Stormwater Management Program
Snohomish County, Washington

March, 2009

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.

The SWMP itself is not a regulatory document. The main purpose of the SWMP document is to inform various audiences about the permit and the actions that the County will take to comply with it. These audiences include the Department of Ecology, County elected officials, and the public.

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 and reissued them 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.

This SWMP is considerably different than the SWMP developed for the last municipal stormwater permit. Under the previous permit, each municipal permittee was required to submit to Ecology a SWMP that contained specific details about what the permittee

would do to comply with the permit. Ecology officially approved the SWMP, which in essence became a set of permit conditions. In contrast, the current permit contains all the details Ecology considers adequate to define required actions and levels of compliance, and so while each permittee is still required to develop a SWMP 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.

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.

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 or will be 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

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, 2009). 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 summaries. Interested readers can refer to the complete permit and appendices, which are posted on Ecology's website at

> http://www.ecy.wa.gov/programs/wq/stormwater/municipal/phase_I_permit/ph_i-permit.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 (with Ecology's concurrence) will include 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.

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

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 (8/16/09)	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)	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

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 (2/16/10)	Begin monitoring as specified in QAPP (see note 3)	S8
Full implementation of BMPs specified in Early Action BMP Plan (2/16/10)	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) (11/15/11)		various
Conduct public review of Bacterial Pollution Control Plan (11/15/11) (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 (8/15/11)	Submit BPCP with permit renewal application (8/15/11)	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

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 is 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 will begin the inspection program by the required date in 2009, which will meet the TMDL 2009 deadline for list development. Some commercial animal handling facilities and commercial composting facilities may be inspected 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;

- 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

Assessment of general legal authority

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 permit required the County to adopt specific code revisions related to new development and water pollution control by August 16, 2008. This deadline was extended to October 23, 2008, for Snohomish County by Ecology. The 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.

The County's primary means of meeting the rest of the general legal authority requirements lie in SCC Chapter 7.53, Water Pollution Control. This code:

- generally prohibits the discharge of pollutants to groundwater or surface water;
- requires any person storing or using materials containing contaminants in any manner that may result in a prohibited discharge to implement the source control BMPs described in Volume 4, Chapter 2 of the Snohomish County Drainage Manual;
- requires any person operating a facility or performing an activity described in Volume 4, Chapter 3 of the Snohomish County Drainage Manual to implement the source control BMPs described therein for the facility or activity; and
- allows the County to approve the use of BMPs from other documents such as stormwater pollution prevention plans developed pursuant to farm plans or similar documents.

Prior to July 2008, this code only prohibited the discharge of pollutants, and required implementation of pollution control BMPs only to remedy a documented code violation as a part of the code enforcement process. On July 30, 2008 the code was revised to

require BMPs as described above, irrespective of the presence of a documented pollution problem. Consequently, the County now has very broad legal authority that requires members of the public to prevent pollution from their actions. The requirement to "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" is met through the various investigation programs described later in the SWMP related to permit conditions S5C7 (source control) and S5C8 (illicit discharge detection and elimination).

SCC Chapter 7.35, Solid Waste Disposal, prohibits a person from depositing solid waste on the ground unless the person owns or leases the property.

SCC Title 13, Roads and Bridges, also controls discharges to the County's drainage system within the County road right-of-way (ROW), as a part of the County's overall regulation of ROW use. Specifically, this code states that "it shall be unlawful for anyone other than the department to spill, dump, or otherwise deposit any material upon a county right-of-way except where done pursuant to contract with the county, permission granted by the department as provided in this chapter, or other legal authority." Obviously, this code does not apply to discharges to surface waters or private drainage systems not located in the ROW. However, within the ROW, the ability of this code to regulate pollution is perhaps even stronger than that of SCC Chapter 7.53 because determination of a violation of SCC Title 13 is not based in determining a pollution problem or lack of BMP implementation, but simply in the lack of permission or permit. Since Chapter 7.53 specifically prohibits discharges of contaminants to the County's drainage system, a right-of-way use permit would never be issued under Title 13 for such a discharge.

In addition to the protections provided by SCC Chapter 7.53 and Title 13, water pollution is controlled through Snohomish County code Chapters 30.62 - Critical Area Regulations and 30.62A - Wetlands and Fish&Wildlife Habitat Conservation Areas. These codes restrict and regulate land use and activities within critical areas, including surface water bodies and their defined buffer areas. The agricultural provisions of these codes apply to agriculture outside of defined urban growth areas (UGAs). Agricultural activities within buffers must include the implementation of farm plans containing BMPs from the National Resource Conservation Service Field Office Technical Guide (FOTG). These codes apply to the areas described above in all watersheds of the County, not just those with TMDLs.

In summary, the County's current water pollution control enforcement capabilities are extremely broad, and the scope of the water pollution control code was significantly expanded in 2008. The new provisions of the code pertaining to source control will be put to the test by the implementation of the new business inspection program, which began in early February, 2009. The 2010 SWMP update (submitted with the CY 2009 annual report) will contain an evaluation of the implementation and enforcement of the revised water pollution control code.

Assessment of legal authority to control bacteria pollution in areas with TMDLs for bacteria

In addition to the general legal authority requirements, the permit contains the following specific requirements.

Evaluation of adopting a pet waste ordinance to control bacteria pollution control in areas with TMDLs.

SCC Chapter 7.53 applies to the entire unincorporated County, and contains broad prohibitions against discharges of pollutants to water, and broad requirements for implementation of pollution control BMPs, including those for livestock and many commercial activities involving animals. Discharges containing bacterial pollution to the County's drainage system within the ROW are also prohibited under SCC Title 13. Further, a public behavior poll conducted under contract for Snohomish County concluded that 89% of people pick up their pet waste in public places such as parks (as is required by SCC Chapter 7.35). Due to the factors described above, and the difficulty of enforcing a code requiring people to pick up small amounts of pet waste on their private residential properties, Snohomish County has decided not to pursue adoption of further regulations at this time.

Evaluation of existing water pollution control code enforcement authority related to bacteria pollution control in areas with TMDLs.

SCC Chapter 7.53 applies to the entire unincorporated County, and contains broad prohibitions against discharges of pollutants to water, and broad requirements for implementation of pollution control BMPs. The enforcement authority includes the ability to require those responsible for prohibited discharges to investigate and test their drainage systems and properties, the ability to require implementation of BMPs specified by the County, and the ability to order immediate cessation of the activities causing the prohibited discharge. In addition, discharges containing bacterial pollution to the County's drainage system within the ROW are prohibited under SCC Title 13, with similar enforcement capability. The County concludes that its existing water pollution control code enforcement authority is adequate.

Evaluation of the need for a County code specifically regulating commercial composting facilities in order to address bacteria pollution control in areas with TMDLs.

SCC Chapter 7.53 requires the implementation of specific source control BMPs related to activities or land uses specified in Volume 4, Chapters 3 and 4 of the Snohomish County Drainage Manual. In July, 2008, Ecology deemed this volume of the Drainage Manual equivalent to Volume 4 of the 2005 Stormwater Management Manual for Western Washington. Sections 3.3 and 4.3 of Volume 4 of the Snohomish County Drainage Manual contain BMPs for commercial composting activities. In addition to requiring specific BMPs for these facilities through code, the County is required to inspect all

commercial composting facilities in watersheds with TMDLs by December 16, 2011. The County concludes that the existing water pollution control code adequately regulates commercial composting facilities in watersheds with bacterial TMDLs.

Evaluation of the need for a County code specifically regulating commercial animal handling facilities (areas) in order to address bacteria pollution control in areas with TMDLs.

Neither the NPDES permit nor the 2005 Ecology Stormwater Manual define the terms "animal handling facility" or "animal handling area." However, Ecology staff have stated in public presentations that these facilities are those in Standard Industrial Classification codes 074 and 075. These codes correspond to a wide variety of animal-related businesses including farms, ranches, equestrian centers, animal breeding facilities, kennels, veterinary clinics, and the like. Sections 3.2 and 4.2 of Volume 4 of the Snohomish County Drainage Manual contain BMPs for commercial animal handling areas, which are required through SCC Chapter 7.53. In addition to requiring specific BMPs for these areas through code, the County is required to inspect all commercial animal handling areas in watersheds with TMDLs by December 16, 2011. The County concludes that the existing water pollution control code adequately regulates commercial animal handling areas in watersheds with bacterial TMDLs.

Evaluation of a livestock ordinance and of the ability of the County's critical area regulations to address bacteria pollution control in areas with TMDLs.

Ecology staff have clarified that the intended meaning of "livestock ordinance" is a regulation that controls potential water pollution resulting from livestock by means such as setting a maximum number of animals per acre, preventing or limiting the entry of animals into water bodies, requiring proper manure management practices, etc. Typically, such a regulation would be applicable to the entire unincorporated County, although in certain cases the County has adopted land use regulations that apply only to a specific watershed or other area. The discussion below assumes that the regulation would apply to the whole County, not just those watersheds for which bacterial TMDLs have been developed.

Currently, Snohomish County does not have a "livestock" code as described above. However, SCC Chapters 7.53, 30.62 and 30.62A taken together largely serve this function.

Volume 4, Chapter 3 of the County's Drainage Manual is an adaptation of Volume 4 of the 2005 Ecology Stormwater Manual. The 2005 Ecology Stormwater Manual is largely targeted at urban businesses and industrial activities, not at agricultural activities involving livestock, and thus does not include "farm" BMPs such as exclusion of livestock from water bodies by fencing. However, the combined requirements of the TMDLs and the business pollution source control inspection program will require the County to inspect most commercial animal handling businesses in those areas by early 2012. The only section of the 2005 Ecology Stormwater Manual specifically directed at livestock management is that related to commercial animal handling areas, which is of

limited application in the TMDL context because Ecology wrote it as specifically limited to commercial operations, and because it is more descriptive of a kennel than a large livestock operation.

In order to have a standard BMP manual applicable to agriculture, Ecology staff have agreed that agricultural BMPs found in the Natural Resource Conservation Service Field Office Technical Guide (FOTG) are acceptable alternatives to the 2005 Ecology Stormwater Manual for agricultural activities in the context of compliance with SCC Chapter 7.53. Since SCC Chapter 7.53 requires BMPs at virtually all commercial agricultural operations involving livestock in Snohomish County, and since all of these commercial operations in watersheds with TMDLs will be inspected for BMP implementation by late 2011, Snohomish County concludes that a livestock regulation is not needed for these commercial operations. However, SCC 7.53 currently does not have a categorical requirement for specific livestock management BMPs associated with noncommercial livestock activities. Absent an obvious and documentable water pollution problem or pollution source (such as a stockpile of manure near a stream), under SCC 7.53 a cow or a horse simply standing near an unfenced stream would be as legal as an elk standing near an unfenced stream.

SCC Chapters 30.62 and 30.62A, as noted above, require the use of FOTG BMPs if agriculture is performed in buffers of water bodies. However, the agricultural provisions of these codes currently do not apply within UGAs. Virtually all of the unincorporated area within the Swamp Creek watershed and the North Creek watershed are within UGAs, and some of the unincorporated areas within the Snohomish Tributaries watersheds are within UGAs. As a result, FOTG BMPs are not categorically required for non-commercial livestock management activities inside these areas.

As a comparison, King County Code Chapters 21A.30.040-075 establish a default prohibition against keeping large livestock on lots less than 20,000 square feet, provided that this value may be reduced by the use of agricultural BMPs. There is no blanket requirement to exclude livestock from surface water bodies and associated buffers, but this requirement is invoked at livestock densities above minima established in the code. This said, King County staff report that King County does not have an inspection program directed at enforcing the use of noncommercial agricultural BMPs. On such parcels, appropriate BMPs would be invoked to correct conditions causing water quality violations, but King County would not take action to enforce BMPs such as riparian area fencing absent such violations. Thus, in practice, Snohomish County's code functions basically the same as King County's codes.

In summary, the County's water pollution control regulations combined with its critical area regulations contain significant provisions that should limit bacterial pollution (as well as other types of pollution) in support of TMDL goals. To test the effectiveness of the critical area regulations, the County has implemented a monitoring program specifically designed to test whether the regulations are protecting functions and values, identify specific causes if functions and values are declining, and to identify specific actions the County can take to remedy the situation. The first report on baseline data is in draft form and will be available sometime in spring 2009.

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

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, 2009, 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, 2009, at which the SWMP development and public involvement opportunities were discussed. As noted in the introduction, the main purpose of the SWMP document is to inform various audiences about the permit and the actions that the County will take to comply with it. However, by the time the actions are described in the SWMP, they are typically established in the next year's budget and workplan. The two primary pathways for members of the public to affect the County's NPDES programs are (1) public involvement processes specific to certain actions or programs, and (2) involvement in the County's annual budget process.

In 2009, two project-specific activities for which significant public involvement will occur are:

- revisions to development codes, the Engineering Design and Development Standards (EDDS), and the Snohomish County Drainage Manual pursuant to meeting the requirements of permit section S5C5, and
- the water quality facilities planning program, which is part of the Structural Stormwater Controls program pursuant to permit section S5C6.

The annual County budget development process is a potentially powerful way for the public to affect the County's NPDES-related programs. It is by law a public process with direct access to elected officials. In addition, input can affect both the scope and nature of the activities and also the level of resources allocated to them.

5. New Development / Redevelopment / Construction Site Runoff Control

Permit requirements

By August 16, 2007, 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.

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. The current drafts of these documents are available on the internet at:

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

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 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. 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:

- 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.

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 document is posted on the internet at:

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

The full document has numerous appendices and maps. It is presented in summary below.

Program goals

The Structural Stormwater Control Program will address stormwater impacts caused or exacerbated by discharges from the County's storm sewer that are not adequately controlled by other required actions of the SWMP. The program includes a list of projects that will be periodically updated and a process to identify additional potential future projects. The goals of the program are:

1. provision of stormwater treatment or other best management practices (BMPs) in the watersheds of the 303(d) listed water bodies in Snohomish County that are not addressed by other BMPs in the SWMP;
2. ensuring adequate stormwater treatment by retrofitting existing stormwater facilities to improve water quality treatment and/or flow control;
3. improved stream riparian buffers that would otherwise be vulnerable to the effects of runoff from development or modified land, whether directly through the riparian area, or from collected stormwater runoff in the stream, such as lack of tree or vegetative cover which would moderate or mitigate thermal pollution due to lack of cover, reduced wetland areas that could provide biofiltration treatment of instream runoff, riparian erosion from high flows of stormwater runoff, damage from livestock activity due to access, or other causes;
4. installation of low impact development and infiltration BMPs to promote groundwater recharge and stream flow; and

5. improved stormwater treatment in urbanized and urbanizing areas of the County.

Program priorities

Snohomish County has established the following priorities to be used in the evaluation of specific projects:

- location in areas of existing development or new development, including land modified for agriculture or other use;
- concentration of potential pollutant sources that could indicate higher potential return for investment in water quality improvements;
- possibility of combining stormwater control projects in other existing capital projects; and
- logistical feasibility, including secured funding, land development/access rights, and permits.

Program description

The Structural Stormwater Control Program will combine activities and projects from several Surface Water Management (SWM) work areas, including new capital stormwater improvements, structural retrofits to existing stormwater systems, riparian buffer work, and riparian buffer acquisition. Because of the varied nature of these activities and projects, each will have specific attributes and profiles for the nature of work being done, the environmental and water quality benefits being achieved, and the method of public involvement being used.

The County is committed to spend approximately $250,000 annually for the structural stormwater control program. Depending on availability, grants and other funding sources will be used as allowable to leverage County funding.

In any given year, the Structural Stormwater Control Program will consist of a combination of specific project types. The project type(s) will vary from year to year, as the County continues to evaluate water quality problems, coordinate priorities with the public, and identify capital projects to address those problems. The following text provides an initial list of projects to be constructed in 2008 and included in the Structural Stormwater Control Program, and a list of project options/types for the Program in 2009-2012. More detailed information on each of these projects or project options/types is provided in Appendix B of the complete Structural Stormwater Control Program document. The list will be evaluated and updated each year as projects are completed and new projects are added.

Projects in the Snohomish County Structural Stormwater Control Program

1) Projects Completed

a) Lake Stevens/Crestline Estates Detention Retrofit (completed 2008)

- Location: Lake Stevens area, in the Snohomish River watershed
- Description: Stormwater pond retrofit. Estimated cost: $258,000 (including matching grant)
- Water quality benefits: Improved solids settling and maintenance, elimination of hydraulic short-circuiting through the pond, improved biological uptake with wetland plant installation.

2) Projects underway in 2009

a) Water Quality Facilities Program

The Water Quality Facilities Program is the designated Structural Controls Program project for 2009. The Water Quality Facilities Program has been funded for start up work in 2008, and will carry over to 2009 and beyond.

The Water Quality Facilities Program will evaluate existing water quality conditions at the neighborhood scale and recommend specific capital projects and maintenance actions for implementation to help address these problems and improve water quality.

The program is starting up as a pilot in a subbasin of the North Creek watershed area, with funding for about $168,000 designated in the year 2009 of the Surface Water 6-year capital projects Detailed Implementation Plan. A second pilot is designated for about $149,000, with the watershed to be determined. All funding is subject to County Council approval for the 2009-2010 budget

The North Creek watershed is under a TMDL for fecal coliform, is located in an urbanizing part of the south Snohomish County area, and has an active citizenry for public involvement and outreach. The North Creek pilot will provide lessons for the next pilot and expansion in other watershed areas. The scope of the Water Quality Facility Program North Creek pilot project will include evaluation of both traditional and innovative programs to manage existing surface water facilities. The program will also be proactive in planning the development and construction of facilities that emphasize LID designs, taking advantage of natural processes wherever possible to minimize disruptions to the natural hydrologic system. Water quality facility improvements (e.g., water quality inlets, detention pond retrofits, etc.) will also be considered as performance improvements for the removal of certain pollutants, such as nutrients and total suspended solids.

The short term goal of the North Creek pilot program will be to measurably improve water quality in a specific subbasin of the watershed by recommending a combination of capital projects and maintenance actions. Potential projects that will likely be considered include retrofitting existing facilities and outfalls, enhancing ditches, and implementing source control BMPs in their contributing areas. Potential maintenance activities may include use of high efficiency vacuum-sweepers for roads. The long-term goal of the pilot program will be to serve as a template that can be applied to watersheds throughout the county.

Other aspects of the project scope include:

- Develop a public process to engage all stakeholders in the development of the plan
- Inventory and map all facilities, including their contributory areas
- Develop an assessment protocol and prioritize facilities
- Identify, assess, and prioritize all sources of pollution entering facilities for source reduction strategies
- Develop public involvement and outreach plans
- Develop a recommended capital project list, recommended maintenance activities, and a recommended implementation schedule. The final project list and budgeting will be subject to the review and approval of the County Council.
- Develop an early action component based on citizen input and existing data on current facility failures or problems

3) Potential projects for design or construction in 2010 to 2012 (Approximately $250,000 per year, funds may be augmented with grants when available.)

a) Drainage facility retrofits

- Location: Urban growth areas in Snohomish, Cedar/Sammamish, or Stillaguamish watersheds
- Brief description: Individual improvement projects which may include retrofits to various drainage system components for water quality improvement, such as pipe slope drains, water quality inlets/catch basins, detention pond improvements, swale improvements, etc.
- Water quality benefits: Water quality facility improvements (e.g., water quality inlets, detention pond retrofit, etc.) will allow performance improvements for removal of certain pollutants (nutrients, total suspended solids). Benefits from drainage improvements such as slope drains improvements will prevent erosion of hillsides and removal of earth, and the water quality benefit may be typically estimated in terms of linear feet protected or other descriptive measure.

b) Water Quality Facilities (other locations)

- Location: County-wide
- Brief description: Capital improvement plan for water quality facilities, to eventually lead to specific water quality facilities projects.

- Water quality benefits: Water quality facility improvements (e.g., water quality inlets, detention pond retrofit, etc.) will allow performance improvements for removal of certain pollutants (nutrients, total suspended solids).

c) Riparian planting/restoration

- Location: County-wide
- Brief description: Riparian restoration work using native plants
- Water quality benefits: Water quality benefits come from erosion protection from runoff and stream flow, improved biological treatment of runoff, and improved evapotranspiration of rainfall (reducing runoff volume). Native plants also provide an aesthetic and ecological benefit from restoring indigenous species to an area. Improvements are typically noted in terms of numbers of plants, linear feet of riparian zone, or acres of riparian buffer.

Public involvement process

The Structural Stormwater Control Program document was posted on the County's NPDES website for public review and comment on February 15, 2008. Additional discussions were held at public meetings in February 2009.

The individual projects and project types/options that comprise the Structural Stormwater Control Program may also have project or program-specific public involvement, which may include the following:

- neighborhood notification of a potential project;
- neighborhood meetings to gain feedback on priority areas or project types; and
- coordination with neighborhood or other groups on specific project construction.

In addition, Snohomish County goes through an extensive public input process for its yearly Annual Construction Program (ACP) and 6-year Capital Improvement Program (CIP) development and approval. This process includes updating and having formal public meetings for the County Planning Commission and, afterwards, the County Council, who has the responsibility of approving the yearly budget. Projects in this Program will be part of the public process because they will be included in the County's ACP and 6-year CIP.

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://198.238.192.104/nxt/gateway.dll?f=templates&fn=default.htm&vid=default

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

http://www1.co.snohomish.wa.us/Departments/PDS/Divisions/Development_Review_Construction/Engineering/

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. In 2009, the program will try two approaches suimultaneously - targeting specific business types and door-to-door inspections - to test the merits of each approach.

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, 2011, 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.

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. In addition, the Source Control Program document referred to in the previous section of this SWMP contains many technical details of these programs.

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.

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. Factors for selection in any given year may include location of the outfall, tributary area characteristics, occurrence of previously-detected illicit discharges, and downstream pollution problems. This GIS exercise is performed on an annual basis to account for newly mapped drainage and changes to ownership 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 seen as the most effective way to locate illicit dry-weather discharges to the storm sewer. However, threshold bacterial concentration values have been established for prioritizing further investigations.

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.

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.

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;

- 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 will be resubmitted to 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 will be 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.

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 vactor 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 by the targeted audiences. 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.

Stormwater management program

A) Overview

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

1. Pet Waste Management
2. Natural Yard Care
3. Soaps and Toxins
4. Urban BMP Toolbox
5. Septic System Program
6. Streamside Landowner Program

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.

This core program applies 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 2007 stormwater permit specifically 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's mandates.

In eight years of research, the County has not identified any other strategy that demonstrates equivalent likelihood of meeting the permit's requirement to produce measurable progress to "reduce or eliminate behaviors and practices that cause or contribute to adverse stormwater impacts."

In addition to the six emphasis areas, some work components developed under the previous stormwater permit will be continued at current levels, including youth education. Others will be enhanced to accommodate the new emphasis programs, including technical support to landowners, program administration and program support.

B) Emphasis areas and targets

1) Pet Waste Management

Target pollutants and limiting factors:
- Bacteria
- Non-bacterial pathogens
- Nitrogen and phosphorus

Target audiences:
- Dog owners in Urban Growth Areas

Target practices:
- Pet waste cleanup and disposal

2) Natural Yard Care

Target pollutants and limiting factors:
- Bacteria
- Non-bacterial pathogens
- Pesticides – herbicides, insecticides, rodenticides
- Nitrogen and phosphorus – fertilizers, animal waste
- Temperature
- Dissolved oxygen
- Flow/volume

Target audiences:
- Homeowners - single family residential
- Homeowners - multi-family residential
- Renters - single family residential
- Renters - multi-family residential
- Landscaping businesses, gardeners
- Nurseries and related businesses

Target practices:
- Riparian vegetation management
- Landscaping, gardening, yard care
- Erosion control
- Stormwater infiltration/detention

3) Soaps And Toxins

Target pollutants and limiting factors:
- Soaps and surfactants
- Household hazardous chemicals
- Metals
- Pesticides – herbicides, insecticides, rodenticides
- Nitrogen and phosphorus – fertilizers

Target audiences:
- Homeowners - single family residential
- Homeowners - multi-family residential
- Renters - single family residential
- Renters - multi-family residential
- Property managers
- Residential pest control contractors
- Cleaning businesses – carpet cleaning, pressure washing, etc.

Target practices:
- Vehicle washing
- Vehicle maintenance
- Household hazardous material storage
- Household hazardous waste disposal
- Gray water disposal – carpet cleaning, wash water, etc.
- Building maintenance – pressure washing, moss control, painting, etc.

4) Urban BMP Toolbox

Target pollutants and limiting factors:
- Bacteria
- Non-bacterial pathogens
- Soaps and surfactants
- Household hazardous chemicals
- Metals
- Pesticides – herbicides, insecticides, rodenticides
- Nitrogen and phosphorus – fertilizers, animal waste
- Temperature
- Dissolved oxygen
- Flow/volume

Target audiences:
- Homeowner association leaders and members - single family residential
- Homeowner association leaders and members - multi-family residential
- Neighborhood leaders/organizers

Target practices:

- Riparian vegetation management
- Landscaping, gardening, yard care
- Pet waste cleanup and disposal
- Soaps and toxins
- Community property, Native Growth Protection Area, Critical Area Protection Area management
- Neighborhood stormwater facility operation and maintenance
- Stream, wetland, floodway management
- Stormwater infiltration/detention
- Impervious surfaces

5) Septic System Program

Target pollutants:

- Bacteria
- Non-bacterial pathogens
- Nitrogen and phosphorus

Target audiences:

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

Target practices:

- On-site sewage disposal system operation and maintenance

6) Streamside Landowner Program

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

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 Streamside Landowner Program, which began in 2001, progressed through all five phases of work, and is being implemented in its fourth iteration as of 2008. The Pet Waste Program, which has been piloted under a Department of Ecology grant, is now being adapted for landscape level implementation. The Soaps and Toxins Program will begin formative research in 2010 or 2011. The Septic Program is currently being piloted under a Department of Ecology grant. The Urban BMP Toolbox, which draws together components of several programs and projects, is in ongoing development and is planned to be packaged as a whole in 2011.

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.

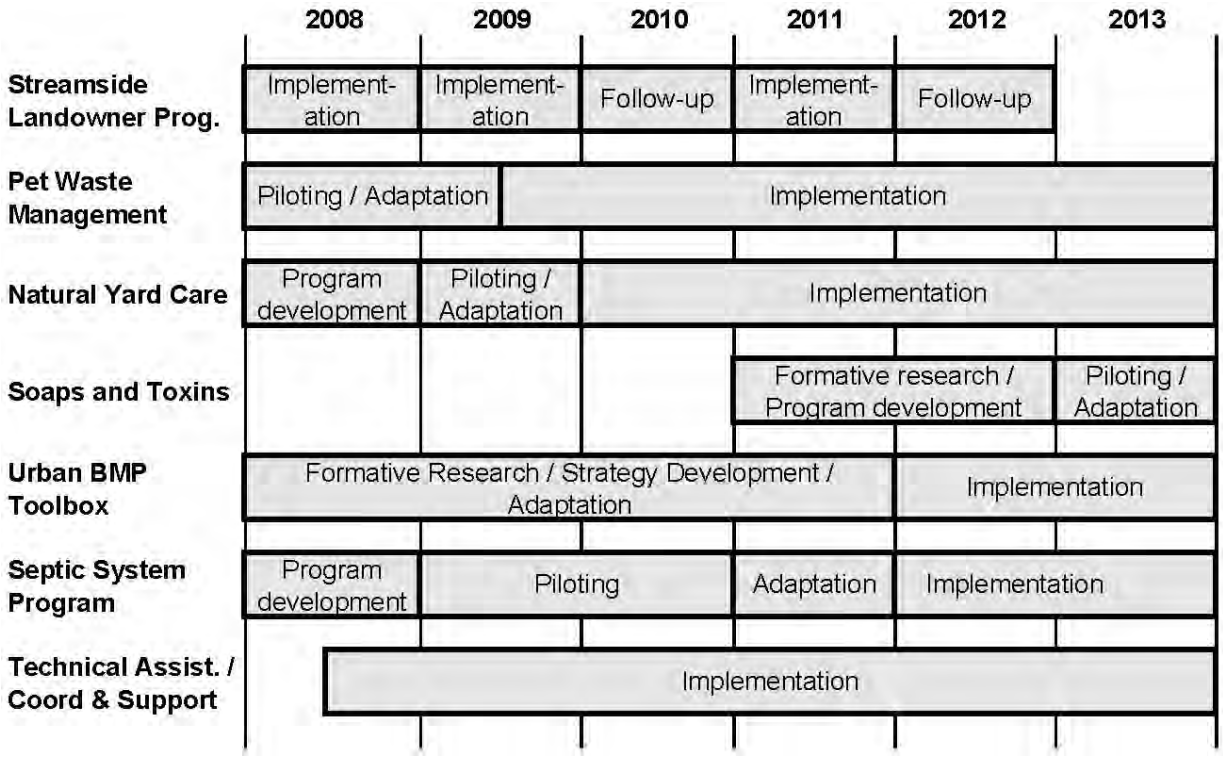


Figure 1. Education Program Implementation schedule.

D) Education To Achieve Behavior Change

Section S.5.C.10 of the stormwater permit mandates a program that goes well 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.

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 pilot pet waste management program, which contacted every veterinarian and every homeowner within the pilot 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) Program Evaluation

Implementation monitoring utilizes activity measures designed to evaluate whether activities were implemented as planned (Figures 2, 3). 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).

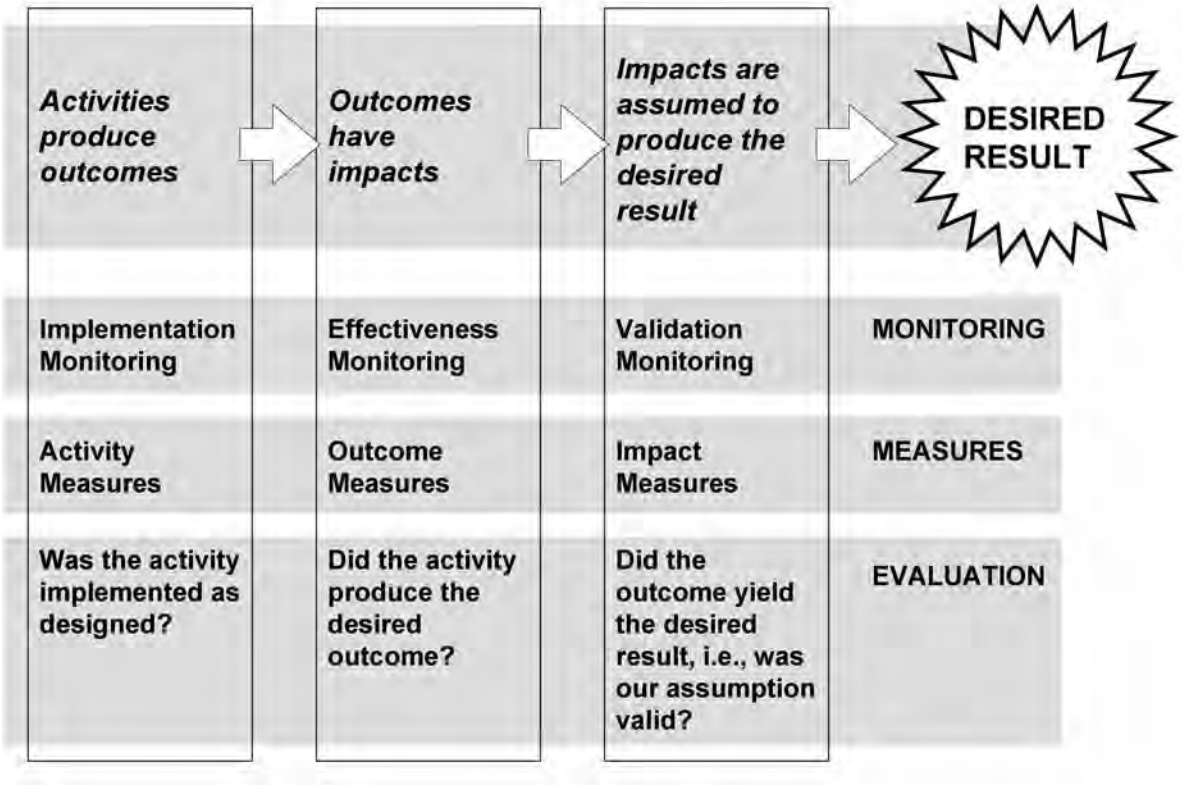


Figure 2. Public education monitoring measures and their relationships to a desired result.

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.

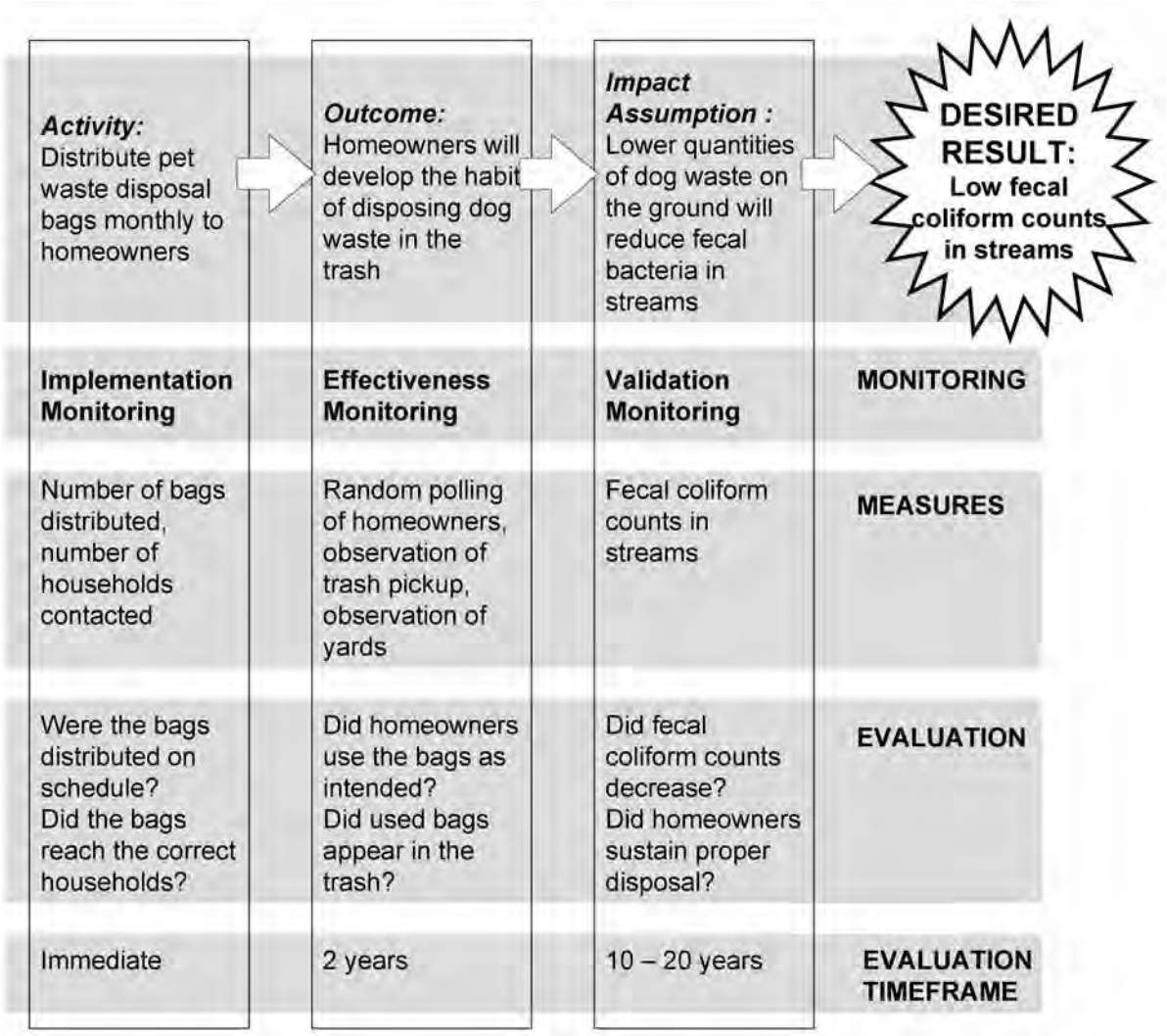


Figure 3. Example public education monitoring measures.

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 to 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 will begin in 2009. As part of the required monitoring, Snohomish County is assessing pollution removal capability of wetponds.

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. The County investigates water quality complaints and provides technical assistance and referrals for any pollution problem identified. The long term ambient data are maintained in a database that is available for viewing on line at the following address:

www.data.surfacewater.info

Snohomish County maintains 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.

Table 2 identifies the current long-term monthly ambient monitoring sites for the Lake Washington and the Snohomish tributaries.

b) Early action BMP sampling

The North Creek Fecal Coliform Bacteria TMDL Detailed Implementation Plan states that “the sources of bacterial pollution affecting North Creek are not clearly understood at this time.” Using the permit required monitoring, Snohomish County intends on

selecting and monitoring and surveying a discrete drainage sub-basin, with water quality treatment structure, which is representative of the dominant urban residential landscape in the impaired watersheds. The monitoring and surveys will attempt to identify the sources of fecal coliform within a typical drainage basin, which could then be use to direct future fecal coliform reduction strategies. The larger goal of this program is to understand the sources of fecal coliform and use that knowledge to support, improve or create programs to reduce fecal coliform throughout the TMDL areas. The components of this program are described below and may be modified depending on the results.

The Early Action BMP sampling and survey efforts identified below will be implemented per the QAPP submitted to Ecology.

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	148th St SW	1992-Present
Lake Washington	Swamp Creek	SCLD	County line	1992-Present
Lake Washington	Little Bear Creek	LBLU	51st St	1993-Present
Lake Washington	Little Bear Creek	LBLD	228th St.	1993-Present
Snohomish	Quilceda Creek	QCLD	88th St. NE	1992-Present
Snohomish	Allen Creek	ACLU	67th Ave NE and 112 St. NE	1998-Present
Snohomish	Allen Creek	ACLD	4th St in Marysville	1992-Present
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	167th Ave	1993-Present
Snohomish	French Creek	FCLD	Old-Snohomish Monroe Hwy	1995-Present
Snohomish	Catherine Creek	CATH	12th St NE	1998-Present
Snohomish	Dubuque Creek	DUBQ	OK Mill Road	1998-Present
Snohomish	Little Pilchuck Creek	LPIL	12th St NE	1998-Present
Snohomish	Pilchuck River	PILR	6th ST in Snohomish	1998-Present

c) Stormwater monitoring

The stormwater monitoring strategy enacted under the TMDL requirements will focus on collecting storm based fecal coliform grab samples upstream and downstream of a water quality or quantity treatment system, and at points within the drainage area that isolate subsets of the sub-basin. The goals of this monitoring strategy include:

- Identify the fecal coliform loading to the receiving waterbody from an urban residential land use.

- Identify the impacts of water quality or quantity treatment facilities on fecal coliform loading.
- Isolate the source of elevated concentrations of bacteria within the system.

d) Sediment Sampling

Sediment grab samples from catch basins will be collected from randomly-selected catch basins within the drainage system representing twenty percent of the structures in that drainage area. The sediment samples will be analyzed for fecal coliform.

APPENDIX 1

Total Maximum Daily Loads
Supplemental Information

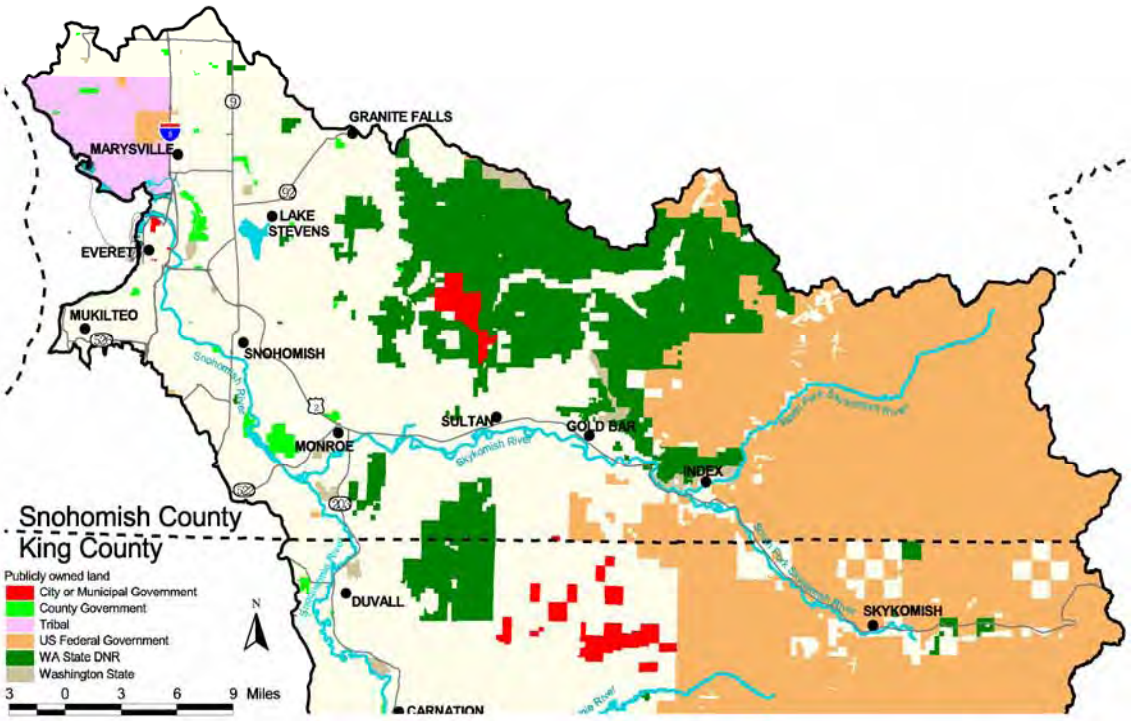
Introduction

This appendix contains background information about the areas in Snohomish County for which TMDLs have been developed, and also contains information supplemental to the SWMP about the County's actions taken under the permit in the areas with TMDLs.

Snohomish River Tributaries TMDL for Fecal Coliform Bacteria

The Snohomish River basin (WRIA 7) encompasses 1,856 square miles and is the second largest basin in Washington State draining to Puget Sound. In Snohomish County, the three primary rivers in the basin flowing from the west slope of the Cascade mountains are the Skykomish River, the Snoqualmie River, and the Snohomish River. These rivers and many smaller rivers such as the Pilchuck River, the Sultan River, and the Wallace River provide significant habitat for five salmon species, three trout species and one char species. Over 1,730 tributary rivers and streams have been identified in the Snohomish River basin, totaling approximately 2,718 miles in length (Williams et al. 1975). The land ownership is dominated in the headwaters by the U.S. federal government and in the lowlands by private owners (see Figure A-1).

Figure A-1 Snohomish Basin (WRIA 7) Land Ownership



Historical land uses in the basin have been mainly agriculture and forest related, but are being rapidly developed for residential and commercial use. Increased urbanization and land development activities are impacting water quality in the basin with riparian corridor alteration, conversion of forests, inadequate retention/detention of stormwater from new impervious surfaces, and poorly treated stormwater run-off (Wright et. al. 2001)
Wright et. al. (2001) identified that nonpoint water pollution most commonly results from poor land use management, such as inadequate agricultural practices, failing on-site septic systems, and untreated stormwater runoff. The Snohomish River tributaries are susceptible to agricultural nonpoint pollution with large rural areas and farmland in the watershed. Approximately 20 dairies are located within the Snohomish River Tributaries as well as numerous commercial livestock and small farms. Many areas of the watershed have poor soils for locating on-site septic systems, resulting in failing or inadequate septic systems that may also contribute pollutants. Stormwater from urban areas may carry pet wastes to nearby streams. Urban development is continually increasing in certain areas of the Snohomish River Tributaries, and water quality impacts from urban stormwater runoff are increasing. The watershed is also rich in wildlife, such as waterfowl, elk, deer, and beaver. A portion of fecal coliform bacteria found in Snohomish River tributaries will originate from these natural sources (Wright et. al., 2001).

To meet CWA section 303(d) requirements, Ecology conducted a technical study within the Lower Snohomish River Tributaries to verify the existence of bacteria problems and provide a basis for future water cleanup efforts. The TMDL technical study consisted of using long-term monitoring and special short-term study data collected by Ecology and Snohomish County during the period November 1992 to April 1996. The TMDL study areas were Quilceda Creek, Allen Creek, Woods Creek, French Creek, Marshland Drainage, and the Pilchuck River. Figures A-2 through A-6 show these watersheds. Collectively, for the purposes of the TMDL study, these watersheds are referred to as the Lower Snohomish River Tributaries. *NOTE: Snohomish County's permit requirements apply only to the unincorporated areas of the County, plus properties owned by the County that may lie inside another municipality.*

Current Washington State water quality standards for fecal coliform bacteria within the Lower Snohomish River Tributaries are classified as extraordinary primary or primary contact for recreation and are expected to meet numeric criteria for those classifications.

The technical study identified the in-stream loading capacity or waste load allocations expressed as a percent reduction of fecal coliform bacteria at each tributary monitoring station during wet and dry seasons needed to meet water quality standards. These data are shown in Table A-1.

Figure A-2 TMDL-listed Segments and Coverage Area for Quilceda Creek and Allen Creek

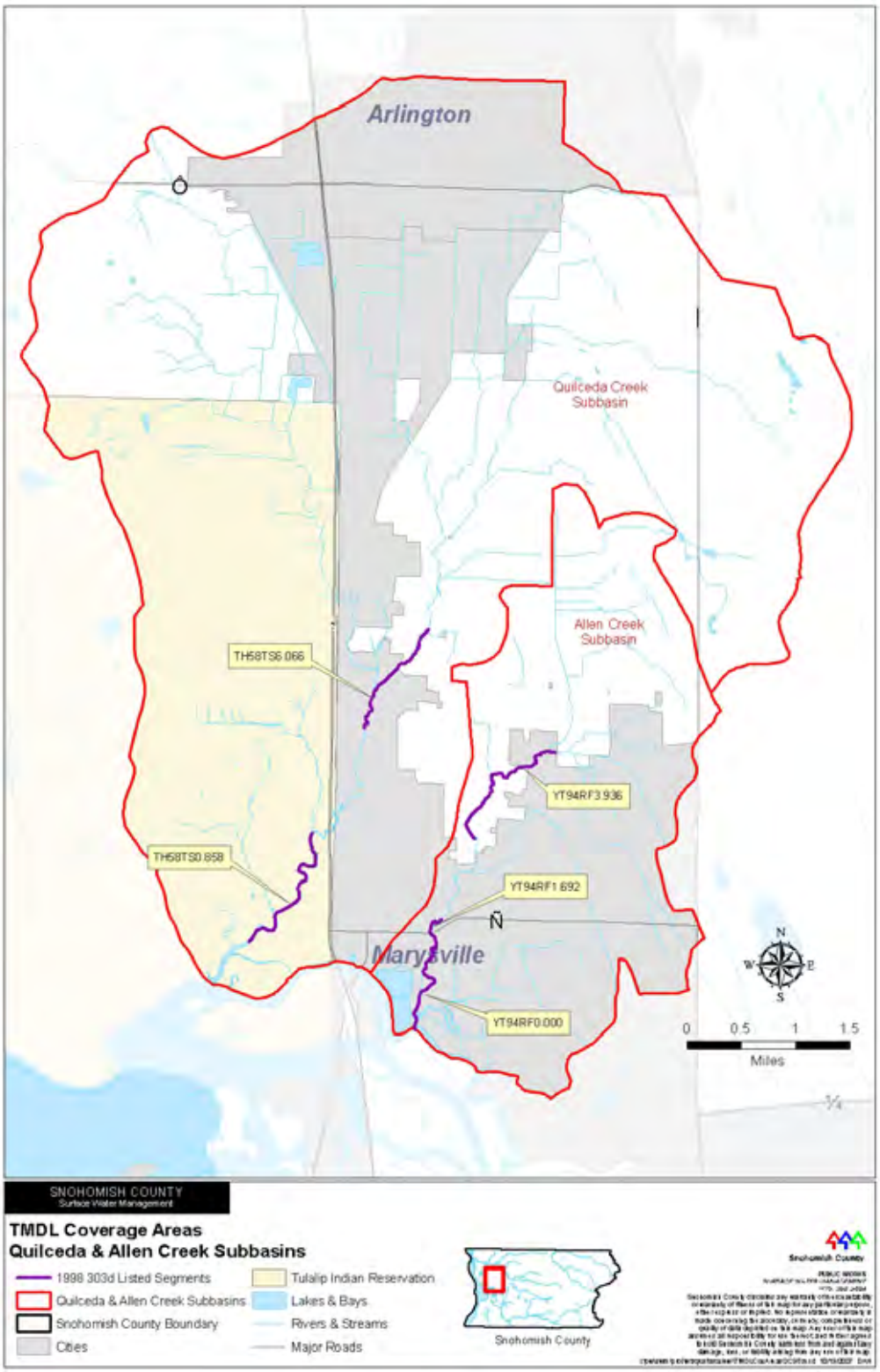


Figure A-3 TMDL-listed Segments and Coverage Area for Marshland Drainage

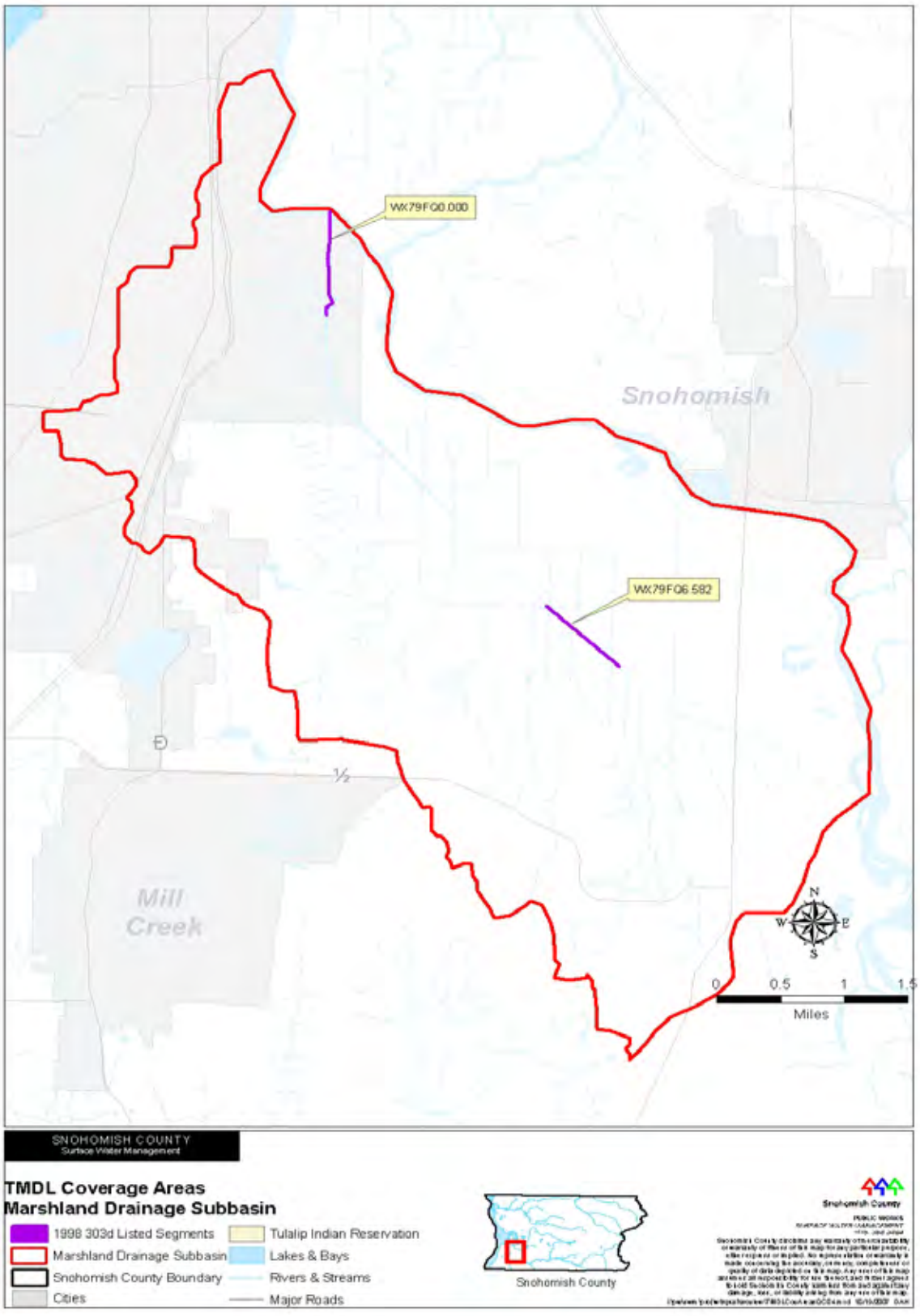


Figure A-4 TMDL listed Segments and Coverage Area for Pilchuck River

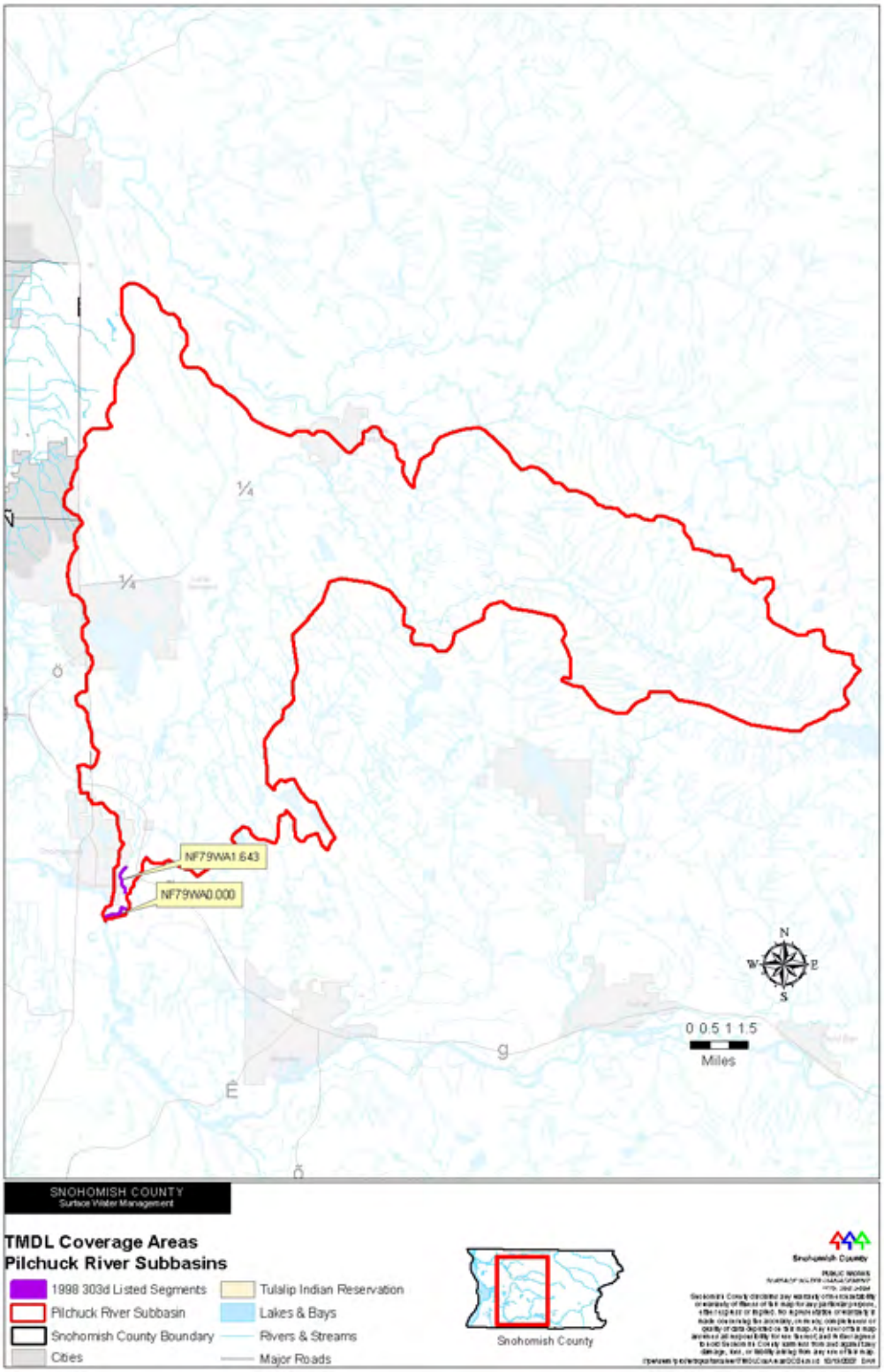


Figure A-5 TMDL listed Segments and Coverage Area for Woods Creek

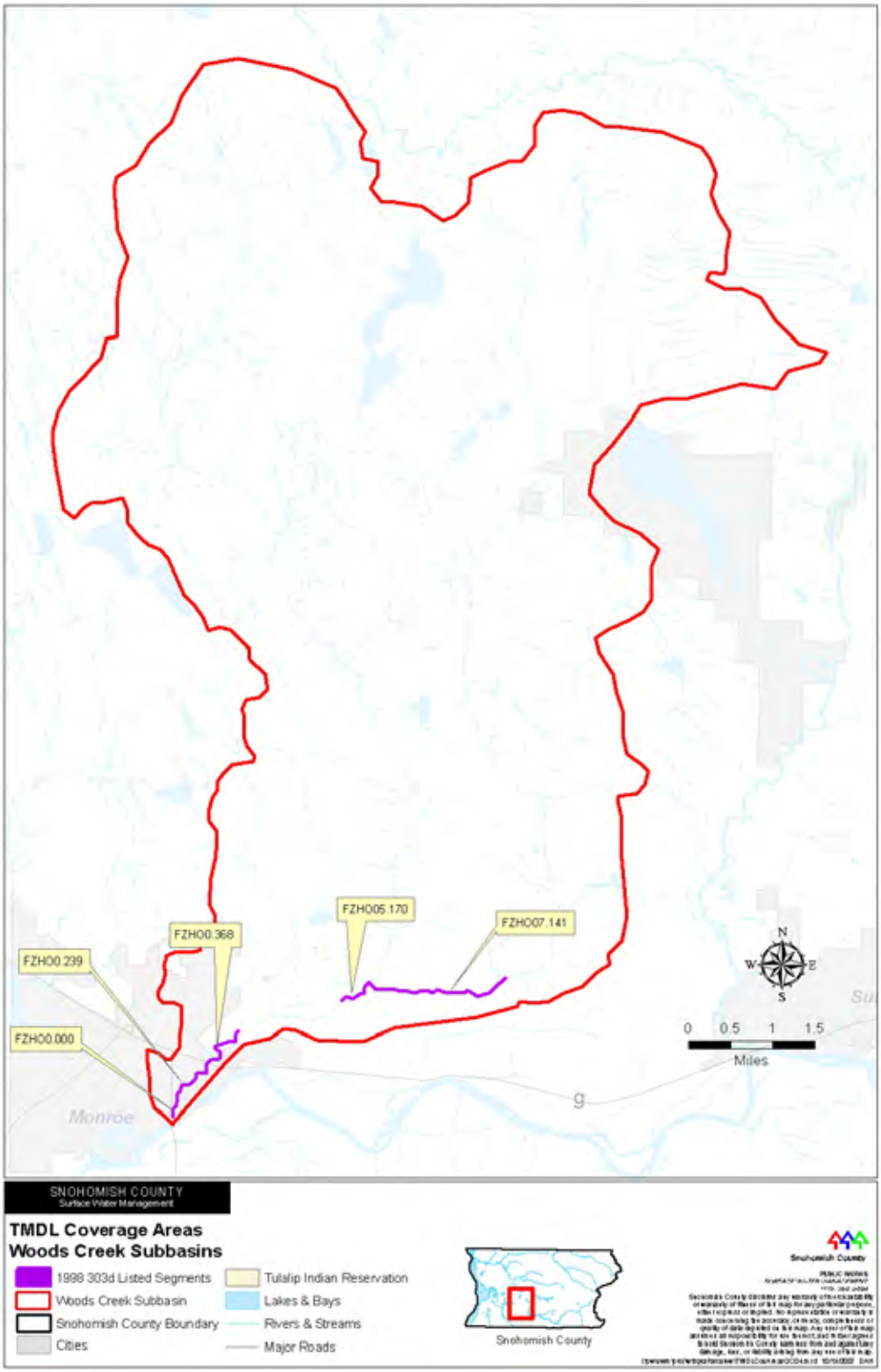


Figure A-6 TMDL listed Segments and Coverage Area for French Creek

Table A-1. Target percent reductions and target geometric means for stream sampling stations within the Snohomish River Tributaries (from Wright et. al 2001)

		Target Percent Reduction		**Target Geometric Mean**	
Waterbody	**Station**	Wet Season %	Dry Season %	Wet Season cfu/100 mL	Dry Season cfu/100 mL
Allen Creek	ACLU	90	91	40	62
Allen Creek	ACMC	54	84	56	95
Allen Creek	ACSF	66	72	50	40
Allen Creek	ACNF	61	54	42	91
Allen Creek	ACMS	57	70	73	99
Allen Creek	ACLD	0	64	n/a	44
Quilceda Creek	QCLU	26	70	35	63
Quilceda Creek	QCEF	89	92	47	86
Quilceda Creek	QCUS	0	7	n/a	55
Quilceda Creek	QCWF	50	87	65	78
Quilceda Creek	QCMF	66	79	41	94
Quilceda Creek	QCMS	68	63	64	99
Quilceda Creek	QCLD	74	70	55	94

Table A-1 continued

		Target Percent Reduction		Target Geometric Mean	
Waterbody	**Station**	Wet Season %	Dry Season %	Wet Season cfu/100 mL	Dry Season cfu/100 mL
French Creek	FL1	2	84	22	64
French Creek	TRUS	0	32	n/a	36
French Creek	LH2	0	87	n/a	49
French Creek	FL3	5	80	46	35
French Creek	CCUS	29	42	21	38
French Creek	LH1	23	90	43	56
French Creek	FL2	64	82	26	39
French Creek	STUS	0	75	n/a	66
French Creek	STLS	0	77	n/a	32
French Creek	CCLS	44	83	22	67
French Creek	CCH2	0	91	n/a	39
French Creek	FCLU	24	79	29	76
French Creek	FCMS	91	90	40	66
French Creek	FCDD	55	85	61	42
French Creek	FCLD	78	82	40	72
French Creek	PUMP	73	81	23	67
French Creek	FCMSb	No data	90	No data	50
French Creek	PUMPb	No data	79	No data	99
Pilchuck River	PRUP	0	0	n/a	n/a
Pilchuck River	PR8.6	0	19	n/a	60
Pilchuck River	PR4.2	0	0	n/a	n/a
Pilchuck River	PRDN	0	29	n/a	47
Pilchuck River	LPDN	0	80	n/a	47
Pilchuck River	CCDN	0	67	n/a	44
Pilchuck River	DCDN	0	67	n/a	54
Marshland	MLUP	93	87	40	61
Marshland	MLDN	90	65	69	61
Woods Creek	WCUP	0	0	n/a	n/a
Woods Creek	WCMF	0	0	n/a	n/a
Woods Creek	WCWF	0	70	n/a	56
Woods Creek	WCDN	0	20	n/a	77

The sample result geometric means and 90th percentiles are found in Appendix C of Wright et. al. (2001). The technical study can be found at

http://www.ecy.wa.gov/pubs/0010087.pdf.

The technical study was used as a basis for development and EPA approval of the Lower Snohomish River Tributaries Detailed Implementation Plan (DIP). Recommendations from the approved DIP were then used as a basis for TMDL requirements set forth in the NPDES Phase 1 municipal stormwater permit issued in January, 2007. The approved TMDL DIP can be found at

http://www.ecy.wa.gov/pubs/0310031.pdf.

North Creek TMDL for Fecal Coliform Bacteria

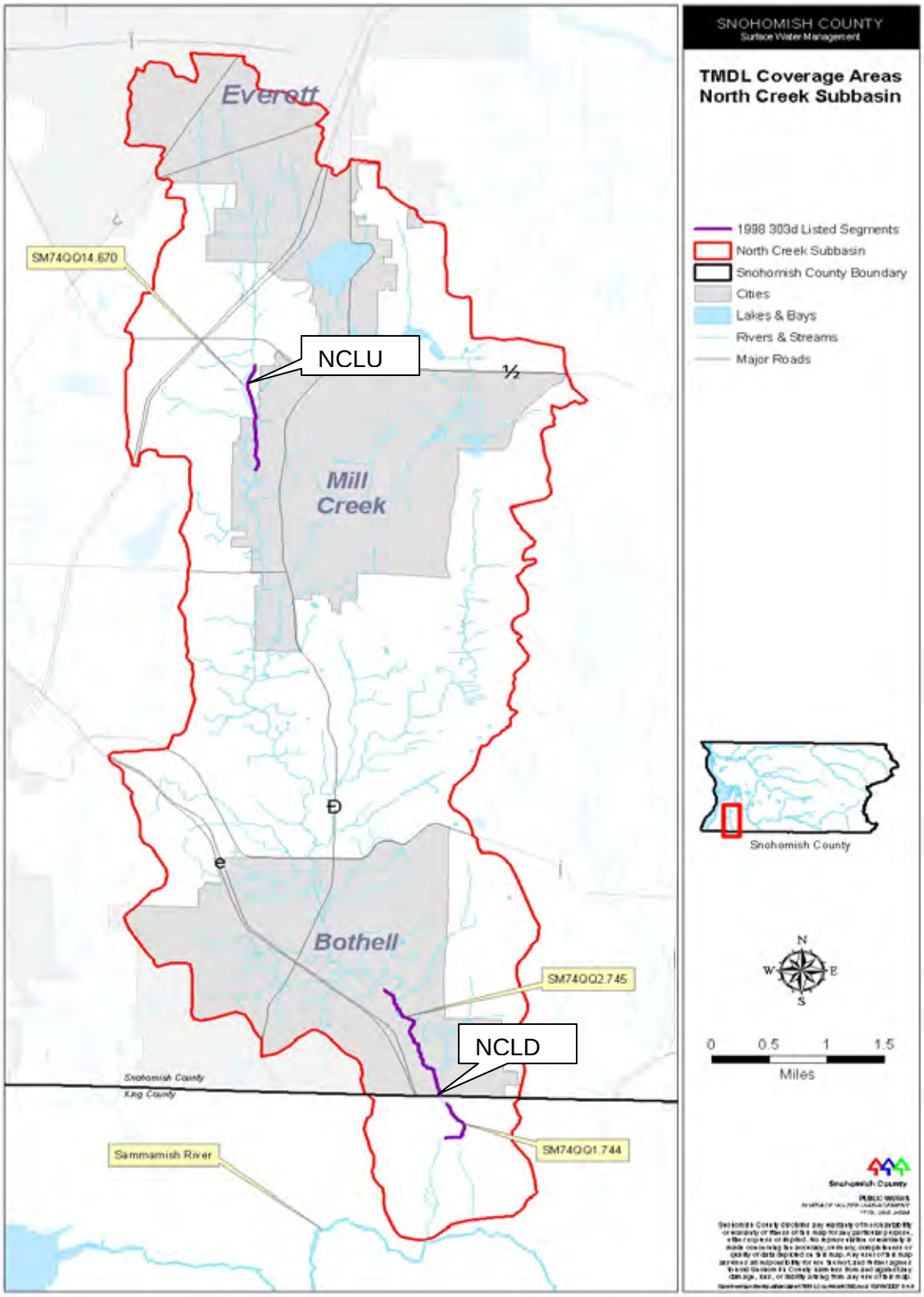
The North Creek watershed, shown in Figure A-7, comprises approximately 30 square miles. North Creek discharges to the Sammamish River, which is tributary to Lake Washington. Land use within the basin is primarily urban or suburban with some pockets of rural and forested land. The basin is being rapidly developed for residential and commercial use. Urbanization and land development activities affect water quality in the basin through riparian corridor alteration, conversion of forests, inadequate retention/detention of stormwater from new and existing impervious surfaces, and poorly treated stormwater runoff (Svrjcek, 2003).

Snohomish County has collected monthly ambient samples from two stations in the North creek watershed since May, 1992. These two stations are McCollum Park (NCLU) and (NCLD) at the County line. Samples have been analyzed for fecal coliform bacteria according to a Quality Assurance Project Plan (QAPP) approved by Ecology.

North Creek was included on Washington's 1996 and 1998 303(d) lists because 44% of samples collected between 1992 -1995 showed excursions beyond the upper criteria at station NCLU, while 29% of samples collected between 1992 -1995 showed excursions beyond the upper criteria at station NCLD (Thornburgh, 1996). The current state water quality standards for North Creek are designated as primary contact.

As required by section 303(d) of the CWA, Ecology acted upon the 303d listings and developed the North Creek Fecal Coliform TMDL through a water quality technical study which consisted of using long-term monitoring study data collected monthly by Snohomish County (NCLU) and (NCLD) during the period of May 1992 – May 1998.

Figure A-7 TMDL Listed Segments and Coverage Area for North Creek



The Statistical Theory of Rollback (Ott, 1995).was used in the technical study to calculate target percent reductions and target geometric means at NCLU and NCLD for wet and dry seasons. Table A-2 identifies the inherent point source waste load allocations at each station through percent reductions and target geometric means (Glenn 2001).

Table A-2. Target percent reductions and target geometric means for stream sampling stations on North Creek (from Glenn, 2001).

	Target Percent Reduction		**Target Geometric Mean**	
Station	Wet Season %	Dry Season %	Wet Season cfu/100 mL	Dry Season cfu/100 mL
NCLU (McCollum Park)	92	96	23	25
NCLD (County line)	93	93	19	35

The North Creek Fecal Coliform technical study can be found at

http://www.ecy.wa.gov/pubs/0010087.pdf.

The approved TMDL can be found at

http://www.ecy.wa.gov/pubs/0310031.pdf.

The technical study was used as a basis for development and EPA approval of the North Creek Fecal Coliform Detailed Implementation Plan (DIP). Recommendations from the approved DIP were then used as a basis for TMDL requirements set forth in the NPDES Phase 1 municipal stormwater permit issued in January, 2007. The approved TMDL DIP can be found at

http://www.ecy.wa.gov/pubs/0310047.pdf.

NOTE: Snohomish County's permit requirements apply only to the unincorporated areas of the County, plus properties owned by the County that may lie inside another municipality.

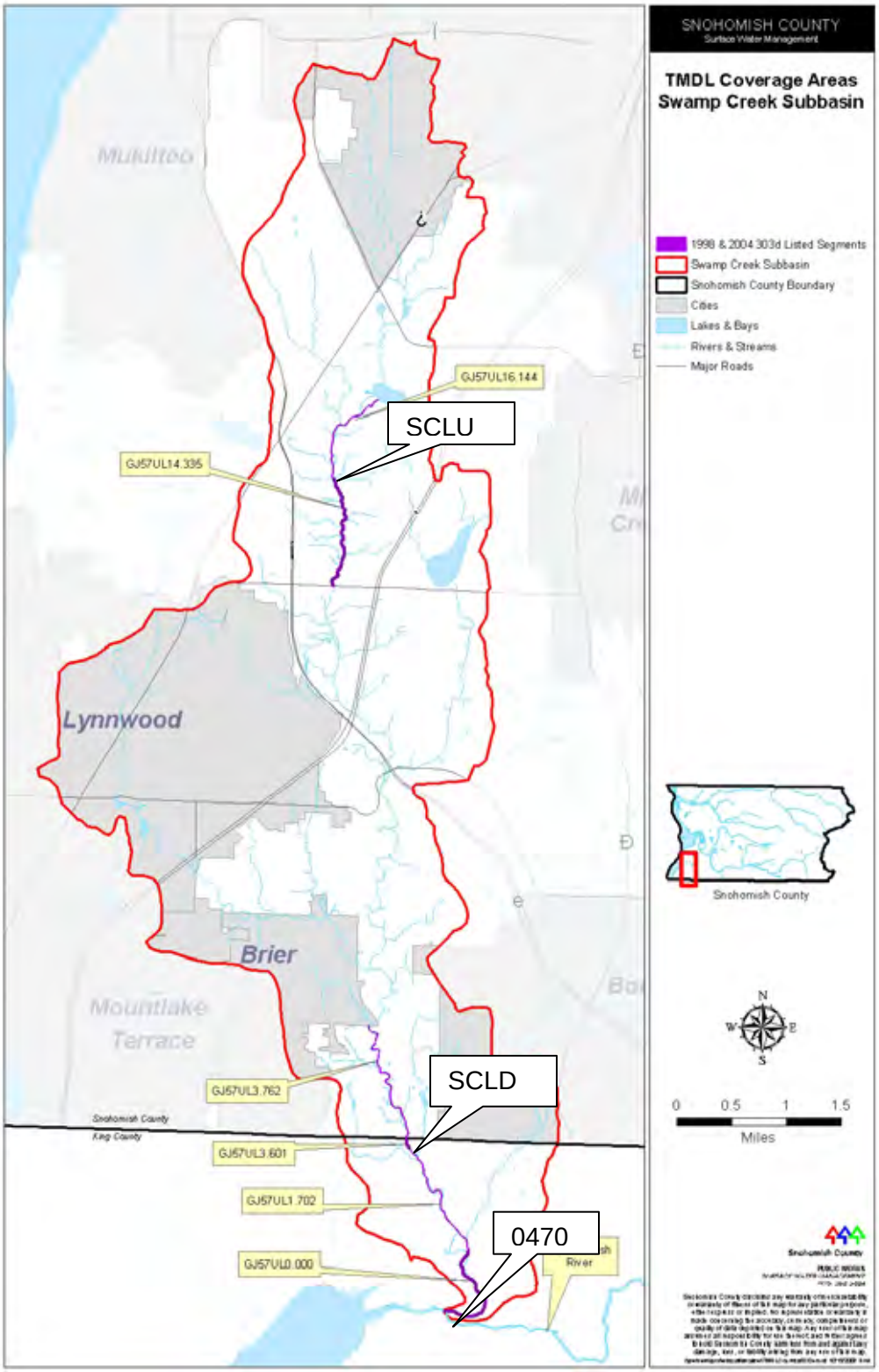
Swamp Creek TMDL for Fecal Coliform Bacteria

The Swamp Creek watershed, shown in Figure A-8, comprises approximately 24 square miles. Swamp Creek discharges to the Sammamish River, which empties to upper Lake Washington 0.7 miles below the Swamp Creek confluence. Swamp Creek flows through a narrow valley which gradually broadens to a floodplain almost ¾ of a mile wide in the lower basin. The middle basin also contains a narrow valley with steep slopes in excess of 15 percent just south of the I-405 and I-5 crossing. Elevation in the headwaters is approximately 520 feet, while the elevation at the mouth is about 20 feet above sea level. The stream gradient is flat, decreasing for about 50 feet per mile in the upper basin to less than 20 feet per mile near the mouth. Scriber Creek, Little Swamp Creek, and Martha Creek are the largest of the 19 streams tributary to Swamp Creek (Svrjeck 2006).

In the late 1990s, Swamp Creek watershed was highly urbanized with about 50 percent of the land in residential or commercial use, 30 percent with forest cover, 10 percent in commercial use, and less than 10 percent rural property (MRLC 1999, SWM 2002). Commercial and light industrial uses are primarily located within Lynnwood and Everett. Small farms and pastures are most common in the middle of the watershed, especially in Brier and unincorporated Snohomish County (Svrjeck 2006).

As discussed in Svrjeck (2006), Ecology evaluated water quality and quantity data collected by Snohomish County Surface Water Management Division (SCSWM 2005) and King County Water and Land Resources Division (KCWLRD 2005a) to characterize bacteria levels in the Swamp Creek Watershed. Long term water quality data sets are available for Swamp Creek at the three locations shown in Figure 2**,** stations SCLU, SCLD, and 0470. These stations characterize the upper, middle, and lower portions of the basin, respectively. Data were then analyzed to determine the geometric mean value9 (GMV) and the 90^{th} percentile bacteria concentrations to assess compliance with state standards. Looking over many years, the pattern of bacteria levels varied among the long term water quality monitoring sites. At station 0470 bacteria levels fluctuated within a consistent range for the entire period of record Station SCLU data showed similar fluctuations. In contrast, a significant change in water quality occurred at SCLD during the mid 1990's. A consistent pattern emerged at station SCLD around 2000. For that reason, Ecology has used data from 2000 through early 2005 to characterize pollution levels at each of the three TMDL compliance points.

Figure A-8 TMDL Listed Segments and Coverage Area for Swamp Creek



Since the year 2000, a consistent pattern of bacterial pollution has been observed in Swamp Creek at each of the three long term stations. All areas exceed state criteria for bacteria at all times of the year. During the dry summer months when stream flows are low, bacteria levels rise far beyond both the geometric mean criterion of 50 cfu/100 mL and the 90th percentile criterion 100 cfu/100 mL. During the wetter months of the year, bacteria concentrations improve at each site, but not enough to meet state standards. (Svrjeck 2006).

The Swamp Creek TMDL technical calculated target percent reductions and target geometric means at SCLU and SCLD for wet and dry seasons. Table A-3 identifies the inherent point source waste load allocations at each station through percent reductions and target geometric means.

Table A-3 Target percent reductions and target geometric means for stream sampling stations on Swamp Creek (from Svrjeck, 2006).

	Target Percent Reduction		**Target Geometric Mean**	
Station	Wet Season %	Dry Season %	Wet Season cfu/100 mL	Dry Season cfu/100 mL
SCLU (148th St SW)	84	96	100	100
SCLD (County line)	68	78	100	100

The Swamp Creek technical study and DIP were developed by Ecology as one report found at

http://www.ecy.wa.gov/pubs/0610021.pdf

Recommendations from the approved DIP were then used as a basis for TMDL requirements set forth in the NPDES Phase 1 municipal stormwater permit issued in January, 2007. *NOTE: Snohomish County's permit requirements apply only to the unincorporated areas of the County, plus properties owned by County that may lie inside another municipality.*

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.

Table A-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

Table A-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

Table A-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.

References and supplemental information for Appendix 1

Caroll, J., and K. Thornburgh, 1994. Quilceda/Allen Watershed Characterization Snohomish County, Washington. Snohomish County Department of Public Works, Surface Water Management, Everett, WA.

Ecology. 2007. Washington State Department of Ecology 2006 Enforcement Review. Publication 07-01-022. . Washington State Department of Ecology Water Quality Program, P.O. Box 47600, Olympia, WA, 98504-7600.

Glen, Norm. 2001. North Creek Watershed Total Maximum Daily Load Evaluation for Fecal Coliform Bacteria. Publication 01-03-020. Washington State Department of Ecology Water Quality Program, P.O. Box 47600, Olympia, WA, 98504-7600.

Multi-resolution Land Characterization Consortium. 1999. National Land Cover Data obtained through a cooperative agreement with the United States Geological Service, EROS Data Center (EDC), Sioux Falls, SD. http://edc.usgs.gov/

Ott, Wayne R., 1995. Environmental Statistics and Data Analysis. CRC Press LLC, 2000 Corporate Blvd., NW, Boca Raton, Florida 33431.

Snohomish County Surface Water Management (SWM), 1994. Swamp Creek Watershed Management Plan. Department of Public Works Surface Water Management Division, 3000 Rockefeller Avenue, M/S 607, Everett WA 98201-4046.

Snohomish County Surface Water Management (SWM). 2005. Electronic data retrieval from Snohomish County website at http://198.238.192.103/spw_swhydro/wqsearch. asp. Department of Public Works Surface Water Management Division, 3000 Rockefeller Avenue, M/S 607, Everett WA 98201-4046.

Svrjcek, R., and Glen, N. 2002. North Creek Fecal Coliform Total Maximum Daily Load Submittal Report. Publication 02-10-020. Washington State Department of Ecology Water Quality Program, P.O. Box 47600, Olympia, WA, 98504-7600.

Svrjcek, Ralph. 2003. Lower Snohomish River Tributaries Fecal Coliform Bacteria Total Maximum Daily Load. Detailed Implementation Plan. Publication 03-10-031. Washington State Department of Ecology Water Quality Program, P.O. Box 47600, Olympia, WA, 98504-7600.

Svrjcek, Ralph. 2006. Swamp Creek Fecal Coliform Bacteria Total Maximum Daily Load
Water Quality Improvement Report and Implementation Plan. Publication 06-10-021. Washington State Department of Ecology Water Quality Program, P.O. Box 47600, Olympia, WA, 98504-7600.

References and supplemental information for Appendix 1, continued

Thornburgh, Kathy. 1996. Snohomish County Ambient Water Quality Monitoring, Summary Report for 1992 – 1995. Snohomish County Public Works, Surface Water Management. April, 1996.

Williams, R.W., R.M. Laramie, and J.J. Ames. 1975. A catalog of Washington streams and salmon utilization. Volume 1. Puget Sound Region. Wash. Dept. Fish. (Available from Washington Dept. of Fish and Wildlife, 600 Capitol Way N., Olympia, WA 98501-1091).

Wright, Robert J., R. Coots and R. F. Cusimano. 2001. Snohomish River Tributaries Fecal Coliform Total Maximum Daily Load Submittal Report. Publication 00-10-087. Washington State Department of Ecology Water Quality Program, P.O. Box 47600, Olympia, WA, 98504-7600.