2013-2018 - NPDES permit TMDL Requirements
Amended CY 2015 Annual Report

Snohomish Tributaries / North Creek / Swamp Creek	Little Bear Creek	Stillaguamish River
Targeted Source Id. / Elimination		
Narrative Summary: As described in the County's TMDL Monitoring QAPP, fecal coliform data collected under the 2007 permit was analyzed for the purpose of identifying one high priority area for source identification and elimination efforts. The most recent 30 fecal coliform samples (June 2010 – December 2012) gathered from 38 County-wide locations were analyzed to determine the frequency that sites exceeded either the 100 or 200 colony/100ml water quality standard for contact recreation. Sites with higher frequencies of exceedences were prioritized for source identification. Additionally, mapping information, probabilities of impairment, 303d/305b listing status and fecal coliform geometric means were useful in decision making. **North:** Through the end of the 2007 – 2012 permit required data evaluation period, Silver Creek @ 196th (NCMU) exhibited the second highest fecal coliform concentrations of all sites considered. Considering all factors, this site was chosen for source identification and elimination efforts beginning in 2015. Mapping of potential sources, hydraulic modeling, drainage inventory, water quality data and other data sources were used to carry out dry and wet weather surveys of 21 drainage features within a 0.5 square mile area of the Silver Creek sub-basin. One discharge of turbid potable water was eliminated. Coordination with the Snohomish Health District resulted in eliminating one failed septic system. Follow up sampling is ongoing to help determine whether	No TMDL requirement	No TMDL requirement

an Alderwood Water and Waste Water sewer line is contributing sewage to Silver Creek. **Swamp:** Through the end of the 2007 – 2012 permit required data evaluation period, neither monitoring site on Swamp Creek (SCLU or SCLD) ranked poorly enough under the County's MWQA program to be considered for targeted source identification and elimination. Ecology guidance indicated that if sites in Swamp Creek did not rank poorly enough, then the County would choose the next best candidate site from any TMDL basin where these requirements apply. (Email communication from Rachel McCrea – November 8, 2013). S**nohomish:** Through the end of the 2007 -2012 permit required data evaluation period, Allen Creek @ 100th (ACLU) exhibited the highest fecal coliform concentrations of all sites evaluated. Considering all factors, this site was chosen for source identification and elimination efforts beginning in February 2014. Agency and landowner coordination, sampling and analysis identified an abandoned manure lagoon as the most likely primary source of fecal coliform bacteria at ACLU. While the suspect manure lagoon does not discharge into or from the County storm water system, coordination with partners and upstream landowners to decommission the lagoon was ongoing through 2015.		

2013-2018 - NPDES permit TMDL Requirements
Amended CY 2015 Annual Report

Snohomish Tributaries / North Creek / Swamp Creek	Little Bear Creek	Stillaguamish River
Surface Water Monitoring		
Draft QAPP was submitted to Ecology. Monitoring began by August 1, 2015. Data summary and narrative evaluation is presented below.	Draft QAPP was submitted to Ecology. Monitoring began by August 1, 2015. Data summary and narrative evaluation is presented below.	Draft QAPP was submitted to Ecology. Monitoring began by August 1, 2015. Data summary and narrative evaluation is presented below.
Snohomish Tributaries / North Creek / Swamp Creek	**Little Bear Creek**	**Stillaguamish River**
IDDE Field Screening		
Fecal coliform screening is standard in the IDDE sampling suite. Screening of TMDL sub basins to be completed by permit term.	Screening of sub basin to be completed by permit term.	Screening of known outfalls in50% rural sub basins to be completed by permit term
Snohomish Tributaries / North Creek / Swamp Creek	**Little Bear Creek**	**Stillaguamish River**
Operation and Maintenance		
North: Waste and/or Education Stations located at the identified facilities in this basin. **Swamp:** Waste station and education station located at identified facility in this basin **Snohomish:** Waste and/or Education stations located at identified facilities in this basin	One property added in November 2015 that has temp (until 2018) horse boarding operation. Facility has a Farm Mgt Plan. Waste station is located on-site.	Waste and/or Education Stations located at the identified facilities in this basin**.**

2013-2018 - NPDES permit TMDL Requirements
Amended CY 2015 Annual Report

Snohomish Tributaries / North Creek / Swamp Creek	Little Bear Creek	Stillaguamish River
Public Education and Outreach		
Most of our water lessons touch on pollution prevention but the lessons where bacterial pollution and pet waste management are a major message include: *"It's not Fido's Fault", "There Is No Point to This Pollution", "Water Quality Monitoring w/Test Kits"*	Most of our water lessons touch on pollution prevention but the lessons where bacterial pollution and pet waste management are a major message include: *"It's not Fido's Fault", "There Is No Point to This Pollution", "Water Quality Monitoring w/Test Kits"*	Most of our water lessons touch on pollution prevention but the lessons where bacterial pollution and pet waste management are a major message include: *"It's not Fido's Fault", "There Is No Point to This Pollution", "Water Quality Monitoring w/Test Kits"*

Snohomish Tributaries / North Creek / Swamp Creek	Little Bear Creek	Stillaguamish River
Business Inspections		
The required business inspections will be completed by the August 1, 2016 deadline.	The required business inspections will be completed by the August 1, 2016 deadline.	The required business inspections will be completed by the August 1, 2016 deadline.

2013-2018 - NPDES permit TMDL Requirements
Amended CY 2015 Annual Report

Amended CY 2015 NPDES Annual Report – Attachment to Question 71

Surface Water Monitoring Data Evaluation and Narrative Summary

Background

The following amended answer to question #71 for the CY 2015 NPDES Annual Report is provided to the Washington State Department of Ecology (Ecology) as follow-up to an August 11, 2016, G20 notice of non-compliance with Special Condition S7.A and Appendix 2. Snohomish County implemented the surface water monitoring requirements applicable to the Stillaguamish River, Snohomish River Tributaries, North Creek and Swamp Creek Total Maximum Daily Loads (TMDL), but mistakenly omitted a data summary and narrative evaluation from its' CY 2015 report. The following amended report includes a data summary and narrative evaluation to satisfy the permit condition and G20 notice of non-compliance.

Introduction

Special condition S7.A and Appendix 2 of the 2013-2018 NPDES permit required that Snohomish County select one surface water monitoring location within each of the TMDL basins listed above at which samples would be gathered for the purpose of characterization and long term trends evaluation of fecal coliform data. It also required that Little Bear Creek be incorporated into the monitoring program for prioritization of bacteria source identification and elimination activities. Although not explicitly stated under surface water monitoring requirements for the Stillaguamish basin, dissolved oxygen is listed as a parameter under that TMDL summary in Appendix 2. Therefore, this data summary and narrative evaluation will include dissolved oxygen for the Stillaguamish basin sampling station.

Surface water monitoring requirements, procedures, and locations are documented in an Ecology approved Quality Assurance Project Plan (QAPP) found at http://www.snohomishcountywa.gov/ArchiveCenter/ViewFile/Item/4251

Monitoring under the QAPP was required to begin by August 1, 2015. The County satisfied this requirement through collection of samples beginning July 29, 2015. Data was collected monthly at each station through December 2015 under the QAPP and submitted to Ecology's Environmental Information Management (EIM) System prior to May 31 of 2016 EIM Search Results.

Fecal Coliform Data Summary

As detailed in the QAPP, the County selected one surface water monitoring location within each TMDL basin. Table 1 includes station details. Maps showing locations can be found in the QAPP or at EIM Search

Table 1. Snohomish County TMDL Monitoring Stations

WRIA	Subbasin	Sample Station	Location	Latitude	Longitude
8	North Creek	NCMU	SILVER CREEK PRIOR TO CONFLUENCE WITH TAMBARK CREEK FROM UPSTREAM SIDE OF 196TH ST SE. 190FT SE OF INTERSECTION WITH BOTHELL EVERETT HWY	1303061.05	302302.94
8	Swamp Creek	SCLU	SWAMP CREEK FROM SOUTH SIDE OF 148TH ST SW. 625FT EAST OF INTERSECTION WITH MANOR WAY. SAMPLE DOWNSTREAM OF CONFLUENCE WITH DITCHES ALONG SOUTH SIDE OF 148TH DISCHARGING INTO SWAMP CREEK.	1288708.69	318462.10
8	Little Bear Creek	LBLD	LITTLE BEAR CREEK FROM DOWNSTREAM SIDE OF BRIDGE 552 AT 228TH ST SE	1318160.87	1318160.87
7	Allen Creek	ACLU	67TH AVE NE AND 100TH ST NE. PARK AT GRANGE AND WALK EAST APROXIMATELY 525FT TO CREEK. SAMPLE FROM UPSTREAM SIDE OF 67TH	1321706.76	398457.58
5	Lower Stillaguamish	DOUG	DOUGLAS SLOUGH WEST SIDE OF PIONEER HWY OUTLET OF BOX CULVERT DOWN PRIVATE ACCESS ROAD	1269971.26	460599.51

Characterizing fecal coliform bacteria can be inclusive of determining whether a station exhibits exceedences of Washington State Water Quality Standards for bacteria in freshwater. Washington State Administrative Code 173-201A contains the standards relevant to waterbodies as shown in table 2. Trends analysis for fecal coliform bacteria demands a larger volume of data than required for collection during CY2015.

Table 2. Washington State Freshwater Quality Standards for Fecal Coliform Bacteria

TMDL Basin	Fecal Coliform Bacteria Standards Colonies/100ml		
	Standard	**Extraordinary Contact**	**Primary Contact**
Stillaguamish River (extraordinary standards generally apply only to the upper reaches of the Stillaguamish River and streams that flow into lakes or Port Susan)	Geometric Mean	50	100
	10% not to exceed	100	200
Snohomish River Tributaries (extraordinary standards generally apply only to the upper reaches of Pilchuck River and streams that flow into lakes)	Geometric Mean	50	100
	10% not to exceed	100	200
North Creek /Swamp Creek/Little Bear Creek	Geometric Mean	50	100

Washington State Water Quality Standards and Ecology's Water Quality Policy 1-1 contain methods for analysis of fecal coliform bacteria. They indicate that;

- when averaging data for comparison to the geometric mean criteria, it is preferable to average by season and include five or more data collection events within each period;
- the period of averaging should not exceed twelve months, and should have sample collection dates well distributed throughout the reporting period;
- data will be assessed in 12 month reporting periods or in reporting periods that represent distinct climatic regimes of less than a year; and
- the assessment will be consistent with the general water year for the State, October through September.

The required CY 2015 data collection period (August 1 – December 31) resulted in gathering fewer than five samples within each station's distinct climactic period. Therefore, calculation of geometric means for comparison to water quality standards is not appropriate. However, data sets are appropriate for comparison to the 10 percent not to exceed standard. Depending upon the station, not more than 10 percent of samples are allowed TO exceed either 100 or 200 colonies per sample. Tables 3 and 4 show the total number of credible samples gathered and percentage of samples exceeding standards by water year and climactic period.

Table 3. Credible Fecal Coliform Bacteria Samples Water Year/Climactic Period

Water Year/Climactic Season	# of Credible Samples @ ACLU	# of Credible Samples @ DOUG	# of Credible Samples @ LBLD	# of Credible Samples @ NCMU	# of Credible Samples @ SCLU
WY 2015 dry season	2	2	2	2	2
WY 2016 dry season	1	0	0	1	0
WY 2016 wet season	2	3	3	2	3

Note: Samples gathered July 29, 2016 were rejected from use because the contract laboratory analyzed them outside of hold times.

Table 4. Percentage of Fecal Coliform Samples Exceeding the Single Sample Standard

	Sampling Station and Single Sample Fecal Coliform Standard				
Water Year/Climactic Season	**ACLU % samples exceeding 200 cfu/100ml**	**DOUG % samples exceeding 200 cfu/100ml**	**LBLD % samples exceeding 100 cfu/100ml**	**NCMU % samples exceeding 100 cfu/100ml**	**SCLU % samples exceeding 100 cfu/100ml**
WY 2015 dry season	0	100	50	100	50
WY 2016 dry season	0	NA	NA	0	NA
WY 2016 wet season	50	0	0	50	0

In addition to evaluation of data against standards, minimum and maximum results for fecal coliform bacteria are provided in table 5. The complete dataset for these stations is available at EIM Search Results

Table. 5. Fecal coliform bacteria minimum and maximums

Seasonal Samples	ACLU cfu/100ml Min/Max	DOUG cfu/100ml Min/Max	LBLD cfu/100ml Min/Max	NCMU cfu/100ml Min/Max	SCLU cfu/100ml Min/Max
WY 2015 dry season	120/180	360/400	68/120	460/540	27/320
WY 2016 dry season	170	NA	NA	76	NA
WY 2016 wet season	40/220	74/160	22/70	88/150	27/98

Fecal Coliform Bacteria Narrative Evaluation

Given the small sample sizes within each water year and climactic period, each station had greater than 10 percent of samples exceeding single sample fecal coliform bacteria standards during at least one water years climactic period. The percentage of samples exceeding standards are shown in table 4.

Over the CY 2015 monitoring period, station NCMU (North Creek basin on Silver Creek @ 196th) exhibited the highest percentage of exceedences across water years and climactic periods. Additionally, fecal coliform concentrations were highest at NCMU. As required under the Targeted Source Identification and Elimination requirement, the County evaluated fecal coliform data gathered under the 2007-2012 permit, including that at NCMU. Over that monitoring period, NCMU also ranked poorly enough to prioritize the basin upstream of NCMU for focused source identification and elimination. One failing septic system was identified and eliminated as a result. Additional detail is provided under the targeted source identification and elimination heading for North Creek.

Dissolved Oxygen Data Summary and Narrative Evaluation for the Stillaguamish

Characterizing dissolved oxygen for the Stillaguamish basin sampling station (DOUG – Douglas Creek @ Pioneer Highway) can also be inclusive of determining whether a station exhibits exceedences of Washington State Water Quality Standards. Washington State Administrative Code 173-201A contains the standards relevant to waterbodies. Ecology's Water Quality Policy 1-11 contains methods for analysis. Douglas Creek is not allowed to fall below a minimum one day dissolved oxygen value of 8.0 mg/l at an average frequency greater than once in ten years.

Over the CY 2015 monitoring period (August 1 – December 31) Douglas Creek did not fall below 8.0 mg/l. Dissolved oxygen values ranged from a minimum of 9.14 to a maximum of 13.06 mg/l. These values suggest conditions in Douglas Creek at Pioneer Highway are supportive of salmonid spawning, rearing and migration. However, a longer period of monitoring data is needed for comprehensive evaluation.