2019-2020

Skagit Stream Team Water Quality Report

Citizen Monitoring Summary for Samish Bay, Padilla Bay, Ace of Hearts, Gages Slough, Trumpeter Basin, Kulshan Creek and Nookachamps Creek

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I. Introduction

This report summarizes the results of the 2019-2020 Skagit Stream Team Program, the twentieth consecutive year of data collection by volunteers. From October 2019 through mid-March 2020, sixty-seven dedicated citizen volunteers monitored the water quality of freshwater streams that drain into Skagit County's Samish Bay, Padilla Bay, the Skagit River and Fidalgo Bay. In addition, nine of those volunteers formed the Padilla Bay Storm Team, sampling ten sites in the Padilla Bay watershed during six rain events.

This report is meant to provide useful and reliable background water quality data. It is not intended to provide a legal documentation of water quality violations. All data and methods are available to the public.

Background

The Skagit Stream Team Program was established in 1998 to educate and involve local citizens in the protection and stewardship of local streams. Sponsors include Skagit Conservation District (SCD) in partnership with the Padilla Bay National Estuarine Research Reserve (PBNERR), City of Mount Vernon, City of Burlington, City of Anacortes, and Skagit County. Funding was provided by the Washington State Conservation Commission, the Washington State Department of Ecology's Centennial Clean Water Fund Program, and partnering jurisdictions. Local citizens volunteered over 695 hours during the 2019-2020 sampling season. Like most other activites in the spring of 2020, Skagit Stream Team sampling stopped in mid-March when COVID-19 arrived, and we have no data for the end of the sampling year.

Skagit Stream Team Objectives

- To inspire community stewardship of water resources by educating local citizens about land use and non-point sources of pollution and involving them in the process of water quality data gathering;
- To develop and implement a routine sampling program that can be used to assess water quality trends, characterize the existing water quality of priority freshwater drainages, and determine how water quality conditions compare to State Standards;
- To document improvements in water quality as a result of the implementation of Best Management Practices on farmlands and the repair and/or replacement of failing septic systems;
- To teach community volunteers the sampling and analytical techniques used by environmental professionals, how to manage the data collected and create a database, and the importance of establishing a long-term water quality monitoring program.

Volunteers measured fecal coliform (FC) bacteria, dissolved oxygen (DO), water temperature, turbidity, and total depth. Some of the questions the study hoped to address were:

- How do water quality conditions compare to State Standards in our priority watersheds?
- Could water quality conditions support aquatic life such as salmon?

II. Methods

Efforts were made to insure high quality data from this volunteer-based study. Quality Assurance/Quality Control (QA/QC) plans and laboratory plans were submitted to and approved by the WA Department of Ecology. These plans have since been updated and revised. Volunteers were given ten hours of training before sampling in the field, and were accompanied by a trainer for their first sampling. All analysis and collection methods are detailed in the QA/QC plan, and are available on request.

The Samish watershed had two upper and two lower teams, and was coached by Cindy Pierce, SCD. The Padilla Bay watershed had two teams each on No Name Slough, Joe Leary Slough, and in the village of Bay View, coached by Susan Wood, PBNERR. Nookachamps Creek had two upper and two lower teams coached by Cindy Pierce, SCD. Kulshan Creek, and Trumpeter Basin each had two teams coached by

Kristi Carpenter, SCD. Gages Slough had two teams coached by Cindy Pierce. Ace of Hearts/Happy Valley Creek sites were monitored by two teams coached by Susan Wood.

At each site, samples were usually taken every two weeks. Temperature, dissolved oxygen (DO), and salinity (when applicable) were measured on-site with an electronic YSI Data Probe. Field measurements and samples were taken just below the surface, in the deepest part of the stream that could be reached. Depth was measured for some sites using staff gages. Samples were tested for Fecal coliform either at the Padilla Bay volunteer lab (Padilla, Samish, Nookachamps samples), taken to Burlington Waste Water Treatment Plant (Gages Slough), taken to the Mount Vernon Wastewater Treatment Plant (Trumpeter Basin, Kulshan Creek) or the Anacortes Waste Water Treatment Plant (Ace of Hearts and Happy Valley Creeks) for analysis. Turbidity was measured either in Padilla Bay's lab or in the field. Volunteers also recorded water appearance and color. Quality procedures are outlined in more detail in Appendix C.

Quality control checks by staff were conducted periodically in the lab and in the field to assure that volunteers were using proper and consistent protocols.

The data were recorded on field sheets (See Appendix D) and transferred to a Microsoft Excel spreadsheet by a volunteer. Padilla Bay staff verified all data entries, making edits as appropriate. Any anomalies were recorded in the metadata.

In accordance with state standards, annual fecal coliform (FC) results were calculated using the geometric mean. "Too Numerous To Count" (TNTC) results were assigned a value of 1600 CFU/100 ml. Volunteers in Padilla Bay's lab ran two FC lab tests for each sample, generating a high and low reading, from which an average was calculated. Averages were calculated for dissolved oxygen, temperature and turbidity levels.

Important note: COVID-19 precautions prevented volunteers from sampling after March 17, 2020. Because seasonal variations in rainfall, temperature, and other weather conditions has such a significant impact on water quality, and we have no data for mid-March through June, we will not compare these data to data from previous years. Likewise, it is impossible to make any claims regarding how our sampling sites compare to state standards. We will use the state standards as reference points in this report, recognizing our very incomplete data for 2019-2020.

III. Padilla Bay Storm Team

In 2019-2020 , Storm Team volunteers continued monitoring sites in the Padilla Bay watershed. They include sites on Joe Leary Slough, No Name Slough, and Bay View drainages, and were selected to support a Department of Ecology water quality improvement project. Monitoring many sites throughout the drainage during storm events when high fecal coliform numbers are expected may detect priority areas for clean up. Special thanks to our Storm Team volunteers for their ongoing commitment – in the worst of weather. Complete data are found in Appendix B.

IV. Results

This section presents the data collected during the 2019-2020 season. It provides a preliminary overview for each parameter followed by details for each watershed. Complete data for all watersheds are provided in Appendix A. Site maps and locations are found in Appendix D.

Dissolved Oxygen Standards

Dissolved oxygen (DO) measurements determine how much oxygen is available in the water for fish and other organisms. The state water quality standards for dissolved oxygen are based on aquatic life uses. Streams in this program fall under three categories based on aquatic life use. For Nookachamps Creek, Trumpeter Basin, Kulshan Creek, and Upper Samish Site 2, the standard is a lowest 1 day minimum of 9.5 mg/l required for core summer salmonid habitat. (Higher dissolved oxygen levels are better.) For the lowland watercourses, Joe Leary Slough, No Name Slough, Bay View, Gages Slough and all Samish sites except Swede Creek (Upper Samish 2) the minimum standard is a lowest 1 day minimum of 8.0 mg/l for salmon spawning and rearing. Ace of Hearts and Happy Valley Creeks in Anacortes are classified for salmon rearing and migration, with the lower DO standard of a lowest 1 day minimum of 6.5 mg/l

Annual averages are presented for the purpose of comparison between sites, but this data cannot determine whether the water body meets the standard. The standard is based on the lowest single-day measurement, not on the annual average. It is important to note that most of the teams do not monitor during the warmer summer months when DO would likely drop with warmer air and water temperatures.

Temperature Standards

Temperature is a water quality concern in part because warm water holds less dissolved oxygen than cool water. Many northwest fish species require cool temperatures and high oxygen levels at various stages in their life cycle. Warm water temperatures can cause stress to animals that lowers resistance to disease and infections. Many factors affect water temperature. These include large fluctuations in air temperature, changes in the shape of stream channel and lake margins, reductions in overhanging vegetation, turbidity, and reductions in water flow.

State standards for temperature are based on the 7-day average of the daily maximum temperatures (7-DADMax). For Nookachamps Creek, Trumpeter Basin, Kulshan Creek, and Upper Samish Site 2, that maximum is 16°C. All other sites must be less than 17.5°C to meet standards. (Lower temperatures are better.)

The average temperatures presented below are used for comparison, but this data cannot determine whether the water body meets the standard. Most sites were not monitored during the critical summer warm periods and none were monitored daily in order to obtain a 7-DADMax.

Turbidity Standards

Turbidity is a measurement of water clarity. Turbidity data in this report are not referenced to a state standard because that standard is relative to naturally occurring background levels and varies for each stream. For streams with background levels less than 50 NTU (all of the Stream Team sites), turbidity should not exceed 5 NTU above the background level. Short-term occurrences of high turbidity are not as harmful to aquatic animals as extended periods of moderately elevated turbidity.

Fecal Coliform Standards

Fecal coliform live in the digestive system of warm blooded animals, including birds, livestock, and humans. They are not directly harmful to humans or aquatic life, but their presence indicates the possible presence of disease-causing microbes. To meet state standards, streams must meet two criteria. Part I: The geometric mean of fecal coliform bacteria levels cannot exceed 100 colony-forming units (CFU)/100 ml. A minimum of five samples in the database is needed to calculate the geometric mean. Part II: With fewer than 10 samples, no single sample can exceed 200 CFU/100 ml.

State regulations for fecal coliform use the geometric mean, which reduces the weight of occasional extreme results or results that don't fall within a reasonable range of the overall sample database This is helpful when analyzing bacteria concentrations, because levels may vary anywhere from 10 to 10,000 fold over a given period.

Upper Samish Results

Figures 1 through 4 below present results from Upper Samish sampling.

For dissolved oxygen, Sites 1- 3 maintained levels above the state standard. As in past years, Site 4, the Willard Creek site had the lowest levels, and dropped below 8.0mg/l.

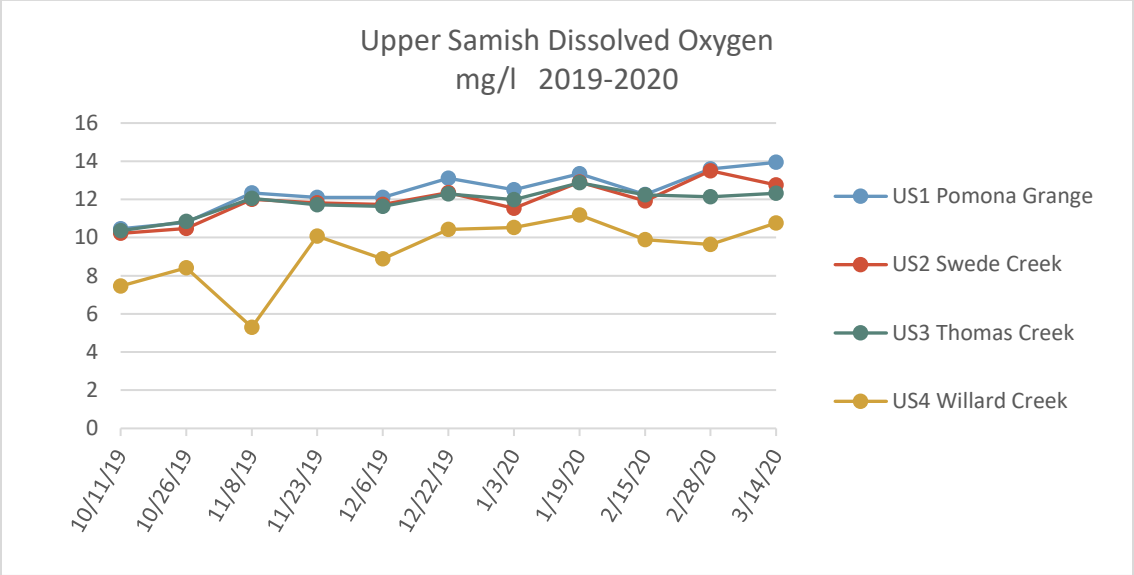

Figure 1. Upper Samish DO: 2019-2020

Though all temperature readings during the sampling season fell within state standard temperatures, sampling stopped before the warm season. Temperatures were similar for all Upper Samish sites.

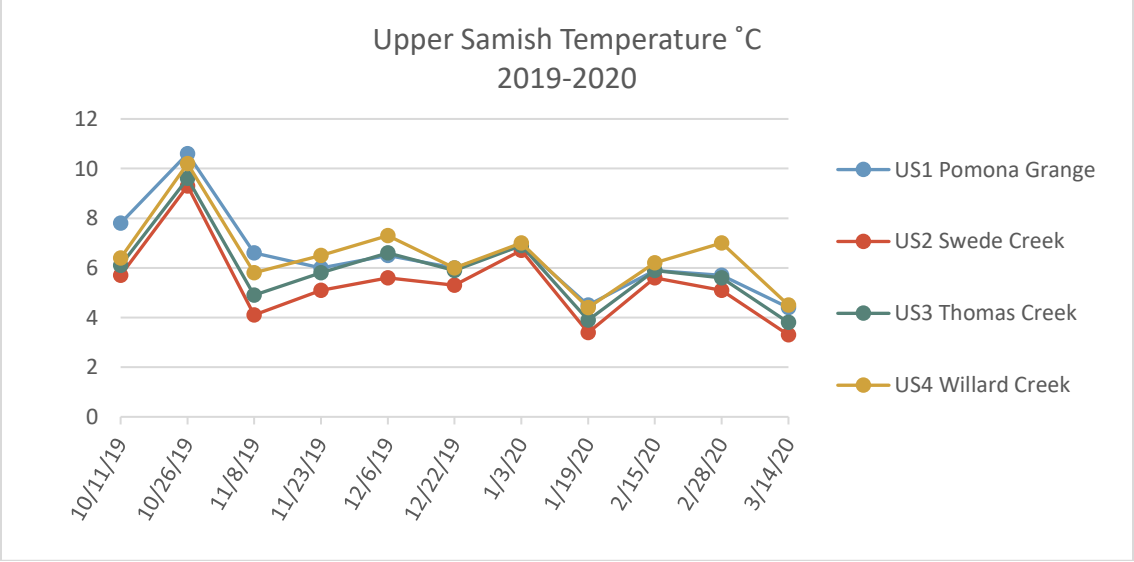

Figure 2. Upper Samish Temperature: 2019-2020

Turbidity levels in the Upper Samish (Figure 15) were higest at Site 3, Thomas Creek.

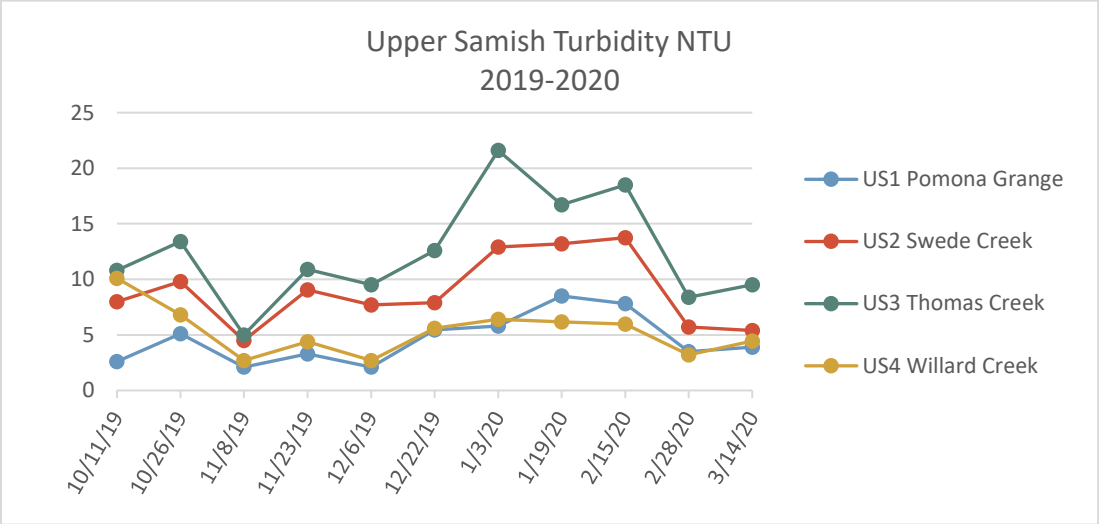

Figure 3. Upper Samish Turbidity: 2019-2020

Sites 3 had 2 out of 11 readings higher than 200 cfu/100ml. All other sites had fewer than 10% of the samples over 200 CFU/100ml and geometric mean below 100cfu/100ml, meeting both standards.

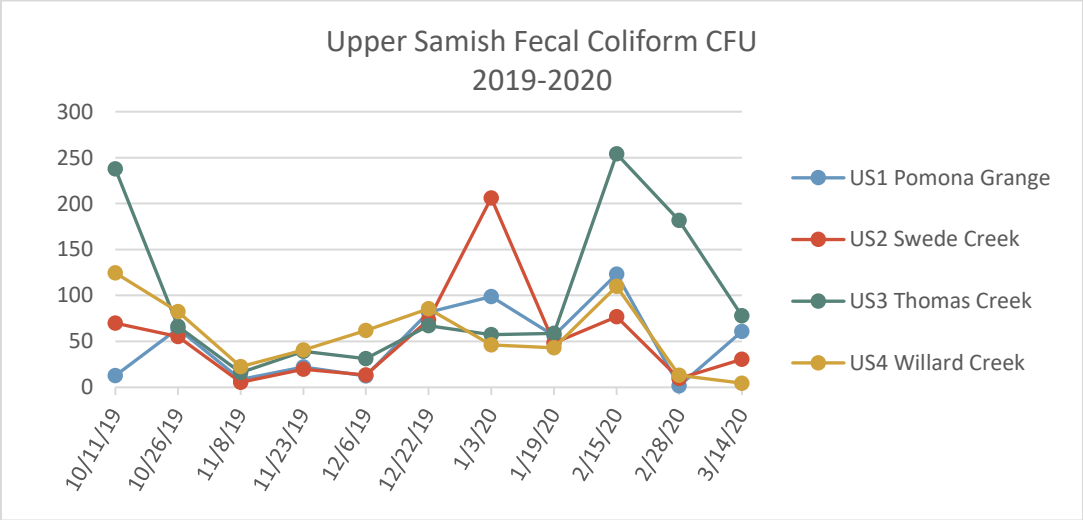

Figure 4. Upper Samish Fecal Coliform: 2019-2020

Lower Samish Results

Figures 5 through 8 below present results from Lower Samish sampling.

Dissolved oxygen levels were similar for all sites, staying above 8mg/l through the sampling season. Sites were not sampled during the warmest summer months when dissolved oxygen is likely to be lowest.

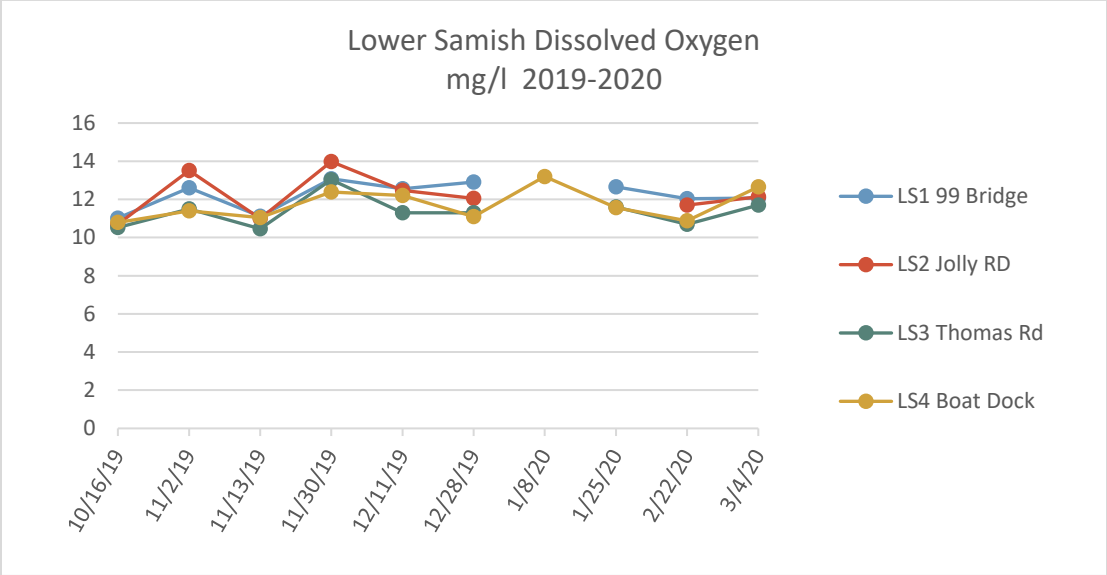

Figure 5. Lower Samish DO: 2019-2020

Temperatures were similar for all sites, staying well below the maximum 17.5 degrees.

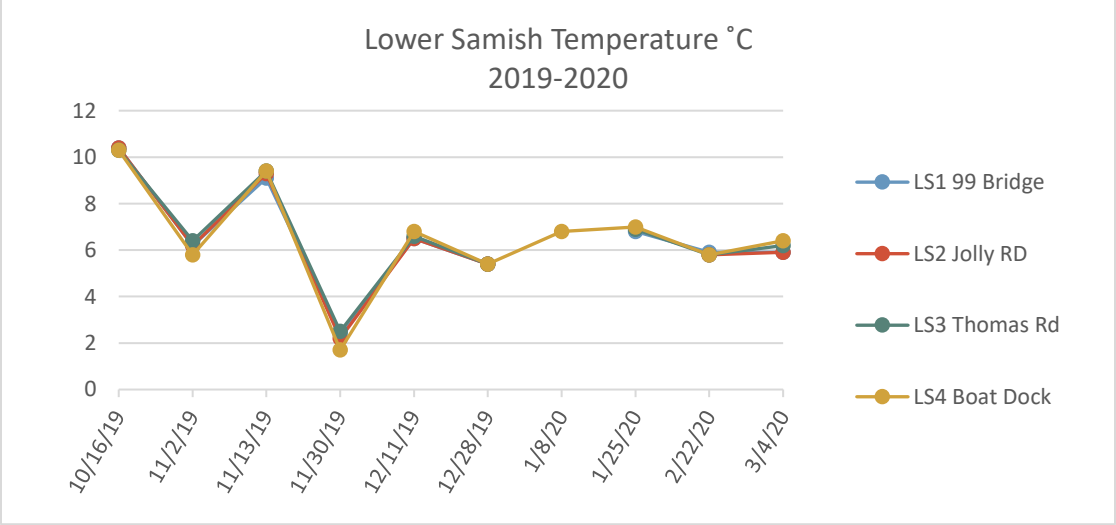

Figure 6. Lower Samish Temperature: 2019-2020

The spike in turbidity 1/25/2020 corresponds to rains and high water levels that prevented sampling at site 2, Jolly Road..

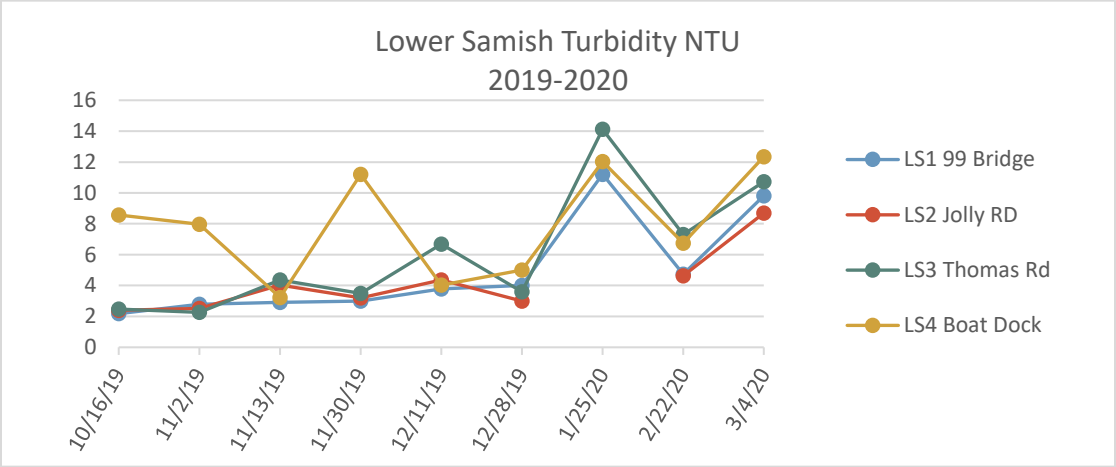

Figure 7. Lower Samish Turbidity: 2019-2020

In fecal coliform testing, Site 4 went above 200 cfu/100ml twice. Other sites met both parts of the state standard for fecal coliform

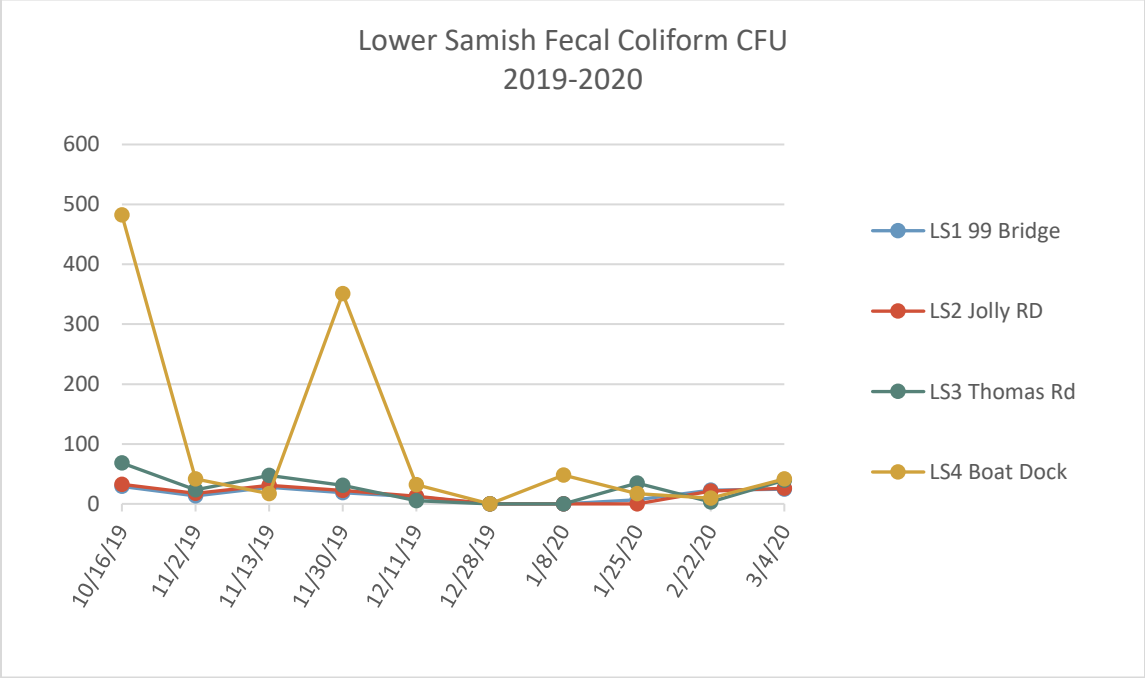

Figure 8. Lower Samish Fecal Coliform: 2019-2020

Upper Nookachamps Results

Figures 9 through 12 below present results from Upper Nookachamps Creek sampling.

Sites 1, 2, and 4 had DO levels below 9.5 mg/l through this sampling period. Once again, Site 1 was below 9.5° much of the season, and was consistently the lowest of the four sites.

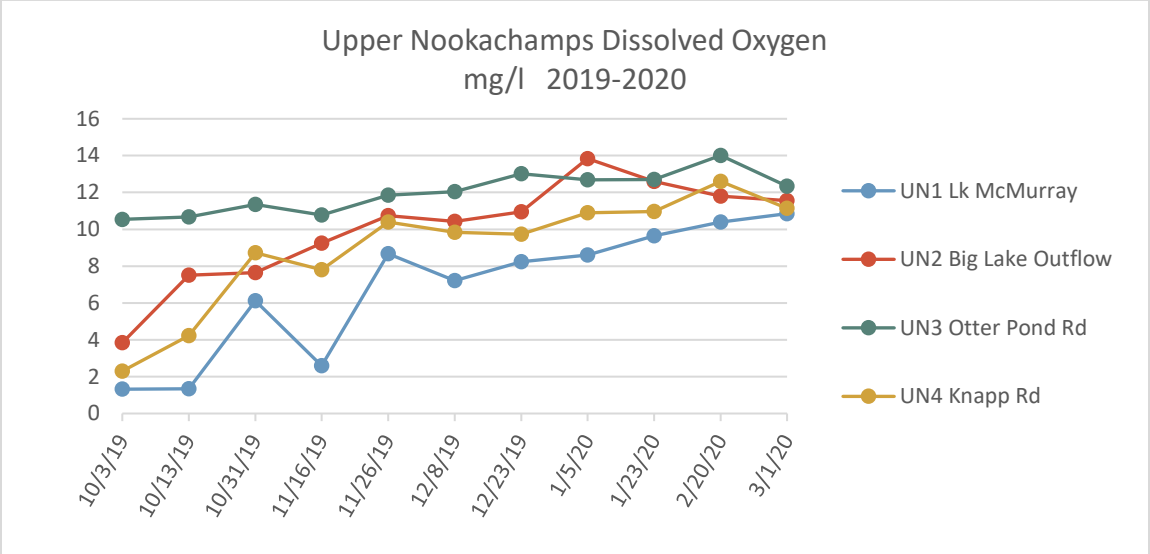

Figure 9. Upper Nookachamps DO: 2019-2020

Temperatures for Upper Nookachamps were below 16˚C for all sites throughout the sampling period.

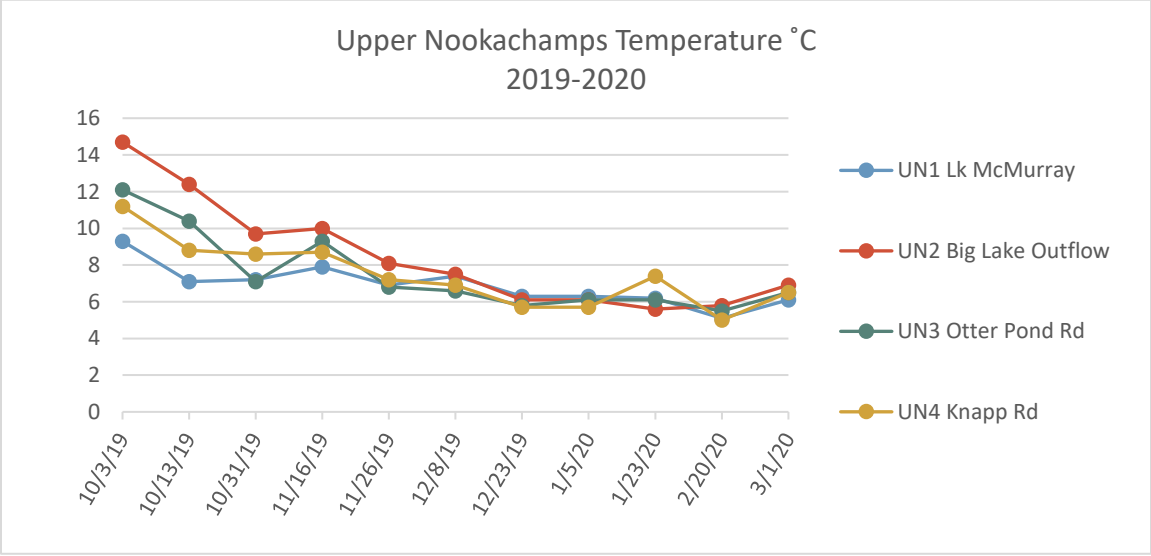

Figure 10. Upper Nookachamps Temperature: 2019-2020

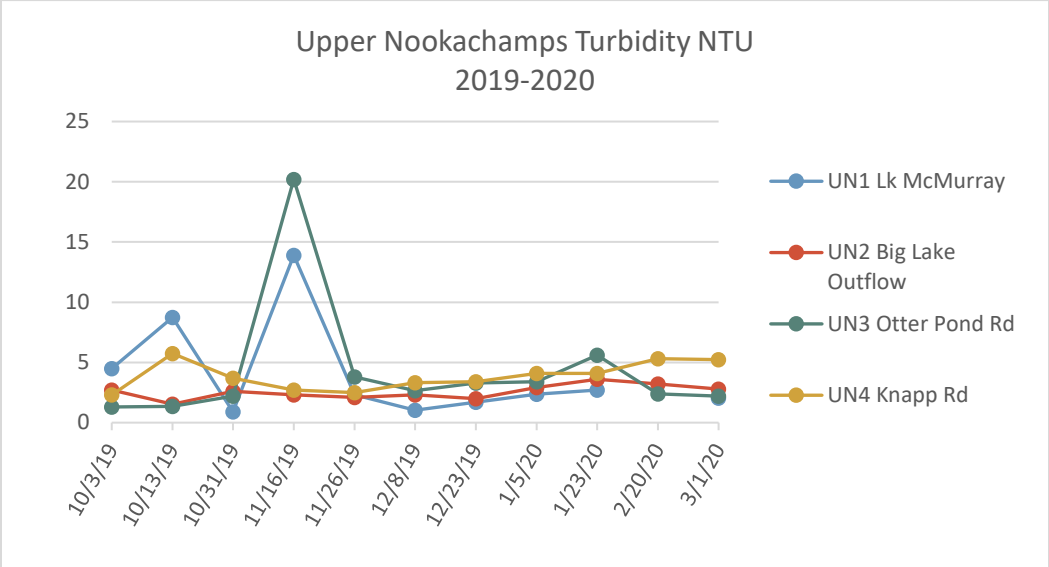

Figure 11. Upper Nookachamps Turbidity: 2019-2020

Fecal coliform levels at Site 4 were most variable, but all sites met both parts of the state standard.

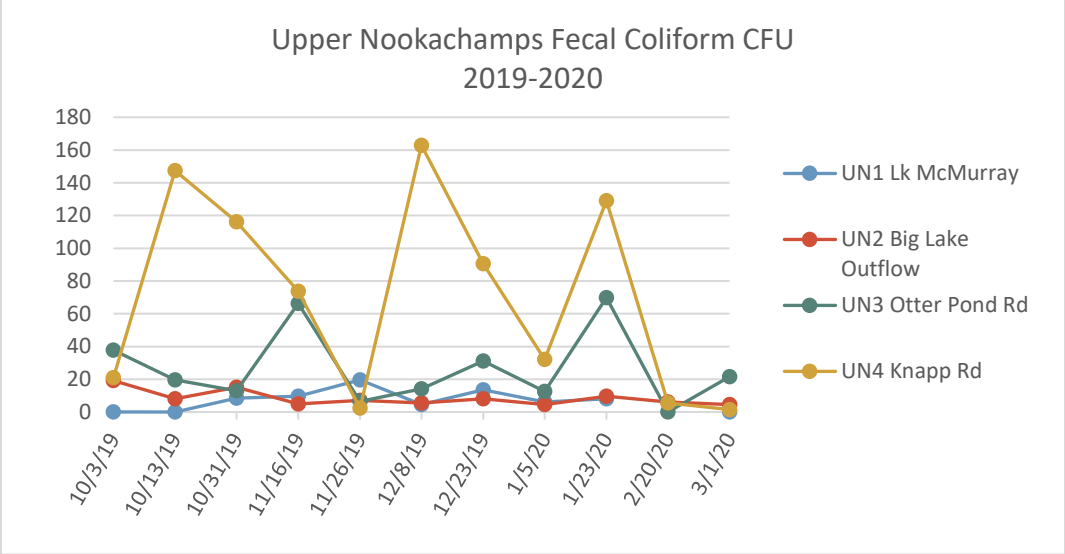

Figure 12. Upper Nookachamps Fecal Coliform: 2019-2020

Lower Nookachamps Results

Figures 13 through 16 below present results from Lower Nookachamps Creek sampling.

Sites 2-4 dropped below the state standard of 9.5°C dissolved oxygen during the sampling period.

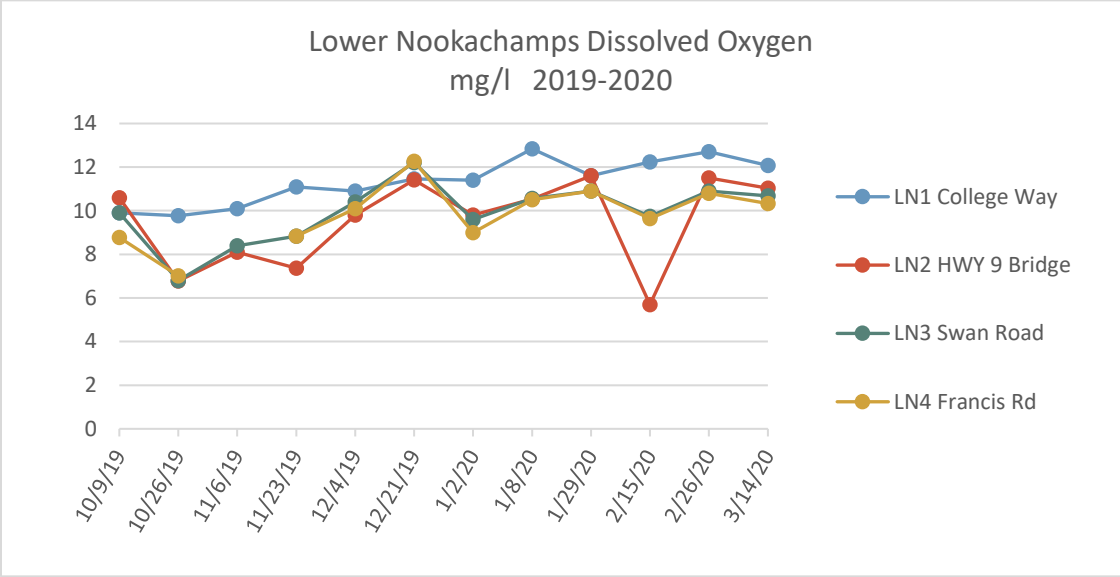

Figure 13. Lower Nookachamps DO: 2019-2020

Temperatures for all sties stayed below the state standard of 16°C throughout the sampling period. No samples were taken during the warmest summer months.

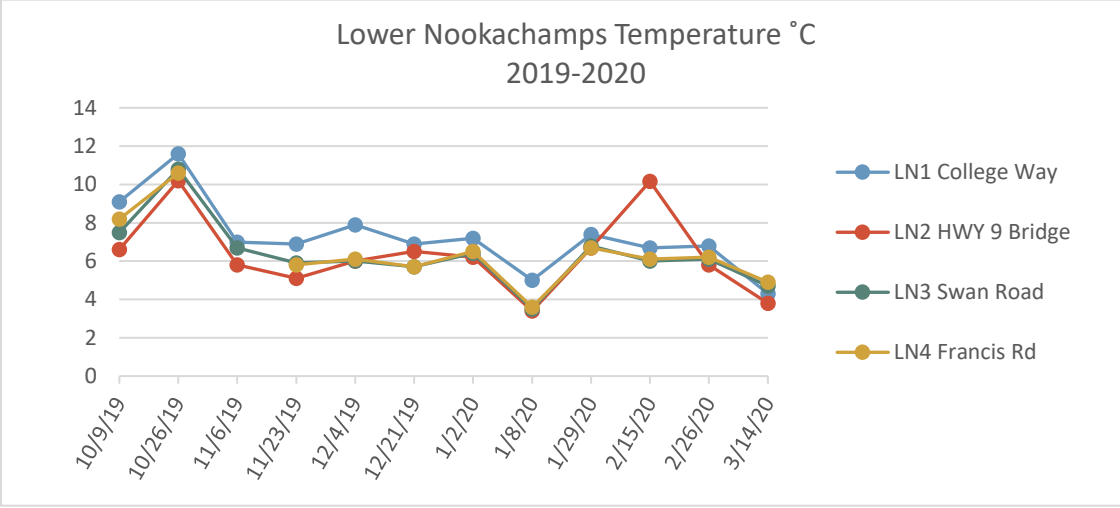

Figure 14. Lower Nookachamps Temperature: 2019-2020

The spike in turbidity, along with high fecal numbers at Site 1 (see Figure 15 and 16 below) followed a heavy storm that broke rainfall records in Seattle.

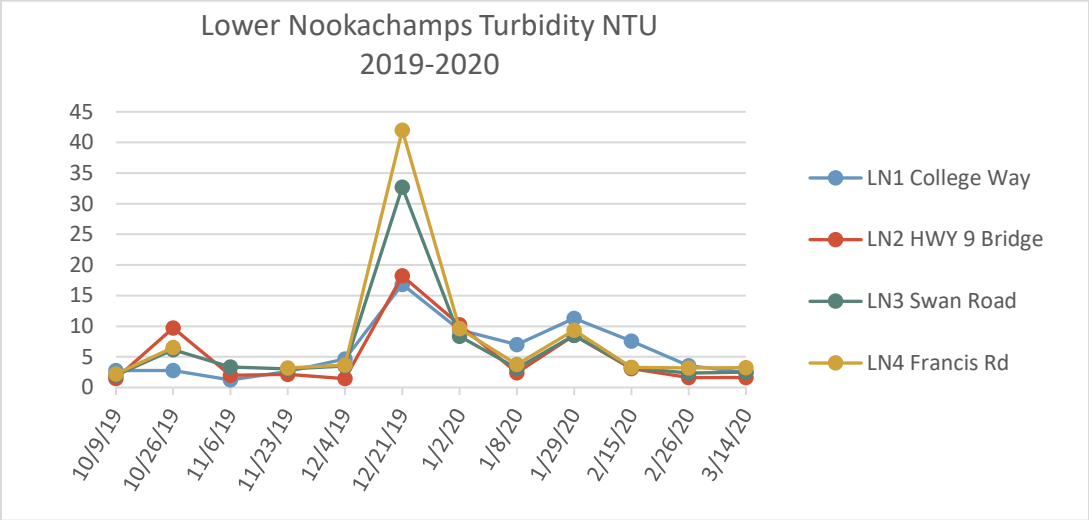

Figure 15. Lower Nookachamps Turbidity: 2019-2020

Highest fecal coliform levels were highest at Site 1, College Way. Sites 2-4 met both parts of the state standard.

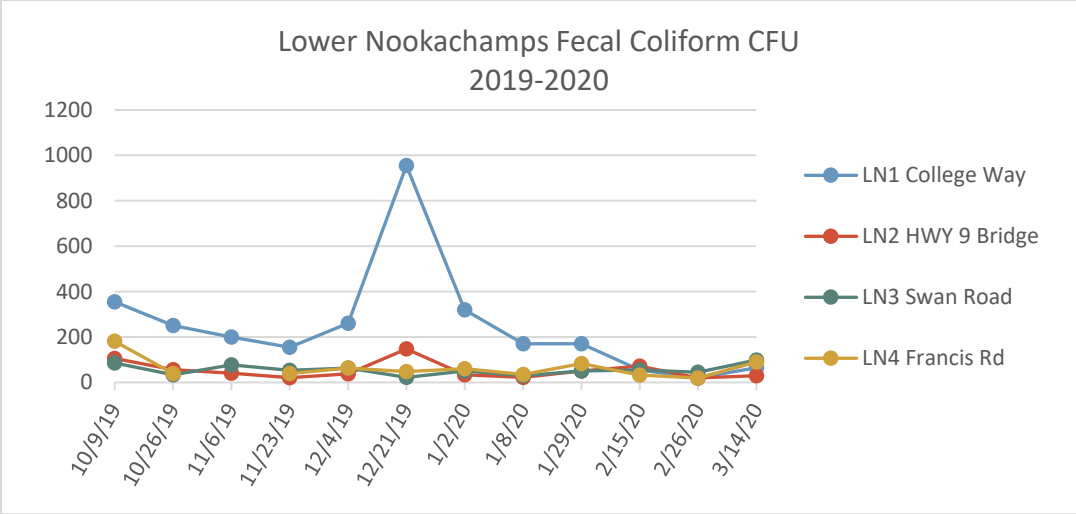

Figure 16. Lower Nookachamps Fecal Coliform: 2019-2020

No Name Slough Results

Figures 17 through 20 below present results from No Name Slough sampling.Site 2 was moved in October 2019 due to property owner concerns. The new site 2 is not on No Name Slough proper, but is just above a culvert that drains land north of Marihugh Road and joins the ditch surrounding farmland behind the dike.

Dissolved oxygen levels were below the state standard of 8mg/l at sites during the sampling season. The upper stream dries up in early summer.

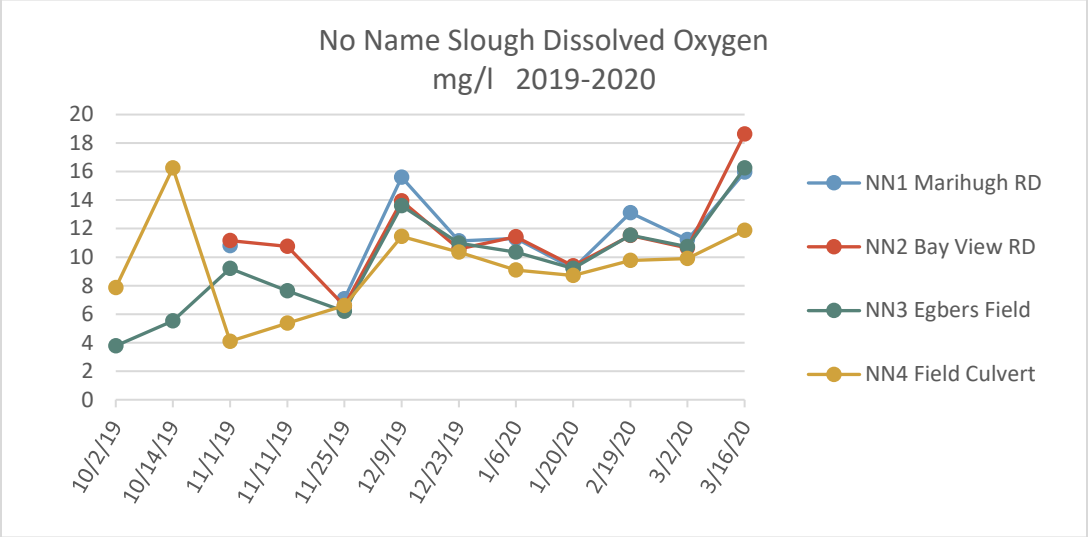

Figure 17. No Name Slough DO: 2019-2020

Temperatures at all No Name Sites were within the optimum range of <17.5°C throughout the sampling period.

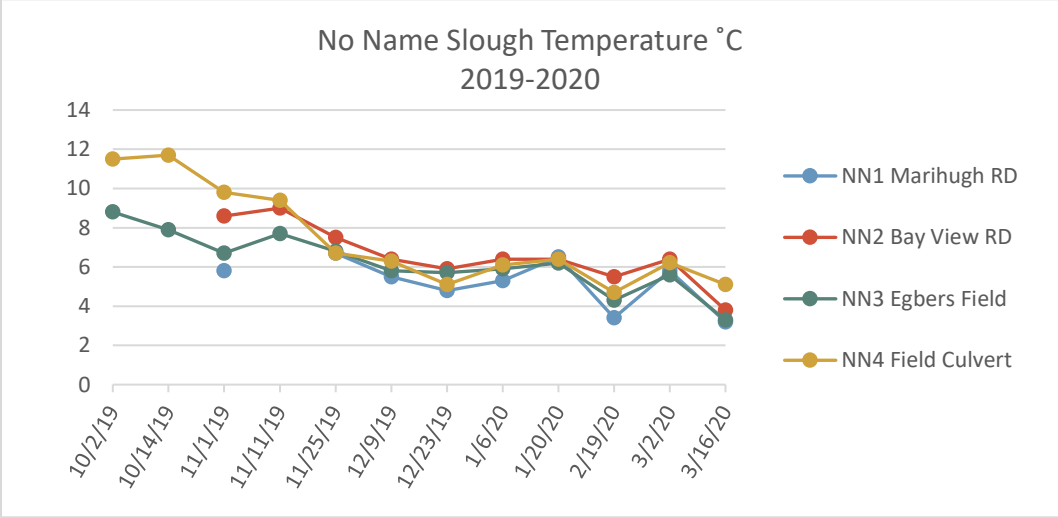

Figure 18 No Name Slough Temperature: 2019-2020

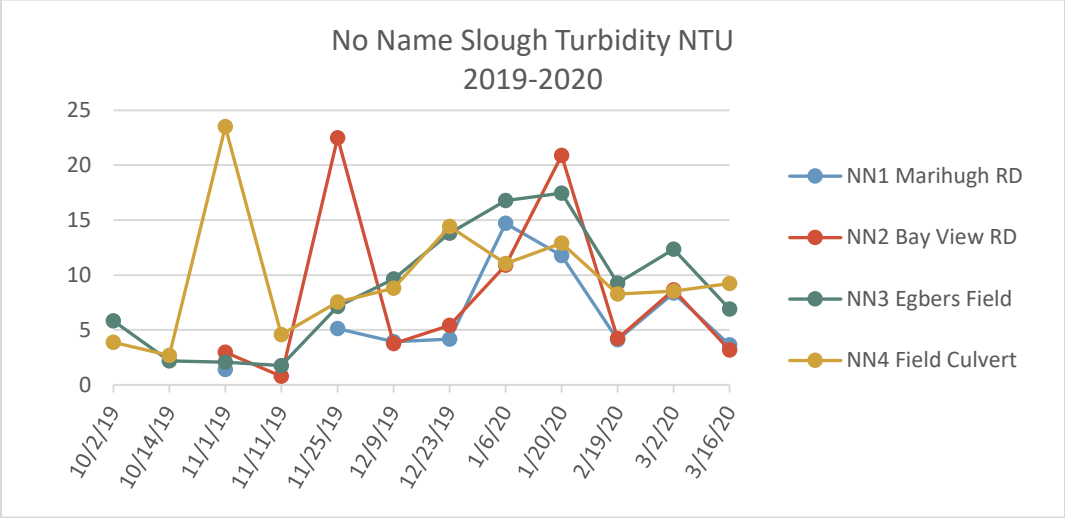

Figure 19. No Name Slough Turbidity: 2019-2020

Sites 2 and 3 met both Fecal Coliform standards in 2019-2020, with lowest numbers at site 2. All sites had geomeans below 100 cfu/100ml.

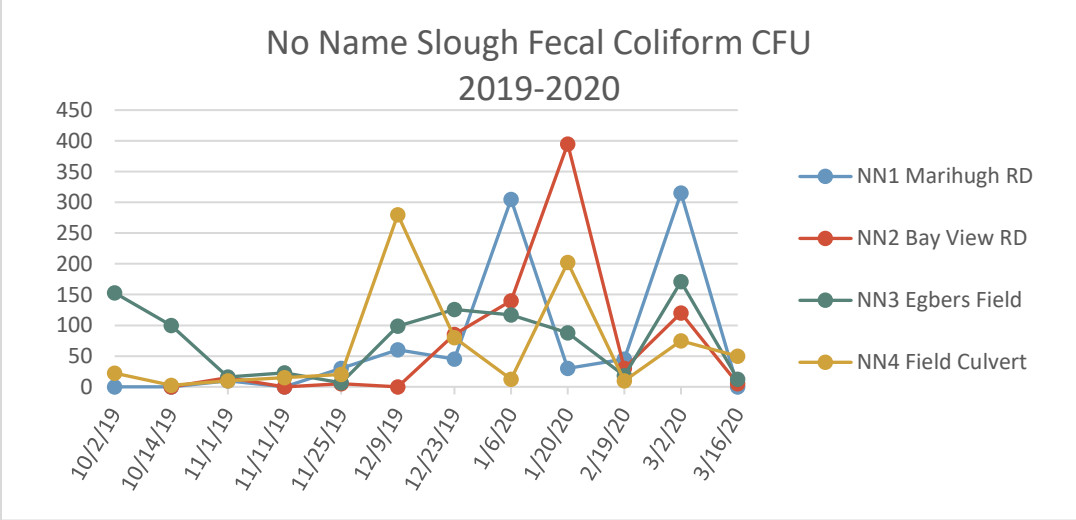

Figure 20. No Name Slough Fecal Coliform: 2019-2020

Bay View Drainage Results

Figures 21 through 24 below present results from Bay View Drainage sampling. Sites 1-3 are roadside ditches that dry up between rainy periods. Site 4 is often without water due to low tide.

Dissolved oxygen measurements dropped below 8 ˚C at all sites in Bay View.

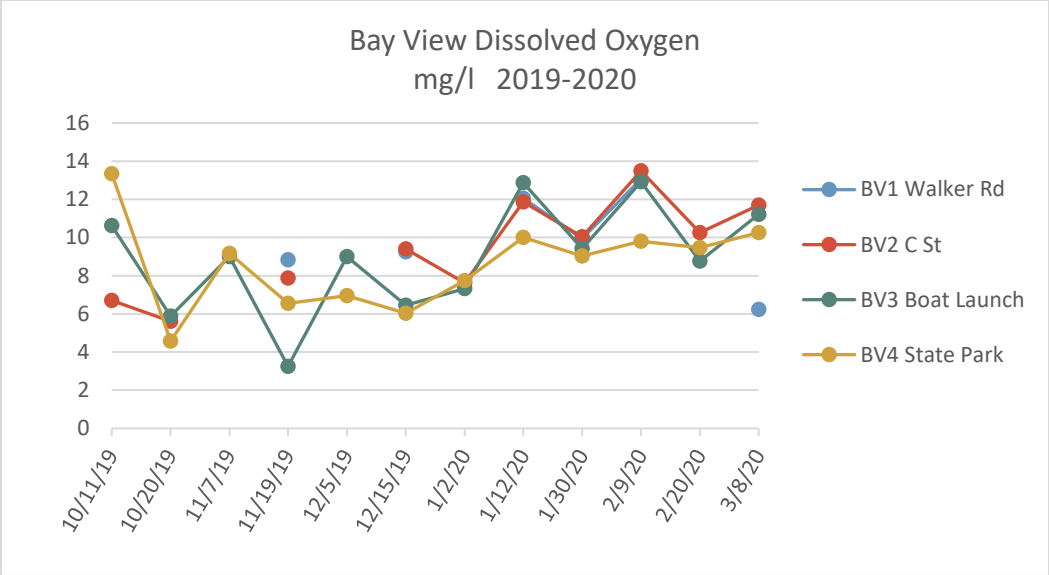

Figure 21. Bay View Drainage DO: 2019-2020

Temperatures in 2019-2020 were below the maximum of 17.5C at all sites.

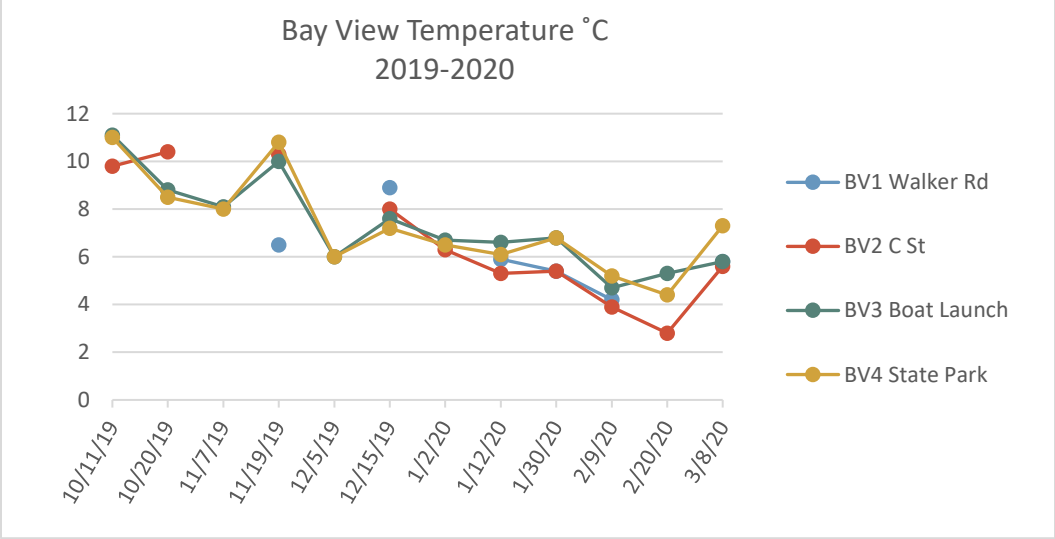

Figure 22. Bay View Drainage Temperature: 2019-2020

Turbidity readings were highest on the two dates when fecal coliform counts were also very high.

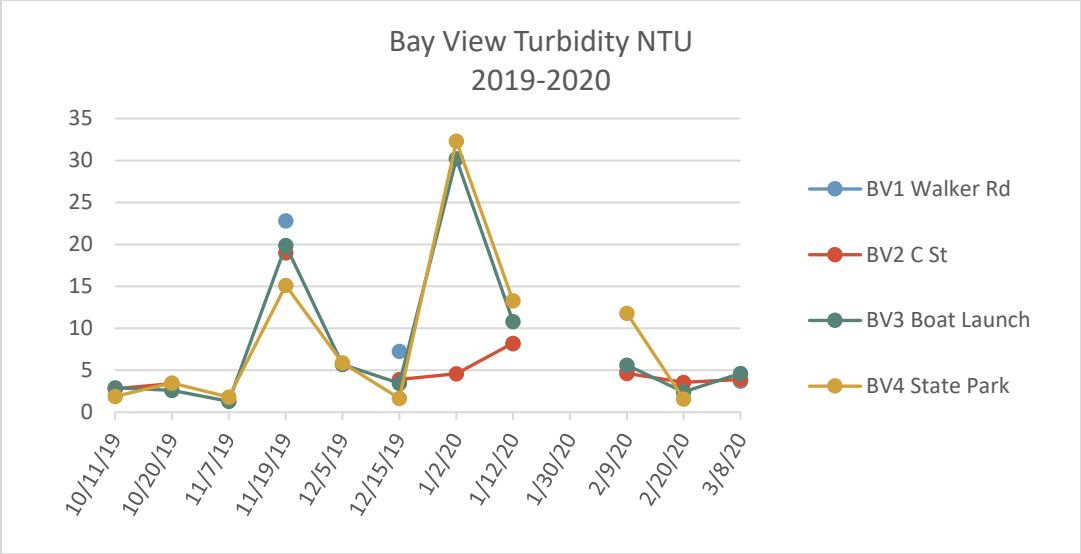

Figure 23. Bay View Turbidity: 2019-2020

All Bay View sites met part 1 of the state standards for fecal coliform, and met part 2 at Site 3.

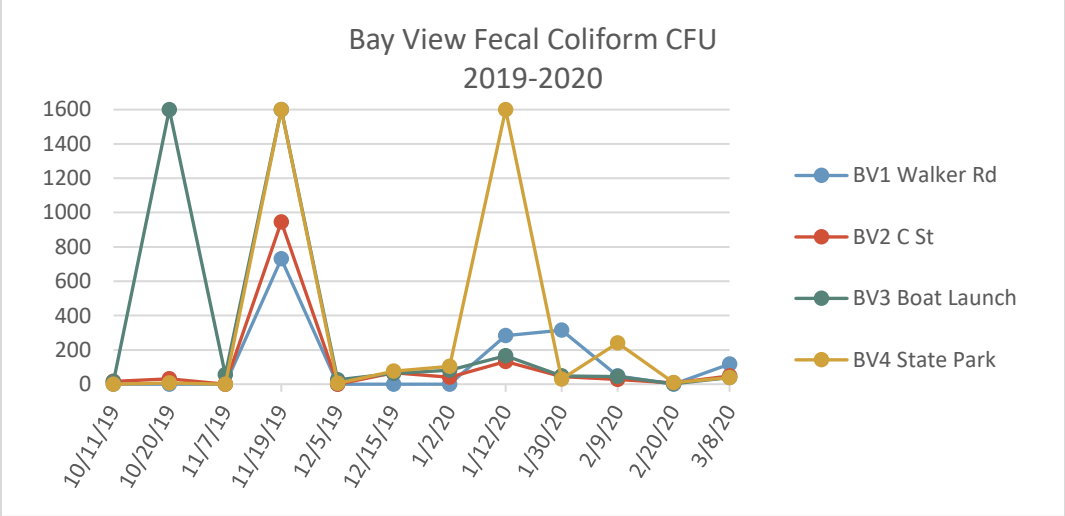

Figure 24. Bay View Fecal Coliform: 2019-2020

Joe Leary Slough Results

Figures 25 through 28 below present results from Joe Leary Slough sampling.

Once again, dissolved oxygen levels were consistently below standards for all sites, even during the cold winter months.

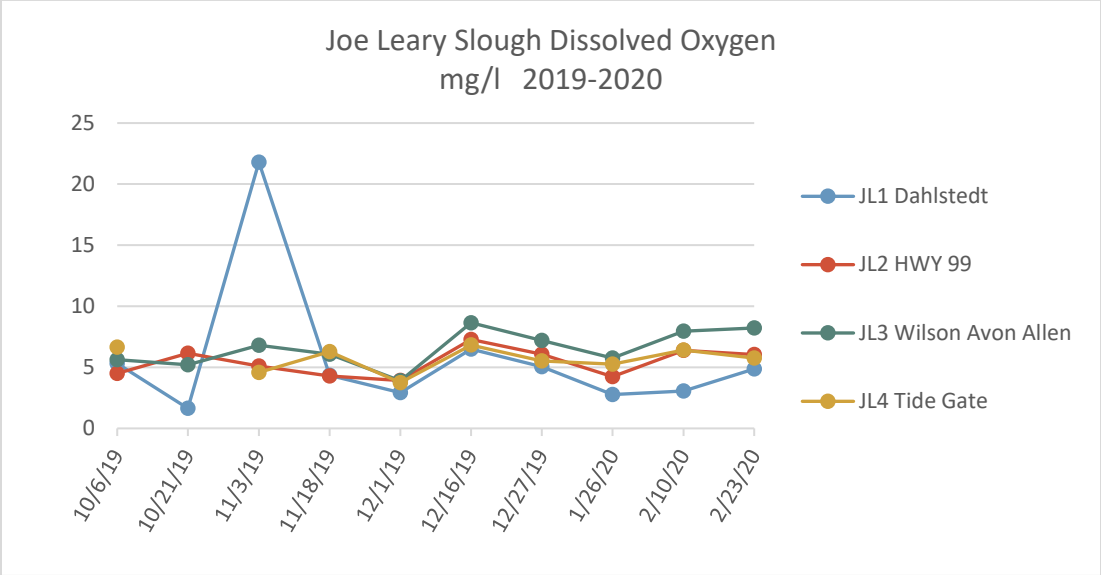

Figure 25. Joe Leary Slough DO: 2019-2020

Temperatures were below 17.5 °C at all sites. No samples were taken during the warmest season when temperatures may have risen above the standard.

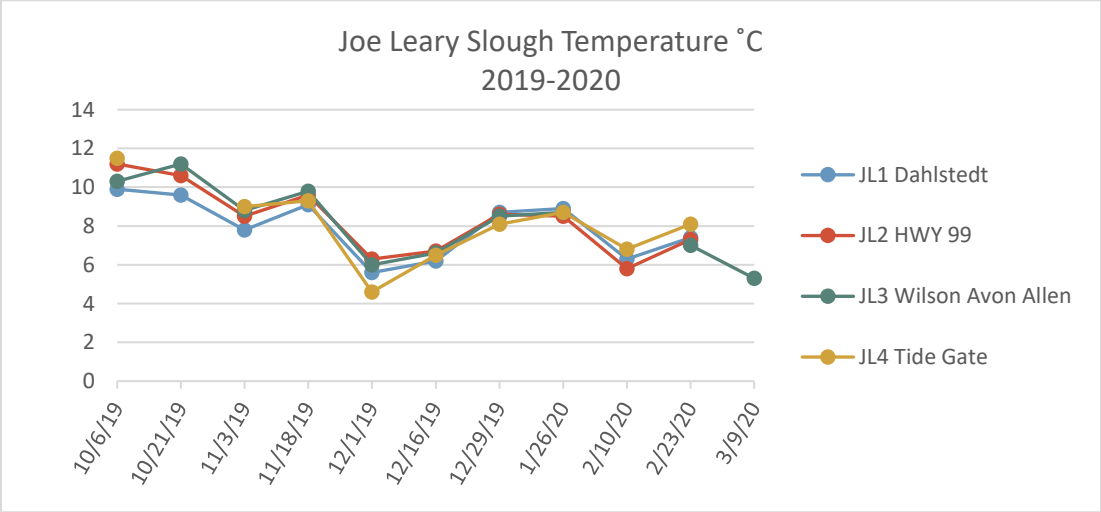

Figure 26. Joe Leary Slough Temperature: 2019-2020

Joe Leary Slough maintains its distinction of having the highest turbidity of all the stream team sites.

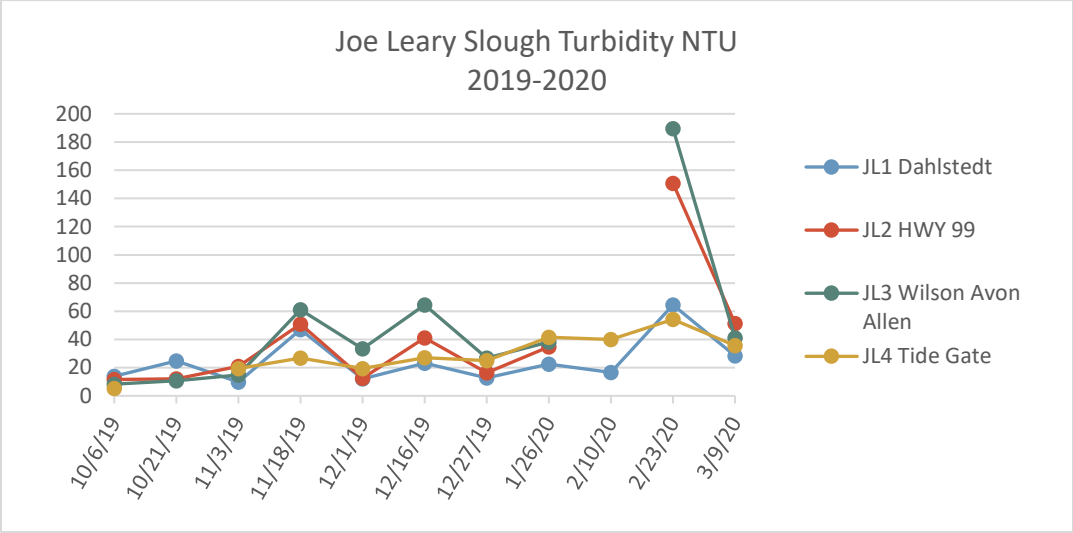

Figure 27. Joe Leary Slough Turbidity: 2019-2020

Though Sites 3 and 4 met both parts of the state standard for fecal coliform, there were just 10 samples taken, the minimum, and the season did not include spring when rains often bring increases in fecal coliform.

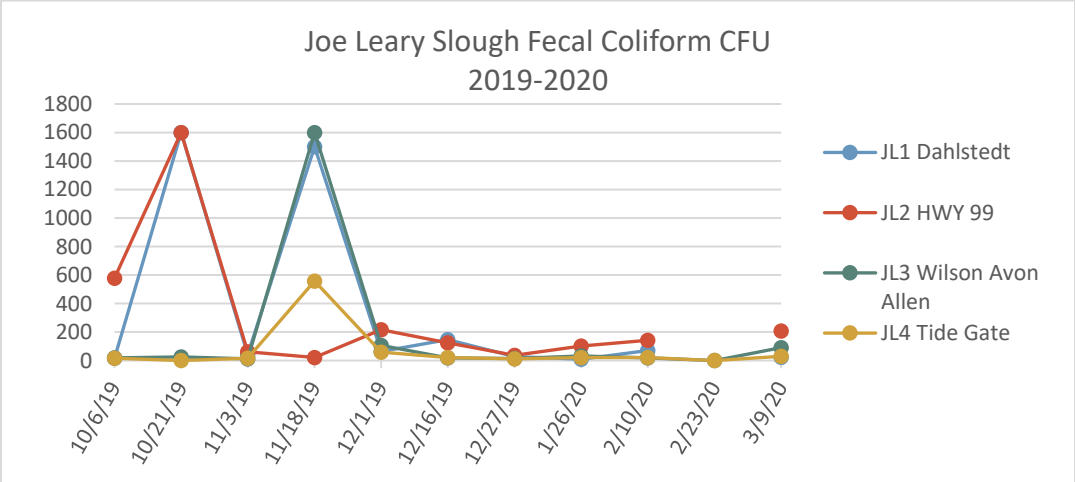

Figure 28. Joe Leary Slough Fecal Coliform: 2019-2020

Trumpeter Basin Results

Figures 29 through 32 below present results from Trumpeter Basin sampling.

Dissolved oxygen levels dropped below the standard of 9.5mg/l at site 3 and 5.

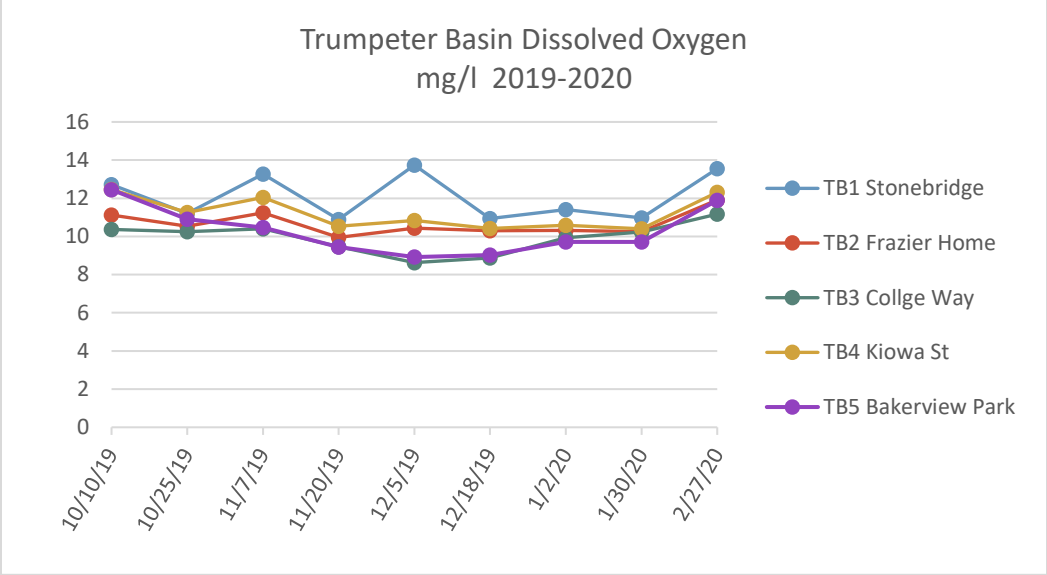

Figure 29. Trumpeter Basin DO: 2019-2020

Temperature at all sites stayed cooler than the maximum of 16°C.

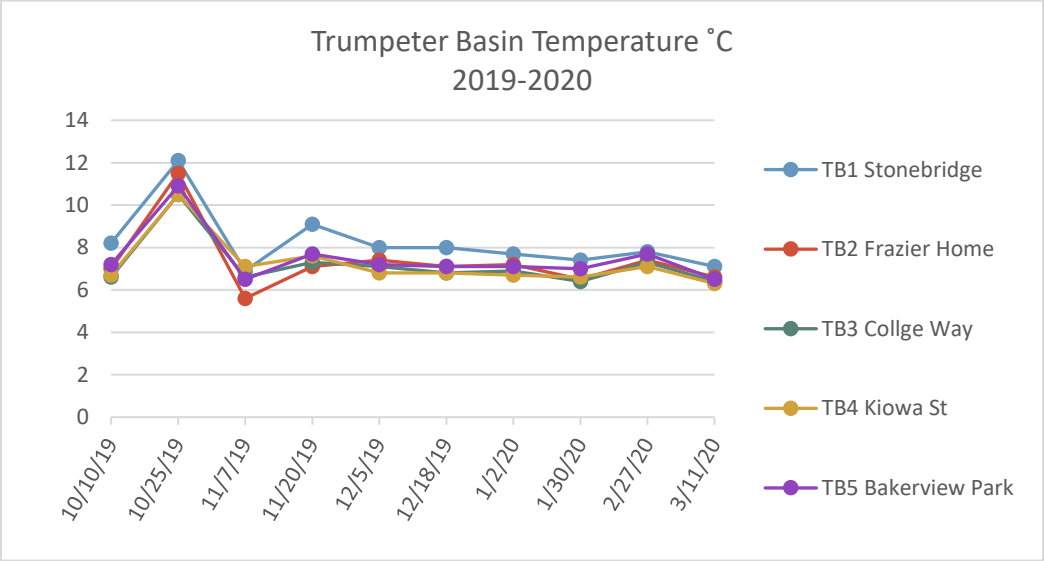

Figure 30. Trumpeter Basin Temperature: 2019-2020

Turbidity levels for Trumpeter Basin were again highest at site 2.

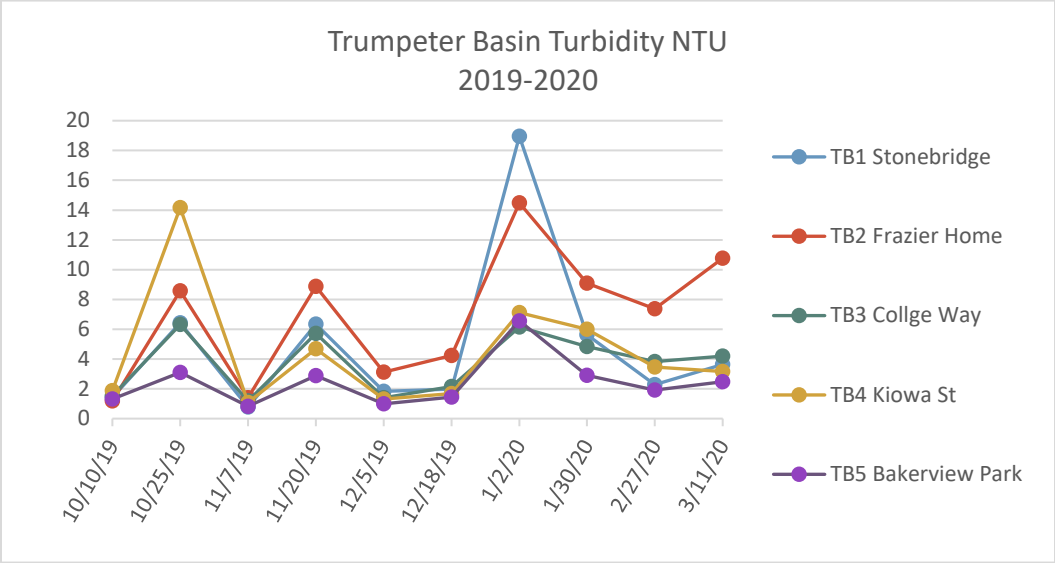

Figure 31. Trumpeter Basin Turbidity: 2019-2020

All sites passed the standard of a geometric mean under 100 cfu/100ml. Only site 5 had <10% of counts under 200 CFU/100ml.

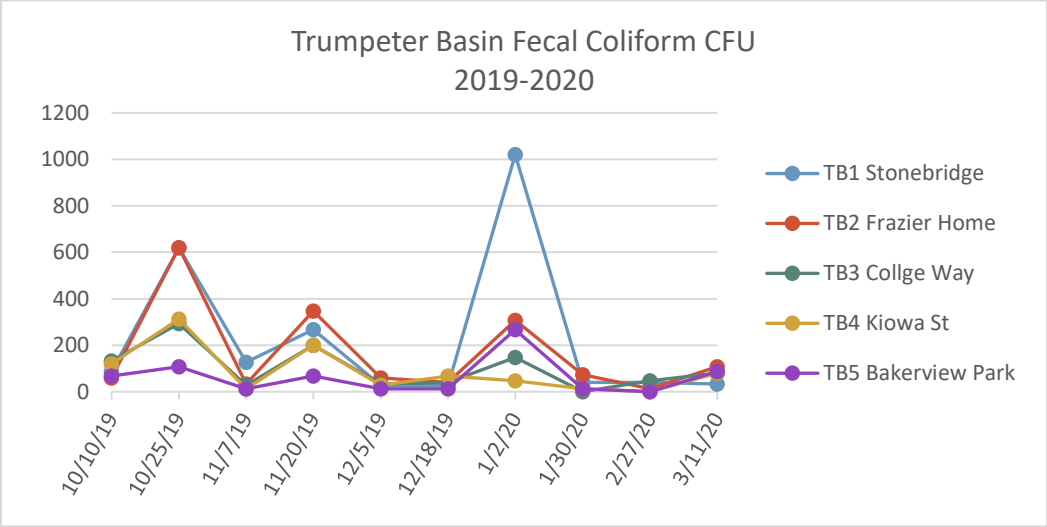

Figure 32. Trumpeter Basin Fecal Coliform: 2019-2020

Kulshan Creek Results

Figures 33 through 36 below present results from Kulshan Creek sampling.

Dissolved oxygen in Kulshan Creek sites 2-5 went below the state standard of 9.5mg/l during this sampling season. Site 1 was never below the standard. Site 3 never met the standard.

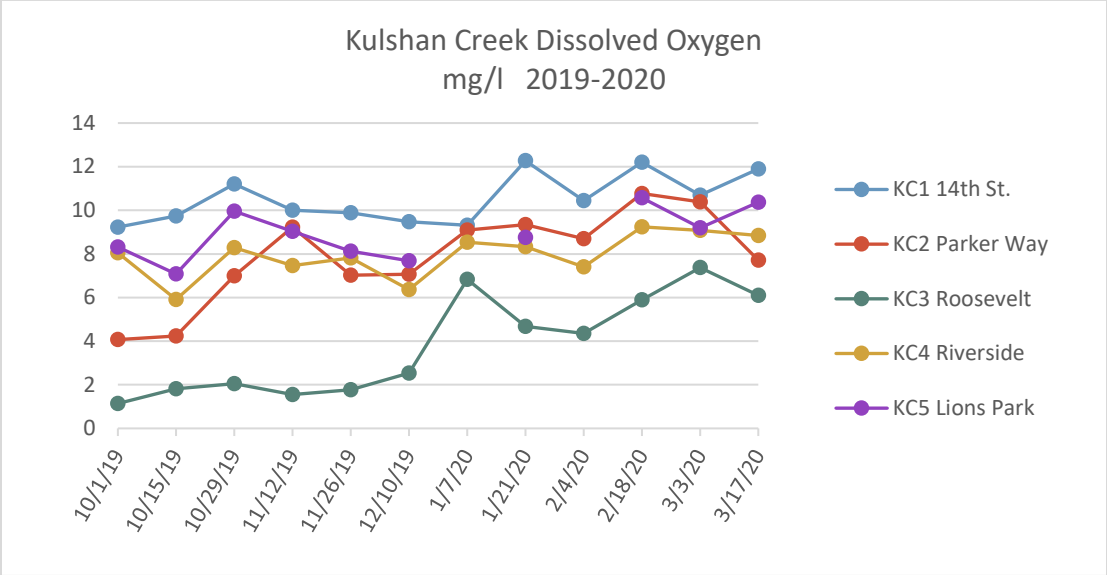

Figure 33. Kulshan Creek DO: 2019-2020

All sites stayed below 16°C.

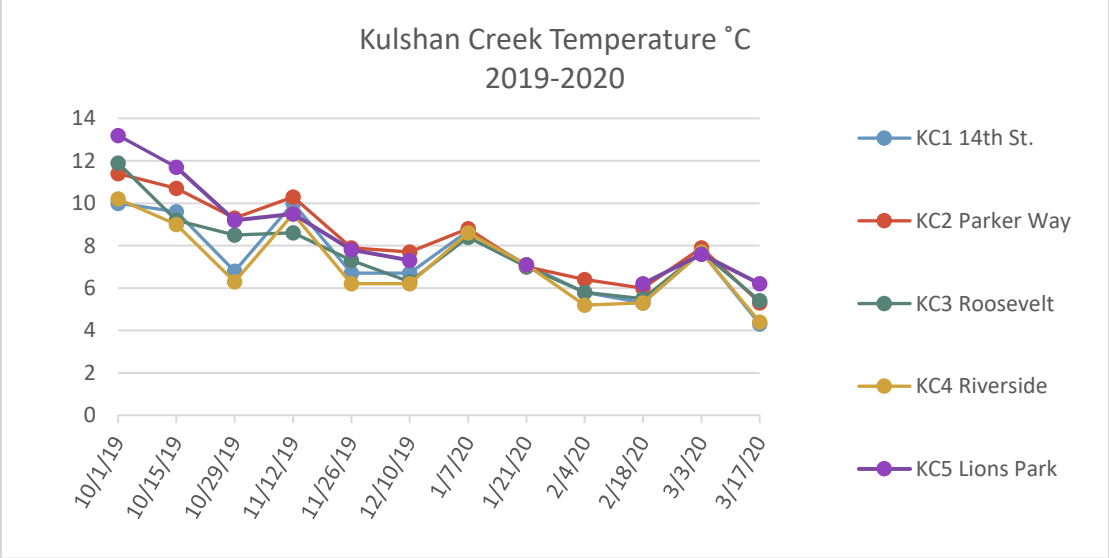

Figure 34. Kulshan Creek Temperature: 2019-2020

Incidents of high turbidity in Kulshan Creek corresponded to high fecal coliform levels.

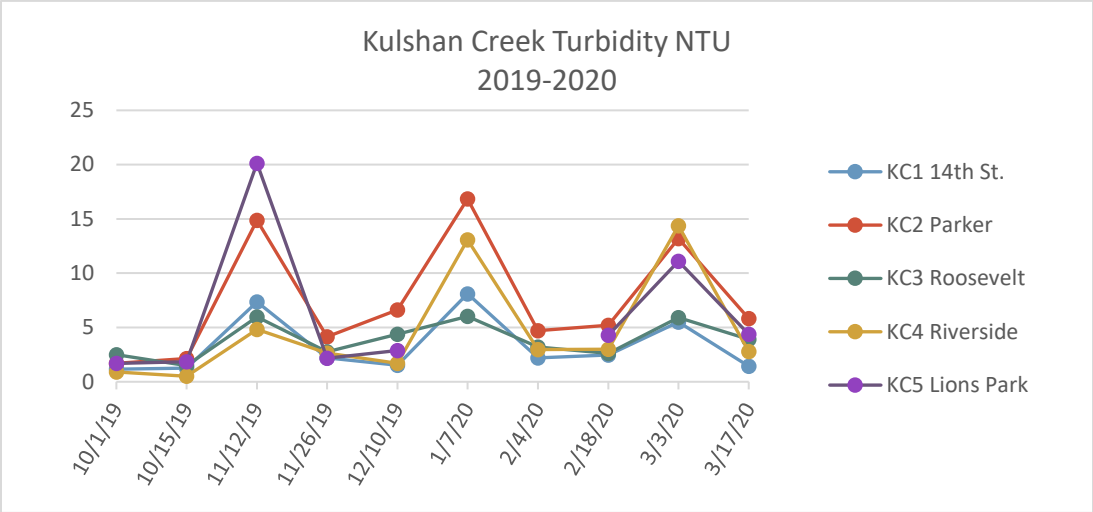

Figure 35. Kulshan Creek Turbidity: 2019-2020

As in previous years, fecal coliform counts in Kulshan Creek were variable throughout the year. Sites 1 and 2 had geometric means above 100 cfu/100ml. All sites have multiple samples over 200 CFU/100ml, and therefore did not meet part 2 fo the standard.

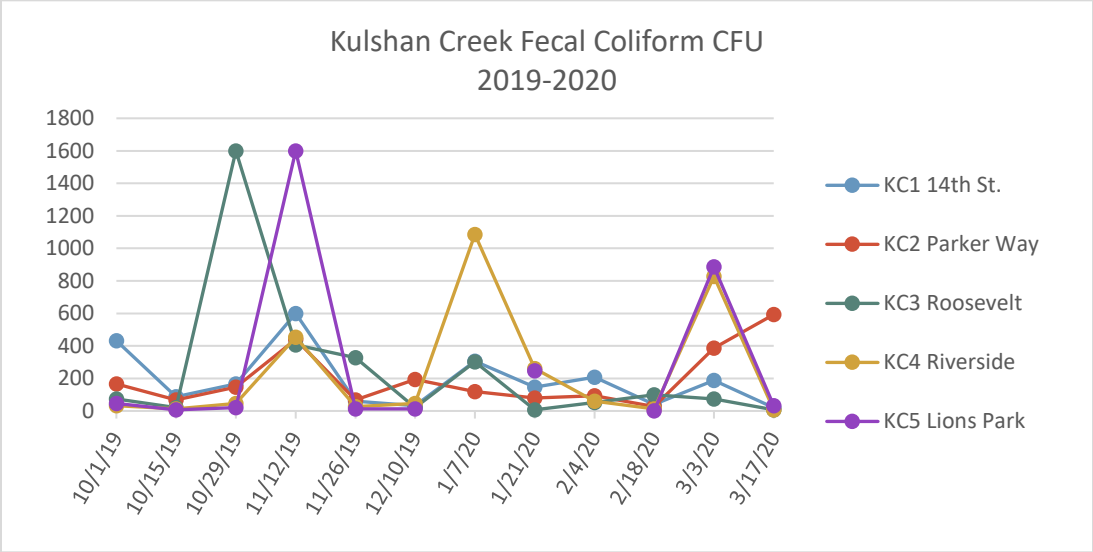

Figure 36. Kulshan Creek Fecal Coliform: 2019-2020

Ace of Hearts/Happy Valley Creeks

Figures 37 through 40 below present results from Ace of Hearts and Happy Valley Creek sampling. This was the third year of sampling these sites.

Only Site 4 stayed above the standard for Dissolved Oxygen throughout the sampling season.

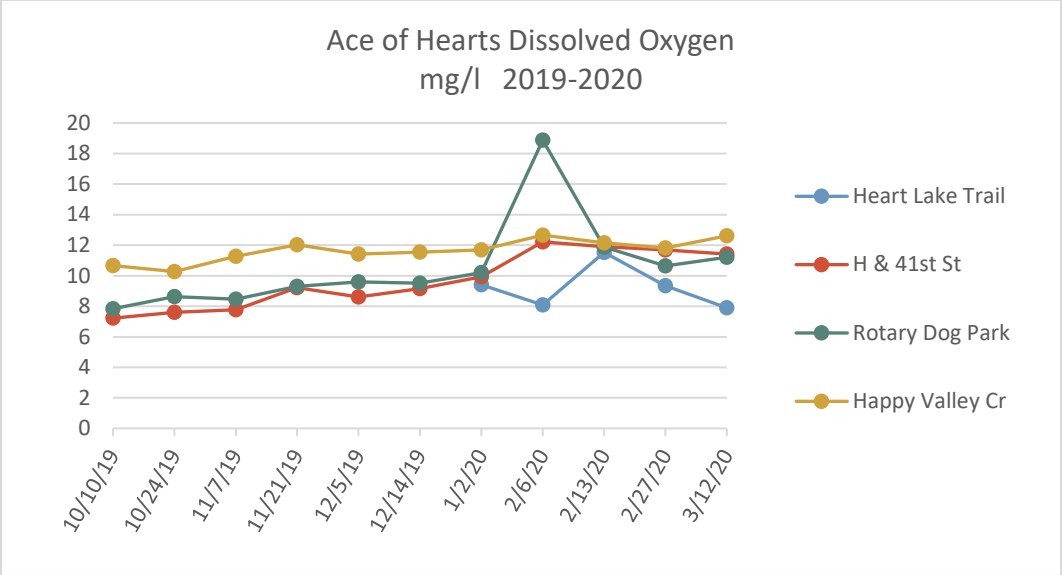

Figure 37. Ace of Hearts DO: 2019-2020

All sites stayed below 17.5 °. Ace of Hearts sites were not sampled in summer months when temperatures would be warmer.

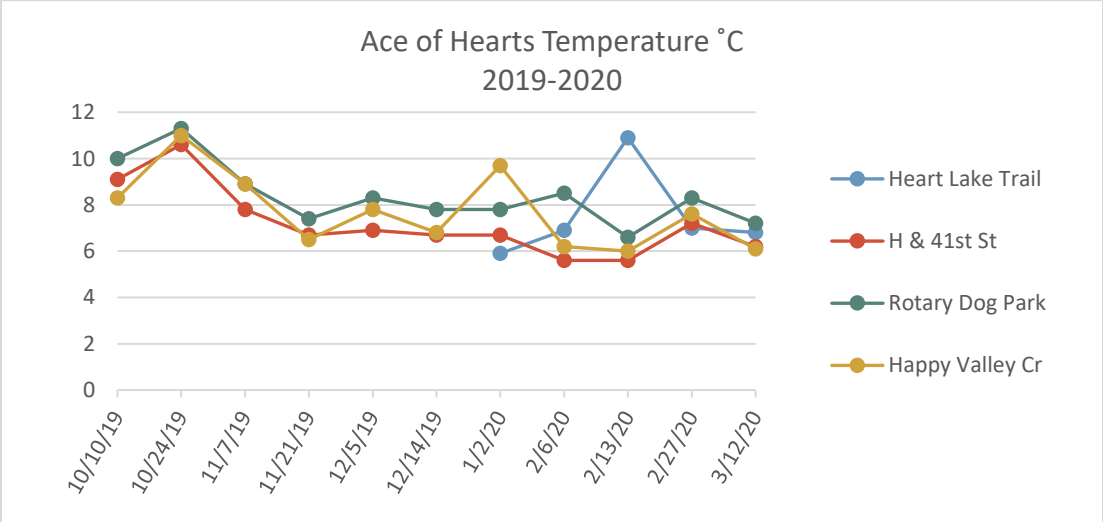

Figure 38. Ace of Hearts Temperature: 2019-2020

The turbidity meter for the Ace of Hearts teams was replaced mid-year. Levels were some of the lowest of all the stream team sites..

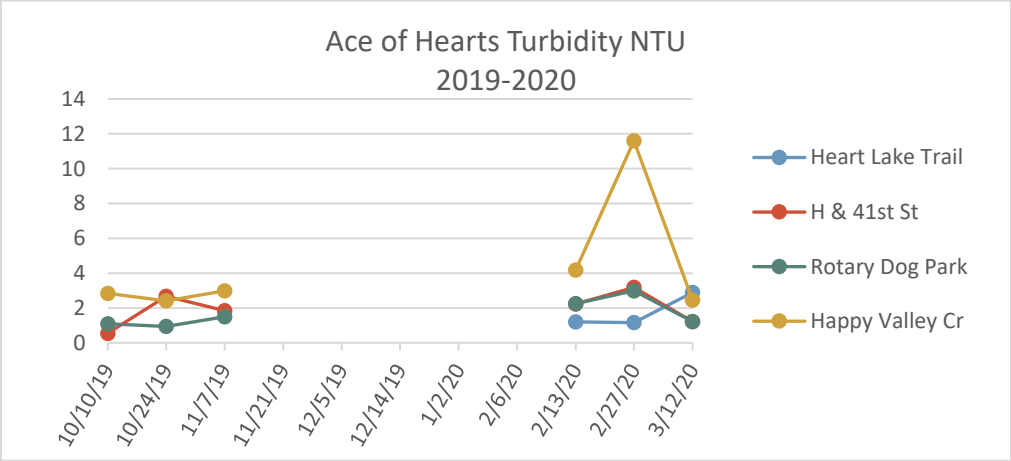

Figure 39. Ace of Hearts Turbidity: 2019-2020

Ace of Hearts and Happy Valley sites have some of the lowest fecal coliform levels of all the stream team sites. Sites 1 -3 met both parts of the standard. Site 4 did not meet Part 2, with more than 10% of the counts higher than 200CFU/100ml.

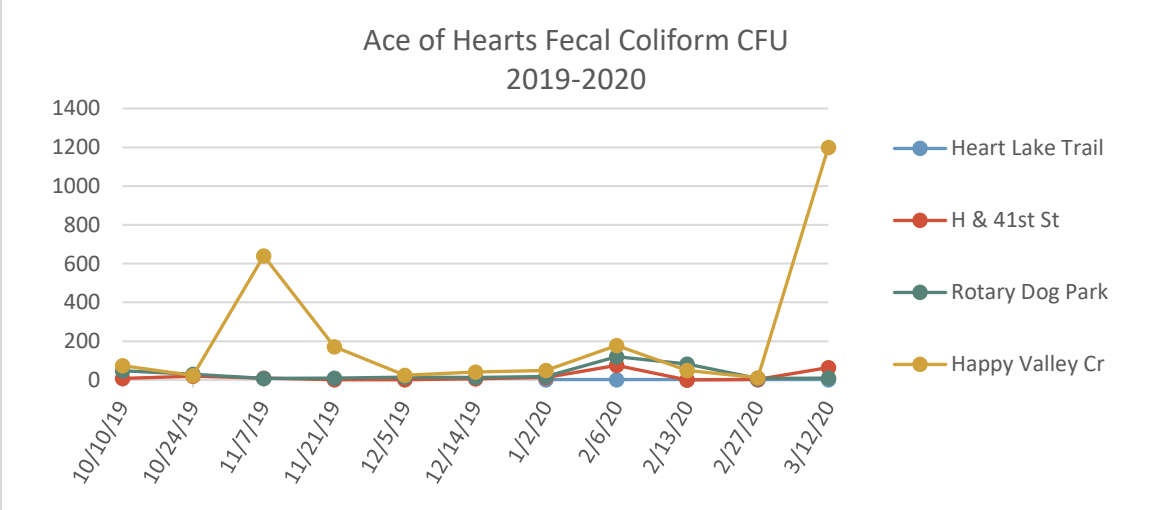

Figure 40. Ace of Hearts Fecal Coliform: 2019-2020

Gages Slough Results

Figures 41 through 44 below present results from Gages Slough sampling. Site GS4 was moved in 2013-14 because of changes to public access, and was renamed GS4A. This stream is monitored every four weeks.

Dissolved oxygen at all Gages Slough sites was below the standard throughout the year, including winter when cold water temperatures usually increase DO.

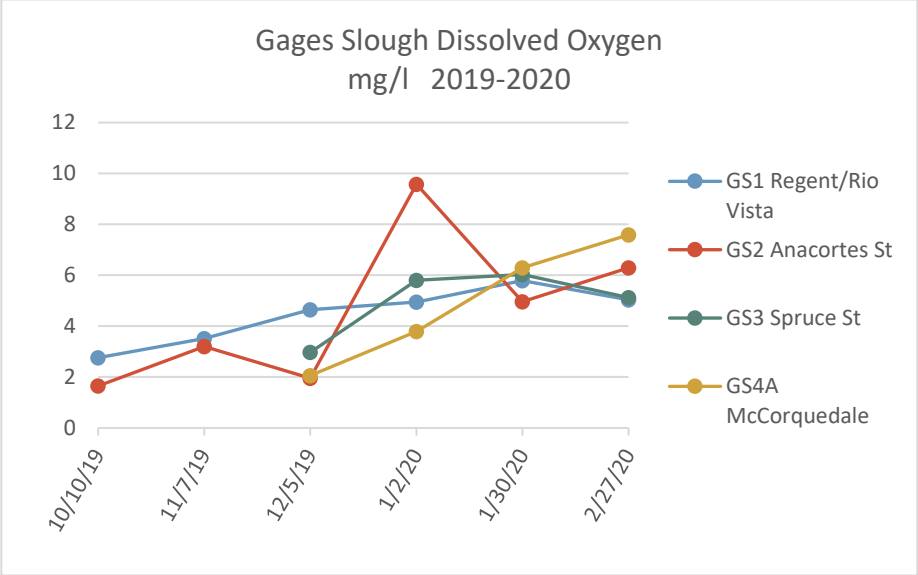

Figure 41. Gages Slough DO: 2019-2020

All Gages Slough sites were cooler than 17.5°C throught the sampling period.

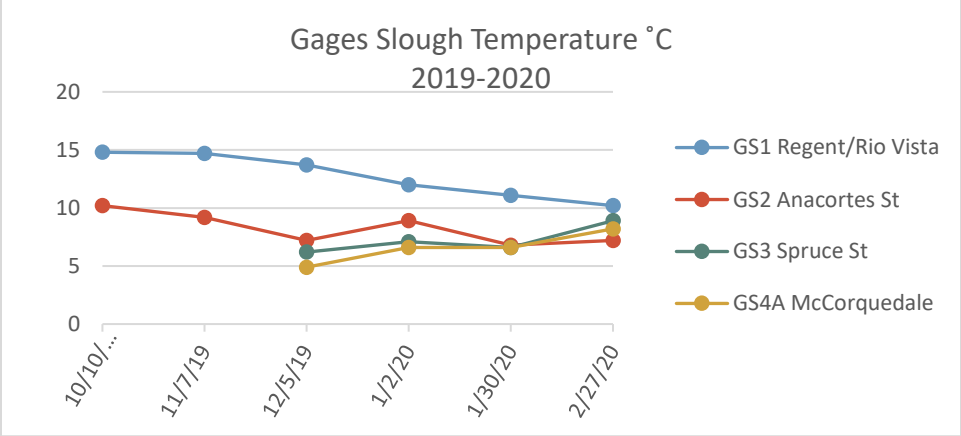

Figure 42. Gages Slough Temperature: 2019-2020

Site 2 again had the highest turbidity levels.

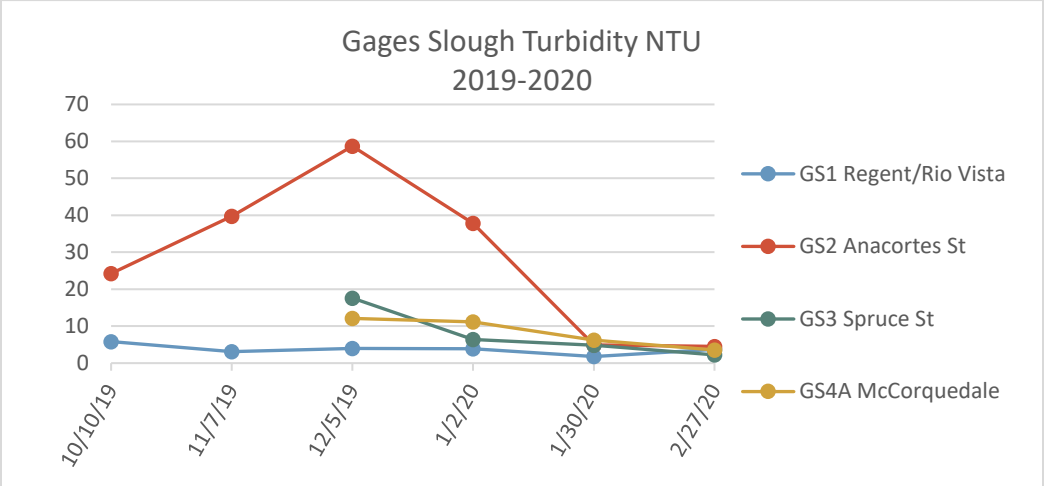

Figure 43. Gages Slough Turbidity: 2019-2020

For fecal coliform, Site 1 did not meet either part of the state standard. All other sites met standards, though only 6 samples were taken and the sampling season was short.

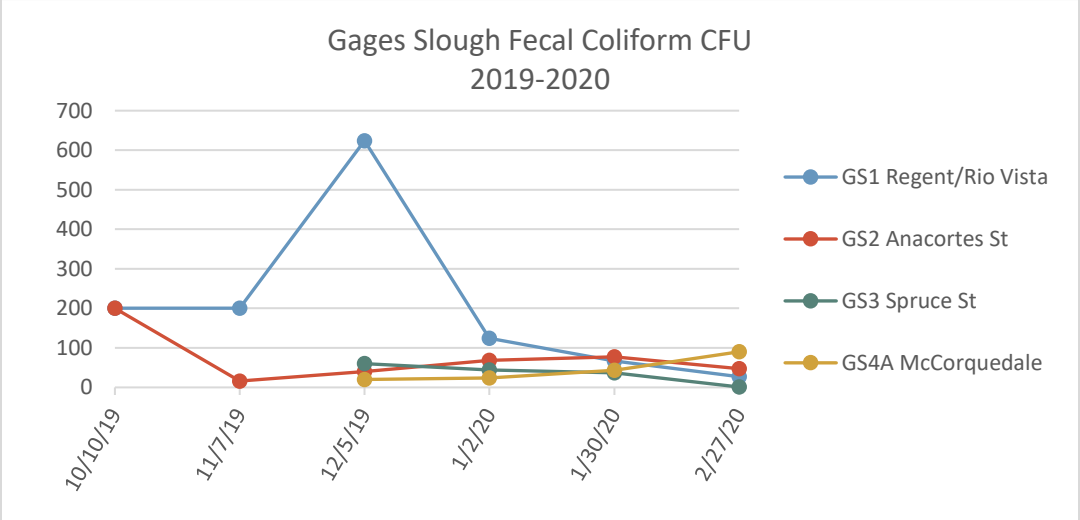

Figure 44. Gages Slough Fecal Coliform: 2019-2020

Stream Team 2019-2020 Summary

Figures 45-48 below show annual averages for each parameter at all sites. While it is interesting to compare watersheds, it is important to note that each water body has unique characteristics that naturally influence water quality. Variation is normal, and what might be considered "healthy" for water backed up behind a tide gate might not be healthy for a small wooded stream in the Upper

Nookachamps. The 2019-2020 sampling year was cut short by COVID restrictions, so spring/early summer data is missing.

For dissolved oxygen, (Figure 98) a number of sites have annual averages below 8mg/l. Considering regulations do not allow even one occurrence of levels below the standard, it is clear that these sites are in need of attention. Upper Nookachamps 1, all Joe Leary sites, and all Gages Slough sites have low DO levels.

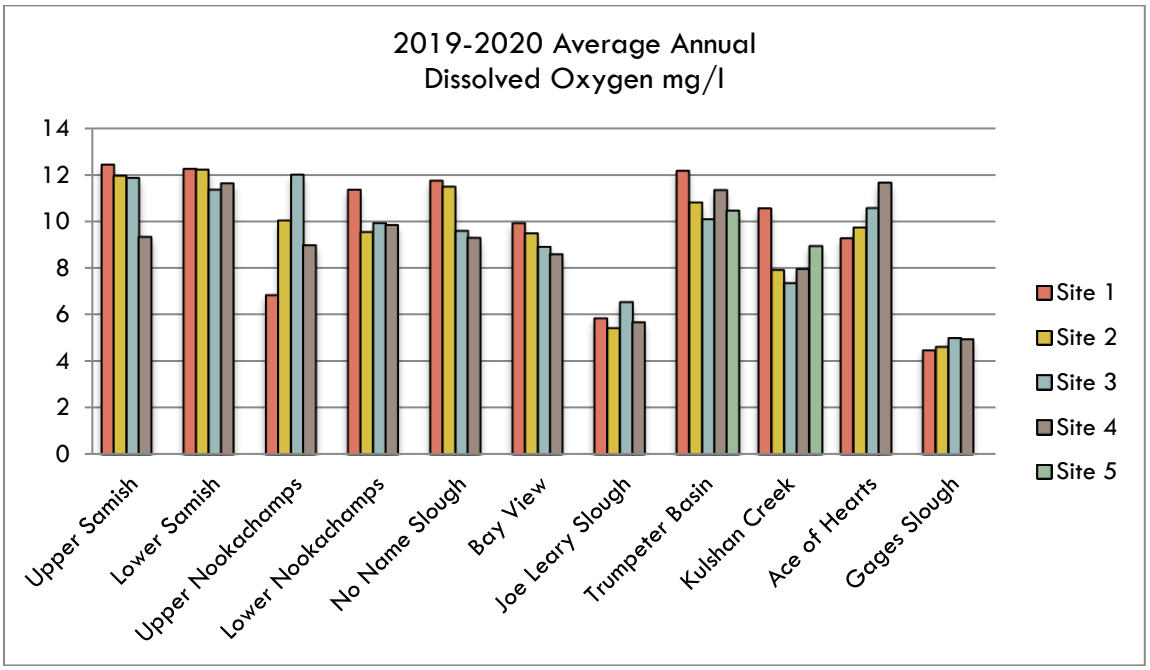

Figure 45. Annual Average Dissolved Oxygen: All sites

Figure 99 (next page) shows average temperature. State standards are not based on annual average temperatures, but on the average 7-day maximum. Sites were not sampled during the warm summer season.

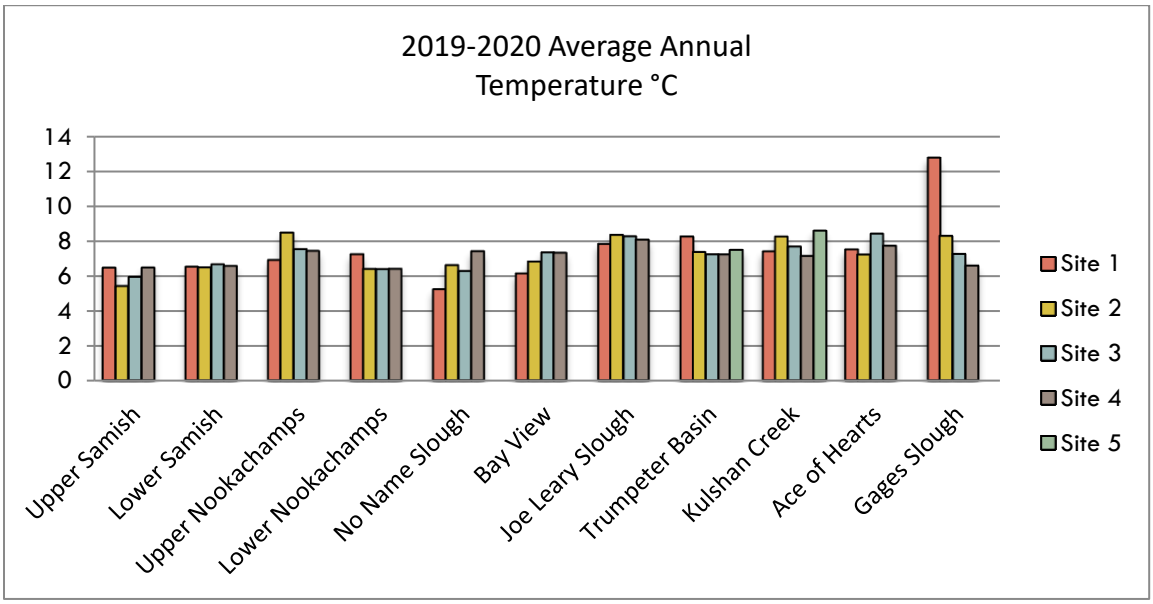

Figure 46. Annual Average Temperature: All sites

Turbidity is the parameter with the greatest naturally occurring variability. Comparing all streams, Gages Slough Site 2, and Joe Leary Slough stand out. All Joe Leary sites are 2-3 times higher than most other sites. Along much of Joe Leary's course, it drains cultivated cropland and is periodically dredged to improve drainage.

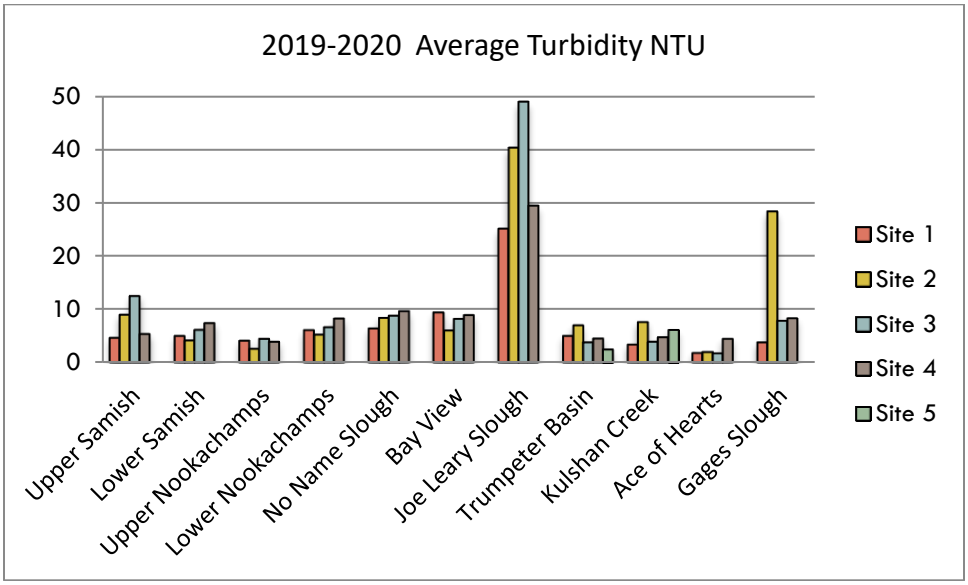

Figure 47. Annual Average Turbidity: All sites

Fecal coliform (Figure 101) is the parameter of greatest interest to regulators, health officials, and shellfish growers. While most sites met the Part 1 of state standards this year compared to past years, the season did not include our spring which is typically rainy, with higher levels of runouff and fecal coliform pollution.

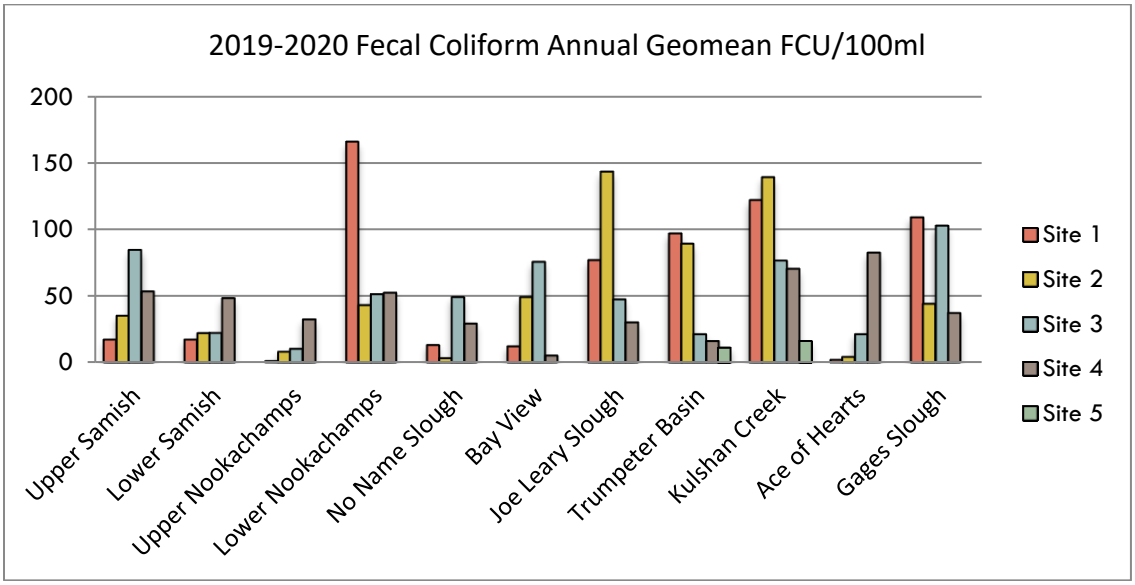

Figure 48. Fecal Coliform Annual Geomean: All sites

Table 11 below shows each site compared to state standards: Part 1 (geomean <100CFU/100ml) and Part 2 (<10% of samples under 200CFU/100ml) of the state standard for fecal coliform. Bold text denotes sites that met both parts of the standard. The sampling season was very short, did not include the spring season, and was not representative of past Stream Team years.

Table 11. Fecal Coliform Results Compared to State Standards

	Site 1		Site 2		Site 3		Site 4		Site 5	
	Part 1	Part 2	Part 1	Part 2	Part 1	Part 2	Part 1	Part 2	Part 1	Part 2
Upper Samish	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**	yes	no		
Lower Samish	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**	yes	no		
Upper Nookachamps	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**		
Lower Nookachamps	no	no	yes	no	no	yes	no	no		
No Name Slough	yes	no	**yes**	**yes**	**yes**	**yes**	yes	no		
Bay View	**yes**	**yes**	yes	no	yes	no	**yes**	**yes**		
Joe Leary Slough	no	no	no	no	Yes	Yes	yes	yes		
Trumpeter Basin	yes	no	yes	no	yes	no	yes	no	**yes**	**yes**
Kulshan Creek	no	no	no	no	yes	no	yes	no	yes	no
Ace of Hearts Creek	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**	yes	no		
Gages Slough	no	no	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**		

Storm Team Results

2019-2020 the Storm Team completed a fourth year of sampling in the Padilla Baywatershed. Volunteers sampled sites on Joe Leary Slough, No Name Slough, Little Indian Slough, and in the village of Bay View. Volunteers sampled 12 sites during 6 rain events between October and February, before COVID-19 ended sampling for the season. Storm team data should be viewed differently from the rest of the stream team data. They do not represent typical conditions. Even a healthy stream can have occasional high fecal coliform levels during rain events. Standards are based on an samples taken in a variety of conditions, with at least 10 samples.

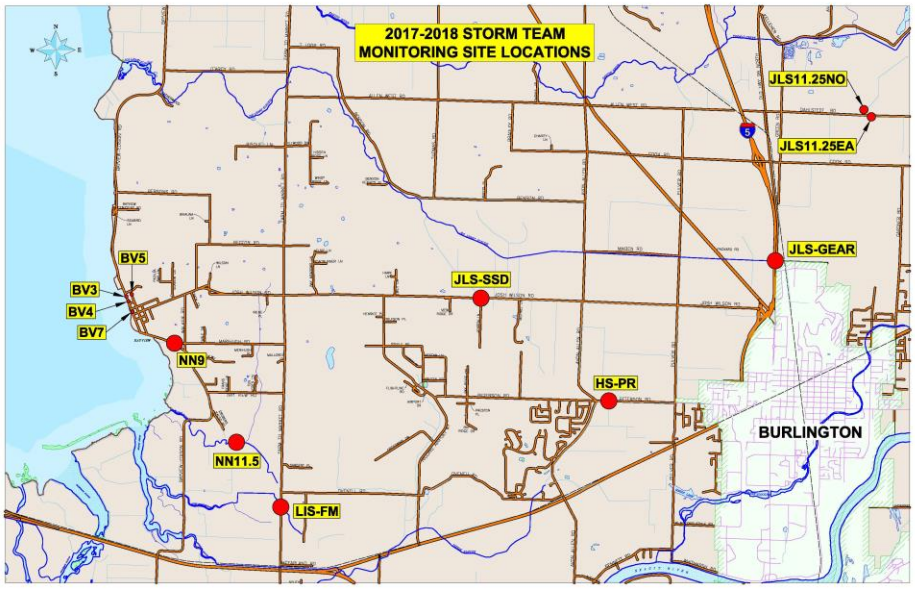

Figure 102. Padilla Bay Storm Team Sampling Sites 2019-2020

Table 12. Storm Team Site Names and Location

Site ID	Location	Lat	Long
JLS-SSD	South Spur Ditch (JLS) at Josh Wilson Rd	48.486785	-122.400550
JLS11.25NO	Joe Leary Slough N side of Dahlstedt Rd at v-ditch	48.515290	-122.316760
JLS11.25EA	Joe Leary Slough S side of Dahlstedt Rd , E of culvert	48.514820	-122.316120
JLS-GEAR	Joe Leary Slough at Gear Rd (car lots)	48.493169	-122.334936
HS-PR	Higgins Slough at Peterson Road	48.471939	-122.372181
LIS-FM	Little Indian Slough at Farm-Market Road	48.455794	-122.444279
NN9	Marihugh and Bayview-Edison Road	48.479283	-122.468683
NN11.5	No Name Slough at end of Egbers-Kalso Road	48.465098	-122.455329
BV3	Culvert South of Bay View State Park	48.485931	-122.479358
BV4	B Street Culvert (Bay View)	48.485154	-122.478814
BV5	Second St at south end of board fence (Bay View)	48.486494	-122.478086
BV7	Boat Launch Culvert (Bay View)	48.484440	-122.478754

Figure 103 below shows fecal coliform counts for all sites.

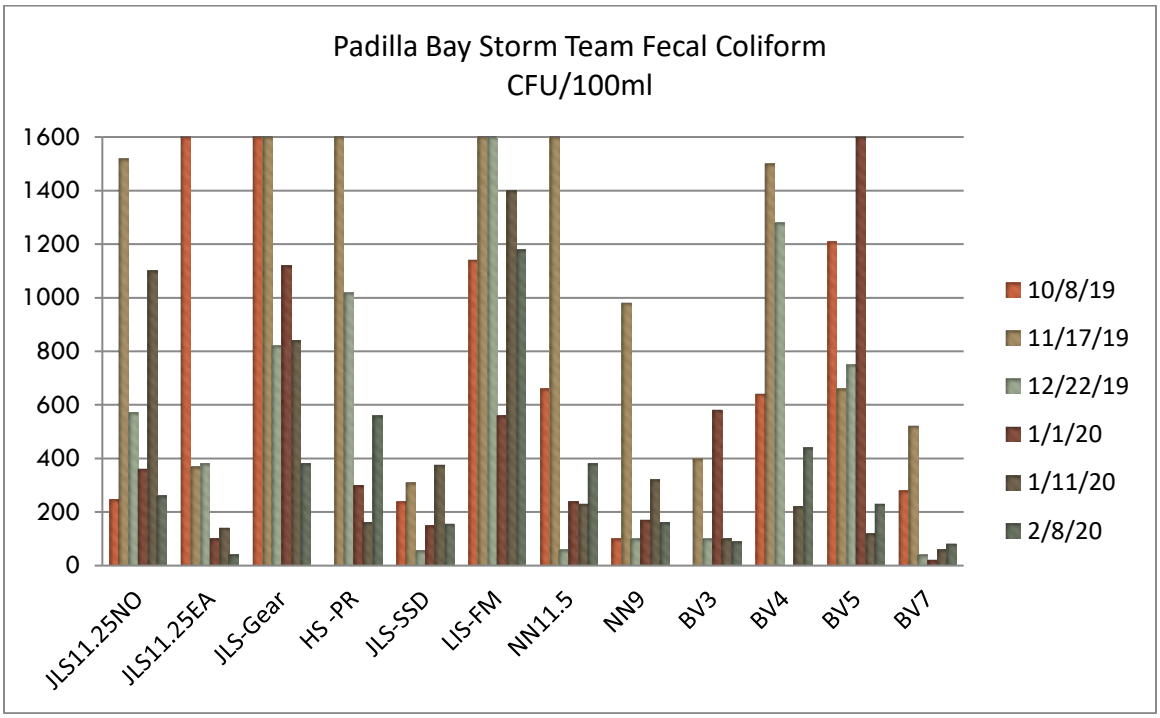

Figure 103. Storm Team: Padilla Bay Fecal Coliform, 2019-2020

Figure 105 (below) shows geometric means for the 2019-2020 sampling season. Only 2 sites were below the state standard of 100cfu/100ml of water. In Bay View, the B Street culvert (BV 4) continued to have higher counts than nearby Bay View sites. Consistent with past years, Little Indian Slough at Farm-to-Market Road stands out with extremely high counts.

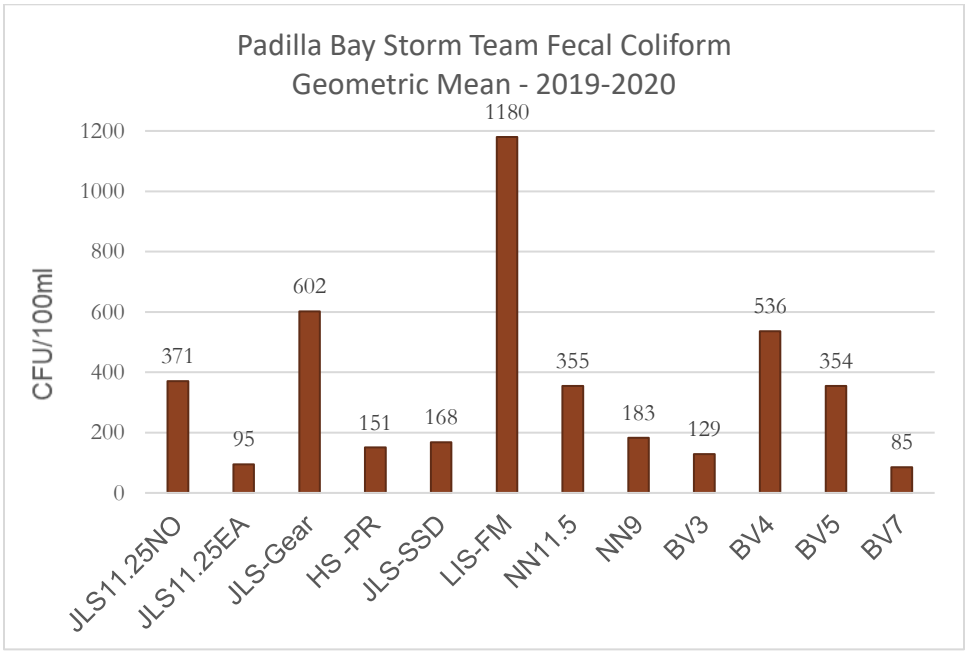

Figure 105. Storm Team: All Sites, Fecal Coliform Annual Geometric Means for 2019-2020

Figure 106 (below) compares sites over the past four years. Fecal coliform counts were lower than the previous year for most sites, and the sampling season was much shorter than previous years..

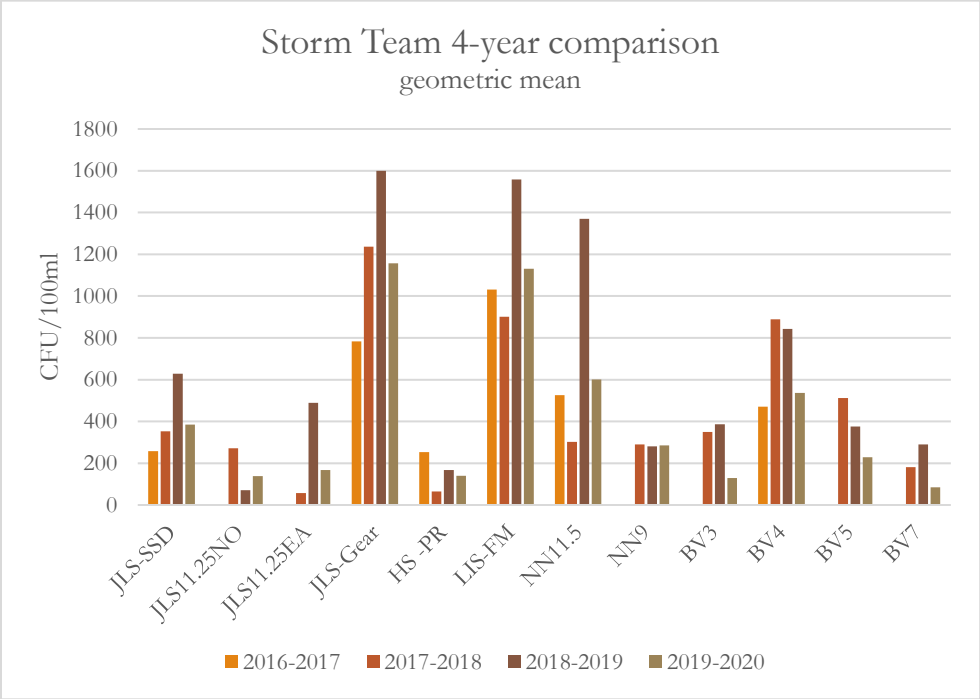

Figure 106. Storm Team: Four-year annual geometric mean comparison

VI. Conclusion

The 2019-2020 Stream Team volunteers built upon the success of previous years, and provided the twenty-first year of WQ data for Skagit County's priority watersheds. This year saw the continued monitoring of 46 sites, and fearless Storm Team sampling of the Padilla Bay watershed during heavy rain events.

Sixty-eight volunteers were exposed to a firsthand view of the impact that non-point source pollution has on local water quality. Along the way they experienced sampling techniques used by environmental professionals, learned the importance of establishing a long-term, routine sampling program, formed lasting friendships and enriched their own lives through volunteering.

Thanks to 695 volunteer hours, this program has provided valuable data to citizens and agencies, assessing current conditions so water quality improvements can be made and documented in the future. This is key data for the long-term protection of our water resources. We hope that our data is useful in identifying trends, improvements, and problem areas for the attention of the appropriate agencies and local citizens.

Appendix A - Data

Site	Date	Water Temp (° C)	Turbidity (NTU)	D.O. (% sat.)	D.O. (mg/l)	FC (CFU/100ml)
No Name Slough						
NN1 Marihugh Road	Average/Geomean	5.22	6.35	92.41	11.71	12.99
-	10/2/2019	-	-	-	-	-
-	10/14/2019	-	-	-	-	-
-	11/1/2019	5.8	1.39	84.9	10.79	10
-	11/11/2019	-	-	-	-	-
-	11/25/2019	6.7	5.13	70.5	7.08	30
-	12/9/2019	5.5	3.93	119	15.61	60
-	12/23/2019	4.8	4.15	87.2	11.14	45
-	1/6/2020	5.3	14.7	90.6	11.32	305
-	1/20/2020	6.5	11.78	74.6	9.21	30
-	2/19/2020	3.4	4.1	98	13.11	45
-	3/2/2020	5.8	8.35	88.3	11.22	315
-	3/16/2020	3.2	3.64	118.6	15.95	0
NN2 Bay View Road	Average/Geomean	6.59	8.32	94.44	11.72	3.38
-	10/2/2019	-	-	-	-	
-	10/14/2019	-	-	-	-	
-	11/1/2019	8.6	2.96	97.4	10.06	15
-	11/11/2019	9	0.78	96.5	11.91	0
-	11/25/2019	7.5	22.5	68.2	10.73	5
-	12/9/2019	6.4	3.75	115.5	11.95	0
-	12/23/2019	5.9	5.41	82.3	12.21	85
-	1/6/2020	6.4	10.9	92	11.94	140
-	1/20/2020	6.4	20.9	76.1	15.50	395
-	2/19/2020	5.5	4.22	89.7	10.83	30
-	3/2/2020	6.4	8.66	86.4	12.35	120
-	3/16/2020	3.8	3.16	140.3	10.96	5
NN3 Egbers Field	Geomean/Average	6.23	8.76	78.10	9.58	49
-	10/2/2019	8.8	5.82	31.5	3.78	153
-	10/14/2019	7.9	2.18	47.2	5.53	100
-	11/1/2019	6.7	2.06	75.5	9.2	16
-	11/11/2019	7.7	1.76	76.5	7.63	23
-	11/25/2019	6.8	7.13	61.6	6.19	7
-	12/9/2019	5.8	9.65	107.3	13.6	99
-	12/23/2019	5.7	13.82	85.7	10.98	126
-	1/6/2020	5.9	16.77	84	10.35	117
-	1/20/2020	6.2	17.46	74.2	9.2	88
-	2/19/2020	4.3	9.26	86.1	11.53	18

Site	Date	Water Temp (° C)	Turbidity (NTU)	D.O. (% sat.)	D.O. (mg/l)	FC (CFU/100ml)
NN3 Egbers Field	3/2/2020	5.6	12.34	84.6	10.74	171
-	3/16/2020	3.3	6.89	123	16.25	13
NN4 Field Culvert	Geomean/Average	7.42	9.61	82.75	9.28	29
-	10/2/2019	11.5	3.87	71.5	7.87	23
-	10/14/2019	11.7	2.68	173	16.25	3
-	11/1/2019	9.8	23.5	57.2	4.1	10
-	11/11/2019	9.4	4.56	55	5.37	15
-	11/25/2019	6.7	7.53	65.6	6.61	20
-	12/9/2019	6.3	8.79	96	11.44	280
-	12/23/2019	5.1	14.43	82.6	10.36	80
-	1/6/2020	6.1	11.05	72.9	9.1	13
-	1/20/2020	6.4	12.91	70.3	8.71	203
-	2/19/2020	4.7	8.27	77.3	9.76	10
-	3/2/2020	6.21	8.54	80.5	9.9	75
-	3/16/2020	5.1	9.24	91.1	11.87	50
[redacted]						
Upper Samish						
US1 PomonaGrange	Geomean/Average	6.45	4.56	101.46	12.41	28.43
-	10/11/2019	7.8	2.6	89	10.46	13
-	10/26/2019	10.6	5.1	96.7	10.79	64
-	11/8/2019	6.6	2.1	101	12.34	9
-	11/23/2019	6	3.3	97.1	12.1	22
-	12/6/2019	6.5	2.1	98.7	12.1	13
-	12/22/2019	6	5.45	106.1	13.11	82
-	1/3/2020	6.9	5.8	108.8	12.5	99
-	1/19/2020	4.5	8.5	103.9	13.34	56
-	2/15/2020	5.9	7.8	98.4	12.26	123
-	2/28/2020	5.7	3.5	109	13.6	2
-	3/14/2020	4.4	3.9	107.4	13.94	61
US2 Swede Creek	Geomean/Average	5.38	8.90	94.45	11.93	34.87
-	10/11/2019	5.7	8	81.4	10.22	70
-	10/26/2019	9.3	9.8	91.8	10.47	55
-	11/8/2019	4.1	4.5	92.1	12	6
-	11/23/2019	5.1	9.06	93.2	11.81	20
-	12/6/2019	5.6	7.7	93.6	11.73	14
-	12/22/2019	5.3	7.9	97.6	12.35	73
-	1/3/2020	6.7	12.9	94.5	11.54	206
-	1/19/2020	3.4	13.2	96.2	12.9	48

Site	Date	Water Temp (° C)	Turbidity (NTU)	D.O. (% sat.)	D.O. (mg/l)	FC (CFU/100ml)
US2 Swede Creek	2/15/2020	5.6	13.75	96.4	11.91	77
-	2/28/2020	5.1	5.7	106.1	13.5	10
-	3/14/2020	3.3	5.4	96	12.75	31
US3 Thomas Creek	Geomean/Average	5.91	12.45	95.65	11.86	71.54
-	10/11/2019	6.1	10.8	88.8	10.36	238
-	10/26/2019	9.6	13.4	95.3	10.85	66
-	11/8/2019	4.9	5	94.5	12.05	16
-	11/23/2019	5.8	10.9	93.7	11.71	39
-	12/6/2019	6.6	9.5	95.2	11.64	31
-	12/22/2019	5.9	12.6	98.4	12.28	67
-	1/3/2020	6.9	21.6	98.8	11.98	57
-	1/19/2020	3.9	16.7	98.1	12.87	59
-	2/15/2020	5.9	18.5	99.5	12.23	254
-	2/28/2020	5.6	8.4	96.5	12.13	182
-	3/14/2020	3.8	9.5	93.4	12.32	78
US4 Willard Creek	Geomean/Average	6.48	5.32	76.05	9.32	41.65
-	10/11/2019	6.4	10.1	61.9	7.46	125
-	10/26/2019	10.2	6.8	74.7	8.42	82
-	11/8/2019	5.8	2.7	42.3	5.3	23
-	11/23/2019	6.5	4.4	82.1	10.07	41
-	12/6/2019	7.3	2.7	73.6	8.89	62
-	12/22/2019	6	5.6	83.9	10.42	85
-	1/3/2020	7	6.4	87.2	10.52	46
-	1/19/2020	4.4	6.17	86.7	11.18	43
-	2/15/2020	6.2	5.98	81.4	9.89	110
-	2/28/2020	7	3.2	79.5	9.63	13
-	3/14/2020	4.5	4.43	83.3	10.76	5
[redacted]						
Lower Samish						
LS1 99 Bridge	Geomean/Average	**6.51**	**4.94**	**100.18**	**12.23**	**17.63**
-	10/16/2019	10.4	2.18	99	11.02	29
-	11/2/2019	6.2	2.78	102.5	12.61	14
-	11/13/2019	9.1	2.92	96.5	11.12	28
-	11/30/2019	2.4	3	99.5	13.08	19
-	12/11/2019	6.5	3.78	102.5	12.56	12
-	12/28/2019	5.4	4	102.2	12.9	-
-	1/8/2020	-	-	-	-	-
-	1/25/2020	6.8	11.21	104.5	12.65	7

Site	Date	Water Temp (° C)	Turbidity (NTU)	D.O. (% sat.)	D.O. (mg/l)	FC (CFU/100ml)
LS1 99 Bridge	2/22/2020	5.9	4.74	96.8	12.03	23
-	3/4/2020	5.9	9.81	98.1	12.07	25
LS2 Jolly Rd	Geomean/Average	**6.46**	**4.11**	**97.71**	**12.19**	**22.24**
-	10/16/2019	10.4	2.4	96.1	10.7	33
-	11/2/2019	6.2	2.52	100.1	13.51	18
-	11/13/2019	9.3	4.04	95.8	11	31
-	11/30/2019	2.2	3.2	102.1	13.98	22
-	12/11/2019	6.5	4.37	101.8	12.47	13
-	12/28/2019	5.4	3	95.5	12.05	
-	1/8/2020	-	-	-	-	
-	1/25/2020	-	-	-	-	
-	2/22/2020	5.8	4.63	93.7	11.7	21
-	3/4/2020	5.90	8.69	96.60	12.13	26
LS3 Thomas Rd	Geomean/Average	**6.61**	**6.11**	**92.58**	**11.35**	**21.98**
Bridge	10/16/2019	10.3	2.48	94.7	10.53	68
-	11/2/2019	6.4	2.26	92.7	11.5	24
-	11/13/2019	9.4	4.36	91.5	10.46	47
-	11/30/2019	2.5	3.5	95.8	13.03	31
-	12/11/2019	6.6	6.68	92.7	11.29	6
-	12/28/2019	5.4	3.6	89	11.3	
-	1/8/2020	-	-	-	-	
-	1/25/2020	6.9	14.12	95.7	11.6	35
-	2/22/2020	5.8	7.3	86	10.7	3
-	3/4/2020	6.20	10.72	95.10	11.70	40
LS4 Samish at Boat	Geomean/Average	**6.56**	**7.35**	**95.40**	**11.62**	**47.52**
Docks	10/16/2019	10.3	8.57	98.6	10.79	482
-	11/2/2019	5.8	7.96	92.1	11.4	42
-	11/13/2019	9.4	3.23	97.5	11.04	17
-	11/30/2019	1.7	11.2	89.2	12.38	351
-	12/11/2019	6.8	4.03	101.2	12.2	32
-	12/28/2019	5.4	5	87.7	11.09	
-	1/8/2020	6.8	-	110.4	13.2	48
-	1/25/2020	7	12.04	95.7	11.57	17
-	2/22/2020	5.8	6.75	86.2	10.88	10
-	3/4/2020	6.40	12.34	103.10	12.66	42

Site	Date	Water Temp (° C)	Turbidity (NTU)	D.O. (% sat.)	D.O. (mg/l)	FC (CFU/100ml)
Gages Slough						
GS1 Regent St. &	Geomean/Average	**12.75**	**3.72**	**39.32**	**4.45**	**133.26**
E Rio Vista St.	10/10/2019	14.8	5.83	21.7	2.76	200.0
-	11/7/2019	14.7	3.1	32.6	3.51	200.0
-	12/5/2019	13.7	4	39.8	4.65	624.0
-	1/2/2020	12	3.9	42.4	4.95	124.0
-	1/30/2020	11.1	1.78	52.3	5.79	67.0
-	2/27/2020	10.2	3.73	47.1	5.04	27.0
GS2 Anacortes St.	Geomean/Average	**8.25**	**28.32**	**39.05**	**4.61**	**56.20**
-	10/10/2019	10.2	24.2	15.1	1.65	200.0
-	11/7/2019	9.2	39.7	27.4	3.2	16.0
-	12/5/2019	7.2	58.7	17.1	1.95	40.0
-	1/2/2020	8.9	37.8	81.5	9.58	68.0
-	1/30/2020	6.8	4.97	40.9	4.96	77.0
-	2/27/2020	7.2	4.53	52.3	6.3	47.0
GS3 S. Spruce St.	Geomean/Average	**7.20**	**7.78**	**41.53**	**4.98**	**43.60**
-	10/10/2019	-	-	-	-	-
-	11/7/2019	-	-	-	-	-
-	12/5/2019	6.2	17.6	24.2	2.97	60.0
-	1/2/2020	7.1	6.42	42.9	5.8	44.0
-	1/30/2020	6.6	4.88	49.3	6.03	37.0
-	2/27/2020	8.9	2.23	49.7	5.13	1.0
GS4 McCorquedale	Geomean/Average	**6.58**	**8.26**	**41.50**	**4.94**	**36.92**
-	10/10/2019	-	-	-	-	-
-	11/7/2019	-	-	-	-	-
-	12/5/2019	4.9	12.1	17.6	2.06	20.0
-	1/2/2020	6.6	11.2	31.9	3.79	24.0
-	1/30/2020	6.6	6.19	53.3	6.3	43.0
-	2/27/2020	8.2	3.55	63.2	7.59	90.0
[redacted]						
Bay View						
BV1 Walker Rd	**Average/Geomean**	**6.12**	**9.35**	**77.44**	**9.90**	**12.38**
-	10/11/2019	-	-	-	-	
-	10/20/2019	-	-	-	-	
-	11/7/2019	-	-	-	-	
-	11/19/2019	6.5	22.8	73	8.83	730
-	12/5/2019	-	-	-	-	

Site	Date	Water Temp (° C)	Turbidity (NTU)	D.O. (% sat.)	D.O. (mg/l)	FC (CFU/100ml)
BV1 Walker Rd	12/15/2019	8.9	7.24	7.55	9.26	0
-	1/2/2020	-	-	-	-	
-	1/12/2020	5.9	8.17	95.5	12.05	283
-	1/30/2020	5.4	-	94.4	9.95	315
-	2/9/2020	4.2	4.82	103.8	13.06	47
-	2/20/2020	-	-	-	-	
-	3/8/2020	5.8	3.7	90.4	6.23	117
BV2 C Street	**Average/Geomean**	**6.78**	**6.00**	**80.16**	**9.46**	**48.66**
-	10/11/2019	9.8	2.8	50.3	6.7	17
-	10/20/2019	10.4	3.4	57.1	5.61	31
-	11/7/2019	-	-	-	-	-
-	11/19/2019	10.3	19	70.3	7.88	946
-	12/5/2019	-	-	-	-	-
-	12/15/2019	8	3.9	74.6	9.4	66
-	1/2/2020	6.3	4.6	76.7	7.63	41
-	1/12/2020	5.3	8.23	93.2	11.87	131
-	1/30/2020	5.4	-	98.6	10.04	45
-	2/9/2020	3.9	4.64	101.2	13.49	28
-	2/20/2020	2.8	3.57	88.8	10.25	7
-	3/8/2020	5.6	3.9	90.8	11.7	47
BV3 Boat Launch	**Average/Geomean**	**9.57**	**5.45**	**72.38**	**8.36**	**67.35**
-	10/11/2019	11.1	2.9	114.7	10.62	14
-	10/20/2019	8.8	2.6	58.5	5.88	1600
-	11/7/2019	8.1	1.3	93.9	9	55
-	11/19/2019	10	19.9	65.7	3.25	1600
-	12/5/2019	6	5.7	76.5	9	26
-	12/15/2019	7.6	3.45	57.1	6.45	64
-	1/2/2020	6.7	30.2	73.6	7.32	82
-	1/12/2020	6.6	10.82	100.3	12.88	165
-	1/30/2020	6.8	-	93.2	9.42	48
-	2/9/2020	4.7	5.6	105.5	12.92	44
-	2/20/2020	5.3	2.42	82.3	8.76	3
-	3/8/2020	5.8	4.62	91.1	11.22	38
-						
BV4 Bay View State Park	**Average/Geomean**	**9.65**	**13.14**	**70.89**	**8.47**	**4.89**
-	10/11/2019	11	1.9	137.5	13.35	0
-	10/20/2019	8.5	3.5	68	4.58	7
-	11/7/2019	8	1.8	95	9.16	0
-	11/19/2019	**10.8**	**15.1**	**70.1**	**6.56**	1600

Site	Date	Water Temp (° C)	Turbidity (NTU)	D.O. (% sat.)	D.O. (mg/l)	FC (CFU/100ml)
BV4 Bay View State Park	12/5/2019	6	5.9	67.8	6.95	6
	12/15/2019	7.2	1.66	60.5	6.04	77
-	1/2/2020	6.5	32.3	78.1	7.74	103
-	1/12/2020	6.1	13.3	98.8	10.01	1600
-	1/30/2020	6.8	-	90.5	9.04	30
-	2/9/2020	5.2	11.8	90	9.81	241
-	2/20/2020	4.4	1.56	83.9	9.47	9
-	3/8/2020	7.3	-	96.7	10.25	38
[redacted]						
Trumpeter Basin						
TB1 Stonebridge	Average/Geomean	**8.23**	**4.93**	**102.41**	**12.14**	**97**
Adult Community	10/10/2019	8.2	1.42	108.8	12.72	87
-	10/25/2019	12.1	6.43	104.9	11.21	620
-	11/7/2019	6.9	0.77	107.2	13.27	127
-	11/20/2019	9.1	6.34	94.7	10.89	267
-	12/5/2019	8	1.84	112.5	13.74	27
-	12/18/2019	8	1.98	93.2	10.94	27
-	1/2/2020	7.7	18.95	93.5	11.4	1020
-	1/15/2020	-	-	-	-	-
-	1/30/2020	7.4	5.63	94.3	10.98	40
-	2/27/2020	7.8	2.29	110.9	13.56	40
-	3/11/2020	7.1	3.64	104.1	12.7	33
TB2 Frazier Home	Average/Geomean	**7.34**	**6.91**	**90.12**	**10.78**	**89**
on College Way	10/10/2019	7	1.18	91.9	11.12	60
-	10/25/2019	11.5	8.58	97.7	10.54	620
-	11/7/2019	5.6	1.4	91.6	11.24	33
-	11/20/2019	7.1	8.87	82.6	9.95	347
-	12/5/2019	7.4	3.13	87.9	10.44	60
-	12/18/2019	7.1	4.23	83.6	10.3	40
-	1/2/2020	7.2	14.48	85.8	10.32	307
-	1/15/2020	-	-	-	-	-
-	1/30/2020	6.5	9.1	83.6	10.25	73
-	2/27/2020	7.4	7.37	100.4	11.91	13
-	3/11/2020	6.6	10.77	96.1	11.71	107
TB3 College Way	Average/Geomean	**7.19**	**3.73**	**83.26**	**10.09**	**21**
Trumpet./Thunder.	10/10/2019	6.6	1.52	83.1	10.36	133

Site	Date	Water Temp (° C)	Turbidity (NTU)	D.O. (% sat.)	D.O. (mg/l)	FC (CFU/100ml)
TB3 College Way	10/25/2019	10.5	6.31	92.4	10.25	293
Trumpeter/Thunder-	11/7/2019	6.6	1.18	84.1	10.4	27
Bird confluence	11/20/2019	7.3	5.71	78.3	9.47	200
-	12/5/2019	7.1	1.39	70.9	8.63	33
-	12/18/2019	6.8	2.15	73.1	8.87	40
-	1/2/2020	6.9	6.14	81.8	9.93	147
-	1/15/2020	-	-	-	-	-
-	1/30/2020	6.4	4.84	83.8	10.24	0
-	2/27/2020	7.3	3.83	92	11.17	47
-	3/11/2020	6.4	4.2	93.1	11.53	80
TB4 Kiowa Street	**Average/Geomean**	**7.22**	**4.45**	**93.97**	**11.33**	**16**
-	10/10/2019	6.7	1.87	101.7	12.46	120
-	10/25/2019	10.5	14.16	101.1	11.25	313
-	11/7/2019	7.1	1.08	99.7	12.04	13
-	11/20/2019	7.6	4.69	88	10.54	200
-	12/5/2019	6.8	1.32	88.5	10.83	27
-	12/18/2019	6.8	1.69	84.9	10.41	67
-	1/2/2020	6.7	7.11	86.9	10.59	47
-	1/15/2020	-	-	-	-	-
-	1/30/2020	6.6	5.99	84.6	10.4	13
-	2/27/2020	7.1	3.47	102.6	12.31	0
-	3/11/2020	6.3	3.16	101.7	12.48	80
TB5 Bakerview	**Average/Geomean**	**7.49**	**2.44**	**86.28**	**10.42**	**11**
Park	10/10/2019	7.2	1.31	103	12.45	67
Footbridge	10/25/2019	10.9	3.1	93.2	10.9	107
-	11/7/2019	6.5	0.83	85.2	10.47	13
-	11/20/2019	7.7	2.89	79.3	9.45	67
-	12/5/2019	7.2	0.99	74.9	8.92	13
-	12/18/2019	7.1	1.45	75	9.02	13
-	1/2/2020	7.1	6.56	80.9	9.71	267
-	1/15/2020	-	-	-	-	-
-	1/30/2020	7	2.91	80	9.71	13
-	2/27/2020	7.7	1.91	96.5	11.89	0
-	3/11/2020	6.5	2.48	94.8	11.68	87
-	10/10/2019	4.60	3.10	94.50	12.20	20
-						

Site	Date	Water Temp (° C)	Turbidity (NTU)	D.O. (% sat.)	D.O. (mg/l)	FC (CFU/100ml)
Ace of Hearts						
AH1 Heart Lake	**Average/Geomean**	**7.50**	**1.75**	**80.42**	**9.25**	**2**
Trail	10/10/2019	-	-	-	-	-
-	10/24/2019	-	-	-	-	-
-	11/7/2019	-	-	-	-	
-	11/21/2019	-	-	-	-	-
-	12/5/2019	-	-	-	-	-
-	12/14/2019	-	-	-	-	-
-	1/2/2020	5.9	-	72.5	9.4	2
-	2/6/2020	6.9	-	94.1	8.09	2
-	2/13/2020	10.9	1.21	93.2	11.53	2
-	2/27/2020	7	1.16	77.1	9.35	2
-	3/12/2020	6.8	2.89	65.2	7.9	2
AH2 H & 41st St	**Average/Geomean**	**7.19**	**1.95**	**80.10**	**9.70**	**4**
-	10/10/2019	9.1	0.55	63	7.22	8
-	10/24/2019	10.6	2.67	68.4	7.6	20
-	11/7/2019	7.8	1.85	66.3	7.78	10
-	11/21/2019	6.7	-	76.4	9.21	2
-	12/5/2019	6.9	-	70	8.6	<2
-	12/14/2019	6.7	-	77.6	9.15	7
-	1/2/2020	6.7	-	81.8	9.92	13
-	2/6/2020	5.6	-	97.6	12.22	75
-	2/13/2020	5.6	2.23	95.3	11.91	0
-	2/27/2020	7.2	3.18	92.1	11.7	3
-	3/12/2020	6.2	1.23	92.6	11.41	63
AH3 Rotary Dog	**Average/Geomean**	**8.37**	**1.67**	**84.73**	**10.56**	**21**
Park	10/10/2019	10	1.1	69.5	7.84	47
-	10/24/2019	11.3	0.94	79.2	8.63	30
-	11/7/2019	8.9	1.5	72.7	8.47	8
-	11/21/2019	7.4	-	78.7	9.31	10
-	12/5/2019	8.3	-	82.3	9.6	15
-	12/14/2019	7.8	-	83.2	9.51	13
-	1/2/2020	7.8	-	86.7	10.2	18
-	2/6/2020	8.5	-	97.5	18.88	120
-	2/13/2020	6.6	2.25	96.9	11.88	82
-	2/27/2020	8.3	2.99	91.6	10.65	8
-	3/12/2020	7.2	1.23	93.7	11.2	10

Site	Date	Water Temp (° C)	Turbidity (NTU)	D.O. (% sat.)	D.O. (mg/l)	FC (CFU/100ml)
AH4 Happy Valley	**Average/Geomean**	**7.72**	**4.41**	**97.09**	**11.65**	**82**
Creek	10/10/2019	8.3	2.83	90.5	10.66	73
-	10/24/2019	11	2.41	93.3	10.27	23
-	11/7/2019	8.9	2.98	99	11.28	640
-	11/21/2019	6.5	-	98.7	12.03	172
-	12/5/2019	7.8	-	96.3	11.41	25
-	12/14/2019	6.8	-	96.1	11.55	40
-	1/2/2020	9.7	-	97.2	11.7	48
-	2/6/2020	6.2	-	100.9	12.66	178
-	2/13/2020	6	4.18	97.8	12.15	48
-	2/27/2020	7.6	11.6	96.6	11.81	12
-	3/12/2020	6.1	2.45	101.6	12.61	1200
-						
Kulshan Creek						
KC1 S 14th St.	**Average/Geomean**	**7.39**	**3.32**	**87.68**	**10.53**	**122**
-	10/1/2019	10	1.16	80.2	9.23	433
-	10/15/2019	9.6	1.25	86.7	9.74	87
-	10/29/2019	6.8	-	95	11.2	166
-	11/12/2019	10	7.37	88.8	10	600
-	11/26/2019	6.7	2.21	81	9.88	60
-	12/10/2019	6.7	1.51	77.3	9.47	33
-	1/7/2020	8.7	8.11	79.8	9.32	307
-	1/21/2020	7.1	-	102.3	12.27	147
-	2/4/2020	5.8	2.2	83.2	10.44	207
-	2/18/2020	5.3	2.47	97.4	12.2	40
-	3/3/2020	7.7	5.49	90	10.69	187
-	3/17/2020	4.3	1.43	90.4	11.9	20
KC2 Parker Way	**Average/Geomean**	**8.23**	**7.53**	**66.11**	**7.89**	**139**
-	10/1/2019	11.4	1.7	31.3	4.07	167
-	10/15/2019	10.7	2.15	37.7	4.23	67
-	10/29/2019	9.3	-	59.7	6.99	147
-	11/12/2019	10.3	14.89	82.8	9.23	440
-	11/26/2019	7.9	4.14	59.2	7.03	67
-	12/10/2019	7.7	6.63	59.1	7.07	193
-	1/7/2020	8.8	16.84	78.3	9.1	120
-	1/21/2020	7	-	77.2	9.35	80
-	2/4/2020	6.4	4.72	70.9	8.7	93
-	2/18/2020	6	5.22	86.9	10.77	27

Site	Date	Water Temp (° C)	Turbidity (NTU)	D.O. (% sat.)	D.O. (mg/l)	FC (CFU/100ml)
KC2 Parker Way	3/3/2020	7.9	13.19	86.5	10.39	387
-	3/17/2020	5.3	5.82	63.7	7.71	593
KC3 Roosevelt Ave	**Average/Geomean**	**7.63**	**3.88**	**31.80**	**7.34**	**76**
-	10/1/2019	11.9	2.5	11.5	1.14	73
-	10/15/2019	9.2	1.49	16.2	1.82	20
-	10/29/2019	8.5	-	17.7	2.05	1600
-	11/12/2019	8.6	5.97	13.5	1.55	407
-	11/26/2019	7.3	2.76	15.48	1.77	327
-	12/10/2019	6.3	4.39	19.9	2.54	20
-	1/7/2020	8.4	6.02	58.1	6.84	303
-	1/21/2020	7	-	37.6	46.7	7
-	2/4/2020	5.8	3.2	35.2	4.35	53
-	2/18/2020	5.5	2.6	46.8	5.9	100
-	3/3/2020	7.7	5.92	61.4	7.37	73
-	3/17/2020	5.4	3.9	48.2	6.1	7
KC4 Riverside Dr.	**Average/Geomean**	**7.14**	**4.68**	**60.02**	**7.94**	**70**
-	10/1/2019	10.2	0.89	72.1	8.05	33
-	10/15/2019	9	0.51	51.3	5.91	13
-	10/29/2019	6.3	-	6.9	8.28	47
-	11/12/2019	9.5	4.81	65	7.47	453
-	11/26/2019	6.2	2.65	56.3	7.81	27
-	12/10/2019	6.2	1.7	51.5	6.36	47
-	1/7/2020	8.6	13.07	73.5	8.53	1086
-	1/21/2020	7.1	-	67.7	8.33	260
-	2/4/2020	5.2	2.98	58	7.4	60
-	2/18/2020	5.3	3.01	72.8	9.24	13
-	3/3/2020	7.7	14.37	76.6	9.08	827
-	3/17/2020	4.4	2.8	68.5	8.84	7
KC5 Lions Park	**Average/Geomean**	**8.58**	**6.06**	**77.07**	**8.91**	**16**
-	10/1/2019	13.2	1.69	81.7	8.31	47
-	10/15/2019	11.7	1.86	68.5	7.08	7
-	10/29/2019	9.2	-	86.8	9.96	20
-	11/12/2019	9.5	20.13	79.8	9.04	1600
-	11/26/2019	7.8	2.17	68.4	8.12	13
-	12/10/2019	7.3	2.89	63.7	7.68	13
-	1/7/2020	-	-	-	-	-
-	1/21/2020	7.1	-	72	8.76	247
-	2/4/2020	-	-	-	-	-
-	2/18/2020	6.2	4.3	85.2	10.57	0

Site	Date	Water Temp (° C)	Turbidity (NTU)	D.O. (% sat.)	D.O. (mg/l)	FC (CFU/100ml)
KC5 Lions Park	3/3/2020	7.6	11.1	76.2	9.2	887
-	3/17/2020	6.2	4.37	88.4	10.37	33
Joe Leary Slough						
JL1 Dahlstedt Road	Average/Geomean	**7.81**	**25.04**	**33.51**	**5.83**	**76.76**
-	10/6/2019	9.9	13.8	47.3	5.32	18
-	10/21/2019	9.6	24.8	14.9	1.64	1600
-	11/3/2019	7.8	9.8	19	21.8	42
-	11/18/2019	9.1	47	30.5	4.35	1500
-	12/1/2019	5.6	12.1	27.7	2.92	64
-	12/16/2019	6.2	23.3	52.6	6.5	147
-	12/29/2019	8.7	12.7	43.8	5.05	27
-	1/26/2020	8.9	22.5	28.7	2.77	10
-	2/10/2020	6.3	16.6	30.5	3.05	71
-	2/23/2020	7.4	64.5	40.1	4.88	-
-	3/9/2020	-	28.3	-	-	23
JL2 Hwy 99.Gear Rd	Average/Geomean	**8.31**	**40.22**	**47.13**	**5.40**	**143.14**
-	10/6/2019	11.2	11.6	41.6	4.5	578
-	10/21/2019	10.6	12.1	55.2	6.14	1600
-	11/3/2019	8.5	20.9	44.1	5.09	62
-	11/18/2019	9.6	50.8	38.4	4.3	22
-	12/1/2019	6.3	12.5	41.2	3.92	216
-	12/16/2019	6.7	41.1	59.6	7.28	125
-	12/29/2019	8.6	16.3	52.5	6.06	36
-	1/26/2020	8.5	34.7	37	4.25	101
-	2/10/2020	5.8	-	51.2	6.38	143
-	2/23/2020	7.3	150.8	50.5	6.05	-
-	3/9/2020	-	51.4	-	-	207
JL3 Wilson.Avon	Average/Geomean	**8.22**	**48.88**	**56.89**	**6.54**	**41.90**
Allen	10/6/2019	10.3	8.3	52	5.62	19
-	10/21/2019	11.2	10.7	48.1	5.21	26
-	11/3/2019	8.8	14.8	60	6.8	13
-	11/18/2019	9.8	61.1	54.7	6.06	1600
-	12/1/2019	6	33.5	39.1	3.9	107
-	12/16/2019	6.6	64.6	71	8.65	20
-	12/29/2019	8.5	26.8	62.1	7.19	15
-	1/26/2020	8.7	38.2	50.3	5.75	32

Site	Date	Water Temp (° C)	Turbidity (NTU)	D.O. (% sat.)	D.O. (mg/l)	FC (CFU/100ml)
-	2/10/2020	-	-	63.9	7.96	18
-	2/23/2020	7	189.6	67.7	8.21	-
-	3/9/2020	5.3	41.2	-	-	91
JL4 Tide Gate	**Average/Geomean**	**8.07**	**29.40**	**50.92**	**5.67**	**30.74**
-	10/6/2019	11.5	5.2	69.4	6.65	17
-	10/21/2019	-	-	-	-	-
-	11/3/2019	9	19.4	39.8	4.58	16
-	11/18/2019	9.3	26.9	59.3	6.28	558
-	12/1/2019	4.6	19.4	36.2	3.75	59
-	12/16/2019	6.5	27	56.5	6.82	20
-	12/29/2019	8.1	24.9	47.2	5.51	11
Site	1/26/2020	8.7	41.5	45.9	5.25	20
JL4 Tide Gate	2/10/2020	6.8	39.9	55	6.41	21
-	2/23/2020	8.1	54.2	49	5.75	-
-	3/9/2020	-	35.6	-	-	30
Upper Nookachamps						
UN1 Lake McMurray	**Average/Geomean**	**6.89**	**4.02**	**55.93**	**6.82**	**1**
Estates	10/3/2019	9.3	4.5	13.2	1.32	0
-	10/13/2019	7.1	8.74	11	1.34	0
-	10/31/2019	7.2	0.9	51	6.12	9
-	11/16/2019	7.9	13.9	21.7	2.59	10
-	11/26/2019	6.9	2.3	72	8.68	20
-	12/8/2019	7.4	1.04	60.4	7.22	5
-	12/23/2019	6.3	1.7	67	8.24	14
-	1/5/2020	6.3	2.36	70.3	8.6	6
-	1/23/2020	6.2	2.7	78.8	9.65	8
-	2/20/2020	5.1		82.5	10.4	
-	3/1/2020	6.1	2.05	87.3	10.85	0
UN2 Big lake	**Average/Geomean**	**8.45**	**2.55**	**84.31**	**10.01**	**8**
Outflow	10/3/2019	14.7	2.7	37.8	3.84	19
-	10/13/2019	12.4	1.53	70.1	7.51	8
-	10/31/2019	9.7	2.6	67	7.65	15
-	11/16/2019	10	2.31	81.3	9.24	5
-	11/26/2019	8.1	2.1	91.8	10.74	7
-	12/8/2019	7.5	2.32	86.7	10.42	6
-	12/23/2019	6.1	2	89	10.94	8

Site	Date	Water Temp (° C)	Turbidity (NTU)	D.O. (% sat.)	D.O. (mg/l)	FC (CFU/100ml)
UN2 Big lake	1/5/2020	6.1	2.92	111.8	13.84	5
Outflow	1/23/2020	5.6	3.6	102	12.6	10
-	2/20/2020	5.8	3.2	94.8	11.8	6
-	3/1/2020	6.9	2.79	95.1	11.56	5
UN3 Otter Pond Rd	**Average/Geomean**	**7.48**	**4.40**	**100.25**	**12.00**	**10**
-	10/3/2019	12.1	1.3	99.6	10.54	38
-	10/13/2019	10.4	1.36	95.5	10.67	20
-	10/31/2019	7.1	2.2	94.2	11.34	13
-	11/16/2019	9.3	20.2	93.9	10.77	66
-	11/26/2019	6.8	3.8	98.4	11.86	7
-	12/8/2019	6.6	2.65	98.6	12.05	14
-	12/23/2019	5.8	3.3	105	13.01	31
-	1/5/2020	6.1	3.41	102.4	12.68	13
-	1/23/2020	6.1	5.6	103.2	12.7	70
-	2/20/2020	5.5	2.4	111.8	14.01	0
-	3/1/2020	6.5	2.19	100.2	12.33	22
UN4 Knapp Road	**Average/Geomean**	**7.43**	**3.85**	**73.87**	**8.97**	**32**
Bridge	10/3/2019	11.2	2.3	21	2.3	21
-	10/13/2019	8.8	5.74	36.5	4.23	147
-	10/31/2019	8.6	3.7	74	8.72	116
-	11/16/2019	8.7	2.72	67.9	7.8	74
-	11/26/2019	7.2	2.5	86.6	10.4	3
-	12/8/2019	6.9	3.31	81.2	9.84	163
-	12/23/2019	5.7	3.4	79.3	9.74	91
-	1/5/2020	5.7	4.09	86.9	10.9	32
Site	1/23/2020	7.4	4.1	90.2	10.96	129
-	2/20/2020	5	5.3	98.2	12.6	6
-	3/1/2020	6.5	5.23	90.8	11.14	2

[redacted]

Lower Nookachamps

LN1 College Way	**Average/Geomean**	**8.49**	**4.21**	**93.86**	**10.88**	**268**
-	10/9/2019	12.60	1.60	88.60	9.05	235
-	10/26/2019	10.20	2.40	88.70	9.95	370
-	11/6/2019	10.10	2.57	88.90	9.50	100
-	11/23/2019	8.50	5.61	91.00	10.57	440
-	12/4/2019	2.70	1.83	93.00	12.60	20

Site	Date	Water Temp (° C)	Turbidity (NTU)	D.O. (% sat.)	D.O. (mg/l)	FC (CFU/100ml)
-	12/21/2019	6.28	3.63	99.00	12.49	25
-	1/2/2020	5.33	4.05	93.70	11.30	75
-	1/8/2020	7.30	7.30	95.40	11.44	200
-	1/29/2020	3.50	2.88	111.60	14.50	760
-	2/15/2020	3.70	10.70	104.10	13.50	470
-	2/26/2020	3.00	4.11	99.90	13.40	225
-	3/14/2020	5.80	6.90	109.60	13.60	-
LN2 Hwy 9 Bridge	**Average/Geomean**	**6.36**	**5.20**	**78.98**	**9.52**	**43**
	10/9/2019	6.6	1.45	86.7	10.6	105
-	10/26/2019	10.2	9.74	60.5	6.78	57
-	11/6/2019	5.8	1.96	64	8.1	40
-	11/23/2019	5.1	2.12	57.3	7.36	21
-	12/4/2019	6	1.44	78.1	9.8	38
-	12/21/2019	6.5	18.23	92.5	11.41	147
-	1/2/2020	6.2	10.25	79.7	9.8	34
-	1/8/2020	3.4	2.41	79.3	10.54	22
-	1/29/2020	6.7	8.52	94.5	11.6	51
-	2/15/2020	10.16	3.09	81.2	5.7	72
-	2/26/2020	5.8	1.6	90	11.5	20
-	3/14/2020	3.8	1.63	84	11.03	30
LN3 Swan Road	**Average/Geomean**	**6.34**	**6.57**	**81.15**	**9.91**	**51**
-	10/9/2019	7.5	2	75.8	9.9	86
-	10/26/2019	10.8	6.16	61.5	6.8	34
-	11/6/2019	6.7	3.35	69.4	8.4	77
-	11/23/2019	5.9	3.05	70.8	8.83	54
-	12/4/2019	6	3.5	83.8	10.4	63
-	12/21/2019	5.7	32.7	97.3	12.21	22
-	1/2/2020	6.4	8.37	97	9.6	51
-	1/8/2020	3.5	3.13	79.6	10.56	30
-	1/29/2020	6.8	8.52	89.2	10.9	51
-	2/15/2020	6	3.23	78.4	9.75	54
-	2/26/2020	6.1	2.33	88.1	10.9	45
-	3/14/2020	4.7	2.52	82.9	10.68	99
LN4 Francis Road	**Average/Geomean**	**6.40**	**8.18**	**80.90**	**9.83**	**52**
	10/9/2019	8.2	2.2	74.5	8.78	181
-	10/26/2019	10.6	6.52	63	7.02	40
-	11/6/2019	-	-	-	-	-
-	11/23/2019	5.8	3.18	70.4	8.83	39
-	12/4/2019	6.1	3.66	81	10.1	63

Site	Date	Water Temp (° C)	Turbidity (NTU)	D.O. (% sat.)	D.O. (mg/l)	FC (CFU/100ml)
LN4 Francis Road	12/21/2019	5.7	42	97.8	12.27	47
-	1/2/2020	6.5	9.6	89	9	60
-	1/8/2020	3.6	3.77	79.5	10.51	36
-	1/29/2020	6.7	9.34	89.2	10.9	82
-	2/15/2020	6.1	3.28	77.9	9.64	32
-	2/26/2020	6.2	3.17	86.5	10.8	20
-	3/14/2020	4.9	3.24	81.1	10.33	90

Appendix B – Storm Team Data

	10/8/2019	11/17/2019	12/22/2019	1/1/2020	1/11/2020	2/8/2020	Geomean
JLS-SSD	240	310	55	150	375	155	181
JLS11.25NO	245	1520	570	360	1100	260	529
JLS11.25EA	1600	370	380	100	140	40	224
JLS-Gear	1600	1600	820	1120	840	380	962
HS -PR	0	1600	1020	300	160	560	40
LIS-FM	1140	1600	1600	560	1400	1180	1180
NN11.5	660	1600	60	240	230	380	332
NN9	100	980	100	170	320	160	210
BV3		400	100	580	100	90	184
BV4	640	1500	1280		220	440	653
BV5	1210	660	750	1600	120	230	546
BV7	280	520	40	20	60	80	91

Site ID	Padilla Bay Storm Sites	Site ID	
JLS-SSD	South Spur Ditch (JLS) at Josh Wilson Rd	NN11.5	Little Indian Slough at Farm-to-Market Road
JLS11.25NO	Joe Leary Slough N side of Dahlstedt Rd at v-ditch	NN9	Marihugh and Bayview-Edison Road
JLS11.25EA	Joe Leary Sl S of Dahlstedt Rd , E of culvert	BV3	No Name Slough at end of Egbers-Kalso Road
JLS-Gear	Joe Leary Slough at Gear Rd (car lots)	BV4	Bay View - B Street Culvert
HS -PR	Higgins Slough at Peterson Road	BV5	Bay View - Boat Launch Culvert
LIS-FM	Little Indian Slough at Farm-Market Road	BV7	Blue beach cottage

Appendix C. Quality Objectives

parameter	method	precision (Rel. Std. Dev.)	accuracy	detection level
Dissolved Oxygen (DO)	YSI 55 Probe	Unavailable	± 0.3 mg/l	0-20 mg/l
Total depth	Fixed.hand- held Tape	± 20%	± 0.05 meters	0 - 1 cm
Turbidity	Turbidimeter	Unavailable	0.01 NTU	0-19.9 NTU 0-199.9 NTU
Temperature	YSI 55 Probe	Unavailable	0.2° C	°-5 to 45° C

parameter	method	test equipment	filter type	incubation
Fecal coliform bacteria	Membrane Filtration	Millipore sterifil aseptic system	47 mm membrane filter .45 um pore space	Millipore single chamber incubator Temp. range 30°c (±0.5) 44.5°c (±0.2)

Standard Operating Procedures (SOP's)

1. Dissolved Oxygen (DO)- Samples will be taken with a bottle placed in an extension pole and dipped using the Standard Methods. DO will be measured using a YSI 55 probe. Results will be recorded as DO mg/l.

DO testing procedure (YSI 55 Probe):

i. Turn probe on and calibrate immediately when picking up equipment. Make sure sponge inside the calibration chamber is wet with distilled water.
ii. Place probe in water below the surface of water and move probe back and forth until the reading stabilizes. Record the result in mg/l. Leave probe on for the rest of the sampling.

2. Temperature will be measured with a YSI probe and recorded in °C.

3. Total depth is measured using depth gauges installed at some sites.

4. Water clarity will be determined by placing a sample into a turbidimeter (EPA approved VWR 66120-200)

i. Warm-up Turbidimeter 30 minutes and calibrates w. 0 NTU polymer standard using the "zero-adjustment".
ii. Thoroughly shake the water sample in a clean sampling jar.
iii. Pour sample into unscratched, clean, and Kim-wiped vial. Mix again
iv. Place in turbidimeter w. index line facing directly out to the front.
v. Read and record the steady reading after the highest readings settle.
vi. If reading is greater than 200 NTU, dilute the sample by 50%. (x 2).

variable	sampling equipment	sample container	sample preservation	maximum holding time
fecal coliform	Pole w.glass bottle	glass bottle pre-sterilized	ice chest with ice pack	1 hr
d. oxygen	YSI probe	instream	none	immediately
total depth	Installed depth gauge	instream	none	immediately
temperature	YSI probe thermometer	instream instream	none none	immediately immediately
turbidity	turbidimeter	glass bottle, wide-mouth	ice chest	2 hrs

Equipment calibration and maintenance

1. Millipore Sterifil Filtration System maintenance
Maintenance: Immediately after use disassemble the apparatus and clean the components to ensure optimum performance.

i. Remove the cover from the funnel. Carefully remove the O-ring using forceps. Remove the support screen from the base by pushing a short blunt rod through the base outlet.
ii. Clean all components with a sponge, hot water, and non-alkaline, non-abrasive cleanser (anti-bacterial soap). Remove stubborn residues on the insides of the holder, cover port, and flask side arms using a plastic bristle brush and pipe cleaner dipped in cleanser (do not use any steel wool or abrasive materials that can harm the components).
iii. Rinse the components with lab water and sterilize.

2. Sample Containers and Equipment maintenance
Maintenance: Empty bottles and place in Liquinox and warm water. Wash with a bottlebrush. Double rinse with tap water and final rinse with distilled water. Autoclave all fecal coliform sample bottles and graduated cylinders.

3. Millipore Portable Single Chamber Incubator maintenance
Maintenance: Clean the exterior case and interior chamber with a damp cloth and warm water (anti-bacterial soap). Give final spray with rubbing alcohol.

4. VWR Turbidimeter
Calibration: Insert 0 NTU polymer standard with the range control set at "20". Set the "Zero Control" to 0. Set the coarse so that the meter reads as close to zero as possible. Calibrate turbidimeter annually.

5. YSI Meters (DO, Temp)
Calibration: Press and release UP ARROW and DOWN ARROW keys at the same time. Enter "0" for altitude and salinity, and ENTER afterwards. Instrument is calibrated.
Maintenance: Turn YSI 55 off and rinse probe with distilled water after each use. Replace membrane filters and Kim-wipe moisturizers monthly. Replace batteries as needed.

Appendix D. Sample Data Sheet

Date:_____

Lower Samish Watershed
Skagit Stream Team
Water Quality Monitoring

Field Work By_____

Lab Work By:_____

Dupe Site_____

FC Results_____

Site LS1. Old Hwy. 99 Samish Bridge
Water Appearance
- ❑ Scum/Film
- ❑ Foam
- ❑ Muddy Brown
- ❑ Milky
- ❑ Clear
- ❑ Oily Sheen
- ❑ Frozen
- ❑ Other_____

Field: Biological/Unusual Observations:

Time of Sample	Total Depth ft	Water Temp ºC
D.O. saturation %	D.O. mg/L	

Lab metadata

Turbidity NTU's

Fecal Coliform
____FC = ____FC
mL **100** mL

Fecal Coliform
____FC = ____FC
mL **100** mL

Site LS2. Samish River @ Jolly Road
Water Appearance
- ❑ Scum/Film
- ❑ Foam
- ❑ Muddy Brown
- ❑ Milky
- ❑ Clear
- ❑ Oily Sheen
- ❑ Frozen
- ❑ Other_____

Field: Biological/Unusual Observations:

Time of Sample	Total Depth ft	Water Temp ºC
D.O. saturation %	D.O. mg/L	

Lab metadata

Turbidity NTU's

Fecal Coliform
____FC = ____FC
mL **100** mL

Fecal Coliform
____FC = ____FC
mL **100** mL

Site LS3. Samish River @ Thomas Road Bridge
Water Appearance
- ❑ Scum/Film
- ❑ Foam
- ❑ Muddy Brown
- ❑ Milky
- ❑ Clear
- ❑ Oily Sheen
- ❑ Frozen
- ❑ Other_____

Field: Biological/Unusual Observations:

Time of Sample	Total Depth ft	Water Temp ºC
D.O. saturation %	D.O. mg/L	

Lab metadata

Turbidity NTU's

Fecal Coliform
____FC = ____FC
mL **100** mL

Fecal Coliform
____FC = ____FC
mL **100** mL

Site LS4. Samish River @ Mouth (Boat Dock)
Water Appearance
- ❑ Scum/Film
- ❑ Foam
- ❑ Muddy Brown
- ❑ Milky
- ❑ Clear
- ❑ Oily Sheen
- ❑ Frozen
- ❑ Other_____

Field: Biological/Unusual Observations:

Time of Sample	Total Depth ft	Water Temp ºC
D.O. saturation %	D.O. mg/L	

Lab metadata

Turbidity NTU's

Fecal Coliform
____FC = ____FC
mL **100** mL

Fecal Coliform
____FC = ____FC
mL **100** mL

Additional notes or observations: