Lakewood Stream Team Program

Stream Monitor Program Goals

- Educate citizens about stream ecology, stream health, and nonpoint source pollution
- Involve citizens in observing, monitoring, reporting stream conditions
- Provide useful data/information to local Jurisdictions

What do our stream monitors do?

- Measure dissolved oxygen, water temperature, pH, nitrate-nitrogen, and turbidity
- Measure stream flow
- Conduct an annual habitat assessment

Program Background

Pierce Conservation District has coordinated a volunteer stream monitoring program in all four watersheds in Pierce County since 1994. Since that time PCD has engaged over 1,000 citizens in this program and currently more than 70 volunteers are involved with this effort. 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 to your jurisdiction?

Volunteer monitors build awareness of pollution problems, learn about pollution prevention, raise awareness of problem sites, provide data for waters that may be unassessed, and increase the amount of water quality information available to local communities and decision makers.

Pierce Conservation District

How does this program work?
Local citizens are recruited from the local community through the PCD newsletter, Facebook page, and other media. Interested citizens attend a training focused on the basics of 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. Staff also conducts a follow up field quality control session with each new monitor once they have established their monitoring routine.

Monitoring site selection is typically from a list of open monitoring sites or can be based on jurisdictional preference for a particular stream(s). Stream monitors can choose from three different monitoring schedules (monthly, bimonthly, quarterly) based on best fit with their personal schedule.

PCD provides the water quality kits to the volunteers. PCD staff provides ongoing maintenance of the kits including annual calibration of thermometers, checking and replacing reagents on a regular basis, and updating equipment as needed. The data collected using these kits is considered to be “red-flag” data, highlighting areas of concern where a more focused effort may be needed.

Volunteers
In 2017, 9 volunteers participated in monitoring 4 sites on Chambers, Flett, and Ponce de Leon Creeks contributing a total of 60 hours.

What happens with the data after it is collected?
The data is reviewed as it comes in to check 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 Access database. An annual snapshot of the data is prepared and sent to the volunteers and to our jurisdictional partners.

State Standards

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.

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 also 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 (eutrophication) which leads to lower oxygen levels as they begin to die off. 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

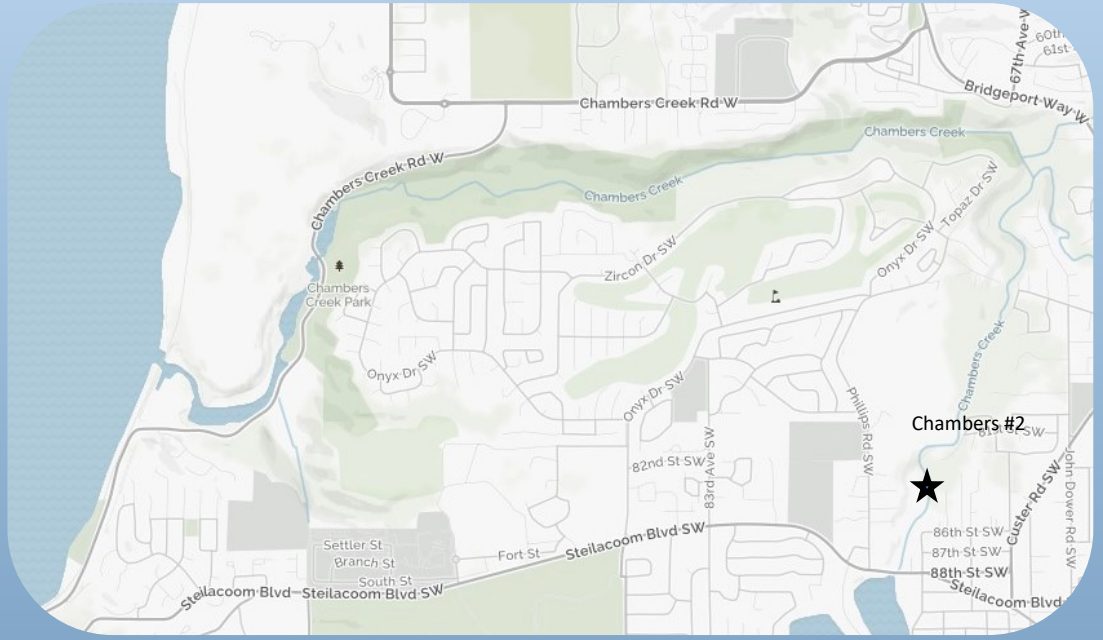
Turbidity is a measure of a stream's overall clarity. This generally varies throughout the year within any stream system, but large variations throughout a given period can be an indicator of problems with runoff, erosion, deforestation, or human activity. Clear water is important for many types of aquatic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

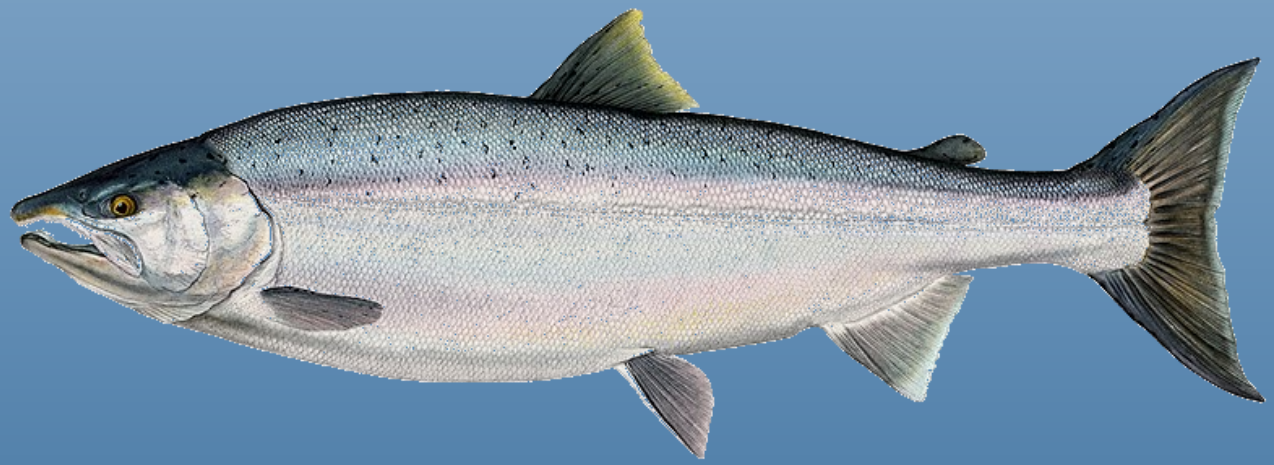
Chambers Creek Monitoring Site

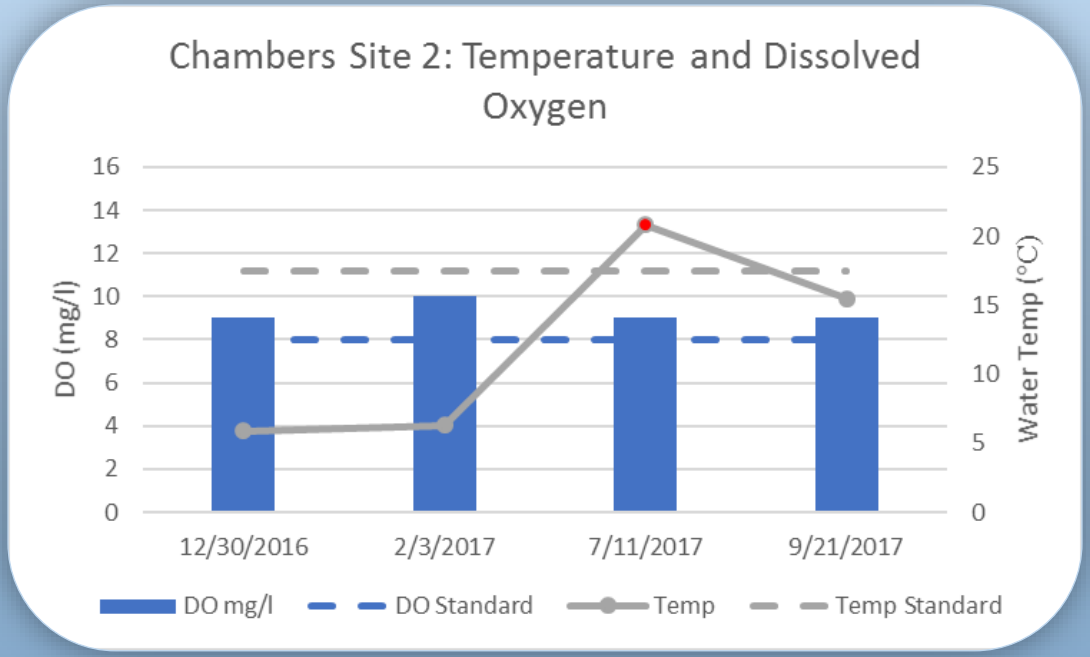
Chambers Creek is located in the Chambers-Clover Creek watershed. It flows approximately 4 miles from the outlet of Lake Steilacoom to Chambers Bay. Chambers Creek supports runs of coho, chum, kokanee and winter steelhead salmon.

Chambers Creek is designated as a spawning, rearing, migration stream and according to state water quality standards, water temperature should be ≤ 17.5˚C, dissolved oxygen should be ≥ 8 mg/l, pH should fall between 6.5 and 8.5.

Site #2 is located upstream of the Chambers Creek Hatchery.

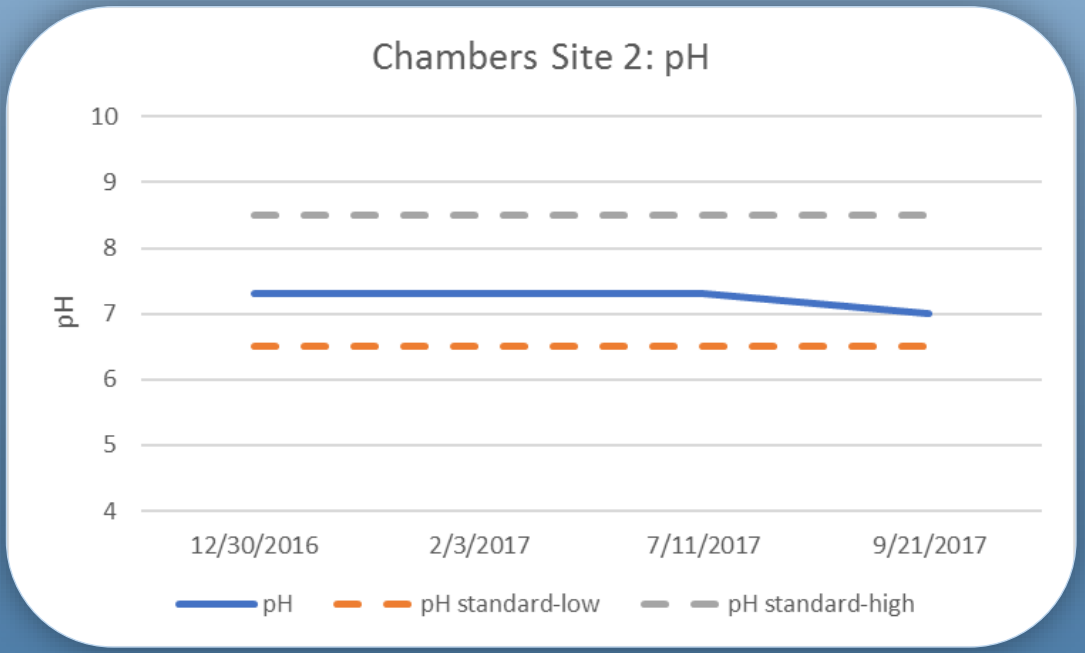


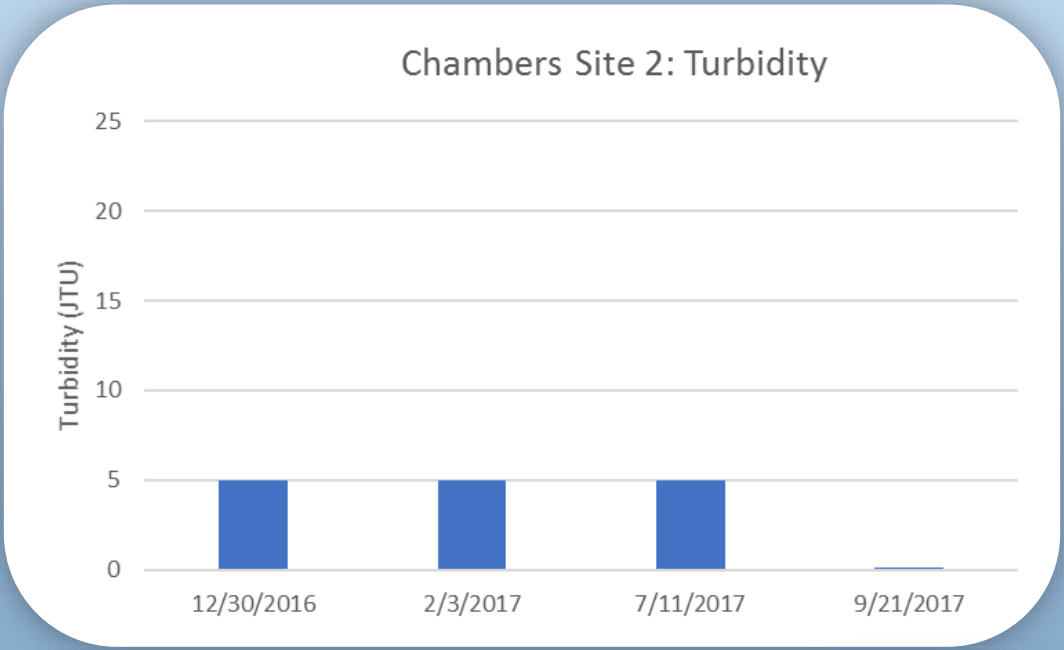




This graph shows dissolved oxygen levels and water temperatures during 2017. While dissolved oxygen standards were met on all sampling dates, the water temperature did not meet standards at the July sampling date.

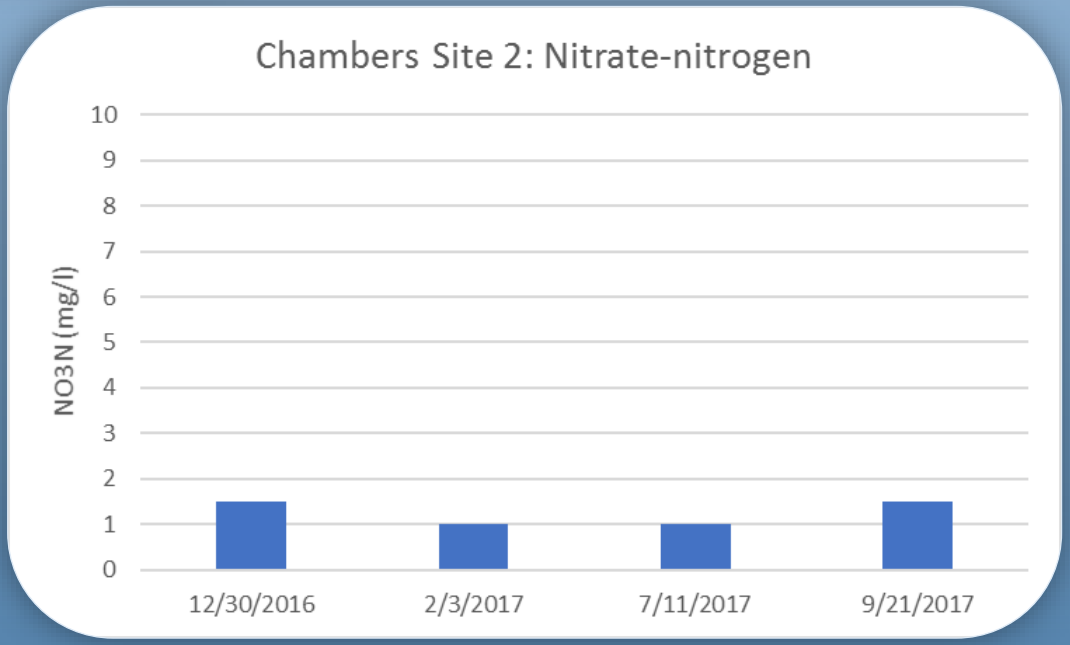
This graph shows pH levels during 2017. pH levels did meet state standards at all of the sampling dates.





This graph shows the turbidity levels for water year 2017.

There are no state standards for nitrates at this time.



Chambers Creek Summary

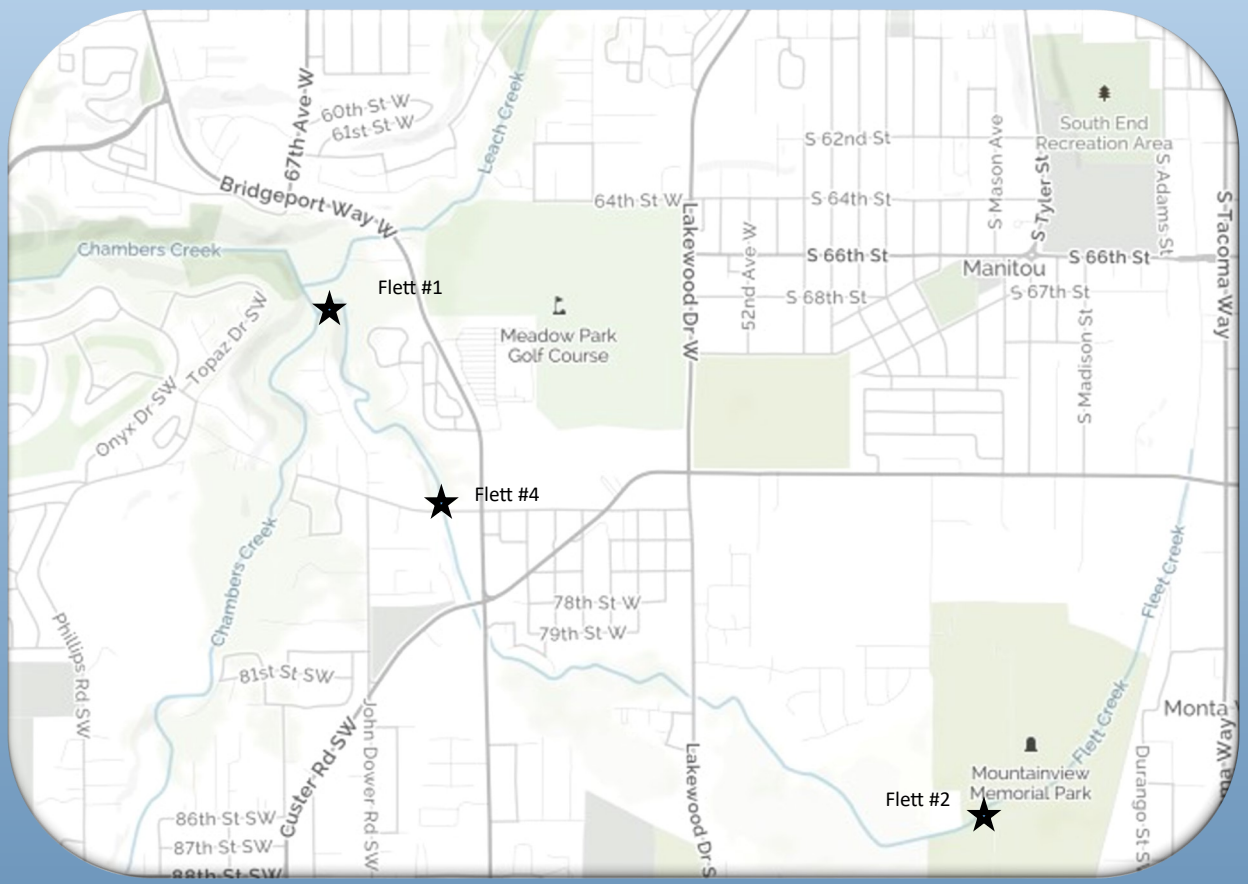
State standards for dissolved oxygen and pH were met on all sampling days. Water temperatures met state standards on most sampling days. Higher water temperature in July is most likely due to warmer air temperatures and lower stream flows at this time of year.

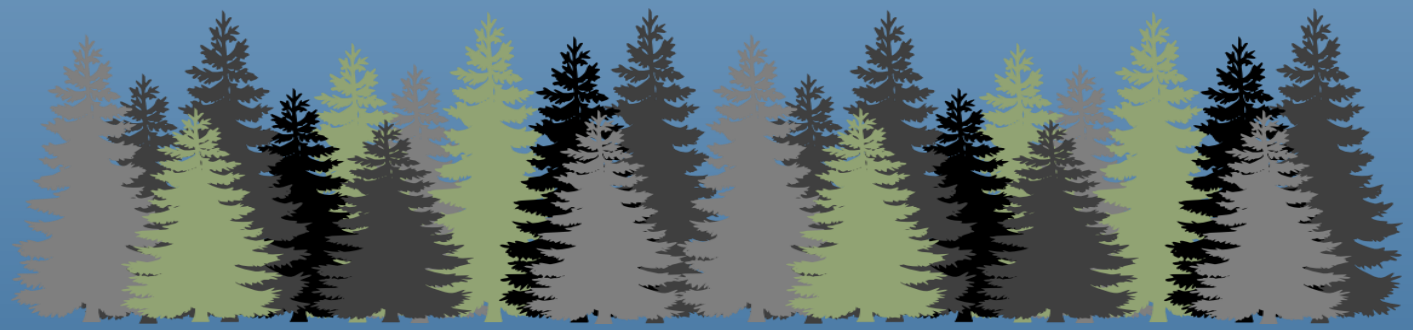
Flett Creek Monitoring Site

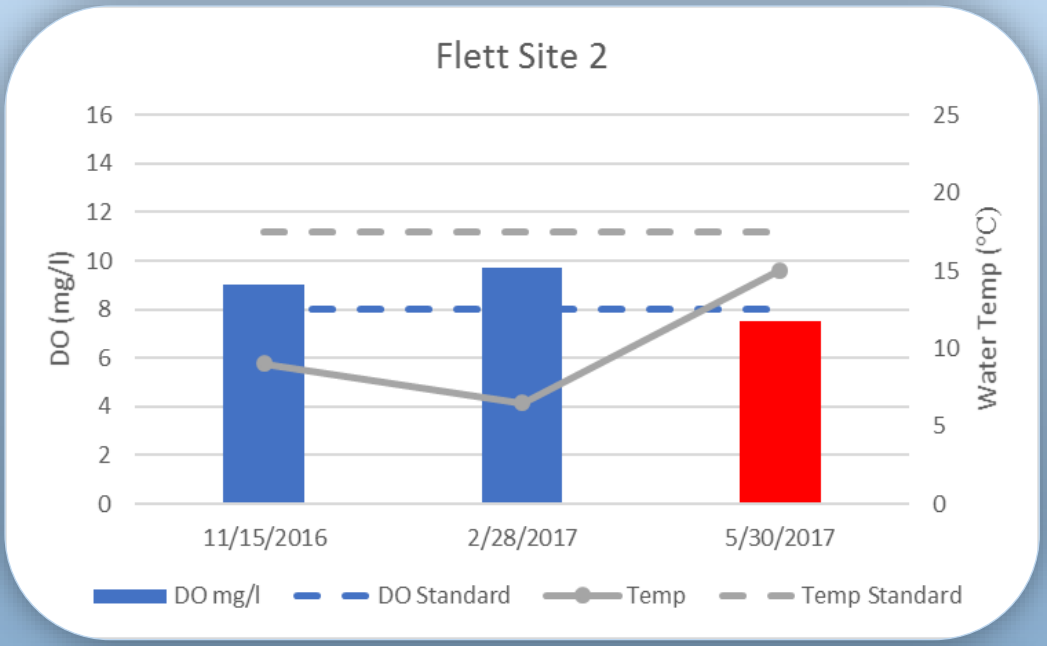
Flett Creek is located in the Chambers-Clover Creek watershed. It flows west approximately 3 miles from Manitou until it converges with Chambers Creek. Flett Creek supports runs of coho, chum and winter steelhead salmon.

Flett Creek is designated as a spawning, rearing, migration stream and according to state water quality standards, water temperature should be ≤ 17.5˚C, dissolved oxygen should be ≥ 8 mg/l, and pH should fall between 6.5 and 8.5.

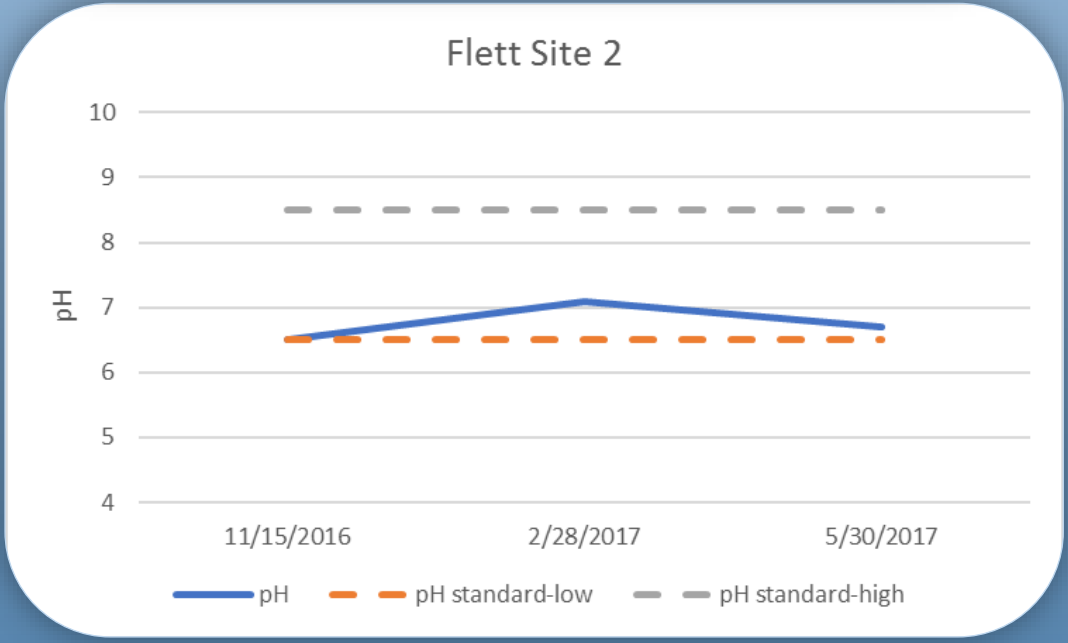
Volunteer stream monitors sample Flett Creek at three sites. Site #1 is located at 6516 Flanagan Rd W, Lakewood, upstream of confluence with Chambers Creek. This site has been recently added and there is not enough data to report this year. Site #2 is located in the Mountain View Cemetery, downstream of the final pond. This site is monitored by the Clover Park Technical College Environmental Science class. Site #4 is located downstream of the 75th Street bridge, there is not enough data for this site to report this year.







This graph shows dissolved oxygen levels and water temperatures during 2017. Flett Site 2 met state standards for stream temperature at all three monitoring dates, but the May 30 2017 dissolved oxygen measurement did not meet the standard.



This graph shows pH levels during 2017. pH levels did meet state standards at all of the sampling dates.

*There was no Nitrate-nitrogen or Turbidity data for Flett Site 2.

Flett Creek Summary

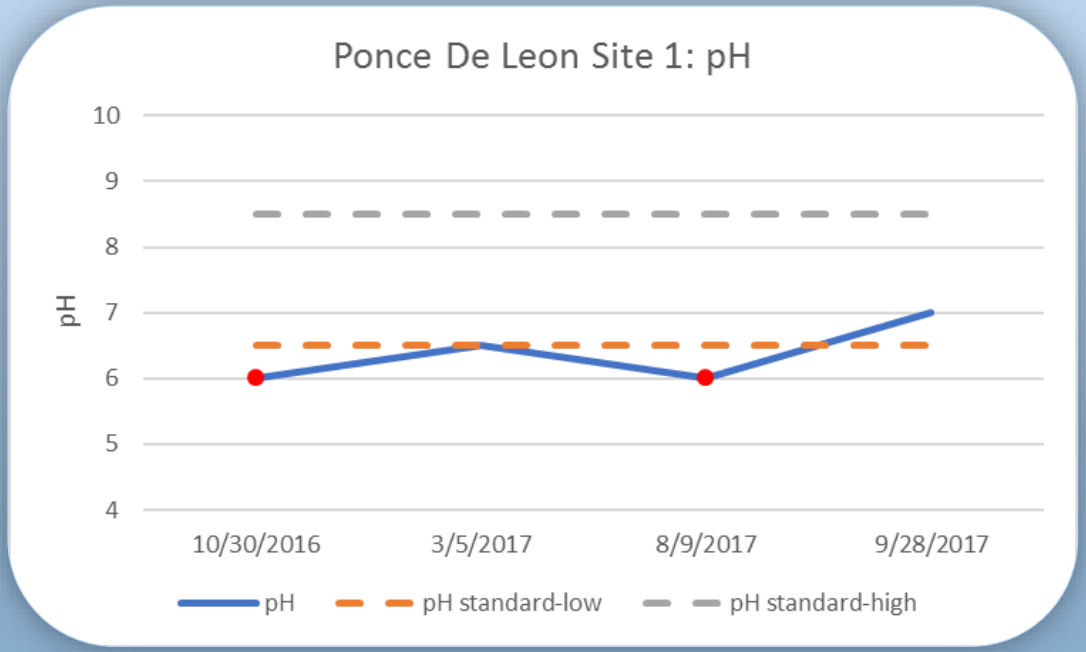
State standards for water temperature and pH were met on all sampling days. Dissolved oxygen levels did not meet standards on one of the sampling days. There aren't additional observations that might explain the low dissolved oxygen levels on the May sampling date.

Ponce de Leon Creek Monitoring Site

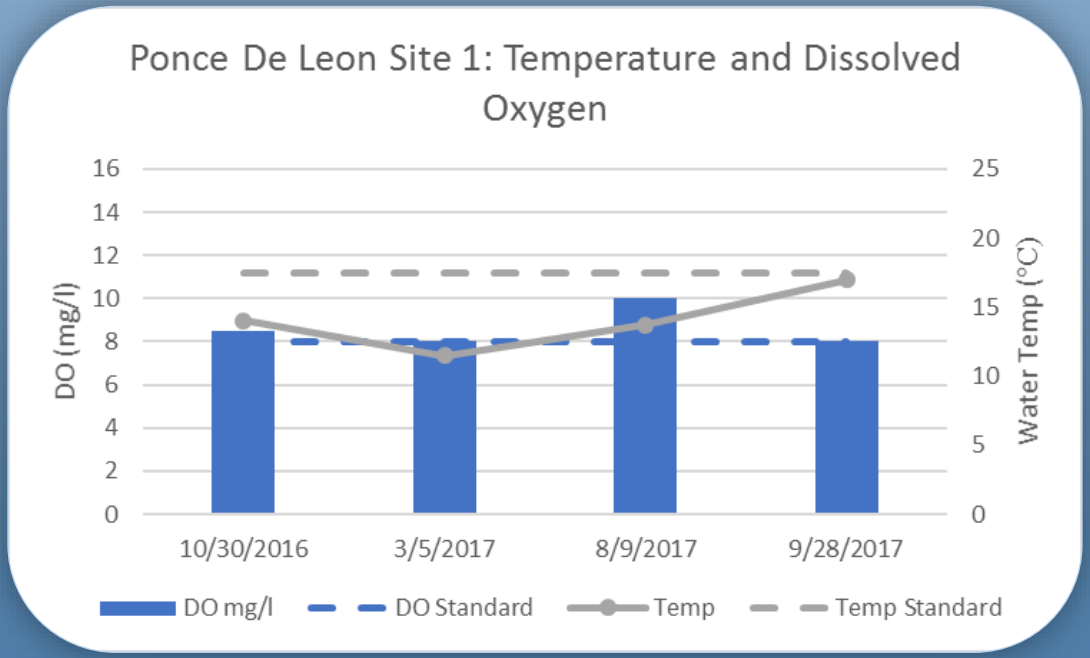
Ponce de Leon is located in the Chambers-Clover Creek watershed. It flows approximately 0.5 miles from Gravelly Lake Drive to Steilacoom Lake. Ponce de Leon Creek supports runs of coho and kokanee salmon.

Ponce de Leon Creek is designated as a spawning, rearing, migration stream and according to state water quality standards, water temperature should be ≤ 17.5 ℃, dissolved oxygen should be ≥ 8 mg/l, and pH should fall between 6.5 and 8.5.

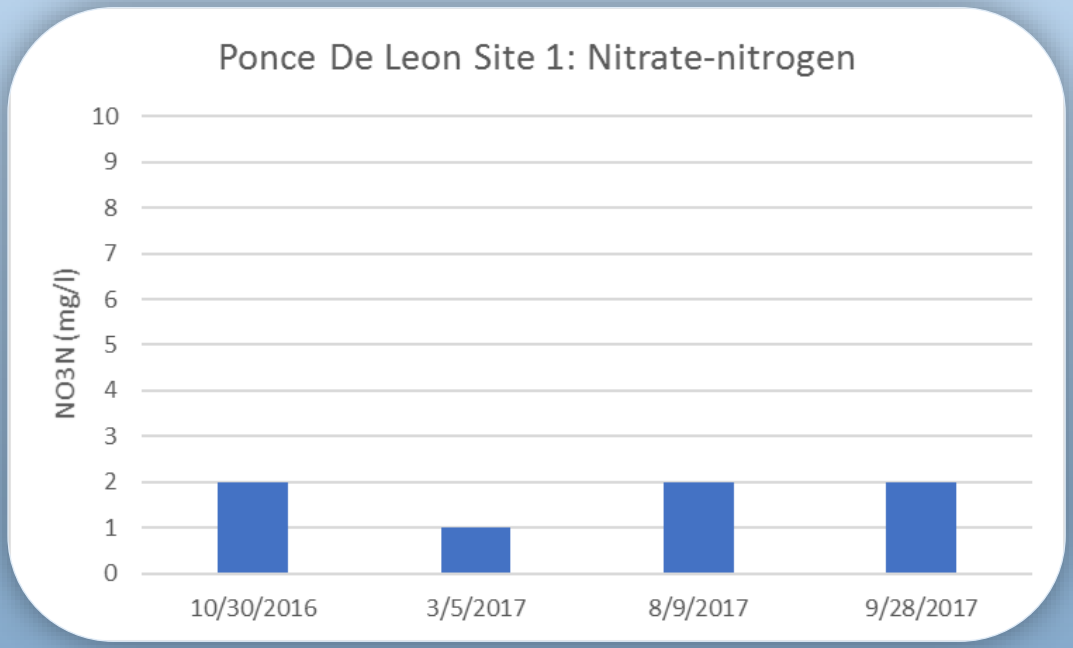
Volunteer stream monitors sample Ponce de Leon Creek at Site #1, which is located at the Gravelly Lake Dr. crossing



This graph shows pH levels for the 2017 water year. There were two instances when pH did not meet state standards.



This graph displays water temperature and dissolved oxygen for the water year 2017. Both dissolved oxygen and water temperature met state standards on all dates sampled.



There are no state standards for nitrates at this time.

*There was no Turbidity data for Ponce De Leon Site 1.

Ponce de Leon Summary

State standards for dissolved oxygen and water temperature were met on all sampling dates. pH did not meet the state standard on two of the sampling dates, it was low (acidic). The volunteer monitors also noted the presence of varying amounts of litter and ivy at the site.

Stream Team is looking for more monitors in Lakewood.

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

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