

PIC Open House

Thanks again to all those in attendance at the June 8, 2018 Pollution Identification and Correction open house at the Historic Dungeness Schoolhouse.

There were some great questions on interpreting water quality data, study method limitations, and more.

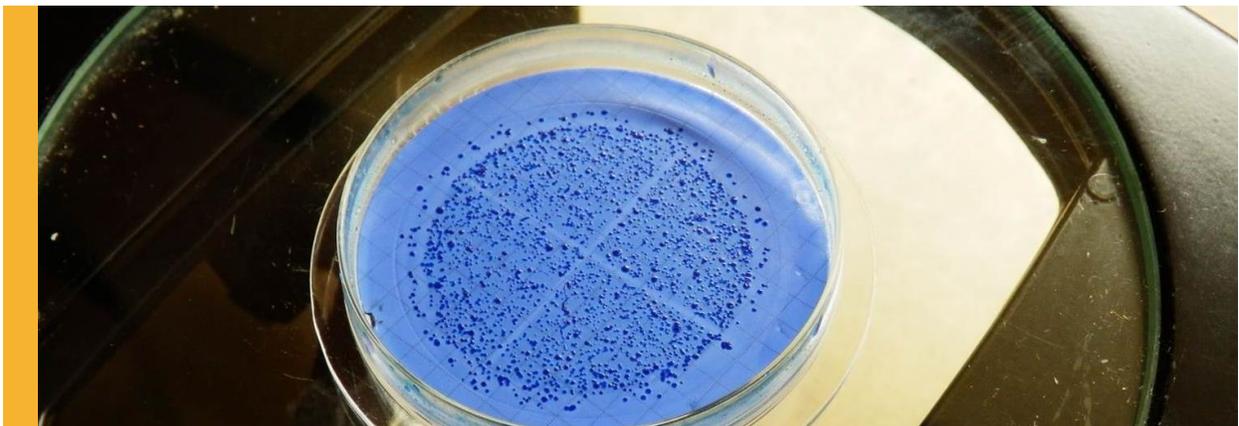
The next open house should happen around December 2018.

Hotspots

The PIC segmented sampling team has been busy in the Matriotti/Lotzgesell waterways, collecting water samples in an attempt to confirm or rule out potential “hotspots,” or, areas with high concentrations of bacteria that require further investigation and cleanup.

July 2018 Update Topics

- June 2018 Open House
- Hotspots
- Water Quality Data
- Water Temperature
- Next Steps
- Resources



Fecal coliform colony-forming units (CFU) are counted in the laboratory.

July 2018 UPDATE

What is a Hotspot?

According to the PIC Plan (the guiding document created by PIC Partners in 2014 to direct pollution cleanup efforts in the Sequim Dungeness Clean Water District):

...Hotspots are locations where the geometric mean of preferably three water quality samples exceeds the “Extraordinary” water quality standards set by Washington State...

...All samples with FC [fecal coliform] results exceeding 50 FC/100 mL are ideally re-sampled to confirm that they are indeed hotspots. Re-sampling should occur as soon as possible, ideally within a few days of the initial collection date.

When the geometric mean from samples taken exceeds 50 FC/100 mL, the hotspot is identified and further investigation is warranted. All hotspots should be investigated; however, when there are multiple hotspots, the following prioritization criteria should be used:

High Priority	Medium Priority	Low Priority
> 400 FC/100 mL	100 to 399 FC/100 mL	50 to 99 FC/100 mL

How is a Geometric Mean Calculated?

Let's take a look at site MAT10 on Matriotti Creek as an example. On July 5, 2018 we collected a 100 mL water sample that resulted in a count of 90 FC colony-forming units in the laboratory.

This single measure was greater than 50 FC/100 mL, but we needed at least two more measurements to confirm a hotspot. We returned to collect water samples on July 11 and July 16, following the PIC Plan. These water samples produced counts of 114 FC/100 mL and 184 FC/100 mL, respectively.

We calculate the geometric mean by taking the n^{th} root of the product of n numbers. Here, since we have three FC Counts, we take the third root of the product of the three values.

$$\sqrt[3]{90 \times 114 \times 184} \approx 124 \text{ CFU/100 ml}$$

Thus, we have a confirmed medium priority hotspot at sample site MAT10. Similar calculations, performed for the remaining sample sites, are summarized in the table, below.

July 2018 UPDATE

Water Quality Data

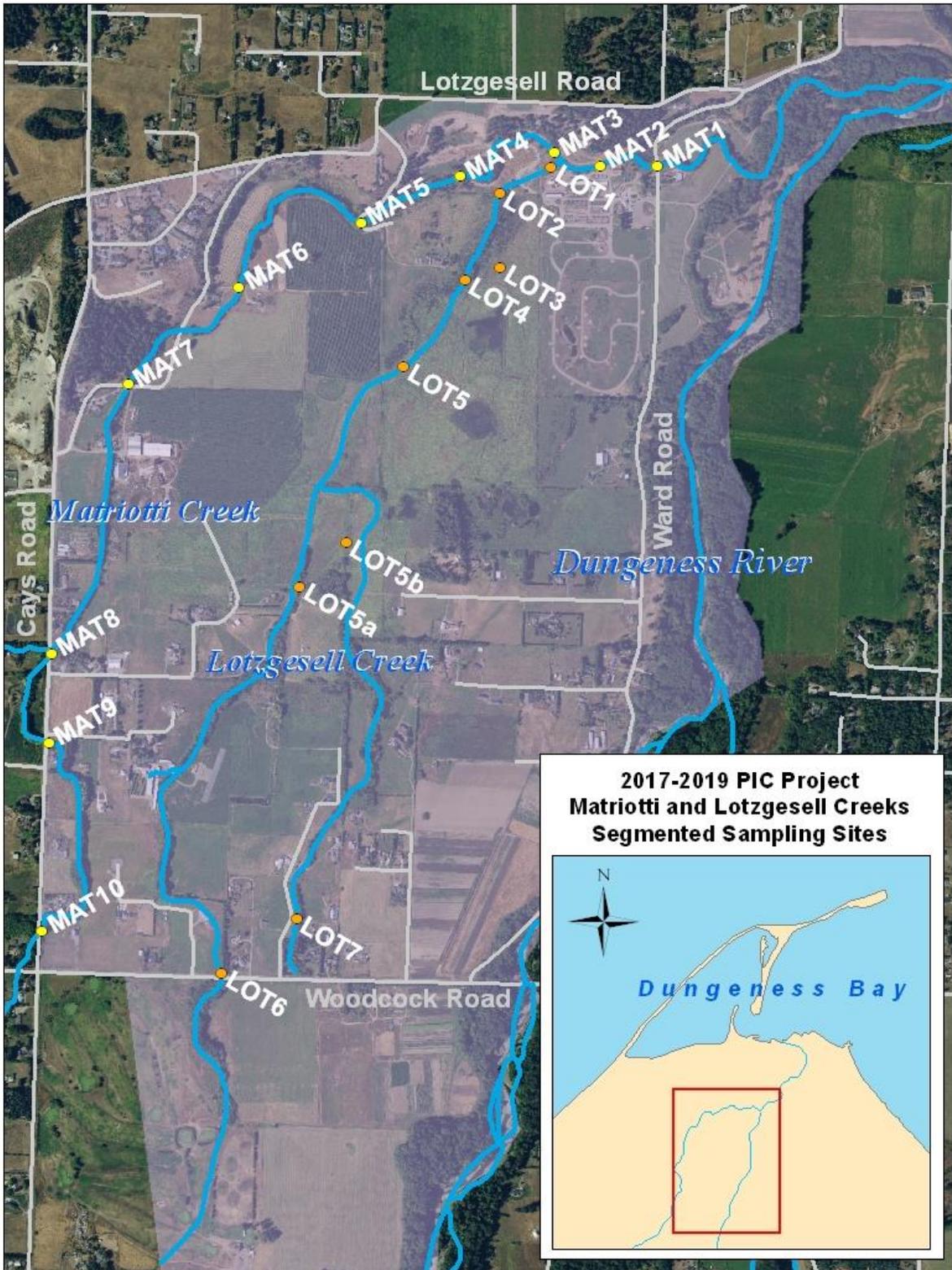
Sample Site	7/5/2018	7/11/2018	7/16/2018	Geometric Mean
LOT1	64	128	126	101
LOT2	26	40	44	36
LOT3	6	NA	NA	NA
LOT4	4	32	20	14
LOT5	8	58	10	17
LOT5a	18	2	16	8
LOT5b	28	NA	NA	NA
LOT6	12	18	8	12
LOT7	26	NA	NA	NA
MAT1	218	118	170	164
MAT2	250	144	146	174
MAT3	508	220	322	330
MAT4	94	156	178	138
MAT5	90	36	166	81
MAT6	26	108	86	62
MAT7	26	56	164	62
MAT8	6	86	110	38
MAT9	30	38	226	64
MAT10	90	114	184	124

Fecal coliform counts in colony-forming units (CFU) per 100 mL sample.

All Matriotti and Lotzgesell segmented sites were visited for water quality sampling on July 5, 11, and 16. The ground has been drying out through the summer and sites LOT3, LOT5b, and LOT7 did not have enough water to sample every visit.

Low priority hotspots were confirmed at sites MAT5, MAT 6, MAT7, and MAT9. Medium priority hotspots were confirmed at sites LOT1, MAT1, MAT2, MAT3, MAT4, and MAT10.

Refer to the map, below, for the location of each individual sample site.



Water Temperature

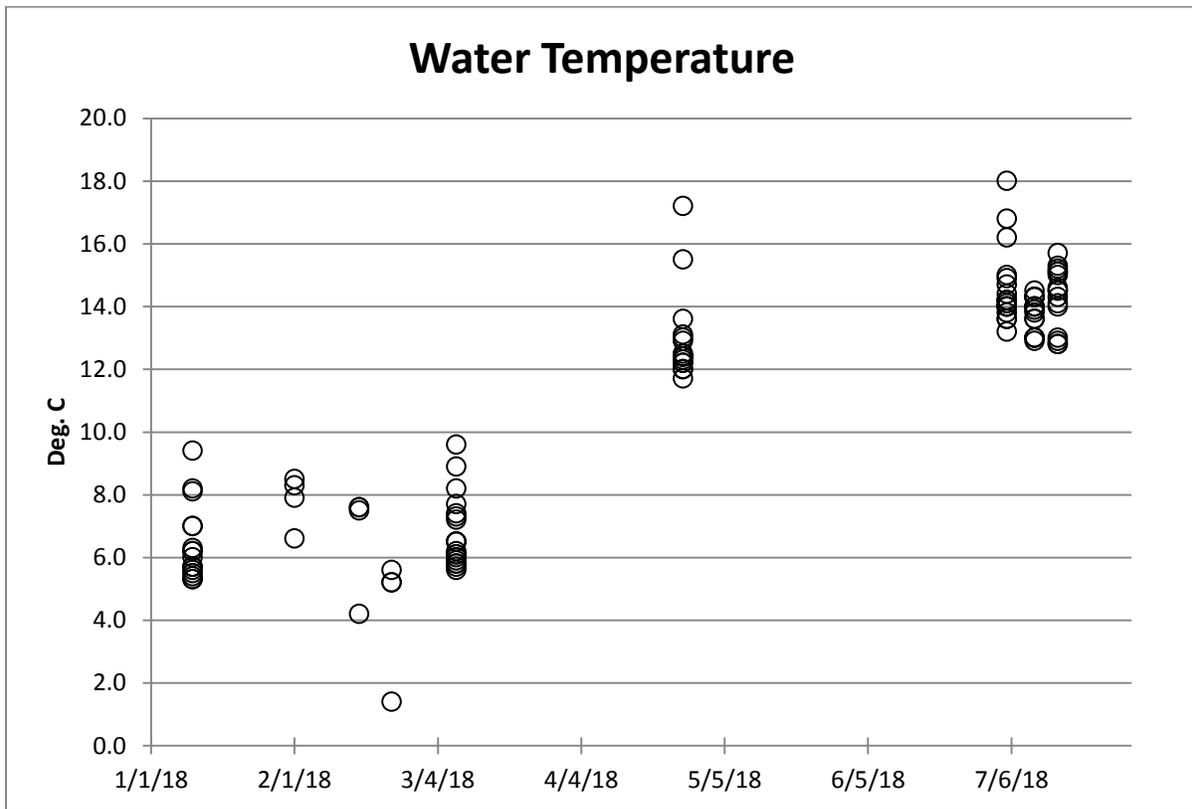
Besides just counting bacteria in local waterways, PIC segmented sampling also involves recording in-stream water temperatures. This allows us to explore relationships between temperature and bacteria concentrations.

It's also worthwhile to note that salmon and trout in Pacific Northwest streams need cool, oxygenated water. When temperatures top 16° C some species struggle to survive.

The May, 2018 PIC Update discussed vegetated buffers along stream banks and their multiple benefits. Not only do trees and shrubs help keep bacteria from entering waterways by filtering runoff, they also shade the water, keeping it cool for fish and other organisms.

Measurements from all segmented sampling sites, shown below, illustrate the range of temperatures recorded so far.

Shading from vegetation varies considerably from segment to segment along Matriotti and Lotzgesell Creeks.



In-stream water temperatures, all sample sites.

July 2018 UPDATE

Next Steps

Now that PIC Partners have established some prioritized hotspots, we'll look more closely at the surrounding parcels and consider factors such as land use, storm water, septic records, and presence/absence of vegetated buffers in critical areas such as stream banks.

We'll start with the medium priority hotspots and work our way down to the lower priority hotspots.

Regular segmented sampling should continue and the next tour will likely take place sometime after mid-August. If we do happen to get a summer rain event, we may try to organize in time to sample immediately afterward in hopes of documenting effects on the watershed.

We'll continue to explore seasonal trends in water quality throughout the project area along with links to factors such as rainfall, water temperature, and more.

Resources:

- More about salmon on the Olympic Peninsula:
<https://restoringolympicpeninsulasalmon.org/about/>
- WSU Extension Program will be at Sequim's Dog Park on September 8, 2018 with pet waste outreach games and supplies:
<http://www.sequimdogparks.org/index.php>
- Find all of the latest PIC information at:
clallam.net/HHS/EnvironmentalHealth/PICProject.html
- Find septic resources including free training for DIY inspections at:
clallam.net/septic