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A) Annual update of Stormwater Management Program

The updated Stormwater Management Program (SWMP) is attached to this annual report.

B) Program evaluation and other activities narrative

1. Changes of authorization

None

2. Summary of actions pursuant to S4F

There were two incidents in 2012 for which notification was given to Ecology pursuant to Special Condition S4.F. The first, in April 2012, was related to the discharge of sewage from a burst City of Everett sewer force main into the County storm sewer, and subsequently into North Creek. The second, in May 2012, was related to discharge of sediment from a recently-maintained County road ditch into a tributary stream to Lake Roesiger, which caused a violation of turbidity standards. In both cases, Snohomish County took necessary remedial actions and Ecology did not indicate the need for changes to the County's stormwater management program.

3. Assessment of appropriateness of program design and BMP selection

The stormwater program design and methods of BMP selection set forth in the permit are deemed appropriate by Snohomish County.

4. Updated information about the Structural Control Program

The updated Structural Stormwater Controls Program document is posted on the internet at:

http://www1.co.snohomish.wa.us/Departments/Public_Works/Services/NPDES/default.htm

5. Summary of actions taken to comply with applicable TMDL requirements (in response to specific information requirements posed in line 84 of annual report form)

The current permit, in effect in 2012 from September 1 to December 31, requires Snohomish County to continue implementation of programmatic actions required in the previous permit until July 31, 2013. The following information addresses specific requirements set forth in line 84 of the annual report form.

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NPDES permit TMDL Requirements for 2012 - TMDLs for Snohomish Tributaries, North Creek, and Swamp Creek

Action (deadline)	Comment
Implement an Ecology approved QAPP to support ongoing water quality monitoring	Ongoing
Include TMDL-related activities in intergovernmental coordination meetings between Snohomish County and other NPDES municipal permittees with which Snohomish County has interconnected storm sewers or shared waterbodies	Ongoing

The Swamp Creek TMDL did not contain deadlines. Deadlines for similar elements in the Snohomish Tributaries & North Creek TMDLS apply. Action descriptions may vary slightly from permit, due to differences in language among the TMDL requirements in the permit.

Comment [s1]: Looked at 1 year permit and edited accordingly review with Bill.

Selected monitoring and implementation approaches, where options are described in Appendix 2: Snohomish County is implementing Strategy B, Early Action Approach, under the Fecal Coliform TMDLs for Snohomish River Tributaries and North Creek. To implement monitoring under the Swamp Creek Fecal Coliform TMDL, the County implemented Option Two, Indirect Measurement of Pollution Sources. As agreed to with Ecology, the County has followed monitoring timelines and dates for submitting the Quality Assurance Project Plan to support required water quality monitoring, set out in Appendix Two for the Snohomish River Tributaries and North Creek TMDLs.

Pursuant to the federal Clean Water Act (CWA), Ecology has adopted water quality standards found in Washington State Administrative Code (WAC 173-201A) for fecal coliform bacteria in order to reduce human health risks in cases where waterbodies are to support designated uses, including but not limited to water contact recreation and shellfish collection, and other uses. Depending upon the subject waterbody, the WAC requires that:

- Fecal coliform organism levels must not exceed a geometric mean value of 50 or 100 colonies/100ml, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 100 or 200 colony forming units (cfu) / 100ml.

Fecal coliform bacteria are a subset of bacteria that are present in the feces of warm blooded animals and which belong to the larger group of *enterobacteriacea (total coliforms)*. They are used as an indicator of the sanitary quality of water because they are associated with pathogens found in feces. A pathogen is a microbe, virus or other organism that is known to cause disease. Examples of bacterial pathogens frequently found in storm water runoff or surface waters include *Shigellis* and *Salmonella*. Fecal coliform bacteria are indicator organisms used as a warning signal that water may have been contaminated by fecal matter from humans or other warm blooded animals.

Ecology is required by section 303d of the Clean Water Act to assess the status of waters and develop clean up plans for those determined to be impaired beyond standards. Ecology acted

upon the exceedences of the fecal coliform standards and developed a clean-up plan, otherwise referred to as a Total Maximum Daily Load (TMDL).The TMDLs for the North and Swamp Creek, and Snohomish Rivers Tributaries were approved by EPA, resulting in the one year permit (August 1, 2012 – July 31, 2013), which required water quality monitoring actions to continue implementation of the 2007-2012 permit required Quality Assurance Project Plan to support water quality monitoring. The purpose of the monitoring program is to identify trends and sources of fecal coliform bacteria. The QAPP is available for download at:

http://www.co.snohomish.wa.us/documents/Departments/Public_Works/SWM/WQ-SnoCoQAPP-SnoRivTribStillyNoSwampLtBear-FecalTMDL.pdf

To address waters listed as impaired for fecal coliform bacteria, forty one sites were sampled monthly during 2012 for fecal coliform bacteria, total suspended solids and in situ parameters. Sample sites are identified in the table below. All sites sampled and near current data collected over the course of the monitoring program and an interactive map are available in Ecology's Environmental Information System.

The annual sample site selection process is driven by probability distribution analysis of fecal coliform bacteria data. Sites having a minimum of 30 samples are analyzed using a 90 percent confidence interval. Those sites showing less than four percent probability of true impairment are removed from the sample design. Efforts are made to coordinate with water quality monitoring partners to determine if overlap may allow for continued sampling at a site removed from design. Addition of new sites includes a review of Ecology's most recent assessment of impaired waters, and coordination with partners. Consideration of establishing or re-establishing sites is given where partners are not monitoring at a frequency required by Washington State Administrative Code WAC 173-201(A)-200, and where Ecology has identified a stream segment as either a category 4a (impaired with a TMDL) or 5 (impaired without a TMDL). Occasionally, sites are chosen where the listing status indicates the need for additional data. Field reconnaissance and property ownership dictates feasibility of site location and establishment. In 2012, the data analysis and sample site selection process resulted in discontinuation of sampling the Mainstem Stillaguamish at Arlington (MSAR) and Mainstem Stillaguamish at Marine View Drive (MSMD). At both stations, analysis showed less than two percent probability of true impairment for fecal coliform bacteria. Partners were coordinated with and were expected to establish sampling at both MSAR and MSMD. Two additional sample sites were discontinued as a result of sampling overlap. These included Harvey Armstrong Creek (AARM) and Pilchuck Creek at Jackson Gulch (PILC). A partner was expected to continue monthly sampling for fecal coliform bacteria at these sites.

Coordination with partners and review of Ecology's 305(b) and 303(d) lists of impaired waters resulted in adding five new sample sites to the design in 2012. These new sample sites are identified in the following table.

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Basin	Waterbody	Site Name	Location	Latitude [e]	Longitude [e]
Stillaguamish	Church Creek	CCPK	Church Creek Park	1276763.00	456406.30
Stillaguamish	Fish Creek	FISH	Near Mouth on 5th Ave	1301110.02	431863.48
Stillaguamish	Jim Creek	JIMJ	@ Jordan Rd.	1337247.54	434271.35
Stillaguamish	Kackman Crk	KACK	@ 55th Ave NE	1318044.65	446808.35
Stillaguamish	Portage Creek	PORU	43rd Ave.	1313722.49	432762.92
Stillaguamish	Portage Creek	PORL	212th St NE	1298907.42	436680.80
Stillaguamish	Tributary No. 30	TR30	Silvana Terrace Rd	1285305.73	442597.43
Stillaguamish	Un-named Creek 0456	UNAM[d]	Soundview Dr.	1265671.611	428519.759
Snohomish	Allen Creek	ACHW[d]	112th St	1321013.387	402300.169
Snohomish	Allen Creek	ACLU	67th Ave NE and 112 St. NE	1321706.76	398457.58
Snohomish	Catherine Creek	CATH	12th St NE	1343413.26	369930.52
Snohomish	Cripple Creek	CCUS	Trombley Rd.	1357493.92	327336.87
Snohomish	Cripple Creek	CCLS	Robinhood Lane	1356435.39	320586.58
Snohomish	Dubuque Creek	DUBQ	OK Mill Road	1346289.00	362621.99
Snohomish	French Creek	FCLU	167th Ave.	1352457.64	332337.77
Snohomish	French Creek	STABLES	Stables Creek @ 96th St. SE	1353489.17	334340.37
Snohomish	Little Pilchuck Creek	LPIL	12th St NE	1343480.00	370061.80
Snohomish	Pilchuck River	PILOK	OK Mill Rd	1345904.54	362397.92
Snohomish	Quilceda Creek	QCLU	172nd St Ave NE	1321621.00	422859.20
Snohomish	Quilceda Creek	QCMFU	67th and 152nd	1321121.03	416237.18
Snohomish	Quilceda Creek	QCWF2	140TH St. NE	1307497.32	412632.24
Snohomish	Quilceda Creek	QCWD	Wade Rd.	1321532.23	413962.12
Snohomish	Riley Slough	RILY[d]	Tualco Rd.	1357088.908	301151.732
Snohomish	Woods Creek	WCMS	Mainstem @ Old Owen Rd. [d]	1364083.31	315630.41
Snohomish	Woods Creek	WCWF	Yeager Road	1374717.33	321461.66
Snohomish	Woods Creek	WCFA [c]	Florence Acres Road	1380266.59	319119.38
Lake Washington	North Creek	NCLU [b]	McCollum Park	1298894.69	323046.66
Lake Washington	North Creek	NCLD [a, b]	County Line at 240th St. SE	1307271.61	287516.32
Lake Washington	North Creek	NCMU[d]	13th Dr. SE	1301545.405	299797.861
Lake Washington	North Creek	FILBERT	Filbert at Filbert Drive	1298625.43	300088.05
Lake Washington	North Creek	NCMU	Silver Crk. at 196th St. SE	1303061.05	302302.94
Lake Washington	North Creek	SULFUR	Sulfur Crk. at 196th St. SE	1304326.47	300237.37
Lake Washington	Swamp Creek	SCLU	148th St SW	1288708.69	318462.10
Lake Washington	Swamp Creek	SCLD [b]	County line @ Lockwood Rd.	1292081.00	286995.80
Lake Washington	Little Bear	LBLU	51st St. SE	1313603.09	306691.65
Lake Washington	Little Bear	LBLD	228th St. SE	1318160.87	291010.05

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Basin	Waterbody	Site Name	Location	Latitude [e]	Longitude [e]
Lake Washington	Little Bear	LBHW	Interurban Blvd	1314135.33	310111.66
Lake Washington	Little Bear	LBMR[d]	Maltby Rd.	1315313.614	296421.363
Lake Washington	Little Bear Creek	CUTT	Cutthroat at Hwy 9	1318346.66	294215.94
Lake Washington	Little Bear Creek	DANE	Great Dane at Maltby Rd.	1316479.57	296367.14
Lake Washington	Little Bear Creek	TROT	Trout at Interurban Blvd.	1314973.32	310053.58

Notes:
a. monitoring subject to existing ILA
b. potential annexation by 2014
c. additional samples required to confirm ranking
d. new site in 2012
e. latitude and longitude are provided in NAD_1983_StatePlane_Washington_North_FIPS_4601_Feet

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The County analyzed 2012 fecal coliform bacteria data using methods found in Washington State Administrative Code WAC 173-201(A) and Washington State Water Quality Policy 1-11 Chapter One (WQP 2006). Despite a July 2012 update to WQP 1-11, Chapter One, 2012 analysis was conducted using the 2006 WQP to provide consistency with Ecology's 2012 freshwater assessment.

A summary of sites meeting fecal coliform bacteria standards in 2012 are found in the table below. Although 15 sites met the geometric mean and 10 percent not exceed standard established for the stream, only 10 sites (highlighted in yellow) had the required number of samples upon which to conduct analysis in accordance with WAC 173-201A and the WQP.

Seven of the 10 sites which met standards were listed in 2008 as impaired for fecal coliform bacteria, and four of these seven sites were discontinued beginning 2013 because a 30 sample analysis showed zero probability of true impairment.

With the exception of KACK, sites shown as meeting the geometric mean and 10 percent not to exceed standards for fecal coliform, but that lacked sample sizes necessary to claim non-impairment or which showed a greater than four percent probability of impairment, will continue to be monitored in 2013.

Sites which failed to meet one or both parts of the fecal coliform standard in 2013 showed greater than four percent probability of impairment and will continue to be monitored in 2013.

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Basin	Site Name	Listed as Category 4(a) Impaired for Fecal Coliform 2008 X = Yes	Met required number of samples for seasonal and/or annual analysis in 2012 X = Yes	Met geometric mean and 10% not to exceed standard for fecal coliform X = Yes	Discontinued monitoring in 2013 : 2012 Analysis showed 0% probability of impairment X = Yes	Continue Monitoring in 2013 : Greater than 4 % probability of impairment X = Yes
Stillaguamish	CCPK	**X**				**X**
Stillaguamish	FISH	X				X
Stillaguamish	JIMJ	X		X		X
Stillaguamish	KACK			X	X	
Stillaguamish	PORU	X		X		X
Stillaguamish	PORL	X				X
Stillaguamish	TR30	X				X
Stillaguamish	UNAM	X	X			X
Snohomish	ACHW	X		X		X
Snohomish	ACLU	X	X			X
Snohomish	CATH	X				X
Snohomish	CCUS		X			X
Snohomish	CCLS		X	X	X	
Snohomish	DUBQ	X	X	X	X	
Snohomish	FCLU	X	X			X
Snohomish	STABLES		X			X
Snohomish	LPIL	X	X	X	X	
Snohomish	PILOK		X	X	X	
Snohomish	QCLU	X	X	X		X
Snohomish	QCMFU	X	X	X		X
Snohomish	QCWF2		X			X
Snohomish	QCWD		X	X		X
Snohomish	RILY	X		X		X
Snohomish	WCMS	X				X
Snohomish	WCWF	X	X	X		X
Snohomish	WCFA	X	X	X		X
Lake Washington	NCLU	X	X			X
Lake Washington	NCLD	X	X			X
Lake Washington	NCMU	X	X			X
Lake Washington	FILBERT	X				X
Lake Washington	NCMU	X	X			X
Lake Washington	SULFUR		X			X
Lake Washington	SCLU	X	X			X
Lake Washington	SCLD	X	X			X
Lake Washington	LBLU	X	X	X		X
Lake Washington	LBLD	X	X			X
Lake Washington	LBHW	X	X			X
Lake Washington	LBMR	X				X
Lake Washington	CUTT	X	X			X

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Stream Flow, Precipitation and Fecal Coliform Bacteria

The 2007 NPDES Phase 1 municipal stormwater permit requires Snohomish County to submit, in the 2012 annual report, the results of the following action pertaining to fecal coliform bacteria (FC) in Swamp Creek:

"Estimate changes in bacterial levels in Swamp Creek as a result of stormwater inputs through receiving water monitoring coupled with flow duration or comparable analyses."

Snohomish County was required to begin water quality monitoring on Swamp Creek at stations SCLU @ 148th St. and SCLD at the County line no later than January 17, 2010. At the same time, the County was to conduct flow monitoring at sites SC @ Interstate 405 and Si at 228th St (Figure 1). The 2007-2012 permit period ended July 31, 2012. These permit cycle start and end dates produce up to 2.5 years of monitoring data upon which to evaluate flow and FC.

Flow duration methodologies or guidance were not prescribed in the permit. Snohomish County evaluation using the method set forth in *Approach for Using Load Duration Curves in the Development of Total Maximum Daily Loads (TMDLs)* (United States Environmental Protection Agency, 2007), but determined that the method was not appropriate given limitations of the data.

Flow duration curve analysis looks at the daily average discharge rates to establish a cumulative frequency of historic flow data over a specified period of time. Once flow duration curves and classifications are established, water quality sampling data are plotted on the curve, showing groupings of water quality data among flow classifications which either did or did not exceed water quality standards. If a great percentage of water quality samples were found to exceed standards during high flow events one might conclude that exceedences are potentially driven by storm flow. The goal of this exercise is to target management actions based upon particular flow regimes associated with elevated levels of pollutants.

EPA (2007) also indicates that performance of load duration curves and quality of results are best where a flow gage is within one-half mile upstream or downstream of a water quality monitoring station. The permit did not set forth co-location requirements, and Snohomish County flow gages are not within one half mile up or downstream of water quality sample sites.

Johnson (2009) applied the EPA (2007) approach to FC though creation of a load duration model called LDCurve™. Given the variable nature of flow and the need to capture drought and flood records, the model required a minimum of 10 years of paired flow and FC data upon which to produce meaningful results.

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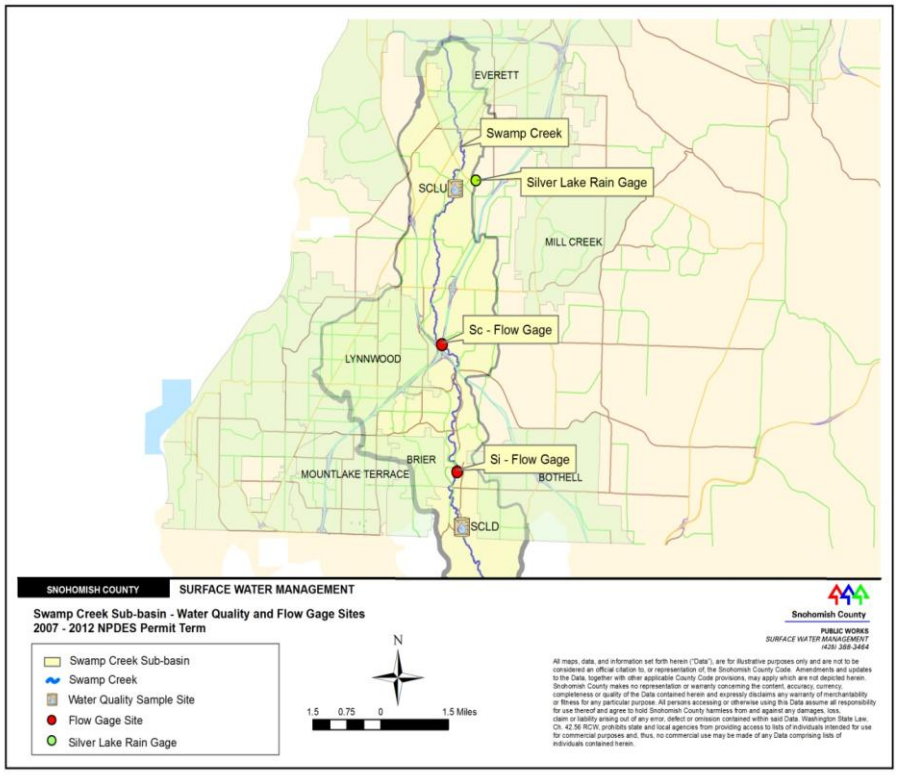
Figure 1. Swamp Creek Water Quality Sample, Flow and Rain Gage Sites



Given the limited data set prescribed by the permit and issues of co-location, it became clear that development of flow and load duration curves would not produce meaningful results upon which to base management actions.

Discussion with Ecology identified an acceptable comparable analysis where a 50 percent increase in mean flows at Swamp Creek gages between the day before and day of a water quality sampling event would be evaluated relative to fecal coliform results that may have exceeded established extraordinary contact standards. Ecology feels that a 50 percent increase in receiving water flows constitutes indication of a storm event where stormwater flow caused the increase.

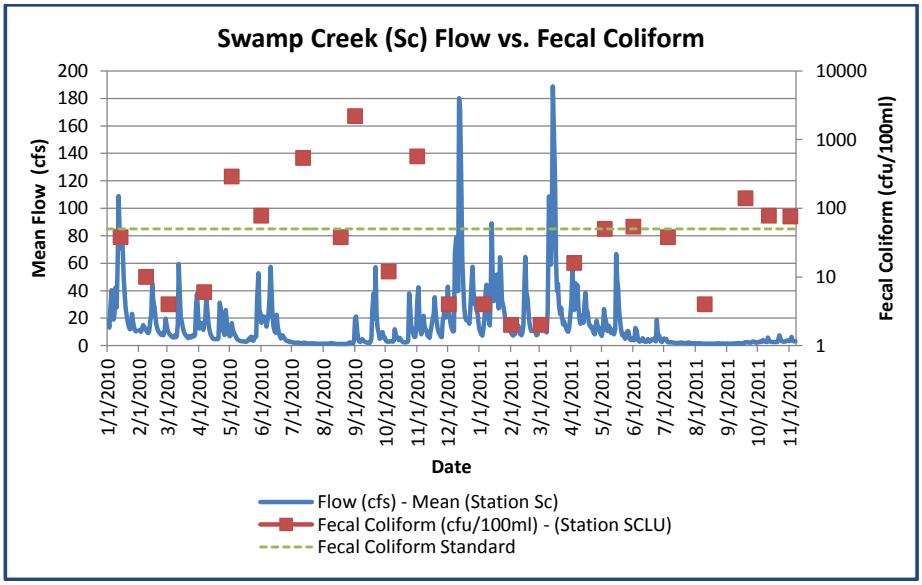
Verified flow and FC data from January 2010 through November 7, 2011 were compared to estimate changes in FC as a potential result of storm based flow. Datasets were first graphed to find patterns between flow, exceedences of the single sample FC standard (50cfu/100ml) and precipitation. Flow data from both Swamp Creek gages were not available from November 8, 2011 – July 31, 2012. Flow measurements during fall and winter of 2011 shifted off the rating curve by as much as 48% at the Sc gage and 68% at the Si gage. Changes to the hydraulic characteristics of the stream bed, interference from debris and other factors can contribute to shifts. Rating tables are reestablished upon having a dataset representative of high and low flows over the period of record. Snohomish County expects to have additional data and available for evaluation in the near future.

a) Bacteria, Flow and Precipitation in Upper Swamp Creek

Storm based flow events are often thought to be the cause of elevated levels of FC bacteria as drainage systems discharge polluted stormwater into receiving waters. Figure 2 shows daily mean flow on Swamp Creek at Sc related to FC sample results from SCLU. Fecal coliform results which exceed the single sample standard of 50cfu/100ml are of most interest. Visual evaluation shows little if any evidence that elevated FC results are associated with spikes in mean flow. One potential reason for a lack of association is the approximately 3 mile separation between the flow gage at Sc and sampling site SCLU.

The 2010 and 2011 FC dry season geometric means at SCLU were 252 and 98 cfu/100ml respectively, whereas wet season geometric means were well below the 100cfu/100ml standard, at 17 and 46 cfu/100ml. Dry season single sample exceedences of the 50cfu/100ml FC standard at SCLU, which drive geometric mean exceedences, are evident in Figure 2. The pattern of dry season exceedences of the geometric mean FC standards was common among all 13 County-wide stations where seasonal standards were exceeded from July 2010 – December 2012.

Figure 2. Swamp Creek (Sc) Flow Gage vs. Fecal Coliform (SCLU)

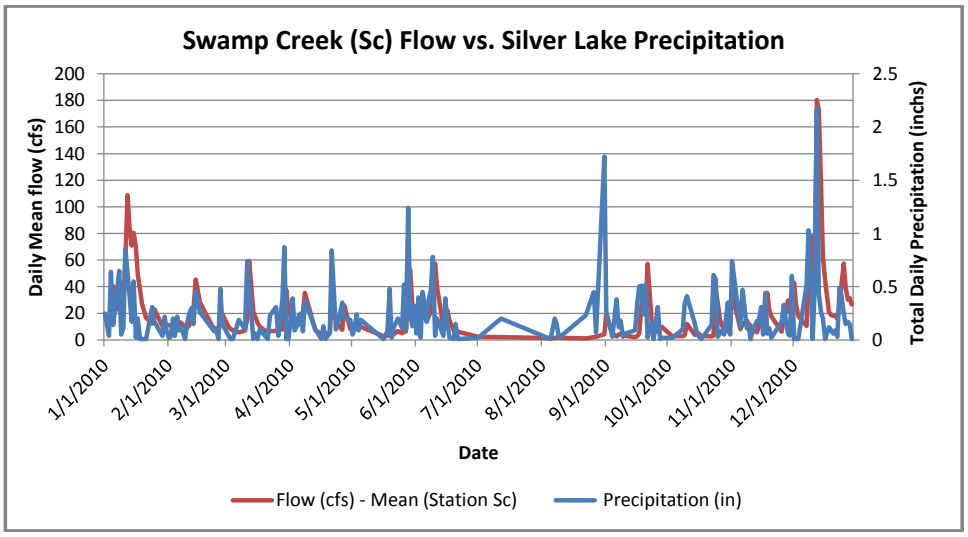


Timing of sampling as it relates to a storm and length of the antecedent period between storms are factors in comparisons between flow and stormwater based pollutants. Generally, the longer the antecedent period, the more time pollutants have to build on impervious surfaces for discharge to receiving waters during a future storm event.

Ongoing and successive winter storms often do not produce spikes in pollutants due to the continue "washing" of impervious surface. Summer and fall "first flush" precipitation events generally produce spikes in pollutants.

Given consistent patterns of dry season single FC and geometric mean exceedences, an evaluation of daily mean flow at Sc and daily precipitation totals at the Silver Lake rain gage was conducted to look for patterns from January 2010 through December 2010 (Figure 3).

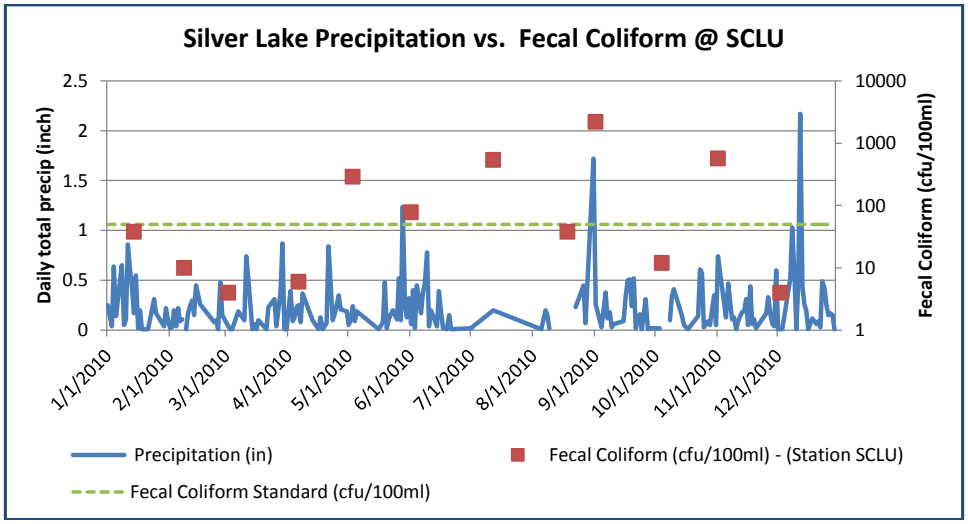
Figure 3. Swamp Creek (Sc) Flow vs. Silver Lake Daily Precipitation Totals



Generally speaking, flow measured at Sc shows a response to precipitation events at the Silver Lake rain gage. A precipitation event on May 3, 2010 produced 0.24 inches, while mean flows on this day increased 54 percent over the previous day. A FC sample result of 290cfu/100ml was observed the same day (Figure 4). The minor precipitation event on July 12 totaling 0.2 inches did not increase flows although a FC sample result of 540cfu/100ml was observed on this day (Figure 4). August precipitation totals were low until a fall "first flush" event on August 31 totaling 1.72 inches increased flow by 79 percent on September 1, during which time a FC sample result of 2200 cfu/100ml was observed (Figure 4).

Although water quality sampling events are not designed to coincide with precipitation events, these storms and paired FC sample results at SCLU illustrates an apparent relationship between 2010 and 2011 dry season storms and exceedences of the FC standard at SCLU. These same observations are not as apparent during the wet season.

Figure 4. Silver Lake Daily Total Precipitation vs. Fecal Coliform (SCLU)



b) Bacteria, Flow and Precipitation in Lower Swamp Creek

The same evaluation was carried out for FC data gathered at station SCLD, flow at Si (228th St.) and precipitation at Silver Lake (Figure 1). Much like the pattern shown at SCLU, exceedences of the single sample FC standard at SCLD occurred during the dry season when flows were much lower (Figure 5). High flows alone do not appear to be a good indicator of exceedences of fecal coliform standards. The 2010 and 2011 FC dry season geometric means at SCLD were 92 and116 cfu/100ml respectively, whereas wet season geometric means were below the 100cfu/100ml geometric mean standard at 32 and 45 cfu/100ml. Dry season single sample exceedences of the FC standard at SCLU, which drive geometric mean exceedences, are evident in Figure 5.

Given consistent patterns of dry season single sample FC and geometric mean exceedences, an evaluation of daily mean flow at Si and daily precipitation totals at the Silver Lake rain gage, was conducted to look for patterns from January 2010 through December 2010 (Figure 6). Generally speaking, flow measured at Si shows a response to precipitation events at the Silver Lake rain gage, but not as well related to exceedences of FC standards as those at SCLU.

Figure 5. Swamp Creek (Si) Flow Gage vs Fecal Coliform (SCLD)

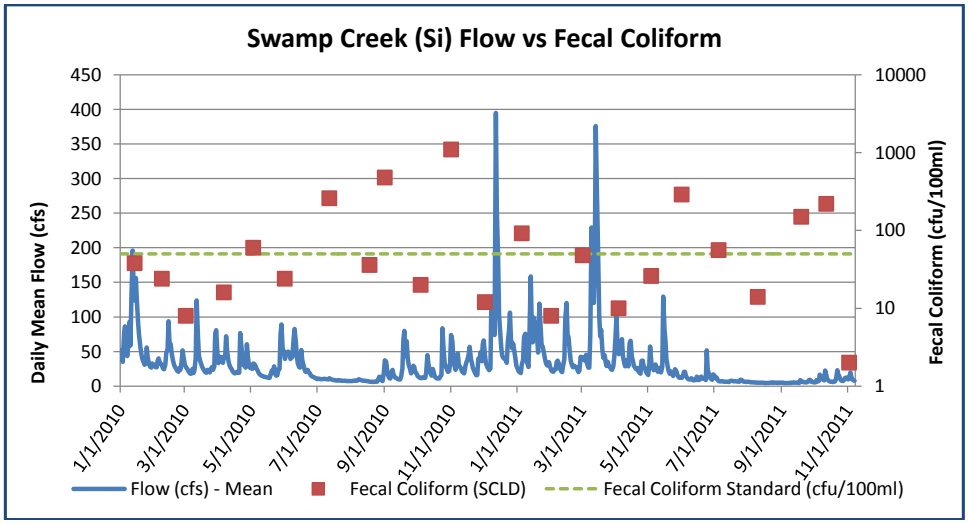
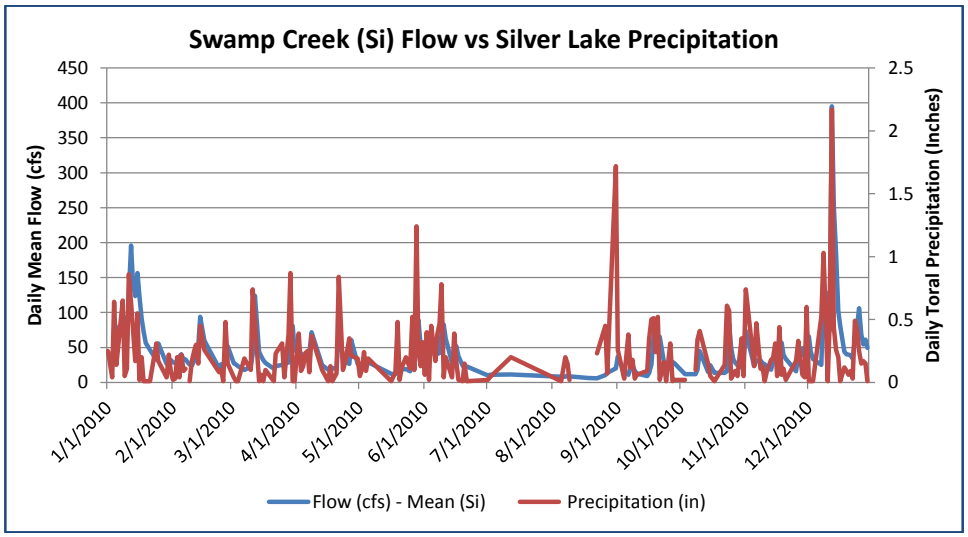
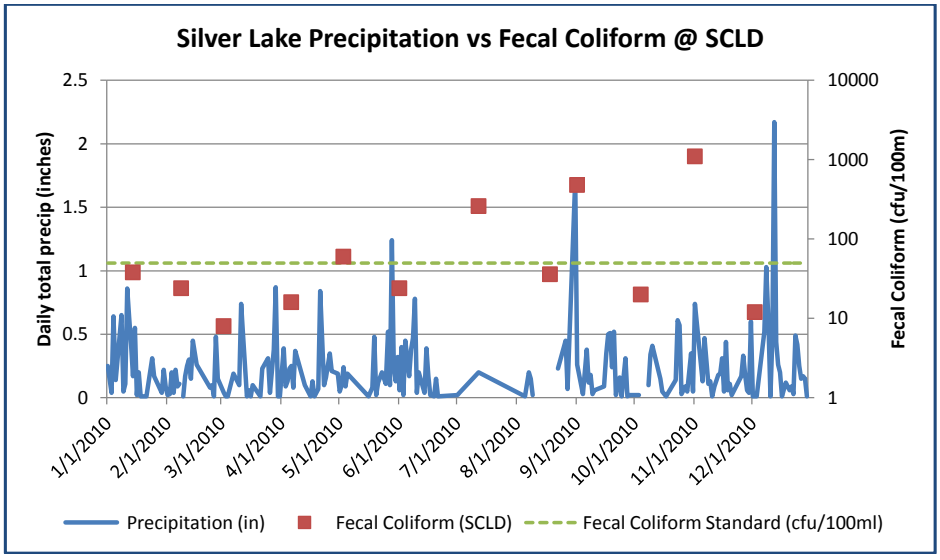


Figure 6. Swamp Creek (Si) Flow vs Silver Lake Precipitation



The May 3 precipitation event did not produce a measureable increase in flow at Si, potentially due to a more localized rain event. Additionally, the FC concentration observed on the same day was 60cfu/100ml; while above standards, this result is not of exceptional concern (Figure 7). The minor July 12 precipitation event also resulted in no increase in flow, yet the FC sample result gathered the same day was 260cfu/100ml (Figure 7). The large precipitation event on August 31 increased daily mean flows at Si by 46 percent on September 1 when FC results were 480 cfu/100ml (Figure 7).

Figure 7. Silver Lake Precipitation vs Fecal Coliform (SCLD)



This evaluation of flow, precipitation and fecal coliform bacteria results illustrates that exceedences of the FC standards at both SCLU and SCLD appear more related to heavy precipitation events during the dry season rather than increased flow. These efforts support seasonal and annual FC data analysis. In an effort to target dry season sources of FC, Snohomish County conducts dry weather illicit discharge detection and elimination efforts and contaminant source surveys targeted at proactive identification and removal of sources of fecal coliform bacteria. The 2013 – 2018 permit requires a continuation of these programs in support of objectives to reduce fecal coliform bacteria levels in Swamp Creek.

References

Environmental Protection Agency. 2007. An Approach for Using Load Duration Curves in the Development of TMDLs. Watershed Branch. Office of Wetland, Oceans and Watersheds. Washington D.C. Publication No. EPA 841-B-07-006.

Johnson S, Whiteaker T, Maidment D. (2009) "Automated Load Duration Curve Creation for the State of Texas." Journal of the American Water Resources Association, 45(3):654-663.

Deleted: ¶

6. Description of any stormwater monitoring studies not included with Annual Stormwater Monitoring Report

None.

7. Operation and maintenance records, if applicable

No actions taken by Snohomish County in 2012 necessitate submittal of operation and maintenance records. No municipal storm sewer maintenance or repair actions under the purview of the NPDES permit were performed in 2012 for which the cost of individual actions equaled or exceeded $25,000.

8. Annexations, incorporations, or jurisdictional boundary changes in the geographic area of coverage during the reporting period, and implications for Snohomish County's Stormwater Management Program.

The table below shows the 2012 municipal annexations of area in unincorporated Snohomish County.

Annexation Name	City	BRB #	Effective Date	Acres
Bloomberg Hill Island	Bothell	03-2011	12/31/12	11.9
Star	Arlington	01-2012	6/27/12	54.07
State Route 531 Right-of-way	Arlington	N/A	6/17/12	2.3
State Route 9 Right-of-way	Arlington	N/A	6/17/12	4.7
Allview Heights	Brier	23-2007	6/15/12	35
			Total Acres	**108**

These areas were removed from the NPDES permit coverage area of Snohomish County. Arlington, Brier, and Bothell are NPDES Phase 2 municipal stormwater permittees, and thus have responsibility for compliance with that permit in the annexed areas.

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9. Information reported pursuant to permit requirements S9.E.10 and S9.E.11

a) Summary of barriers to implementation of Low Impact Development, and any actions taken to remove the barriers (S9.E.10).

The previous annual reports contain discussions of barriers to implementation of Low Impact Development (LID). Snohomish County has begun the process of analyzing and revising codes in order to meet the requirements of the NPDES permit effective in August 2013. These requirements include analysis and revision as needed of County regulations in order to make LID the preferred and common approach in land development.

b) Summary of the extent to which basin or watershed planning is being conducted in the Permittee's jurisdiction, either voluntarily, or pursuant to the Growth Management Act or any other requirement (S9.E.11).

No planning as described above is currently being performed by the County. However, Snohomish County has begun the process of developing a stormwater basin plan to meet the requirements of the NPDES permit effective in August 2013. The deadline for completion of this plan is in 2016.

c) Identification of areas for potential basin or watershed planning that can incorporate development strategies as a water quality management tool to protect aquatic resources. (S9.E.12).

All of unincorporated Snohomish County fits this description, to the extent that there are no areas in which watershed or basin planning could not incorporate such strategies. As noted above, Snohomish County has begun the process of developing a stormwater basin plan to meet the requirements of the NPDES permit effective in August 2013. The deadline for completion of this plan is in 2016.