

**Stormwater Management Program
Snohomish County, Washington**

March 2010

**Prepared in partial fulfillment of requirements of the
National Pollutant Discharge Elimination System
(NPDES) Municipal Stormwater Permit**

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Introduction

This Stormwater Management Program, or SWMP, describes the actions that Snohomish County will take to meet the requirements set forth in Section S5 of the National Pollutant Discharge Elimination System (NPDES) Phase 1 municipal stormwater permit, issued on January 17, 2007, and modified on June 17, 2009.

The County is required to update the SWMP annually, and to solicit public input in this process. The overall intent of this requirement is to foster meaningful public involvement in NPDES-related programs. The County's public involvement efforts are discussed in Section 4 of this SWMP, and in other sections pertaining to specific projects with public involvement elements.

The rest of this introductory section presents a basic background and history of the NPDES municipal stormwater permit, followed by a chart of the main permit actions and associated deadlines. Each programmatic requirement of the permit is then discussed in turn.

The permit also contains specific requirements based in Total Maximum Daily Load plans, or TMDL plans. The permit stated that a discussion of the County's responses to these requirements was to be contained in separate chapters or appendices to this SWMP. However, since virtually all of the TMDL requirements involve specific conditions placed on programs in the SWMP, Ecology agreed that the County could discuss the TMDL requirements in the main body of the SWMP, with an appendix at the end of the SWMP containing supplemental information.

The NPDES Stormwater Permit

The Phase 1 permit was issued by the Washington State Department of Ecology to six municipalities: Snohomish County, King County, Pierce County, Clark County, the City of Seattle, and the City of Tacoma. The permit was also issued to the Washington State Department of Transportation. Ecology issued the first Phase 1 permits in 1995. The Phase 1 permit was reissued in February, 2007. At that time, Ecology also issued Phase 2 municipal stormwater permits, which have a reduced scope of requirements relative to the Phase 1 permits, to over 100 cities and counties in Washington.

The 2007 Phase 1 and Phase 2 permits were appealed by a wide variety of groups. Many of the issues appealed were settled, and some issues were argued in front of the Washington State Pollution Control Hearings Board (PCHB), which is the quasijudicial agency that hears appeals pertaining to orders and decisions made by the Department of Ecology. The entire set of appeal issues and decisions is presented on the Ecology web site at:

<http://www.ecy.wa.gov/programs/wq/stormwater/municipal/appeals.html>

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The Stormwater Management Program document

The permit requires the preparation and annual update of a Stormwater Management Program document. The main purpose of the SWMP document is to inform various audiences about the permit and what the County will do to comply with it. These audiences include the Department of Ecology, County elected officials, and the public.

The SWMP is not intended to serve as a single operational manual for all actions under the permit. Numerous other documents, such as Quality Assurance Plans for monitoring, maintenance standards for drainage systems, and specific field procedures for storm sewer inspections have been developed. Some of these are noted in the SWMP, and many of these documents are on the Snohomish County NPDES web site at:

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

The SWMP document is organized according to the sequence of requirements in condition S5C of the permit:

1. Legal Authority
2. Municipal Separate Storm Sewer System Mapping and Documentation
3. Coordination
4. Public Involvement and Participation
5. New Development / Redevelopment / Construction Site Runoff Control
6. Structural Stormwater Controls
7. Stormwater Pollution Source Controls
8. Detection and Elimination of Prohibited Storm Sewer Connections and Discharges
9. Operation and Maintenance of Stormwater Facilities, Roads, and Properties
10. Education and Outreach

In addition to the operational or programmatic requirements contained in permit section S5, which pertains to the SWMP, monitoring requirements are contained in permit section S8, and in Appendix 2 which pertains to Total Maximum Daily Load (TMDL) Requirements. While not technically part of the SWMP requirements, these monitoring requirements are discussed in section 11 of this SWMP.

For each requirement, the SWMP contains a summary of the permit requirements followed by the related actions Snohomish County will take, with a focus on actions to be taken in the coming year (in this case, 2010). The summaries may not contain all details of the permit requirements, as the summaries are intended to facilitate general understanding by the targeted audiences, with a focus on the intended outcomes of the programs, or on programs with which the public is likely to come into contact or may wish to provide input. For example, several permit requirements involve administrative or recordkeeping processes, or state that all County staff who perform a task shall receive appropriate training. Typically, such requirements have not been included in the

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summaries. The complete modified permit and appendices are posted on Ecology's website at

<http://www.ecy.wa.gov/programs/wq/stormwater/municipal/permitMOD.html>

In addition to the requirements listed above, which apply to the entire unincorporated portion of Snohomish County, the permit contains some more specific requirements pursuant to Total Maximum Daily Load plans, referred to herein as TMDLs. TMDLs are developed by the Washington State Department of Ecology in response to documented violations of specific state water quality standards in specific water bodies. For Snohomish County, the current NPDES municipal stormwater permit contains TMDL requirements related to fecal coliform bacteria in North Creek, Swamp Creek, and the Snohomish River Tributaries. These requirements are set forth in Appendix 2 of the NPDES permit. The County is required to prepare Early Action Plans describing County responses to TMDL requirements. However, since each of the TMDL requirements is essentially an area-specific and pollutant-specific version of one of the programmatic requirements of the NPDES permit, Snohomish County has presented descriptions of the TMDL response actions in the SWMP. For reference, Table 1 shows the requirements of the TMDLs and the related sections of the SWMP.

The current NPDES permit contains numerous implementation schedules with deadlines that will occur months or years after February 2007. Table 1 shows the basic deadlines for operational or programmatic permit requirements. Section S5B of the permit states that until these deadlines occurs, Snohomish County shall continue implementation of the corresponding programs under the terms of the SWMP developed under the 1995 permit.

For further discussion of any of the County's NPDES programs, please contact Bill Leif at (425) 388-3148 or b.leif@snoco.org.

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Table 1 - NPDES permit TMDL Requirements and associated permit / Stormwater Management Program sections

Snohomish Tributaries / North Creek	Swamp Creek	SWMP section
2008	2008	
Prepare Early Action BMP Plan (2/16/08)	Prepare Bacterial Pollution Control Plan	N/A
Consider use of pet waste ordinance (2/16/08)	Evaluate and document applicability of use of pet waste ordinance	S5C1
Consider evaluation of water pollution control enforcement capabilities (2/16/08)	Evaluate water pollution control enforcement capabilities	S5C1
Consider evaluation of critical area regulations in relation to TMDL goals (2/16/08)	Evaluate critical area regulations in relation to TMDL goals	S5C1
Consider educational program directed at reducing bacterial pollution (2/16/08)	Include bacterial pollution as element in educational program implemented per permit condition S5C10	S5C10
Consider investigation and implementation of stormwater treatment, reducing stormwater flow volumes, and preventing new stormwater sources to prevent or reduce bacterial pollution (2/16/08)	Evaluate investigation and implementation of stormwater treatment, reducing stormwater flow volumes, and preventing new stormwater sources to prevent or reduce bacterial pollution	S5C5, S5C6, S8
Consider implementation of (applicable) activities in Watershed Management Plans for Quilceda/Allen Creek, French Creek, and North Creek (2/16/08)		Various; see Appendix 1
Consider ambient water quality monitoring and stormwater monitoring to identify bacterial pollution sources (2/16/08)	Consider ambient water quality monitoring and stormwater monitoring to identify bacterial pollution sources	In monitoring reports
Consider livestock and compost ordinances (2/16/08)	Consider livestock and compost ordinances	S5C1
Public review of initial Early Action BMP Plan (5/16/08)	Public review of initial Early Action BMP Plan	S5C4
Begin implementation of BMPs specified in Early Action BMP Plan (8/16/08)	Begin implementation of BMPs specified in Early Action BMP Plan	Various; see Appendix 1
	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 water bodies.	S5C3
	Consider prioritizing storm sewer outfall investigations in TMDL areas.	S5C8
	Develop threshold values for responding to bacterial problems and initiating investigations in accordance with permit section S5C8(b)(vii).	S5C8

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Table 1 - NPDES permit TMDL Requirements and associated permit / Stormwater Management Program sections

Snohomish Tributaries / North Creek	Swamp Creek	SWMP section
2009	2009	
Prepare and submit to Ecology a Quality Assurance Project Plan for receiving water and stormwater quality sampling to assess compliance with state water quality standards (7/17/09)	Prepare and submit to Ecology a Quality Assurance Project Plan for receiving water and stormwater quality sampling to assess compliance with state water quality standards (see note 3)	S8
Compile a list of commercial composting facilities and commercial animal handling facilities (8/16/09) (See note 1)	Compile a list of commercial composting facilities and commercial animal handling facilities (See note 1)	S5C7
Begin inspection of commercial composting facilities and commercial animal handling facilities on list to ensure implementation of stormwater pollution source control BMPs (8/16/09)	Begin inspection of commercial composting facilities and commercial animal handling facilities on list to ensure implementation of stormwater pollution source control BMPs	S5C7
Public review of Early Action BMP Plan as part of annual Stormwater Management Program public review / revisions (see note 2)		S5C4
	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 water bodies.	S5C3

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Table 1 - NPDES permit TMDL Requirements and associated permit / Stormwater Management Program sections

Snohomish Tributaries / North Creek	Swamp Creek	SWMP section
2010	2010	
Begin monitoring as specified in QAPP (1/17/10)	Begin monitoring as specified in QAPP (see note 3)	S8
Full implementation of BMPs specified in Early Action BMP Plan (1/17/10)	Full implementation of BMPs specified in Early Action BMP Plan	various
Complete inspections of all commercial composting facilities and commercial animal handling facilities in list (12/16/10)	Complete inspections of all commercial composting facilities and commercial animal handling facilities in list	S5C7
Develop Bacterial Pollution Control Plan (BPCP) (5/16/11)		various
Conduct public review of Bacterial Pollution Control Plan (11/16/10) (see note 2)	Conduct public review of Bacterial Pollution Control Plan (see note 2)	S5C4
	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 water bodies.	S5C3
2011	2011	
Submit BPCP with permit renewal application (8/16/11)	Submit BPCP with permit renewal application (8/16/11)	N/A
Public review of Early Action BMP Plan as part of annual Stormwater Management Program public review / revisions (see note 2)	Public review of Bacterial Pollution Control Plan as part of annual Stormwater Management Program public review / revisions (see note 2)	S5C4
	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 water bodies.	S5C3

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Notes for Table 1:

- 1) All three TMDLs state that “The Illicit Connection Detection and Elimination program requirement to prevent non-stormwater discharges described in S.5.C.8.b.ii...shall address commercial animal handling areas and commercial composting facilities, including source control best management practices (BMPs) equivalent to those in the 2005 Western Washington Stormwater Manual Volume 4, pages 2-10 through 2-12.” This statement is followed in the Snohomish River Tributaries TMDL and the North Creek TMDL by the requirement to develop a list of these facilities by 8/16/09 and to inspect all of the facilities by 12/16/10. In fact, the referenced permit condition does not contain an inspection program, but rather requires the County to prohibit illicit discharges and connections. The County’s adopted revisions to SCC Chapter 7.53 meet this requirement, and the revised code applies to the subject facilities. However, permit requirement S5C7 requires the County to implement an inspection program at a wide variety of businesses and multifamily residential properties, including those listed above. By February 16, 2009, the County was obliged to develop a list of sites that may discharge stormwater pollution based on activities conducted at the site, and begin an inspection program that will inspect 20% of the number of sites on the list per year. This list has been developed and it contains the facilities listed above. The County began the inspection program by the required date in 2009.
- 2) The TMDL requirements listed in Appendix 2 of the permit do not state this explicitly, but the permit requires an annual public involvement and review process for the SWMP, into which the Early Action BMP Plan and Bacterial Pollution Control Plan must be incorporated.
- 3) With Ecology’s concurrence, TMDL monitoring for Swamp Creek will be performed on the same schedule as that for North Creek and the Snohomish River Tributaries.

1. Legal Authority

Permit requirements

By February 16, 2007, Snohomish County was required to demonstrate that it can operate pursuant to legal authority that authorizes or enables the County to control discharges to and from municipal separate storm sewers owned or operated by the County.

This legal authority, which may be a combination of statute, ordinance, permit, contracts, orders, interagency agreements, or similar means, shall authorize or enable the County, at a minimum, to:

- Control through ordinance, order, or similar means, the contribution of pollutants to municipal separate storm sewers owned or operated by the County from stormwater discharges associated with industrial activity, and control the quality of stormwater discharged from sites of industrial activity;
- Prohibit through ordinance, order, or similar means, illicit discharges to the municipal separate storm sewer owned or operated by the County;
- Control through ordinance, order, or similar means, the discharge of spills and the dumping or disposal of materials other than stormwater into the municipal separate storm sewers owned or operated by the County;
- Control through interagency agreements among co-applicants, the contribution of pollutants from one portion of the municipal separate storm sewer system to another portion of the municipal separate storm sewer system;
- Require compliance with conditions in ordinances, permits, contracts, or orders; and,
- Within the limitations of state law, carry out all inspection, surveillance, and monitoring procedures necessary to determine compliance and non-compliance with permit conditions, including the prohibition on illicit discharges to the municipal separate storm sewer and compliance with local ordinances.

In addition to this generally stated legal authority requirement, the permit requires the following specific legal authority adoption or analysis:

- adoption of legal requirements related to new development, which will be discussed in section 5 of this SWMP;
- adoption of legal requirements related to pollution source control and illicit discharge control, which will be discussed in this section;
- evaluation of existing water pollution control code enforcement authority related to bacteria pollution control in areas with TMDLs, which will be discussed this section;
- evaluation of the need for a County code specifically regulating commercial composting facilities in order to address bacteria pollution control in areas with TMDLs, which will be discussed in this section;

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- evaluation of the need for a County code specifically regulating commercial animal handling facilities in order to address bacteria pollution control in areas with TMDLs, which will be discussed in this section;
- evaluation of a “livestock” ordinance in order to address bacteria pollution control in areas with TMDLs, which will be discussed in this section; and
- evaluation of the ability of the County’s critical area regulations to address bacteria pollution control in areas with TMDLs, which will be discussed in this SWMP section.

Stormwater management program

Snohomish County relies on a mixture of codes, contracts, and interlocal or interagency agreements to meet the basic requirements set forth in permit section S5C1. This requirement is essentially the same as that of the previous permit, and the County had met the basic legal requirements associated with the current permit deadline of February 16, 2007. The County's NPDES-permit-related codes can be viewed at

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

An assessment of general legal authority and the specific assessments described above were conducted and documented in the 2009 SWMP. This document can be viewed at

http://www.co.snohomish.wa.us/documents/Departments/Public_Works/SurfaceWaterManagement/Water_Quality/PermitMarch2009.pdf

The permit issued in 2007 required the County to adopt specific code revisions related to new development and water pollution control by August 16, 2008. Revisions to the water pollution control code (Chapter 7.53 SCC) and related technical documents were adopted in July, 2008. Revisions to that code were discussed in detail in the 2009 SWMP, to which a web link is provided above.

The deadline for adopting revisions to development-related codes, engineering standards, and the Snohomish County Drainage Manual was extended by Agreed Order 7295 (First Amendment to Agreed Order 6688) such that the codes and related requirements must be effective no later than September 30, 2010. Proposed code revisions related to new development will be discussed in the SWMP section on permit condition S5C5 (new development and redevelopment).

The County is not a co-applicant with any other NPDES municipal permittee and thus does not have any related interlocal agreements. The water pollution control code is discussed below.

2. Municipal Separate Storm Sewer System Mapping and Documentation

Permit requirements

By February 16, 2009, the County must map all known County storm sewer outfalls, receiving waters, and stormwater treatment and flow control facilities owned, operated, or maintained by the County. By that date, the County must also initiate a program to map connection points between storm sewers owned or operated by the County and other municipalities or other public entities. The County must continue to map additional outfalls and structural BMPs as they are found or constructed.

By February 16, 2011, the County must map certain storm sewer attributes within „urban/higher density rural sub-basins’ associated with storm sewer outfalls with a 24” inches nominal diameter or larger, or an equivalent cross-sectional area for non-pipe systems (note that this essentially includes all road ditch systems). Attributes mapped must include land use, tributary conveyances (including type, material, and size if known), and associated drainage areas. The term „urban/higher density rural sub-basins’ is defined in the permit as „all areas within or proposed to be within the urban growth area (UGA), or any sub-basin outside the UGA with 50% or more area comprised of lots less than 5 acres’.

The County must initiate a program to develop and maintain a map of all connections to the storm sewer authorized or allowed by the County after February 16, 2007.

By February 16, 2011, the County must map existing, known connections over 8” to the County storm sewer that are tributary to storm sewer outfalls with a 24” inches nominal diameter or larger, or an equivalent cross-sectional area for non-pipe systems. The extent of this information must be 50% of the area within urban/higher density rural sub-basins, but the permit does not specify how the County will select the specific areas mapped.

By February 16, 2011, the County must map areas served by the County storm sewer that do not discharge stormwater to surface water.

Stormwater management program

For the purposes of this discussion, an "outfall to the County's storm sewer" is the location at which a constructed storm sewer located in a County right-of-way or on County-owned property discharges to receiving water or a storm sewer not owned by Snohomish County.

During the term of the last permit, Snohomish County developed a GIS-based map and database system containing information about the drainage system within the unincorporated urban growth areas. This system includes information about storm sewer structures and facilities, including their location, elevation, material, type, size, and

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condition. Schematic maps of the County drainage system are available on the internet at:

http://www.co.snohomish.wa.us/PWApp/SWM/drainage_maps/index.html.

In accordance with the last permit, the County also developed paper maps showing the location of outfalls outside the urban growth areas.

The current drainage map system meets or exceeds the requirements of the permit based on the deadlines that have occurred to date.

3. Coordination

Permit requirements

Snohomish County must implement coordination mechanisms among County departments to eliminate barriers to compliance with the terms of this permit.

The County must also coordinate stormwater-related policies, programs and projects with other NPDES municipal permittees with which the County shares one or more watersheds.

Stormwater management program

On February 4, 2008, the Snohomish County Executive issued Executive Order 2008-49 requiring department directors or their designees to attend twice-annual meetings at which NPDES issues will be discussed. These meetings are typically held in April and October.

Snohomish County participates in a variety of coordination efforts with other NPDES municipal permittees. For years, permit coordinators from Phase 1 permittees have met frequently to discuss permit implementation issues. TMDL-related issues are often discussed at these meetings.

Since the reissuance of the Phase 1 permit in 2007, a number of separate coordination groups have been initiated. Some are focused on specific issues such as public education, and include Phase 1 and Phase 2 permittees without regard to geographic location. Other coordination groups are focused on specific geographic areas, for example, the group composed of Snohomish County and Phase 2 permittees within the county. As programs are developed and implemented under these permits, additional coordination efforts will be developed in response as needed. TMDL-related issues are often discussed at these meetings.

4. Public Involvement and Participation

Permit requirements

By August 16, 2007, Snohomish County was required to develop and begin implementing a process to create opportunities for the public to participate in processes involving the development, implementation and update of the SWMP, including a process for consideration of public comments on the SWMP. The County must make the SWMP and all other submittals required by this permit, including annual reports, available to the public starting with the first annual report, which is due to Ecology on March 31, 2008. The County shall post these documents on the County website, or submit them in electronic format to Ecology for posting on Ecology's website.

Stormwater management program

This SWMP will be submitted to Ecology by March 31, 2010, and posted on the County's NPDES website at:

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

The County held two public meetings in February, 2010, at which the SWMP development and public involvement opportunities were discussed.

5. New Development / Redevelopment / Construction Site Runoff Control

Permit requirements

By August 16, 2008, Snohomish County must adopt extensive revisions to codes, engineering standards, and the County Drainage Manual, and must modify its construction administration and inspection processes to meet specific requirements in the permit.

The codes and related enforceable documents must:

- contain the equivalent to the Minimum Requirements, thresholds, and definitions in Appendix 1 of the NPDES permit;
- allow non-structural preventive actions and source reduction approaches such as Low Impact Development (LID) techniques; and
- establish legal authority to inspect private stormwater facilities and enforce maintenance standards for all new development and redevelopment approved under the revised codes.

The County's program to regulate private construction must be designed and implemented to meet the following requirements at 95% of the sites regulated by the requirements in Appendix 1:

- review all stormwater site plans submitted to the Permittee for proposed development involving land disturbing activity that meet the thresholds in Appendix 1;
- prior to clearing and construction, inspect all permitted development sites that meet these thresholds and that have a high potential for sediment transport;
- during construction, inspect all permitted development sites involving land disturbing activity that meet the thresholds in Appendix 1 to verify proper installation and maintenance of required erosion and sediment controls, and enforce the related permit conditions; and
- upon completion of construction and prior to final approval/occupancy, inspect all development sites that meet the thresholds in Appendix 1 to verify proper installation of permanent erosion controls and stormwater facilities/BMPs, and enforce related permit conditions.

The County must have a program to enforce against violations of County code, and must keep records of inspections and enforcement actions by staff, including inspection reports, warning letters, notices of violations and other enforcement records, maintenance inspections, and maintenance activities.

The County must make available copies of the "*Notice of Intent for Construction Activity*" and the "*Notice of Intent for Industrial Activity*" to representatives of proposed new development and redevelopment.

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Stormwater management program

Snohomish County regulates private construction and builds a wide variety of public projects. The County's program for each of the permit requirements related to these activities is described below.

A) Revisions to County codes, engineering standards, and Snohomish County Drainage Manual

Snohomish County is in the process of developing revisions to chapters of Snohomish County Code (SCC) Title 30 (Unified Development Code), the Engineering Design and Development Standards (EDDS), and the Snohomish County Drainage Manual. As stated in the section on legal authority above, Snohomish County is required by Agreed Order 7295 to adopt these documents with codes and related requirements that are effective no later than September 30, 2010. The current drafts of these documents are available on the internet at:

http://www1.co.snohomish.wa.us/Departments/PDS/Divisions/Code_Development/UDC/NPDES.htm.

These regulations will enact requirements that are more stringent than those existing for flow control and stormwater treatment.

B) Regulation of private construction

The Department of Planning and Development Services (PDS) is responsible for all phases of regulating private construction, including review and approval of plans, issuance of permits, inspection of construction projects, and enforcement of County codes.

Copies of the "*Notice of Intent for Construction Activity*" and the "*Notice of Intent for Industrial Activity*" are available to representatives of proposed new development and redevelopment are available at the front counter of Snohomish County Department of Planning and Development Services.

C) County construction projects

All County projects are designed and constructed to conform to County codes. Design, construction, and construction inspection may be performed by County staff or private consultants or contractors. Some County agencies, such as Parks and the Airport, use PDS to inspect the work of construction contractors, whereas most Public Works projects are inspected by Public Works staff who manage the contractors. This is important in the context of counting enforcement actions as required by the permit, since the term "enforcement actions" implies code enforcement. The County controls its own contractors through contract management, not code enforcement, so a given corrective

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measure might be required at a private project and also at a County project, but an enforcement action would only occur at the private project.

6. Structural Stormwater Controls

Permit requirements

By February 16, 2008, Snohomish County must have developed a Structural Stormwater Control Program designed to control impacts from discharges from the County's storm sewer system that are not adequately controlled by other required actions of the SWMP. Implementation of the program shall begin no later than August 16, 2008. The program shall address disturbances to watershed hydrology and stormwater pollutant discharges, and shall consider impacts caused by stormwater discharges from areas of existing development, including runoff from highways, streets and roads owned or operated by the County, and areas of new development where impacts are anticipated as development proceeds.

The County must consider projects such as:

- regional flow control facilities;
- water quality treatment facilities;
- facilities to trap and collect contaminated particulates;
- retrofitting of existing stormwater facilities; and
- use of existing rights-of-way and County property and acquisition of other property to provide additional water quality and flow control benefits.

The program should also consider other means to address impacts such as:

- reduction or prevention of hydrologic changes through the use of on-site (infiltration and dispersion) stormwater management BMPs and site design techniques;
- riparian habitat acquisition; and
- restoration of forest cover and riparian buffers

In-stream culvert replacement or channel restoration projects are not eligible to count towards compliance with this permit requirement.

The County must provide a list of planned individual projects that are scheduled for implementation during the term of the permit, and describe how the selected projects comply with the "all known, available, and reasonable treatment" (AKART) and "maximum extent practicable" (MEP) requirements. The initial list must be provided in the 2009 annual report, and any updates and revisions to the list will be provided in subsequent annual reports. The Structural Stormwater Control Program may also include a program designed to implement small-scale projects that are not planned in advance.

The County must include a description of the Structural Stormwater Control Program in the written documentation of their SWMP, including a description of the goals that the Structural Stormwater Control Program are intended to achieve and the planning process used to develop the Structural Stormwater Control Program. The description of the planning process shall include:

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- geographic scale of the planning process;
- issues and regulations addressed;
- steps in the planning process;
- types of characterization information considered;
- implementation budget; and
- public involvement process.

In addition, the County shall describe the prioritization process, procedures, and criteria used to select the projects comprised by the Structural Stormwater Controls Program.

For planned individual projects, and programs of small projects, the County must provide the following information:

- the estimated pollutant load reduction that will result from each project designed to provide stormwater treatment;
- the expected outcome of each project designed to provide flow control;
- any other expected environmental benefits; and
- if planned, monitoring or evaluation of the project.

Stormwater management program

The Structural Stormwater Control Program is described in a stand-alone document which is posted on the internet at:

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

7. Stormwater Pollution Source Controls

Permit requirements

By August 16, 2008, Snohomish County must require the use of source control best management practices (BMPs) at existing sites and for new construction. The BMPs must be equivalent to those in Volume 4 of the 2005 Ecology Stormwater Manual. A draft code and proposed equivalent manual sections must be submitted to Ecology by February 16, 2008.

The County must implement this code by means of an inspection program and a complaint investigation program. By August 16, 2008, the County must establish methods to identify sites for inspection, and in doing so must consider the categories of land uses and businesses in Appendix 8 of the permit, plus other pollution-generating sites identified through pollution complaint response. The County must periodically update the list.

By February 16, 2009, the County must implement an audit/inspection program for sites identified in the list or inventory. The County must notify all sites with a business address about the source control code requirements applicable to their activities. This information may be provided all at one time or spread out over the last three years of the permit term to allow for some tailoring and distribution of the information during site inspections. Each year, the County must inspect 20% of the sites to assure BMP effectiveness and compliance with source control requirements. The County may select which sites to inspect each year, and is not required to inspect 100% of sites over a 5-year period. Sites may be prioritized for inspection based on their land use category, potential for pollution generation, proximity to receiving waters, or to address an identified pollution problem within a specific geographic area or sub-basin. In addition to the proactive inspection program, the County must inspect 100% of sites identified through legitimate complaints.

Stormwater management program

As described in Section 1 of this SWMP, Snohomish County revised its Water Pollution Control code (SCC Chapter 7.53) on July 30, 2008. The County also adopted the equivalent to Volume 4 of the 2005 Ecology Stormwater Manual. The code is available on the internet at:

http://www1.co.snohomish.wa.us/County_Services/county_code.htm (view pdf/Title 7)

Volume 4 of the Snohomish County Drainage Manual is available at:

http://www.co.snohomish.wa.us/documents/Departments/Public_Works/surfacewatermanagement/Drainage_Manual/Aug08Vol4.pdf

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The revised code requires the implementation of stormwater source control BMPs by anyone who is performing activities that might contribute pollutants to stormwater.

In addition, the County has begun a business inspection program that meets the requirements of the permit. A list of businesses was prepared, and in 2009 over 20% of these businesses were inspected. In 2010, inspections will continue to be focused on the unincorporated urbanized area in the southwest part of the County.

8. Detection and Elimination of Prohibited Storm Sewer Connections and Discharges

Permit requirement

The County must continue implementation of a program to prevent, identify and respond to discharges and connections to the County storm sewer that are prohibited by County code. As stated above, the deadline for code adoption by the County is August 16, 2008.

The County must continue to operate a water quality complaint phone line.

The County must continue to conduct a “field screening” program to detect prohibited connections and discharges to the storm sewer. Field screening is the term used in the permit to mean a systematic dry-weather inspection of a location in the storm sewer, including both visual inspection of the storm sewer and chemical analysis of water if it is present.

By February 16, 2012, the County must prioritize outfalls and conveyances in urban subbasins and higher density rural sub-basins for screening and must complete field screening for at least half of the conveyance systems in these areas, and must complete field screening in at least one rural sub-basin.

The County must investigate a report of a prohibited connection within 21 days of the report, and must use enforcement authority in a documented effort to eliminate the prohibited connection within 6 months. All prohibited connections to the MS4 must be eliminated. In addition, the County must contact Ecology immediately upon discovering a prohibited connection that presents a severe threat to human health or the environment.

By August 16, 2007, the County must have either begun participation in a regional emergency response program, or have developed and implemented procedures to investigate and respond to spills and improper disposal into the County’s storm sewer.

The County must have a program to prioritize and investigate complaints, reports, or monitoring data that indicate potential prohibited discharges, spills, or illegal dumping. The County must immediately respond to problems or violations judged by the County to be urgent, severe, or emergent. Spills of oil or hazardous materials must be reported to appropriate authorities.

Stormwater management program

As noted above, Snohomish County revised its Water Pollution Control code (SCC Chapter 7.53) on July 30, 2008. The revised code contained the current permit requirements regarding specific prohibitions or conditions for discharges and connections to the County storm sewer.

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The County's program for addressing polluted discharges and illicit storm sewer connections comprises two primary bodies of work. First, the County has for years implemented a program to investigate reported water pollution problems. This program supports the enforcement of the County's Water Pollution Control Code (SCC 7.53). Most potential problems are reported by members of the public. Second, the County has a systematic program to inspect discharge points from its storm sewer system during dry weather in order to locate non-stormwater discharges. These discharge points are often referred to as "outfalls" and the dry-weather inspections are often referred to as "screening." Both of these programs are described below.

Water pollution complaint investigation program

Members of the public can report potential or observed water quality problems by calling the dedicated water quality complaint phone number at 425-388-6481. In addition, the County has placed information about water quality and water pollution at:

http://www1.co.snohomish.wa.us/Departments/Public_Works/Divisions/SWM/Work_Areas/Water_Quality/

This web page contains an e-mail link for communicating with a staff member of Snohomish County Surface Water Management.

Complaints are prioritized by pollutant type and potential environmental severity of the reported discharge. Response to high priority cases is attempted within three working days as allowed by weather conditions, lab service availability, and/or other external constraints. Response may include notification to other agencies, phone calls, emails and site visits to determine the nature and extent of the problem or discharge.

Potentially severe spills are addressed by implementation of methods in the Snohomish County Comprehensive Emergency Management Plan, including notification to the Ecology Northwest Regional Office, the National Spill Response Center, and the Washington State Emergency Management Division. If a spill might cause bacterial contamination of shellfish beds, the County also notifies the State Department of Health.

Implementation of investigation procedures may involve coordination with other divisions of County government such as Planning and Development Services (PDS) or external agencies, such as the Department of Ecology, Department of Fish and Wildlife, the Snohomish Health District, and law enforcement where necessary.

Ecology and other agencies, if necessary, are notified upon removal of severe illicit connections, severe source control violations and/or severe spills.

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Outfall screening program

The outfall screening program is described in detail in the Source Control Program document posted on the internet at:

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

Outfalls for screening are selected using geographical information system (GIS) methods to identify outfalls within urban higher density rural subbasins and one rural subbasin. The urban higher density rural subbasins identified based upon permit conditions include; McAleer, North, Swamp, Little Bear, Port Susan and Puget Sound Drainages. The rural subbasin selected was Church Creek. This GIS exercise is performed on an annual basis to account for newly mapped drainage and changes to ownership, parcel density and/or hydrography. Once selected, outfalls are field screened using methods adapted from Illicit Discharge Detection and Elimination : A Guidance Manual for Program Development and Technical Assessments, Center for Watershed Protection, October 2004. Field teams screen the list of outfalls during the dry weather season. At each location, the team takes photographs, a GPS location if the location is not already mapped, collects physical attributes, and determines whether there is discharge from the outfall. At each flowing outfall or conveyance location, the field team notes visual and olfactory observations, takes chemical and physical measurements of the water, and collects water samples for laboratory analysis. As indicated, the field team further may investigate the conveyance system associated with the outfall to determine the potential source of pollution.

Placing a relatively higher priority on screening outfalls in TMDL areas was considered but rejected by Snohomish County. It is not the most effective way to locate dry-weather illicit discharges. Although not intentional, some basins identified as urban higher density rural subbasins, in which IDDE efforts are focused, are also currently subject to permit requirements through bacteria TMDLs. These include North and Swamp Creek.

9. Operation and Maintenance of Stormwater Facilities, Roads, and Properties

Permit requirements

The operation and maintenance program may be the single most complex and far-reaching program of the permit. Snohomish County must adopt standards for operation and maintenance of stormwater facilities. The standards must apply to facilities the County owns and privately owned facilities that discharge to the County's storm sewer. The County must inspect its own facilities annually and perform any needed maintenance, and must ensure inspection and maintenance privately-owned facilities to the extent allowed by state and federal law. The County must also adopt and implement standards for operating and maintaining operating and maintaining roads and County properties such as equipment maintenance or storage yards. Each of these requirements is described in more detail below.

A) Adoption of stormwater facility maintenance standards

By August 16, 2008, Snohomish County must establish maintenance standards equivalent to those specified in Chapter 4 of Volume V of the 2005 Stormwater Management Manual for Western Washington. For existing facilities which do not have maintenance standards, the County shall develop a maintenance standard.

B) Maintenance of privately-owned stormwater facilities that drain to the County's storm sewer

By August 16, 2008, Snohomish County must have adopted codes or other enforceable documents requiring maintenance, according to the adopted standards, of privately-owned stormwater flow control facilities, treatment facilities, and catch basins that discharge to the County's storm sewer. By this date the County must also develop an initial inspection schedule for these facilities (excluding the catch basins), such that each facility will be inspected at least once during the term of this permit. The County must either perform the inspections and needed maintenance, or ensure that such work was done by means of credible documentation, provided that these responsibilities are limited to facilities to which the County can legally gain access.

Unless there are circumstances beyond the County's control, when an inspection identifies an exceedance of the maintenance standard, the County must maintain or ensure maintenance of the facility according to the following schedule:

- within 1 year for wet pool facilities and retention/detention ponds;
- within 6 months for typical maintenance;
- within 9 months for maintenance requiring re-vegetation; and
- within 2 years for maintenance that requires capital construction of less than \$25,000.

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Circumstances beyond the County's control include denial or delay of access by property owners, denial or delay of necessary permit approvals, and unexpected reallocations of maintenance staff to perform emergency work. For each exceedance of the required timeframe, the County shall document the circumstances and how they were beyond the County's control.

By February 16, 2011, the County must develop an annual inspection schedule for the facilities described above. The annual inspection requirement may be reduced based on maintenance records with a period double the length of time of the proposed inspection frequency. For example, if four years of annual records for a facility showed that maintenance was needed every other year, the County could change the scheduled maintenance frequency for that facility to two years. In the absence of maintenance records, the County may substitute written statements to document a specific less frequent inspection schedule. The written statements must be based on actual inspection and maintenance experience and shall be certified in accordance with G19 Certification and Signature.

By February 16, 2009, the County must implement a program to inspect all new permanent stormwater treatment and flow control facilities, including catch basins, in new residential developments every 6 months during the period of heaviest construction, and enforce compliance with maintenance standards as needed.

Compliance with the inspection requirements for regulated facilities above will be determined by the presence of an established inspection program designed to inspect all sites, and actual inspection of 95% of all sites.

C) Maintenance of stormwater facilities owned or operated by Snohomish County

By February 16, 2009, the County must implement a program to annually inspect all of its permanent stormwater treatment and flow control facilities (other than catch basins), and maintain them in accordance with adopted standards. The annual inspection requirement may be reduced based on inspection records as described above.

By February 16, 2009, the County must implement a program to conduct spot checks of potentially damaged permanent treatment and flow control facilities (other than catch basins) after major storm events (defined as those with a 24-hour duration and a 10-year recurrence interval). If spot checks indicate widespread damage/maintenance needs, the County must inspect all stormwater treatment and flow control facilities that may be affected, and conduct repairs or take appropriate maintenance actions.

Compliance with the inspection requirements described above shall be determined by the presence of an established inspection program designed to inspect all sites, and achieving inspection of 95% of all sites.

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D) Maintenance of catch basins owned or operated by Snohomish County

By February 16, 2009, Snohomish County must implement a program to annually inspect catch basins and inlets owned or operated by the County. Inspections may be conducted on a “circuit basis” whereby a sampling of catch basins and inlets within each circuit is inspected to identify maintenance needs. If such inspections indicate maintenance is needed, the County must clean all catch basins within the circuit. Alternatively, the County may inspect all catch basins, and clean only catch basins where cleaning is needed to comply with maintenance standards.

As with maintenance of other types of stormwater facilities, the frequency of catch basin inspections may be changed in accordance with records as described above.

The County must dispose of “vactor decant water” (water collected from stormwater facilities by eductor or “vactor” trucks) in accordance with the requirements of Appendix 6 of the permit.

E) Operation and maintenance of County roads

By February 16, 2008, Snohomish County must establish practices to reduce stormwater impacts associated with runoff from its parking lots and roads, and must implement these practices by August 16, 2008. The established practices must address:

- pipe cleaning;
- cleaning of culverts that convey stormwater in ditch systems;
- ditch maintenance;
- street cleaning;
- road repair and resurfacing, including pavement grinding;
- snow and ice control;
- utility installation;
- maintenance of roadside areas, including vegetation management;
- dust control; and
- pavement striping maintenance.

F) Operation and maintenance of County properties

By August 16, 2008, Snohomish County must establish and implement policies and procedures to reduce pollutants in discharges from properties owned or maintained by the County that are subject to this permit. Such properties include parks, open space, road right-of-ways, maintenance yards, and stormwater treatment and flow control facilities.

The policies and procedures must address:

- application of fertilizer, pesticides, and herbicides, including the development of nutrient management and Integrated Pest Management Plans;
- sediment and erosion control;

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- landscape maintenance and vegetation disposal;
- trash management; and
- building exterior cleaning and maintenance.

By February 16, 2009, the County must develop and implement a Stormwater Pollution Prevention Plan (SWPPP) for all County heavy equipment maintenance or storage yards and County material storage facilities located in areas subject to this permit, that are not covered under by another Ecology issued stormwater discharge permit. Implementation of non-structural BMPs shall begin immediately after the pollution prevention plan is developed. A schedule for implementation of structural BMPs shall be included in the SWPPP. Generic SWPPPs that can be applied at multiple sites may be used to comply with this requirement. The SWPPP shall include periodic visual observation of discharges from the facility to evaluate the effectiveness of BMPs.

Stormwater Management Program

A) Adoption of stormwater facility maintenance standards

Snohomish County adopted maintenance standards in the form of revisions to the current Snohomish County Drainage Manual. These have been reviewed Ecology as part of the final code / EDDS / Drainage Manual package that will be adopted to meet the requirements of permit sections S5C5 and S5C9.

B) Maintenance of privately-owned stormwater facilities that drain to the County's storm sewer

An initial inspection schedule was developed to ensure inspection and maintenance of privately-owned stormwater facilities that drain to the County storm sewer. The program for inspection and maintenance of these facilities is combined with the program to inspect and maintain County-owned facilities that serve the road right-of-way. This program was fully implemented in 2009.

The County intends to assess the inspection and maintenance records (or similar information) for private facilities to determine appropriate inspection intervals. By February 16, 2011, the County will develop an inspection schedule for these facilities that stipulates annual inspections unless records or other information indicate that a reduced inspection frequency is warranted.

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C) Maintenance of stormwater facilities owned or operated by Snohomish County

The County increased levels of effort in 2009 to meet the increased inspection and maintenance frequency for stormwater facilities owned or operated by the County. The schedule will stipulate annual inspections unless records or other information indicate that a reduced inspection frequency is warranted.

D) Maintenance of catch basins owned or operated by Snohomish County

The County increased levels of effort in 2009 to meet the increased inspection and maintenance frequency for catch basins and inlets owned or operated by the County, in accordance with the requirements of the permit.

Road Maintenance currently disposes of vector water and solids at a special facility designed for this purpose located at the regional landfill site at Cathcart. The solids are separated from the liquid, which is treated by the landfill leachate treatment plant before discharge to a sanitary sewer.

E) Operation and maintenance of County roads and parking lots

In February, 2008, Public Works Road Maintenance Division established operation and maintenance practices for County roads, and for parking lots at properties managed by Public Works. At County properties operated by other departments, parking lot maintenance is either performed by Public Works according to its practices, or performed by those department according to their practices.

F) Operation and maintenance of County properties

County departments that are the assigned custodians of properties or facilities for which inspections and maintenance are needed have developed programs to perform inspection and maintenance, including the development of Stormwater Pollution Prevention Plans (SWPPPs) if they are required and not already developed under an NPDES industrial stormwater permit.

10. Education and Outreach

Permit requirements

Snohomish County must implement an education program aimed at residents, businesses, industries, elected officials, policy makers, and various County employees. The goal of the education program is to reduce or eliminate behaviors and practices that cause or contribute to adverse stormwater impacts.

By February 16, 2008, the County must implement or participate in an education and outreach program that uses a variety of methods to target the audiences and topics listed below. The program shall be designed to achieve measurable improvements in each target audience's understanding of stormwater problems and what they can do to solve them.

- A) General Public
 - General impacts of stormwater flows into surface waters.
 - Impacts from impervious surfaces.
 - Source control BMPs and environmental stewardship, actions and opportunities in the areas of pet waste, vehicle maintenance, landscaping and buffers.
- B) General public and businesses, including home based and mobile businesses
 - BMPs for use and storage of automotive chemicals, hazardous cleaning supplies, carwash soaps and other hazardous materials.
 - Impacts of illicit discharges and how to report them.
- C) Homeowners, landscapers and property managers
 - Yard care techniques protective of water quality.
 - BMPs for use and storage of pesticides and fertilizers.
 - BMPs for carpet cleaning and auto repair and maintenance.
 - Low Impact Development techniques, including site design, pervious paving, retention of forests and mature trees.
 - Stormwater treatment and flow control BMPs.
- D) Engineers, contractors, developers, review staff and land use planners
 - Technical standards for stormwater site and erosion control plans.
 - Low Impact Development techniques, including site design, pervious paving, retention of forests and mature trees.
 - Stormwater treatment and flow control BMPs.

The County shall implement or participate in an effort to measure understanding and adoption of the targeted behaviors for at least one targeted audience in at least one subject area. The resulting measurements shall be used to direct education and outreach resources most effectively as well as to evaluate changes in adoption of the targeted behaviors.

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Stormwater management program

A) Overview

Snohomish County is developing its core NPDES stormwater education program around the following emphasis areas:

1. Residential Behaviors and Practices:
 - a. Pet Waste Management
 - b. Natural Yard Care
 - c. Septic Systems
 - d. Streamside Landowner Practices
2. Business Behaviors and Practices:
 - a. Mobile Business Practices
 - b. Home-Occupation Business Practices
3. General Public Understanding and Awareness:
 - a. Stormwater Outreach for Regional Municipalities
 - b. Puget Sound Starts Here Campaign
 - c. ECO-Net

These emphasis areas were developed through analysis of audiences and practices described in section S.5.C.10 of the 2007 Phase I Municipal Stormwater Permit, analysis of leading contaminants and the primary practices and audiences that produce those contaminants, and evaluation of various program implementation and management strategies.

The residential and business emphasis areas apply a social marketing approach to promote Best Management Practices (BMPs) among defined audiences. Since the 1970s, this approach has been used in many contexts including disease prevention, social services, and public safety.

Beginning in 2000, Snohomish County increasingly focused its efforts to apply a social marketing approach to non-point source pollution BMPs. Those early efforts, which were developed and implemented largely with funding from the Department of Ecology Centennial Clean Water Fund, produced substantive increases in adoption of specific BMPs among residents.

The stormwater permit mandates measurable changes in understanding and behavior among a broad suite of target audiences. The success of those previous social marketing efforts, and the quantitative results they produced, suggest that this strategy is the most efficient and the most likely to succeed in meeting the permit goals.

B) Emphasis areas and targets

1) Residential Behaviors and Practices

1a) Pet Waste Management

Target pollutants and limiting factors:

- Bacteria
- Non-bacterial pathogens
- Nitrogen and phosphorus

Target audiences:

- Dog owners in high density residential areas
- Veterinary professionals

Target practices:

- Pet waste cleanup in backyards and disposal

1b) Natural Yard Care

Target pollutants and limiting factors:

- Primary:
 - Pesticides – herbicides, insecticides, rodenticides
 - Nitrogen and phosphorus – fertilizers, animal waste
- Secondary:
 - Temperature
 - Bacteria
 - Non-bacterial pathogens
 - Flow/volume

Target audiences:

- Primary:
 - Homeowners - single family residential
 - Renters - single family residential
 - Nurseries and related businesses
- Secondary:
 - Landscaping businesses, gardeners

Target practices:

- Primary:
 - Landscaping, gardening, yard care
- Secondary:
 - Stormwater infiltration

1c) Septic Systems

Target pollutants:

- Bacteria
- Non-bacterial pathogens
- Nitrogen and phosphorus

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Target audiences:

- On-site sewage disposal system owners outside Urban Growth Areas

Target practices:

- On-site sewage disposal system operation and maintenance

1d) Streamside Landowner Practices

Target pollutants and limiting factors:

- Bacteria
- Non-bacterial pathogens
- Pesticides – herbicides, insecticides, rodenticides
- Nitrogen and phosphorus – fertilizers, animal waste
- Temperature
- Dissolved oxygen
- Sediment
- Flow/volume

Target audiences:

- Owner/residents of streamside properties in the Lake Washington and Snohomish River Watersheds

Target practices:

- Stream shoreline management
- Riparian vegetation management
- Development activity
- Landscaping, gardening, yard care
- Livestock management
- Impervious surfaces
- Erosion control
- Stormwater infiltration/detention

2) Business Behaviors and Practices

2a) Storefront Business Education

Target pollutants and limiting factors:

- Petroleum
- Solid waste
- Manure

Target audiences:

- Commercial and industrial facilities
- Multi-family, condo and mobile home facilities
- Churches, schools and similar facilities that involve uses of property for other than residential purposes
- Commercial animal handling

Target practices:

- Spill kits

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- Spill plan
- Training for employees
- Emergency spill procedures
- Proper work (BMP) practices
- Manure removal
- Drainage control
- Solid waste discharge

2b) Home-Occupation and Mobile Business Practices

Target pollutants and limiting factors:

Business Type	Organics	Sediment	Trash & Debris	Oil & Grease	Nutrients	Metals	Solvents/ Soap/ Cleaners	Bacteria
Auto Detailing & Fleet Washing		x	x	x		x	x	
Carpet Cleaning	x	x					x	x
Window Washing		x					x	
Janitorial Services	x	x	x	x	x	x	x	x
Drain/Gutter Cleaning	x	x	x		x	x		
Pressure Washing & Steam Cleaning	x	x	x	x	x	x	x	x
Restaurant Vent Cleaners	x		x	x	x	x	x	x
Grease Recyclers	x		x	x	x			x
Swimming Pool Cleaners	x	x			x		x	x
Construction-Related (Drywall/Painters/Masonry)		x	x					
Landscapers	x	x	x	x	x	x	x	x

Figure 1. Common Pollutants by Industry Type.

Target audiences:

- Home occupations that have the potential to generate pollution as part of the business activity
- Carpet cleaners
- Window washers
- Pressure washers

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- Steam cleaning
- Fleet managers
- Auto detailing
- Duct cleaning
- Mobile businesses that have potential to pollute surface water

Target practices:

- BMP knowledge and implementation.
- Discharges of contaminants
- Industry specific BMPs

C) Phasing

The emphasis programs are intended to follow a common programmatic path:

1. Formative Research
2. Program Development
3. Pilot Program Fielding and Evaluation
4. Program Refinement for Landscape Level Implementation
5. Landscape Level Program Fielding and Adaptive Management

At this point in time, each emphasis program is at a different stage on that path (Figure 1).

The long term goal is to implement each emphasis program at the landscape level. At that point ongoing education and adaptive management will guide program refinement over time.

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		2009	2010	2011	2012	2013
Residential	Streamside Landowners	Implement- ation	Implement- ation	Follow-up	Implement- ation	Follow-up
	Pet Waste Management	Implementation				
	Natural Yard Care	Program dev.	Program dev./piloting	Implementation		
	Septic Systems	Piloting			Implementation	
Business	Mobile Businesses		Program dev.	Piloting		Implement- ation
	Home Occupation & Mobile Business	Piloting			Implementation	
Awareness and Understanding	STORM	Implementation				
	Puget Sound Starts Here	Prog dev.	Implementation			
	ECO-Net	Implementation				

Figure 2. Implementation schedule.

D) Education to Achieve Behavior Change

Section S.5.C.10 of the stormwater permit mandates a program that goes beyond conventional education to one that motivates and measures behavior changes in targeted audiences. Awareness programs play a key role in any comprehensive education program. The permit’s goal of behavior change, however, requires a heightened approach since the prevailing body of evidence indicates that awareness alone rarely produces desired changes in behaviors and practices.

The emphasis programs are, therefore, designed not as conventional education programs with the goal of conveying information and awareness, but rather as behavior change programs with the goal of motivating BMP implementation by target audiences.

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In cases where full audience understanding of an issue is not necessary to produce BMP implementation, the County will focus on other motivators, beyond awareness and understanding, to produce the desired behavior change.

In other cases, awareness and understanding of an issue is an essential step on the path to behavior change. In those instances, the County will rely on conventional education as just one of several steps. It occurs within a progression from 1) *information/awareness* to 2) *education/understanding* to 3) *technical assistance/facilitated action* to 4) *sustained independent BMP implementation*.

Programs developed and implemented under this plan are intended to methodically address entire target audiences rather than self-selected subsets. Examples of this strategy include Snohomish County's Streamside Landowner Program, which has produced repeated contact with every residential streamside property owner in Snohomish County, and the County's pet waste management program, which is designed to contact every veterinarian and every homeowner within the target area.

This is in contrast to most conventional education programs, which serve self-selected audiences instead of the broader populations mandated by the permit.

The County's large and geographically diverse population requires a landscape-scale approach. In this approach, the County anticipates conducting direct contact with strategic portions of certain audiences in phases, while relying on standard marketing practices to disseminate messages across broader populations.

E) Education to Promote Public Awareness and Understanding

Section S.5.C.10 of the stormwater permit mandates a program designed to improve general public understanding and awareness of stormwater issues. To that end, and to ensure that County efforts, messages, recommended practices, and communications are consistent with other stormwater entities, Snohomish County is an active participant in the STORM Coalition.

STORM (STormwater Outreach for Regional Municipalities) is a coalition of more than sixty county and city governments collaborating to implement stormwater permit public education efforts at regional and local scales. Snohomish County staff co-chairs the coalition. Funding for the work of STORM came from the Department of Ecology, with match furnished by the partnering municipalities in the form of staff time. In 2008, STORM combined resources with the Puget Sound Partnership to launch the *Puget Sound Starts Here* public education campaign.

On behalf of the STORM coalition, Snohomish County applied for and was awarded a Municipal Stormwater Grant of Regional or Statewide Significance by the Department of Ecology to continue and expand the work of STORM and the *Puget Sound Start Here* campaign.

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Snohomish County also co-chairs with WSU Extension, the Snohomish County ECO-Net group. ECO-Net is the Puget Sound Partnership's local coordination and communication network. The Snohomish County ECO-Net, which includes Snohomish County, WSU Extension, Snohomish Conservation District and other local organizations, is engaged and fostering partnerships on several stormwater awareness projects.

F) Program Evaluation

Implementation monitoring utilizes activity measures designed to evaluate whether activities were implemented as planned (Figure 2). These measures are typical of conventional education programs and are generally easy to apply. Typical measures include counts of site visits, workshops, participants, materials distributed, and the like. While activity measures do not provide a basis to measure progress toward the program goals, they are nonetheless valuable when evaluating program methods, efficiency, and finances. They are essential when evaluating task and program effectiveness, since variance in implementation may directly impact effectiveness.

Effectiveness monitoring is more challenging to accomplish, but is key to fulfilling the stated permit objectives for measurable behavior change. This type of monitoring is based on outcome measures, and will constitute the core of our program evaluation strategy.

Outcome measures are generally designed to evaluate whether program tasks produced the desired result. These measures, for example, would enable the County to determine if landowners are motivated to implement best management practices as a result of a workshop. This level of monitoring presumes that the expected outcome of program tasks will eventually lead toward achievement of the program's goals. In the case of stormwater BMPs the County will presume, based on a substantive body of peer-reviewed scientific research, that certain BMPs applied across a landscape will eventually lead to specific desired results (i.e., reduced bacterial contamination or lower turbidity).

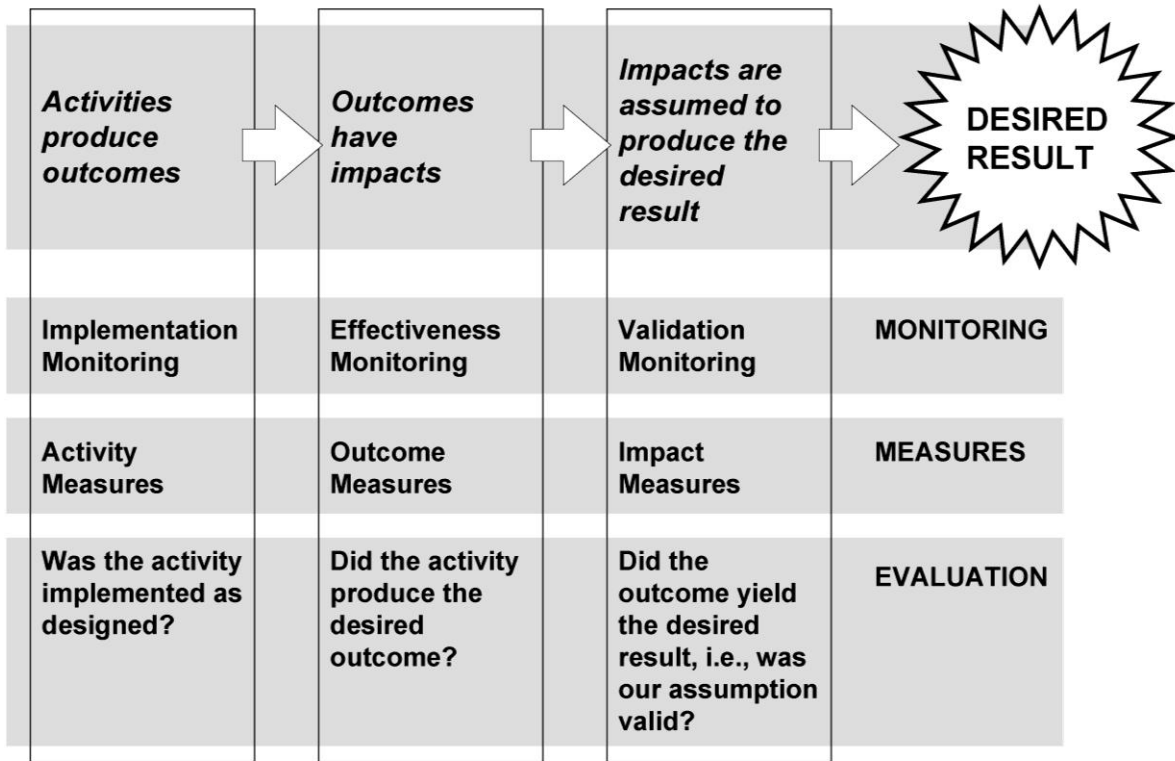


Figure 3. Monitoring measures and their relationships to a desired result.

These measures are generally more challenging to develop than activity measures because they often measure behavior patterns (in contrast to objects or tasks) and activities that are not verifiable through direct observation, and because the number of variables affecting the outcome often makes detection of direct correlations impossible.

Where possible, we will apply the following strategies to overcome these challenges:

- Use multiple measures to collectively evaluate progress.
- Avoid reliance on one measure for any given outcome.
- Use both qualitative and quantitative measures.
- Apply both task-level and program-level measures.
- Build measures directly into tasks where possible.
- Apply proxy measures where direct measures are not possible or practical.

Validation Monitoring focuses on impact measures designed to evaluate if the assumptions upon which the program tasks are based have validity. For example, such monitoring can be used to check the assumption that a specific BMP applied across a landscape will produce a desired water quality result. Where possible, the County will build impact measures into the emphasis programs. However, the greater part of the County’s validation monitoring efforts are included in the program effectiveness monitoring required in permit section S8.

11. Monitoring (Permit Condition S8 and TMDL Requirements)

Permit requirements

The permit requires several kinds of stormwater monitoring in Special Condition S8. Monitoring for fecal coliform bacteria in streams is also required or suggested in Appendix 2 of the permit, which pertains to TMDLs.

Stormwater management program

Monitoring under Special Condition S8

Quality Assurance Project Plans (QAPPs) were submitted in 2008 to Ecology. Monitoring began in 2009. Annual stormwater monitoring reports are provided to Ecology as attachments to the 2009 annual report.

Monitoring pursuant to TMDL requirements

- a) Ambient water quality and stormwater quality sampling to specifically identify bacterial pollution sources

Snohomish County has been collecting long term monthly ambient water quality data in creeks throughout the County since 1992. The goal of this monitoring program is to detect trends in fecal coliform bacteria, dissolved oxygen, temperature, nutrients, sediment, and metals. Snohomish County maintained six monitoring sites in the areas tributary to Lake Washington, eleven sites within the Snohomish River Tributaries and eight sites within the Stillaguamish River watershed during 2009. This work was carried out under an Quality Assurance Project Plan (QAPP) written and approved in 1992.

Historic long term ambient data through 2009 are maintained in a database that is available for viewing on line at the following address:

www.data.surfacewater.info

Table 2 identifies the those long-term monthly ambient monitoring sites for the Lake Washington and the Snohomish tributaries. Ecology used data partially derived from sampling at these locations to develop TMDLs for bacteria.

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Table 2 Snohomish County Ambient Water Quality Monitoring Sites

Watershed	Waterbody	Site Name	Location	Data Range
Lake Washington	North Creek	NCLU	McCollum Park	1992-Present
Lake Washington	North Creek	NCLD	County Line	1992-Present
Lake Washington	Swamp Creek	SCLU	148 th St SW	1992-Present
Lake Washington	Swamp Creek	SCLD	County line	1992-Present
Lake Washington	Little Bear Creek	LBLU	51 st St	1993-Present
Lake Washington	Little Bear Creek	LBLD	228 th St.	1993-Present
Snohomish	Quilceda Creek	QCLD	88 th St. NE	1992-2009
Snohomish	Allen Creek	ACLU	67 th Ave NE and 112 St. NE	1998-Present
Snohomish	Allen Creek	ACLD	4 th St in Marysville	1992-2009
Snohomish	Woods Creek	WCMF	Yeager Road	1993-2007
Snohomish	Woods Creek West Fork	WCWF	Yeager Road	1993-Present
Snohomish	Woods Creek	WCFA	Florence Acres Road	2008-Present
Snohomish	French Creek	FCLU	167 th Ave	1993-Present
Snohomish	French Creek	FCLD	Old-Snohomish Monroe Hwy	1995-2009
Snohomish	Catherine Creek	CATH	12 th St NE	1998-Present
Snohomish	Dubuque Creek	DUBQ	OK Mill Road	1998-Present
Snohomish	Little Pilchuck Creek	LPIL	12 th St NE	1998-Present
Snohomish	Pilchuck River	PILR	6 th ST in Snohomish	1998-Present

To address bacteria TMDLs, Appendix 2 of the NPDES permit and the Early Action approach chosen by Snohomish County required the preparation and submittal of a QAPP for the sampling of streams and/or discharges from conveyance systems in the Snohomish River Tributaries, North and Swamp Creek order to;

- assess whether or not affected water bodies and/or stormwater discharges are meeting state water quality standards,
- reasonably characterize the receiving waters or waste stream,
- estimate changes in bacterial levels in Swamp Creek as a result of stormwater inputs through receiving water monitoring coupled with flow duration or comparable analysis,
- identify sources of bacterial pollution.

Snohomish County submitted the required QAPP on July 16, 2009 for Ecology review and comment. The updated QAPP resulted in an expanded ambient water quality monitoring effort to address TMDL requirements listed above, plus monitoring within the Stillaguamish basin and Little Bear Creek as a result of EPA approval for these TMDLs. A total of 40 long term TMDL monitoring stations are proposed for representative monthly sampling of fresh water for bacteria, total suspended solids and in situ measurements.

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Table 3 identifies those stations where Snohomish County will implement monitoring under the new QAPP. A copy of the QAPP may be accessed at ftp://ftp.snoco.org/Public_Works/Surface_Water_Management/NPDESMonitoring/

Table 3 Snohomish County Long Term TMDL Monitoring Sites

WRIA	Waterbody	Site Name	Location	Latitude	Longitude
Stillaguamish	Armstrong Creek	ARMM ^d	Mouth at Harvey Crk Rd.	1322648.17	446758.68
Stillaguamish	Church Creek	CCPK	Church Creek Park	1276763.00	456406.30
Stillaguamish	Fish Creek	FISH	Near Mouth on 5 th Ave	1301110.02	431863.48
Stillaguamish	Jim Creek	JIMJ ^d	@ Jordan Rd.	1337247.54	434271.35
Stillaguamish	Kackman Crk	KACK ^d	@ 55 th Ave NE	1318044.65	446808.35
Stillaguamish	Stillaguamish	MSAR	Arlington	1324529.00	441740.00
Stillaguamish	Stillaguamish	MSMD	Marine Dr.	1274008.29	445119.07
Stillaguamish	Pilchuck Creek	PILC	Near Mouth on 236 th St NE	1300909.52	444352.70
Stillaguamish	Portage Creek	PORU	43 rd Ave.	1313722.49	432762.92
Stillaguamish	Portage Creek	PORL	212 th St NE	1298907.42	436680.80
Stillaguamish	Tributary No. 30	TR30	Silvana Terrace Rd	1285305.73	442597.43
Snohomish	Allen Creek	ACLU	67 th Ave NE and 112 St. NE	1321706.76	398457.58
Snohomish	Catherine Creek	CATH	12 th 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	167 th Ave.	1352457.64	332337.77
Snohomish	French Creek	STABLES	Stables Creek @ 96 th St. SE	1353489.17	334340.37
Snohomish	Little Pilchuck Creek	LPIL	12 th St NE	1343480.00	370061.80
Snohomish	Pilchuck River	PILOK ^d	OK Mill Rd	1345904.54	362397.92
Snohomish	Quilceda Creek	QCLU	172 nd St Ave NE	1321621.00	422859.20
Snohomish	Quilceda Creek	QCMFU	67 th and 152 nd	1321121.03	416237.18
Snohomish	Quilceda Creek	QCWF2 ^d	140 TH St. NE	1307497.32	412632.24
Snohomish	Quilceda Creek	QCWD ^d	Wade Rd.	1321532.23	413962.12
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	McCullum Park	1298894.69	323046.66
Lake Washington	North Creek	NCLD ^{a, b}	County Line at 240 th St. SE	1307271.61	287516.32
Lake Washington	North Creek	FILBERT	Filbert at Filbert Drive	1298625.43	300088.05
Lake Washington	North Creek	NCMU	Silver Crk. at 196 th St. SE	1303061.05	302302.94
Lake Washington	North Creek	SULFUR	Sulfur Crk. at	1304326.47	300237.37

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WRIA	Waterbody	Site Name	Location	Latitude	Longitude
			196 th St. SE		
Lake Washington	Swamp Creek	SCLU	148 th 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	51 st St. SE	1313603.09	306691.65
Lake Washington	Little Bear	LBLD	228 th St. SE	1318160.87	291010.05
Lake Washington	Little Bear	LBHW	Interurban Blvd	1314135.33	310111.66
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:

- Latitude and Longitude are provided in NAD_1983_StatePlane_Washington_North_FIPS_4601_Feet
- ^a - monitoring subject to existing ILA, ^b – potential annexation by 2011, ^c – Additional samples required to confirm ranking, ^d – new long term monitoring location

Appendix 1 Additional information related to Early Action Approach tasks

Appendix 2 (TMDL Requirements) of the NPDES municipal stormwater permit contains the following requirement in Strategy B - Early Action Approach for the Snohomish Tributaries TMDL:

"The Early Action BMP Plan shall...consider the use of the following approaches:...implementation of activities in Quilceda/Allen or French Creek Watershed Management Plans (as applicable)..."

A parallel requirement is stated in the North Creek TMDL.

Snohomish County has elected to implement Strategy B for the Snohomish Tributaries and North Creek TMDL requirements applicable under the permit. The following tables present the elements contained in those Watershed Management Plans that fall under the purview of the permit and for which Snohomish County was listed as an implementing agency in the plan. The tables summarize the County's actions, and list the SWMP sections in which the actions are contained.

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Table 4 Early Action Approach Tasks – Quilceda/Allen Watershed Management Plan

Quilceda/Allen Watershed Plan			
ID Number	Management Recommendations	SWMP Element	Comment
Q/A 38	Pet Waste Ordinance	S5C1	Assessment of need for ordinance is discussed in Section 1 of SWMP.
Q/A 39	Information on Pet Waste Disposal	S5C10	Part of public education program

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Table 5 Early Action Approach Tasks – French Creek Watershed Management Plan

French Creek Watershed Plan			
ID Number	Management Recommendations	SWMP Element	Comment
FC46	Track Farm Water Quality Referrals	S5C7, S5C8	Implemented as part of water quality investigation program and business source control inspection program
FC47	Adopt Ordinance to Limit Livestock Numbers on Property	S5C1	Assessment of need for ordinance is discussed in Section 1 of SWMP.
FC48	Clarify Land Use Regulations Concerning On-Farm Composting	S5C1, S5C7	Revised water pollution control code requires implementation of source control BMPs; these apply to all pollution generating activities including composting
FC57	Encourage New Waste Handling Techniques	S5C1, S5C7	Revised water pollution control code requires implementation of source control BMPs; these apply to all pollution generating activities including composting
FC60	Install Water Quality Signs Based on Water Quality Sampling Results	S5C10	Under evaluation
FC94	Monitor Streams with High Potential for Onsite Sewage System Problems	S8	Snohomish County has an established long-term water quality monitoring program that includes sampling for fecal coliform bacteria; see section S8 of this SWMP.
FC117	Adopt Pet Waste Ordinance	S5C1	Assessment of need for ordinance is discussed in Section 1 of SWMP.
FC118	Provide Pet Waste Receptacles	S5C9	Assessed but not implemented. Only 11% of pet waste is dropped in public places (Snohomish County 2004)
FC119	Distribute Pet Waste Brochures	S5C10	Implemented as part of public education program in S5C10

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Table 6 Early Action Approach Tasks – North Creek Watershed Management Plan

North Creek Watershed Plan			
ID Number	Management Recommendations	SWMP Element	Comment
AD5	Emergency Pollutant Response Network	S5C8	Implemented through participation in regional spill response program as required by S5C8.
IAC1	Deterrence of Illegal Waste Disposal	S5C10	Implemented as part of public education program under S5C10
M2	Illicit Connection Survey	S5C8	Work is part of Illicit Discharge Detection and Elimination program under S5C8
M3	Monitoring Strategies	S8	Monitoring prescribed under section S8 of permit.
MO1 - MO3, MO5	{storm sewer maintenance actions}	S5C9	Work is part of operation and maintenance program under S5C9
MO4	County Road Runoff Controls	S5C5	Additional treatment controls will be included in revisions to SCC Title 30, to include equivalent of 2005 Ecology Stormwater Manual
PIE2	Contractor Training / Certification	S5C10	Included in public education program under section S5C10 of permit
PIE16	Oil Recycling Program	S5C10	Included in public education program under section S5C10 of permit
R/E2	Increased Water Quality Enforcement	S5C1, S5C7, S5C8	Revised water pollution control code requires implementation of source control BMPs; new business inspection program implemented under section S5C7.