where the jurisdiction wants stream health indicators. Stream monitors select their site from this list, at times monitoring where another group monitors to gather as many datapoints as possible on each site. Stream monitors select one of three different monitoring schedules (monthly, every other month or quarterly) based on best fit with their personal schedule. PCD provides the water quality kits to the volunteers.

PCD staff provides on-going maintenance of the kits including annual calibration of thermometers, cleaning of the kits, checking and replacing reagents on a regular basis, and updating equipment as needed. The data collected using these kits is "red-flag" data, highlighting areas of concern where a more focused effort may be needed.

WHAT HAPPENS WITH THE DATA AFTER IT IS COLLECTED?

The data is reviewed when submitted for any missing, or unusual results or to clarify comments about conditions seen at the site. The results and additional comments are entered into an Excel database. An annual snapshot of the data is prepared and sent to the volunteers and to our jurisdictional partners.

STREAM OF CONCERN PROCESS

Data is reviewed quarterly and highlighted if not meeting state standards set by the Washington State Department of Ecology. If data does not meet the state standard three times in a row, staff will sample with meters at these sites. Stream Team monitors will be contacted to confirm sampling protocols and sample collection method in the stream. Stream of Concern data and results are communicated to jurisdictional partners.

STATE STANDARDS FOR STREAMS IN PIERCE COUNTY

The Washington State Department of Ecology sets standards for each stream based on beneficial uses for water temperature, dissolved oxygen, pH, and turbidity. While there are no nitrate standards issued by the Department, nitrate concentrations in our surface waters can have significant impacts on the other metrics we do have standards for and can cause significant alterations in biotic potential as well as overall habitat. The water quality data collected by volunteer stream monitors is presented in graphs along with the Washington State Department of Ecology standards. Red bars or red circles indicates those data points not meeting state standards.

WATER TEMPERATURE AND DISSOLVED OXYGEN

Temperature and dissolved oxygen are two very important water quality features, and their levels determine what can live in our streams. High water temperatures reduce the ability of water to hold oxygen and stresses the plants and animals that live in the stream. Warm water temperatures can be caused by lack of shading, erosion, stormwater runoff, and flow. Dissolved oxygen levels are affected by temperature, turbulence, photosynthesis, respiration, salinity, elevation, and amount of decaying matter.

pH

pH is a measure of the hydrogen ion concentration of water, which determines whether the water is acidic or basic. Aquatic plants and animals are sensitive to high or low pH. Factors that affect pH levels include photosynthesis, respiration, decomposition, stormwater runoff, and chemical spills. pH is measured on a scale ranging from 0 to 14 of pH units. A pH reading below 7 is considered acidic; above 7 is considered basic. It is important to know that the pH scale is "logarithmic", meaning that for each one whole unit of change in pH, there is a ten-fold change in its acid or base level.

NITROGEN

Nitrogen is an essential plant nutrient required by all plants and animals for building protein. Nitrogen is present in several different forms in aquatic ecosystems. Nitrate is one form of nitrogen that can be easily used by plants and animals. The concentration and supply of nitrates in a stream depends on the surrounding land use. Sources of nitrates include human and animal waste, fertilizers, and stormwater run-off. Excessive amounts of nitrates stimulate increased plant and algae growth which leads to lower oxygen levels as they begin to die off (eutrophication). During spring, nitrate levels may increase due to fertilization of lawns and fields. During winter, high rainfall can cause increased run-off of organic matter such as leaves, twigs, grass, and other debris. Decomposition of this organic material releases nitrates.

TURBIDITY

Turbidity is a measure of a stream's overall clarity. This generally varies throughout the year within any stream system, but large variations throughout a given period can be an indicator of problems with runoff, erosion, deforestation, or human activity. Clear water is important for many types of aquatic animal and plants species throughout their lifespan, and the hallmark of clear, cool water is especially important to anadromous salmonid species in the area.

WHAT CAN YOU DO

LOW DISSOLVED OXYGEN AND HIGH WATER TEMPERATURE

One possible solution to mitigate low dissolved oxygen and high water temperatures is to remove invasive vegetation, like reed canarygrass from streams. Invasive vegetation tends to slow down flow and increase decomposition, both which contribute to low dissolved oxygen. Physical removal of reed canarygrass is not recommended, but instead shading it out with trees and shrubs can have an impact. If sites are devoid of vegetation, installing trees and shrubs can increase canopy cover to shade streams and lower water temperature.

LOW OR HIGH pH

pH outliers above and below a neutral pH can indicate inputs to a stream system, such as stormwater or chemical runoff. Decomposition can also affect pH if there is excess vegetative growth from nutrients or salmon are decaying. While it is not feasible to control stormwater or chemical runoff, you can filter some out before it enters a stream through installing native vegetation. Riparian buffers not only filter out pollution but hold in streambanks. Examples of streamside vegetation include willows, red osier dogwood and Pacific ninebark.

HIGH NITRATES

Similar to pH, high nitrates can be contributed by external inputs to streams. Nitrates are most commonly found in fertilizers, animal waste, waste water treatment plants, septic systems, and biological decomposition. Control options include eliminating the source or installing native vegetation to act as a filter.

HIGH TURBIDITY

High turbidity is caused by excess particles making water appear cloudy or unclear. Particles can be a result from streamside sediment that washes in from erosion or rainfall. Construction and agriculture production can also contribute to excess sediment in streams. High turbidity caused by natural rainfall is an episodic event and not a concern. High turbidity from human-caused sources can be mitigated through restrictions on streamside construction or plant installation on erodible banks.

FENNEL CREEK 2.5 SITE DATA

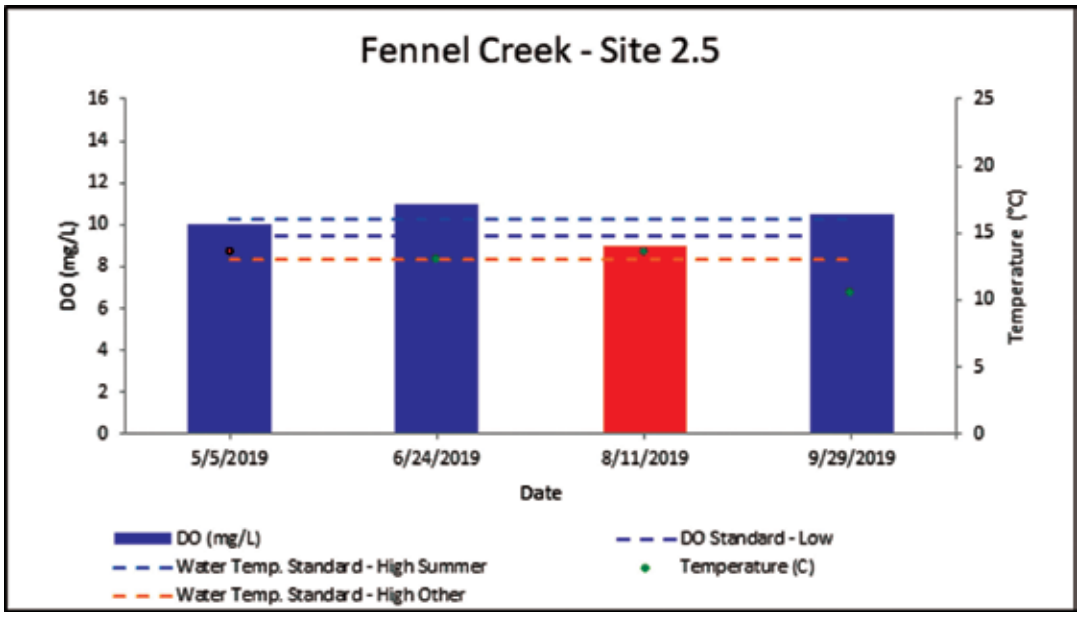
SITE OVERVIEW

Fennel Creek, located in the Puyallup watershed, flows approximately 8 miles from its headwaters on the plateau near Bonney Lake to its confluence with the Puyallup River near Alderton. The lower reaches of Fennel (below Victor Falls) supports chinook, coho, pink, chum and steelhead.

Fennel Site 2.5 is located at the Fennel Creek Trail Head. It is accessed via a small park between two homes and the monitoring takes place from the bridge.

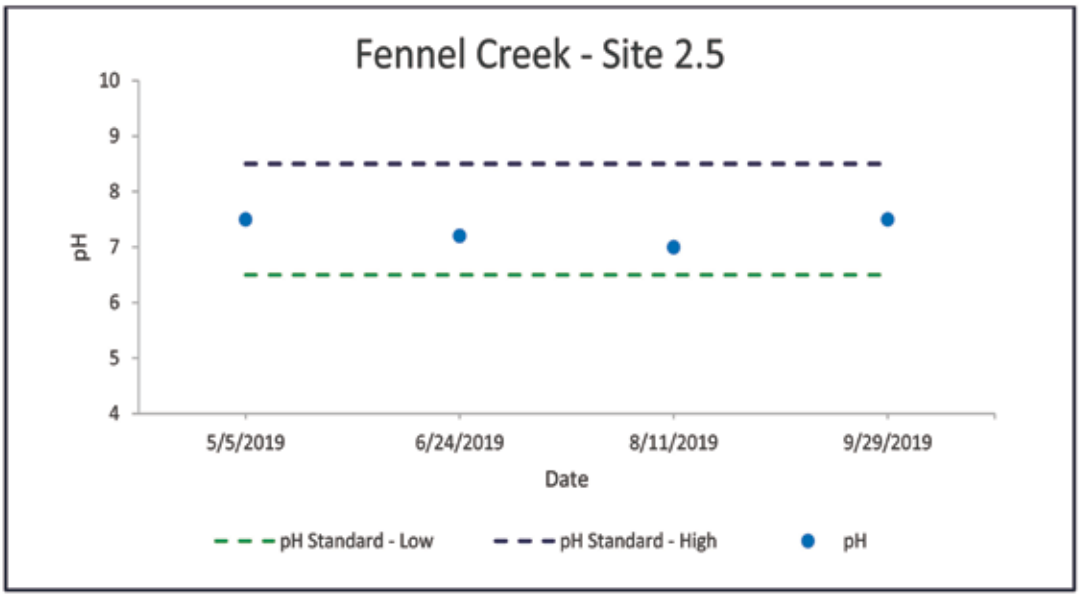
VOLUNTEERS

In 2019, John Lee participated in monitoring of Fennel Creek Site 2.5 contributing a total of 8 hours of volunteer time.



Fennel Creek Site 2.5: DO & Temperature

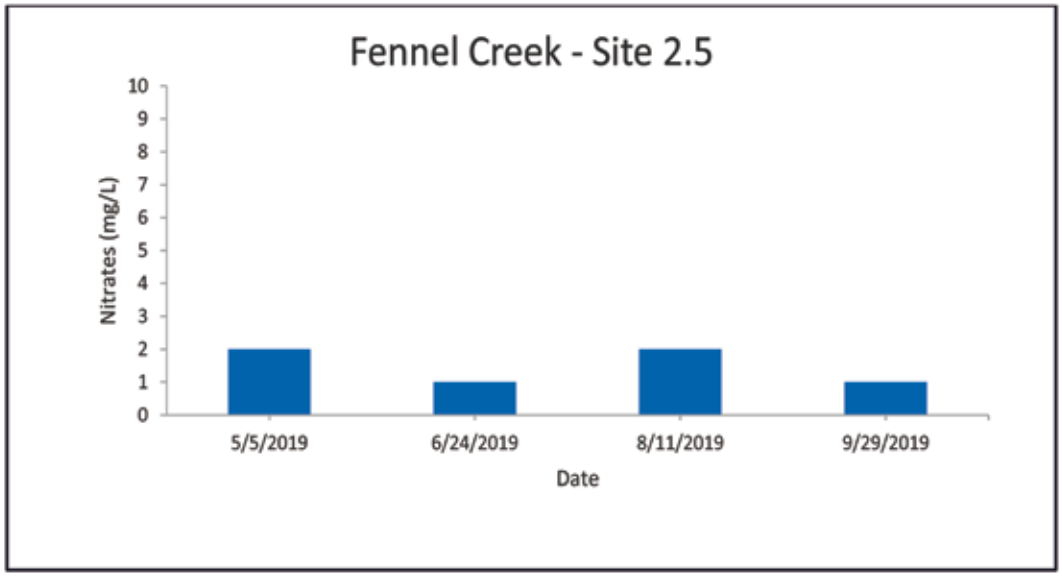
This figure shows the recorded dissolved oxygen (mg/L) and temperature (°C) readings for Fennel Creek throughout the 2019 water year. Dissolved oxygen failed to meet the DO standard of 9.5 mg/L in August 2019. Water temperature did not meet the standard of 13°C during May 2019.



Fennel Creek Site 2.5: pH

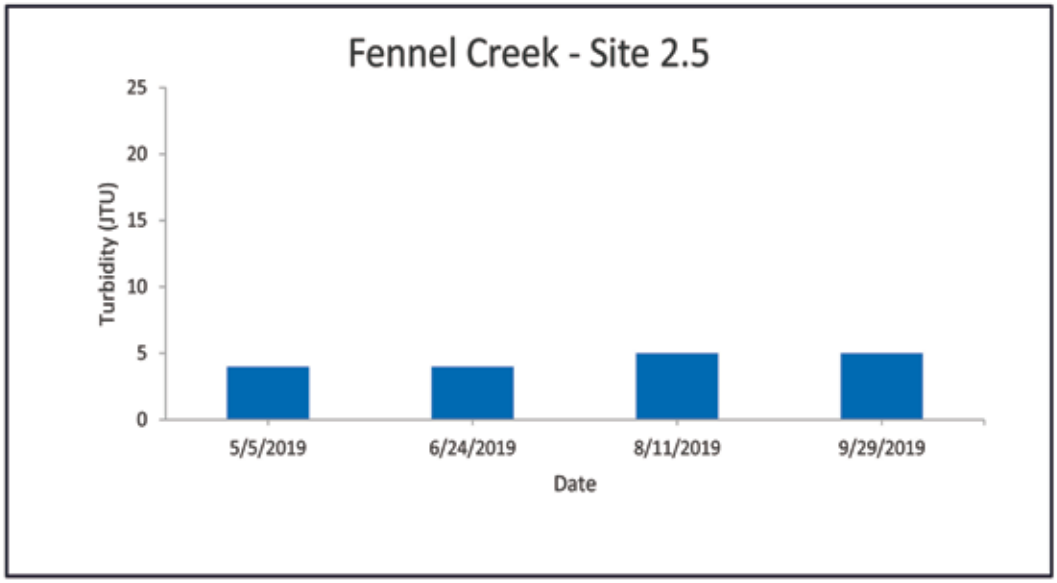
This figure shows the water pH for Fennel Creek 2.5 throughout the 2019 water year. The recorded pH remained at or within the pH Standard range of 6.5 – 8.5.

FENNEL CREEK 2.5 SITE DATA



Fennel Creek Site 2.5: Nitrates

This figure shows the water nitrogen/nitrate level (mg/L) for Fennel Creek Site 2.5 throughout the 2019 water year. Nitrates did not exceed 2 mg/L.

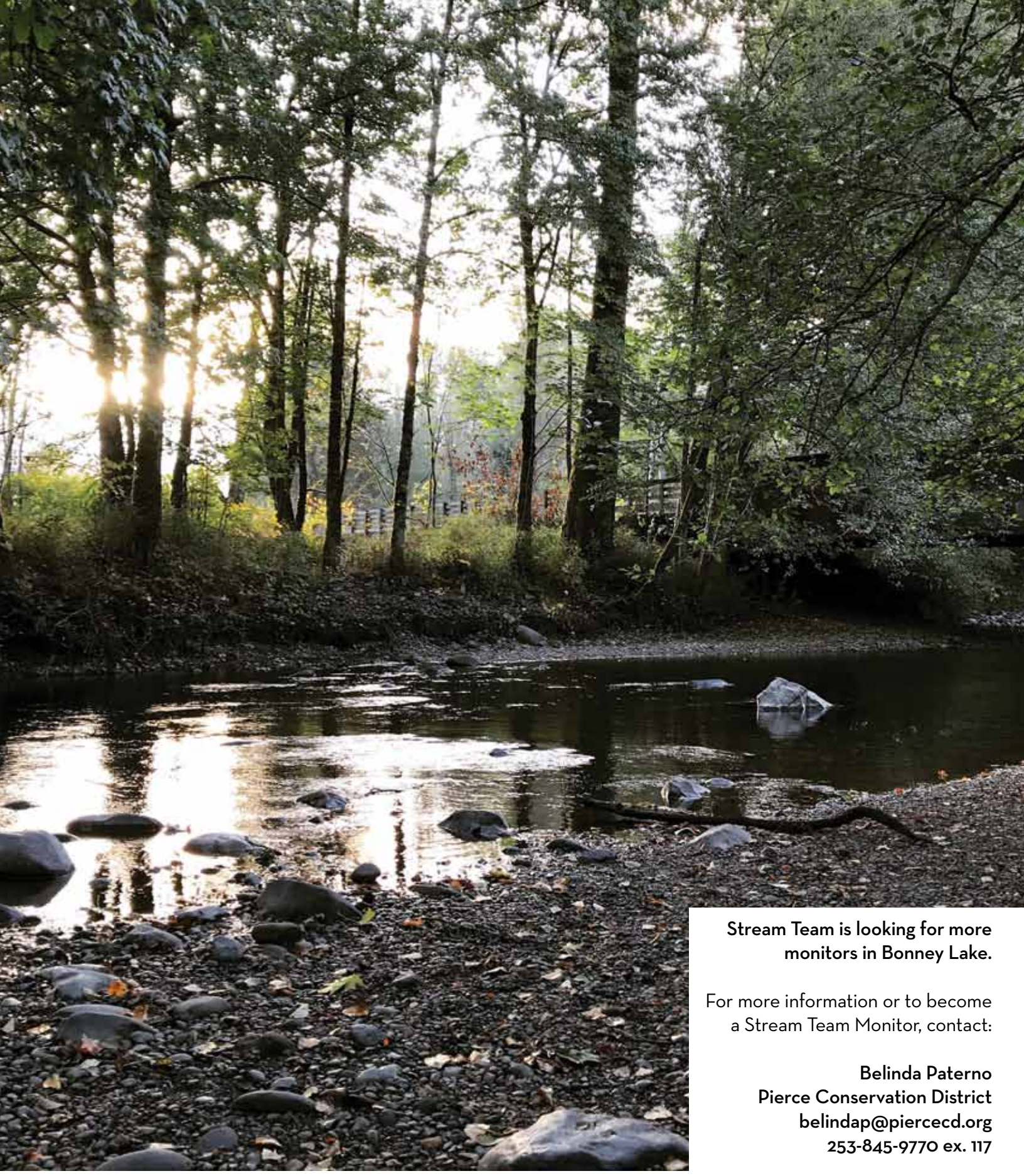


Fennel Creek Site 2.5: Turbidity

This figure shows the water turbidity (JTU) for Fennel Creek Site 2.5 throughout the 2019 water year. Turbidity did not exceed 5 JTU.

SUMMARY

Fennel Creek failed to meet the dissolved oxygen state standard during the August 2019 sampling. The recorded May 2019 water temperature also failed to meet the state standard due to warmer ambient temperatures. The monitor observed a shallow, steady flow with one rock bridge built that did not affect flow.



Stream Team is looking for more monitors in Bonney Lake.

For more information or to become a Stream Team Monitor, contact:

Belinda Paterno
Pierce Conservation District
belindap@piercecd.org
253-845-9770 ex. 117

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