Lower Snohomish River Tributaries Fecal Coliform Bacteria Total Maximum Daily Load

Detailed Implementation Plan

June 2003
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by

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ACKNOWLEDGMENTS

Thanks are due to everyone that has pledged to help clean up the polluted waters within the Snohomish Tributaries watersheds. Many people were involved in developing schedules for the planned activities and reviewing and rewriting the description of pollution sources and how they will be addressed. A special thanks should be extended to Steve Hood, who provided valuable insight on structuring this plan in its early phase.

EXECUTIVE SUMMARY

This is the Detailed Implementation Plan (Action Plan) for the Lower Snohomish River Tributaries Fecal Coliform Bacteria Total Maximum Daily Load (SnoTribs TMDL) as required under the Memorandum of Agreement between The United States Environmental Protection Agency and The Washington State Department of Ecology Regarding The Implementation of Section 303(d) of The Federal Clean Water Act. This document details the actions needed to return the impaired waters in the Lower Snohomish Tributaries to acceptable levels of bacteria content.

In the SnoTribs TMDL evaluation, target geometric means were set as the goals for meeting the bacteria criteria of the Washington State Water Quality Standards (Washington Administrative Code (WAC) 173-201A). The plan's goal is for 75 percent of all sampled stations to meet state standards by 2007, with all stations in compliance by the end of 2009.

A wide variety of activities are proposed in this action plan to reduce bacterial pollution levels. Participating entities include the Tulalip Tribes, Snohomish County, each of the local city governments, and a number of other entities. The actions required of National Pollutant Discharge Elimination System (NPDES) stormwater permit holders are anticipated to have a great effect on pollution levels and greatly improve public awareness of the role of stormwater in our current pollution problems. Many of the activities are already funded or planned for implementation in the future. Where funding is not currently available, Ecology will be assisting in finding appropriate funding sources.

The implementation of the SnoTribs TMDL is based on the assumption the actions proposed in this Action Plan will be adequate if they are fully implemented. Adaptive management methods will be used to identify if additional effort or focus from existing programs is needed or if new programs are needed.

The primary means of ensuring that activities detailed in this plan are implemented is the periodic examination of water quality monitoring data and collaboration of Ecology staff with basin stakeholders. Ecology will facilitate information sharing, coordinate activities between the various governmental and private entities working to reduce pollution inputs, and thus maximize the efficient use of available resources. Ecology will also require certain implementation activities through its NPDES permit programs where applicable.

Figure 1. Snohomish Watershed. The Snohomish Watershed consists of the Snoqualmie, Skykomish, and Snohomish Rivers and their river basins. This Action Plan focuses on reducing bacterial pollution levels in the tributaries draining to the lower Snohomish Basin (SnoTribs watersheds are shown in Figure 3). The Snohomish watershed supports all species of salmon native to the Pacific Northwest and a diverse wildlife population. We also depend upon it for agriculture, municipal water supplies, and many recreational activities.

INTRODUCTION

Many of the tributaries to the Snohomish River are polluted with excessive levels of bacteria. Although each of the specific sources has not been identified, we know that the pollution is coming from human activities. In some cases it could be from our pets and livestock, in others it could be from failing septic tanks or inadequate sewage collection and treatment systems. For this reason, Ecology prepared the Snohomish River Tributaries Fecal Coliform Total Maximum Daily Load Evaluation, (Wright et al., 2001, also called the TMDL Submittal Report). In the Submittal Report, Ecology set targets for cleaning up the polluted waters identified. At hand now is the task of deciding what activities need to be undertaken to return local waters to a condition that is safe for both people and fish—those activities are detailed in this document.

The lower Snohomish River Tributaries (SnoTribs) became polluted because of the way we do things, not the activities themselves. For example, caring for dogs, cats, horses, and other animals is not a problem, rather, it is the way that we care for them. Similarly, roads and parking lots are a reality of our modern society, but the way we build roads, neighborhoods, and shopping centers is causing our local streams and creeks to be polluted. The solution is to do these things differently so that we can have animals and a modern lifestyle as well as clean water.

This report is part of the federal Clean Water Act's Total Maximum Daily Load (TMDL) process for cleaning up polluted waters[1]. This Detailed Implementation Plan (referred to hereafter as the Action Plan) lists those activities that need to be taken to reduce bacteria levels in local streams to a level considered safe for swimming, fishing, and wading. Planned or ongoing projects being undertaken by state, local, tribal, and federal governments, as well as nonprofit organizations and citizen's groups, to improve the water quality of the lower Snohomish River Tributaries are detailed in this Action Plan. Effectiveness monitoring strategies and adaptive management procedures are also discussed.

The TMDL Submittal Report documented that bacterial pollution was a significant and widespread problem across the Snohomish Tributaries (SnoTribs) watersheds. The amount of bacteria that can enter state waters before it reaches the level of being a pollutant is called the loading capacity. Local waters can accept no more than the loading capacity before they are considered polluted. The available loading capacity for the polluted waters in the SnoTribs watersheds has been assigned equally to nonpoint sources

[1] This Detailed Implementation Plan (DIP) for the Lower Snohomish River Tributaries Fecal Coliform Bacteria Total Maximum Daily Load (SnoTribs TMDL) is written to meet the requirements of the Memorandum of Agreement Between The United States Environmental Protection Agency and The Washington State Department of Ecology Regarding The Implementation Of Section 303(d) of The Federal Clean Water Act dated October 29, 1997. It is based on the technical report titled Water Quality Assessment of Tributaries to the Snohomish River and Nonpoint Source Pollution TMDL Study (Cusimano and Coots, 1997) and the Submittal Report Snohomish River Tributaries Fecal Coliform Total Maximum Daily Load Evaluation, (Wright et al., 2001). All three of these documents are available through the Washington State Department of Ecology web site at http://www.ecy.wa.gov/programs/wq/tmdl/index.html

(load allocation or LA) and point sources (wasteload allocation or WLA), the latter of which are associated with permitted stormwater discharges. WLAs for other point sources are either zero (i.e., National Pollution Discharge Elimination System [NPDES] permitted dairies), or set using technology-based treatment levels at the point of discharge (i.e., the Granite Falls Wastewater Treatment Plant).

This document describes our current understanding of the bacterial pollution problem within the SnoTribs watersheds. It also shares information on the many partners participating in this cleanup effort and the activities they hope to accomplish. Ecology expects that much more will be learned about the extent of bacterial pollution as more water quality monitoring is done. Although we have many excellent strategies for improving pollution from failing septic tanks and poor livestock manure management practices, dealing with bacterial pollution problems in urban areas is likely to be more of a challenge. Through adaptive management, information sharing, and close cooperation of all stakeholders, we will meet this challenge and return local waters to good health.

Figure 2. Washington waters should be safe.

When bacteria levels in Washington waters exceed state standards, the risk of illness after swimming and bathing increases. In some areas, pollution becomes more concentrated in the summer when local streams and lakes are most relied upon for recreation.

PROBLEM STATEMENT

Water quality testing by Snohomish County and Ecology has confirmed that high levels of fecal coliform bacteria exist in the SnoTribs watersheds (Wright et al. 2001). Fecal coliform bacteria indicate the presence of fecal wastes from warm-blooded animals. Livestock, failing septic systems, domestic pets, and wildlife are all potential contributors. This poses an unacceptable health risk for fisherman, bathers, and swimmers. For these reasons, TMDLs for fecal coliform bacteria were established at multiple locations through each watershed.

Ecology has also determined that dissolved oxygen levels are impaired in the SnoTribs watersheds. Although Ecology did not set TMDLs for dissolved oxygen at this time, it is assumed that implementation actions taken to reduce bacteria levels will also improve dissolved oxygen levels. Therefore, this document will also detail selected activities aimed at improving dissolved oxygen levels.

Health Risk From Fecal Coliform Bacteria

The high levels of fecal coliform bacteria in many of the Snohomish Tributaries increase the risk of becoming ill when swimming (primary contact recreation), wading, fishing, or boating (secondary contact). Potential illnesses due to pathogen-contaminated recreational waters include gastrointestinal, respiratory, eye, ear, nose, throat, and skin diseases (EPA, 1986). EPA estimates that there is a theoretical risk of 8 illnesses per 1,000 swimming events when geometric mean fecal coliform levels are 200 cfu/100 mL or less in fresh water. There are numerous areas along these polluted streams that afford ready access to the creek for adults and children to swim and wade.

About Dissolved Oxygen

Low dissolved oxygen (D.O.) levels are most pronounced during the dry summer months, when water levels drop, temperatures rise, and pollutants become more concentrated. The fecal matter from which bacterial pollution comes, is known to contain nutrients that support plant and animal growth. Algae and other organisms which utilize these nutrients can deplete oxygen under certain environmental conditions. The direct relationship between bacteria levels and their accompanying nutrient input to the Snohomish Tributaries has not been determined; however, to the extent that these sources are above natural background levels, their reduction should help improve dissolved oxygen levels.

As the temperature of water rises, its ability to absorb and hold oxygen goes down. Thus, there are multiple factors occurring during the summertime when water levels are lower. This lack of dissolved oxygen is a problem for fish, especially small fish which are less able to travel to better waters, where they exist.

Switch to E. Coli In the Future

EPA, Washington State, and other states have questioned for some time whether fecal coliform bacteria are an optimal indicator of pathogenic bacteria in water. At this time, Ecology is proposing to change its freshwater bacteria criteria (Hicks 2001) and base the new criteria upon the use of Escherichia coli (E. coli). E. coli is a subset of fecal coliform bacteria. Recent studies by Ecology and King County have shown that on average, 90-100 percent of fecal coliform bacteria are E. coli. A regression analysis of fecal coliform and E. coli levels in the Nooksack River revealed a close relationship between fecal coliform and E. coli levels (coefficient of variation (r^2) of 0.9865). More information on the proposed changes to the water quality standards can be found at http://www.ecy.wa.gov/programs/wq/swqs/index.html.

After conversion to the new standard, it will be desirable to monitor both fecal coliform bacteria and the new indicator simultaneously to evaluate trends in fecal coliform bacteria as well as measure compliance with the new standards. Because the sources of both of these indicator bacteria are the same and all or nearly all currently measured fecal coliform bacteria are assumed to be E. coli, implementation activities for reducing either of these bacteria are identical and thus the remedial actions needed in the SnoTribs watersheds in relation to this TMDL remain unchanged by the standards change. Where budgetary constraints limit the ability to do both tests, it is recommended that E. coli tests be performed.

BASIN DESCRIPTIONS AND CONDITIONS

The Snohomish River basin drains 1,978 square miles and discharges to Possession Sound near the city of Everett. The junction of two major rivers, the Skykomish and Snoqualmie, forms the Snohomish River. The TMDL study area includes the Quilceda, Allen, Woods Creek, French Creek, Marshlands, and Pilchuck River watersheds, which drain 244 square miles of land into the mainstem Snohomish River (Figure 1). Historical land uses in the basin have been mainly agriculture and forest related, but residential and commercial development is rapidly expanding into these areas. 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 impervious surfaces, and poorly treated stormwater run-off.

All of these streams are classified as Class A waters in Washington's Water Quality Standards. Class A streams should be suitable for domestic, industrial, and agricultural water supply; stock watering; fish migration, rearing, spawning, and harvest; wildlife habitat; and recreation (swimming, boating, fishing, and aesthetic enjoyment). Each of the SnoTribs watersheds and their known pollution problems are discussed below. All waterbodies are expected to meet two state criteria for bacteria; 1) waters cannot exceed a geometric mean bacteria level of 100 colony forming units (cfu) in 100 milliliters (mL) of water, and 2) no more than 10 percent of bacteria samples collected (also called the 90^{th} percentile value) can exceed 200 cfu/100 mL.

Quilceda and Allen Creeks

Quilceda and Allen Creeks flow south through the city of Marysville and are both designated Class A waters in the State of Washington Water Quality Standards (Washington Administrative Code Chapter 173-201A or WAC 173-201A). The combined area of the watershed is about 49 square miles with Quilceda Creek draining roughly 38 square miles of land and Allen Creek about 11 square miles. Both streams enter the Snohomish River delta near Marysville. The upper portions of both the Quilceda and Allen watersheds have a significant amount of agricultural and rural land uses while the lower watersheds are rapidly urbanizing with increased amounts of residential and commercial development. About half of the city of Arlington contributes to the Quilceda watershed—due to the porous soils in the area much of that stormwater is infiltrated and thus recharges groundwater supplies to feed Quilceda Creek. Approximately fifty-three (53) percent of the Quilceda/Allen watershed is in unincorporated Snohomish County.

Data collected during the development of the SnoTribs TMDL revealed that Quilceda and Allen Creeks are not meeting Class A standards for fecal coliform and nutrients (Thornburgh *et al.*, 1991; Thornburgh and Leif, 1992; Cusimano, 1995). In addition, oxygen levels often violate the dissolved oxygen standard with concentrations less than 6.5 mg/L not uncommon during summer months (Thornburgh *et al.*, 1991; Cusimano, 1995). Impaired uses of Quilceda and Allen Creek are swimming, wading, and salmon

and other fish spawning, migration, rearing, and harvesting (Ecology, 1994). Probable sources of contaminants are urban, suburban, and commercial runoff; failing onsite septic systems; livestock manure; and pet wastes.

Currently, Snohomish County has three long term monitoring sites within the basin. The city of Marysville will soon be adding a number of additional stations. Past data from 13 sites across the basin have shown that in nearly all locations, bacteria concentrations increase during dry weather. The only monitoring station that did not violate the geometric mean criteria as part of the TMDL study is the upper mainstem Quilceda Station located at 136th St NE. Failing on-site septic systems is one consistent source of bacteria that could help account for this trend. Over the last 2.5 yrs, **the Quilceda station at 88th Street** has continued to have geometric mean (geomean) bacteria concentrations that are above standards (188 cfu/mL) with the majority of monthly tests above 200 cfu/mL. Although there are some high peak numbers, the high geomean values seem to be driven by consistent sources of bacterial pollution (60 percent of the numbers were above 200 cfu/mL). Bacteria levels are higher in the summer than the winter but do not approach acceptable levels during either the dry or wet season.

On **Allen Creek**, there are currently two long term monitoring stations: one at 100th St near the Grange Hall and another near the mouth just below 3rd Street**. In the upper watershed above 100th St**, geomean fecal coliform numbers are over 200 cfu/100 mL and 60 percent of the monthly numbers are above 200 cfu/100 mL. Occasionally there are peaks over 1000 cfu/100 mL. Dry season geomeans are close in value to wet season geomeans (336 vs. 269, respectively), with 90th percentile values about twice as high in the dry versus the wet season (1,600 vs. 3,280, respectively). Thus, there is a constant input of bacteria that increases with stormwater runoff in the winter. In the lower watershed, geomean bacteria levels are slightly above standards in the dry season (118 cfu/100 mL) and within standards in the winter (50 cfu/100 mL). Ninetieth percentile values are still too high in the summer at 118 cfu but winter numbers are much higher at 1,492 cfu/100 mL. (The high numbers at the lower station appear to be related to similar high readings at the upper stations at the same time period during the early months of 1999.)

Various locations within the Quilceda watershed showed occasional drops in D.O. below standards. The depressed values were at times as low as 4-5 mg/L. D.O. levels were much worse in the Allen Creek watershed. The mainstem of Allen Creek shows serious dissolved oxygen problems at several locations. The north fork of Allen Creek also showed poor D.O. levels. These problems persisted throughout the dry and wet seasons and were more extreme during the dry season.

Lower Pilchuck River

The Pilchuck River flows 39 miles west and south from the western slopes of the Cascades to the Snohomish River and drains about 130 square miles of land. Approximately 96 percent of the total Pilchuck Watershed lies within unincorporated Snohomish County. An average annual discharge of 364 cfs makes the Pilchuck River the largest tributary to the Snohomish River. The city of Granite Falls operates a

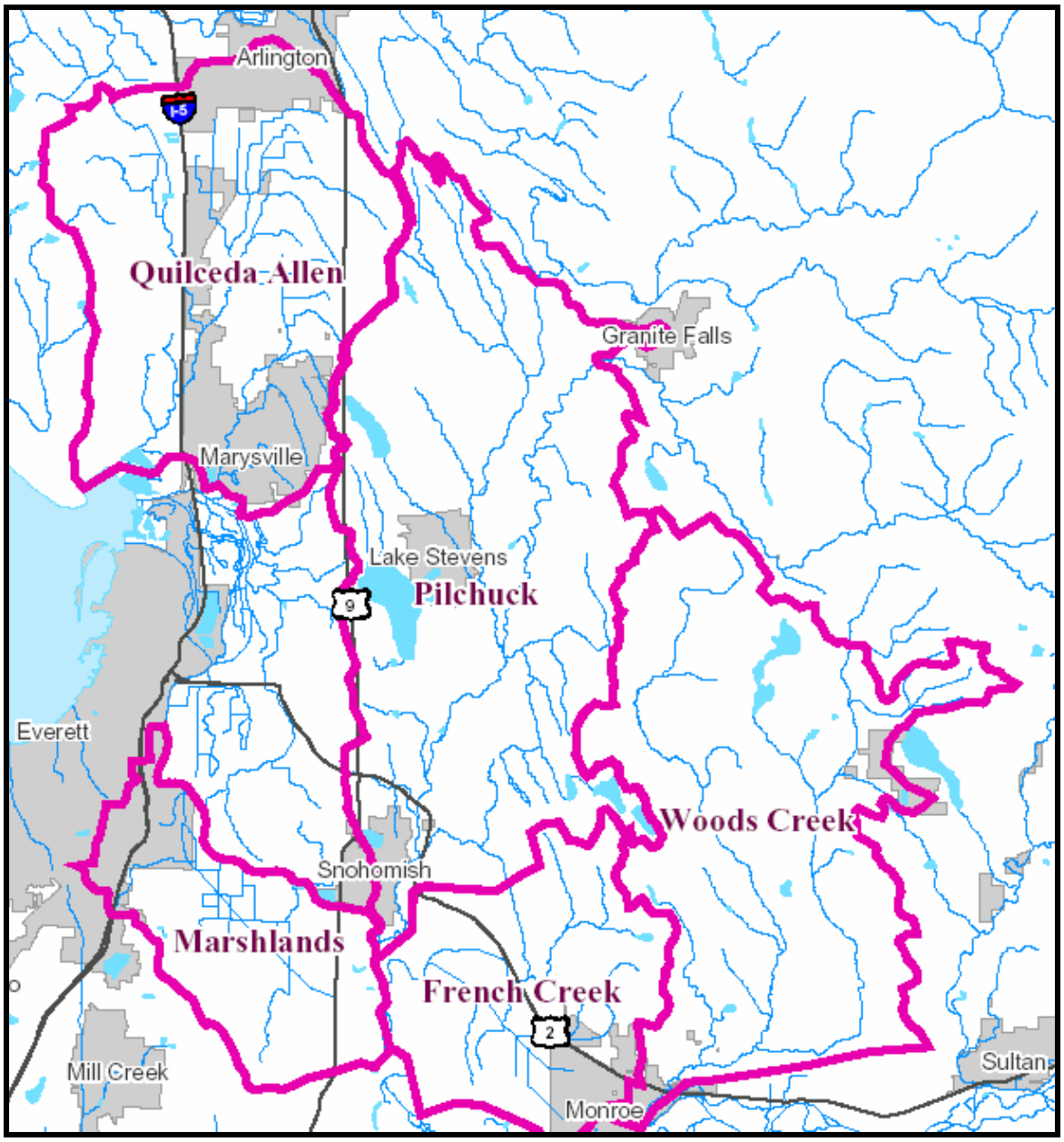


Figure 3. Lower Snohomish River Tributaries Watersheds. The SnoTribs TMDL addresses five distinct areas. The Quilceda/Allen Watershed is actually two separate watersheds but they were combined for study purposes.

wastewater treatment plant (WWTP), which discharges secondary treated effluent to the river. The discharge from the Granite Falls WWTP is located more than 6 miles upstream from the upper-most segment of the Pilchuck River on the 303(d) list. The upper Pilchuck River watershed is generally considered to be of high quality and classified as AA waters, with the lower river designated as Class A waters. The cities of Lake Stevens, Snohomish, and Granite Falls contribute stormwater to the Pilchuck River.

Historically, the Pilchuck River has had a good riparian buffer. Low-density residential development and small farms dominate the land use in the basin. Urbanization is taking place around Lake Stevens, the city of Snohomish, and the town of Granite Falls.

Fecal coliform bacteria contamination is the prime concern for water quality improvement in the Pilchuck River. Dissolved oxygen levels were determined to be adequate throughout the year at all sites monitored by the TMDL study. Snohomish County performs long term monitoring at four sites on the Lower Pilchuck River.

Bacteria levels above Granite Falls were within standards. Traveling downstream however, the river picks up significant amounts of bacteria. Within the Catherine Creek watershed there is a year round contribution of bacteria keeping it above standards in both the wet and dry seasons—30 percent of the samples taken were above 350 cfu/100 mL. The nearby Little Pilchuck system meets state standards during the winter but experiences spikes of bacteria during the summer from 120 to 2,600 cfu/100 mL. Farther downstream in Dubuque Creek, geomean bacteria levels are within standards throughout the year but there are occasional spikes throughout the year, some reaching 4,000 cfu/100 mL. Areas such as Catherine Creek that exceed the state geomean standard of 100 cfu/100 mL have a steady input of bacteria. The elevated 90^{th} percentile levels observed at the mouth of Little Pilchuck Creek, Catherine Creek, and Dubuque Creek, all appear to be due to intermittent sources.

At the mouth of the Pilchuck River near the town of Snohomish water quality improves. During the dry season, there are occasional spikes observed near the city of Snohomish that cause the 90^{th} percentile to be exceeded. The sources of the problems are likely to be livestock access to the stream, inadequate pasture management, and failing on-site sewage disposal systems. The constant source of bacteria from the Catherine Creek system should be a priority for investigation due to the high levels of bacteria observed and the high concentration of people living in the Lake Stevens area.

French Creek

French Creek flows westerly for approximately 11 miles and encompasses about 28 square miles. French Creek is a Class A waterbody that drains a portion of south central Snohomish County north and west of the city of Monroe and southeast of the city of Snohomish, some of which is part of the Snohomish River floodplain. A small portion of the French Creek watershed is located within the city of Monroe, leaving roughly eighty-nine (89) percent of the watershed within unincorporated Snohomish County. Discharge of French Creek to the Snohomish River at about river mile 15 is controlled by a pumping station that is operated and maintained by the French Slough Flood Control District.

The lower portion of the French Creek watershed flows through the flat Snohomish River floodplain where much of the stream network has been straightened and channeled for agricultural purposes. Agricultural practices and lack of stream buffers along the lower reaches of the creek are causing water quality problems. The upper three-quarters of the

French Creek watershed above the Snohomish River floodplain flow over gentle, largely forested slopes. Rural development in the upper watershed has more recently become significant, increasing runoff from land clearing and residential development activities. The land uses in the upper reaches of the drainage are primarily a mix of residential development, small farms and pastures, forested areas, and equestrian centers. Commercial agriculture, dairies, and duck hunting preserves dominate the lower reaches.

A number of water quality studies in addition to this TMDL have identified both fecal coliform and dissolved oxygen problems in the French Creek watershed. Loading of oxygen-depleting substances and low dissolved oxygen water to the Snohomish River from French Creek have been estimated to be lowering dissolved oxygen concentrations in the river under critical summer low flow conditions (Cusimano 1995, 1997). Low dissolved oxygen (<5 mg/L) and high turbidity and nutrient levels have been reported in the drainage near the pump station (Cusimano 1995, Thornburgh 2000).

Throughout the watershed, fecal coliform concentrations are much lower during winter months. During the mid-90's, selected areas of various subsheds showed acceptable levels of bacteria during the wet season including parts of Lords Hill, Cripple Creek, Stables Creek, and Trench Creek. However, other locations within Lords Hill and Cripple Creek showed excessive levels during the winter so those watersheds still have problems in the winter. During the summer, all fifteen stations exceeded at least one water quality criterion for bacteria. Only upper Cripple Creek and Trench Creek met the geometric mean criterion throughout the year and did not have 90^{th} percentile values in excess of 1,000 cfu/100mL during summer months. However, both of these upper sites still exceeded the 90^{th} percentile criteria during dry weather. More recent data from Snohomish County's two mainstem French Creek monitoring stations show that bacteria levels have improved since 1998, but are still not meeting standards year round. Summer months remain the most serious problem. The constant presence of fecal coliform bacteria throughout the year may indicate steady sources of pollution such as failing septic tanks or improper manure management.

Marshlands

The Marshlands watershed, located southeast of the city of Everett and southwest of the city of Snohomish, consists of a number of small Class A creeks. A large part of the Marshlands watershed is a channeled irrigation and drainage ditch system. This drainage network and its tributaries include about 24 square miles of land primarily within the Snohomish River floodplain. The streams that drain to the Marshland originate in the residential areas of the ridge creating the south and west boundary of the floodplain. Approximately eighty (80) percent of the Marshlands watershed is within unincorporated Snohomish County. The remainder is within the city of Everett.

Similar to the French Creek drainage, the lowland portion of the Marshland watershed is in the floodplain of the Snohomish River where land use is dominated by commercial agriculture. The tributary watersheds on the hillsides above the Marshland agricultural area, are primarily residential. After flowing through commercial agricultural land,

discharge from Marshlands to the Snohomish River is controlled by a pumping station operated by the Marshlands Flood Control District. Agricultural practices, inadequate stream buffers along the channeled portion of the creek, and stormwater are the potential pollution sources in the watershed. As unclassified surface waters of the state, the Marshlands are designated as Class A waters in 173-201A-120(6) WAC.

A number of studies have identified water quality problems in the Marshland drainage. The Marshland tributaries have high sediment, fecal coliform, and high nutrient concentrations (Thornburgh *et al.*, 1991). Dissolved oxygen concentrations of less than 2.5 mg/L have been measured in the drainage near the pump station (Cusimano, 1995). High turbidity levels have also been measured in the main drainage (Thornburgh *et al.*, 1991; Cusimano, 1995). Ecology has measured fecal coliform levels as high as 10,000 cfu/mL at the central drainage ditch where it crosses Marsh Road. Geomean bacteria levels exceeded state standards at both the Marsh Road and pump station monitoring points throughout the year. Peak bacteria levels were much higher during the wet season. The high wet season concentrations are likely from stormwater runoff from agricultural areas but stormwater from upland areas should be evaluated. Most recently, high fecal coliform bacteria counts were measured just downstream of a composting facility operating without an NPDES permit. Improvements in dairy operations and the reduction in the number of dairies in the Marshlands agricultural area are expected to result in reduced bacteria concentrations when receiving water monitoring is resumed in this area.

The City of Everett has conducted quarterly monitoring for fecal coliform and dissolved oxygen at its Wood Creek/Larimer Road station. Because the sampling frequency since 1998 has been quarterly, Ecology has informed the City that compliance with the geometric mean water quality standard cannot be determined. Twenty three measurements have been taken (9 dry season, 14 wet season) with geometric means being well under standards (27 and 10 cfu/100mL, respectively). In addition, less than 10 percent of the data exceeded the 90^{th} percentile criteria for both seasons. The data do suggest that the upper section of the Wood Creek watershed may be in good condition and that it should be a lower priority for action and analysis where limited resources exist.

Woods Creek

Woods Creek, near Monroe is a large Class A stream that flows into the Skykomish River just upstream of the confluence with the Snoqualmie River (approx. river mile 25). Draining about 62 square miles of land, Woods Creek flows southerly from near Lake Roesiger entering the river at Monroe. Land use in the lower portion of the creek is mostly residential (around Monroe) and rural residential with some small-scale, noncommercial farms and several equestrian centers. Land use in the upper portion of the drainage is low-density rural residential, small farms, and tree farms. Just over sixty-three (63) percent of the Woods Creek watershed is within unincorporated Snohomish County.

Previous studies have identified water quality problems in the middle to lower watershed. The creek carries high levels of sediment during storm events (Thornburgh *et al.* 1991).

Probable sources of contaminants include agriculture, pasture land, confined animals, tree harvesting, forest management, road construction, channelization, removal of riparian vegetation, and streambank modification (Thornburgh, 1993). Currently, the creek is meeting bacteria standards during wet weather at the mouth of the mainstem at Yaeger Road and on the West fork at Yaeger Road. However, these sites exceed the state standards during the dry season for both bacteria criteria. Give the lack of dairy operations in the Woods Creek watershed, this pattern may suggest a steady stream of bacteria loading may be occurring year round, with dilution occurring during wet weather months. Failing septic tanks are one likely contributor in addition to agricultural practices.

POLLUTION SOURCES

Cleanup Approach

The goal of this plan is to return 75 percent of the target waterbody segments to compliance with state standards by 2007 with all stations meeting standards by 2009. Through a combination of data analysis, literature reviews, interviews with stakeholders, and windshield surveys, Ecology has examined the sources of pollution in the SnoTribs watershed and determined many of the actions needed to reduce pollutant inputs and return local waters to good health. These determinations are discussed below for each identified pollutant source.

All human activities have some effect on the natural environment. When done properly, the impact can be managed and surface waters can remain available for the wide range of uses that our society, and law, demands. Limited work has been conducted to date to identify the specific sources of pollution within the lower Snohomish Tributaries. Table 1 summarizes the general sources of pollution that can occur across all the target basins.

Agriculture and Livestock

Agricultural Activities Requiring a Water Quality Permit

An NPDES water quality permit is rarely required for commercial agricultural activities. The exceptions are where 1) animal husbandry operations that meets the definition of a concentrated animal feeding operation (CAFO, see http://www.epa.gov/ost/guide/cafo/index.html for more information) and 2) where it is determined that a dairy farm is a significant contributor of pollution--most dairies are not required to have an NPDES water quality permit. The only CAFO in SnoTribs watersheds is the National Foods Chicken Egg Plant in the Quilceda basin. This plant discharges egg washing wastewater to the Marysville WWTP. Solid waste generated at the facility, as well as waste from its satellite egg production facility, is composted on-site and is disposed of off-site at various locations. Much of the waste disposal is thought to be occurring within the Quilceda and Allen watersheds on small farms and perhaps some dairies.

Figure 4. Dairies. There are 14 active dairies in the SnoTribs watersheds. Dairy farms that fully implement their farm plans are contributing to the goals of this TMDL by preventing manure from reaching surface local streams.

Table 1 – Potential Pollution Sources and Pollution Factors

Sources	Explanation
Commercial Agriculture – Permitted	Bacteria, nutrients, and surface runoff from improper grazing or manure management practices. Excessive use of fertilizers. Removal of riparian vegetation. Certain ditch maintenance practices.
Commercial Agriculture – Nonpermitted	Bacteria, nutrients, and surface runoff from improper grazing or manure management practices. Excessive use of fertilizers. Removal of riparian vegetation. Certain ditch maintenance practices.
Small Farms	Bacteria, nutrients, and surface runoff from improper grazing or manure management practices. Removal of riparian vegetation.
Residential Wastewater	- Surfacing septic tank wastewater enters streams during dry periods or rain events. - Subsurface septic tank wastewater that reaches nearby streams - Direct discharge of septic tank waste to a stream or stormwater system.
Sediment	Storage of historic contamination that may be resuspended
Wastewater Treatment Plants	Facility upset, major mechanical failure, or facility overwhelmed by influent flow.
Stormwater	Small farm and residential pet waste. Illegal connections of sewer to storm drainage system. Nutrient runoff from excessive lawn and garden fertilization. Failing onsite septic tanks Car wash wastewater. Stormwater runoff from composting facilities.
Wildlife	Usually considered part of natural background levels. An exception can occur when a pollution source is created by man made alterations of the environment.
Altered Stream Hydrology	Loss of summer base flows concentrates pollutants because there is less water in the stream than under natural conditions. High peak flows accelerate natural bank scouring processes and add too much sediment to stream systems.
Loss of Riparian Habitat	Lack of shading and riparian microenvironment effects results in increased stream temperatures and reduced dissolved oxygen levels.

Some dairies meet the definition of a CAFO and others do not. If a dairy is not a CAFO, and is not discharging pollutants to local surface waters, it does not need a permit. Dairies that are issued an NPDES permit have the same requirements as a nonpermitted dairy as described below. The major difference is that a permitted dairy is subject to third party lawsuits and more vigorous inspection for compliance with state water quality laws.

Class A dairies are regulated by the Dairy Nutrient Management Act, RCW 90.64 and must have and implement a Dairy Nutrient Management Plan (DNMP). The DNMP describes how to manage nutrient-rich byproducts of the dairy operation. All DNMP plans are to be implemented by December 31, 2003. At the time this document is being prepared, 14 dairies are located within the SnoTribs watersheds. This number is down from 21 dairies in 2001. Both financial and technical assistance is available to dairies and other commercial animal husbandry organizations through the National Resource

Conservation Service (NRCS) and the Snohomish Conservation District. Whereas Ecology has administered the Dairy Nutrient Management Act in the past, these duties will transfer to the Washington State Department of Agriculture on July 1, 2003.

The average dairy has about 250 cows plus replacement stock and has milking facilities, cattle housing and confinement areas, food storage areas, and waste handling collection and storage facilities. In most cases, manure from cattle is stored in the winter and applied as fertilizer in the summer when plants are actively growing. In this way, the manure is a valuable nutrient for the farmer. Many dairies are located on a flood plain or adjacent to surface water. Manure cannot be applied in winter months when groundwater tables are high and plants are unable to utilize the waste as a source of nutrients. Feed waste, silage leachate, milk-house drainage, and manure from the confinement area or manure storage facility have been found to contaminate runoff at some dairies. Contaminated runoff and overspray from the field application of manure can contribute to bacterial and nutrient pollution.

Nutrient pollution causes decreased levels of dissolved oxygen in downstream waters, which can impair the health of fish and other aquatic organisms. Dairy cattle should not be allowed unrestricted access to streams and ditches to prevent bank erosion and direct deposition of fecal matter by the animals. These best management practices are needed for all livestock operations located in the immediate proximity of a watercourse. In addition, vegetated buffers are highly recommended to protect streams and ditches by providing habitat for support species, reduce nutrient, bacteria and organic matter input, and provide shading to control stream temperatures by reducing the effect of direct solar radiation.

Figure 5. Beef Cattle. All commercial agriculture located near watercourses and drainages should obtain a free farm plan from the Snohomish Conservation District and implement all water quality elements.

Commercial Agriculture Not Requiring a Water Quality Permit

Nonpermitted commercial agriculture is any agricultural activity that is not required to have an NPDES water quality permit as described above. Nearly all commercial agricultural activities do not need this permit and many operate without polluting local surface waters. A wide range of commercial agricultural practices occur throughout the Lower Snohomish Tributaries including beef cattle grazing, dairy farming, small animal production (sheep, llamas), and food production (for both human and animal consumption). In general, a commercial agricultural operation is a business operated for the primary purpose of income generation. When located near a drainage conveyance, potential sources of

pollution from commercial agriculture that can affect bacterial and dissolved oxygen levels in surface water are as follows:

1. Manure handling practices,
2. Improper fertilizer use,
3. Poorly functioning drain tiles,
4. Altered hydrology,
5. Sediment deposition, and
6. Loss or elimination of riparian vegetation

Commercial livestock operations are similar to dairy operations with the exclusion of the milking facilities. Also, the animals spend nearly all their time on pasture. These farms typically include livestock facilities, seasonal feeding areas, and pastures. Water quality concerns will be reduced or eliminated by proper manure management in sensitive areas, improving plant cover through management or reseeding, diverting clean water and armoring the heavy use areas with wood chips or other similar materials. Like dairy cattle, beef cattle should not be allowed unrestricted access to streams and ditches to prevent bank erosion and direct deposition of fecal matter by the animals.

Pastures should be managed to improve prevent soil compaction and stormwater runoff to protect local water quality. All commercial operations should work with the Snohomish Conservation District to develop a farm plan and implement actions related to water quality protection. Recommended BMPs to reduce the input of bacterial pollutants are the installation of exclusion fencing to prevent animal access to streams and riparian areas, improvement of riparian buffers where no trees or hedgerows exist, and installation of systems designed to provide stock watering without direct animal access to waterbodies.

Residential Equestrian Facilities

The majority of land dedicated to caring for horses is associated with homeowners and their personal stables. Like commercial facilities, these horse owners need to carefully manage their pastures and the manure produced by their animals. The range of land types used for residential horse facilities is very diverse. For budgetary and other reasons, residential horse owners frequently have limited area for grazing and exercise. Thus, many times horses live in wooded conditions or are confined to small outdoor paddocks where grass and vegetation is quickly consumed or destroyed. Manure deposited by the animals frequently finds its way into natural drainage corridors and becomes a source of water pollution. All small farms in the proximity of a drainage conveyance should contact the Snohomish Conservation District to have a farm plan developed. This TMDL strongly recommends that local agencies working with residential equestrian facilities be adequately funded to combat this diffuse and significant potential source of bacterial pollution through the development of farm plans and regular technical assistance visits to help homeowners protect local water quality.

Figure 6. Equestrian Facilities. The average horse generates 50 pounds of manure per day (that's 8 tons per year not counting soiled bedding). This owner uses gravel, rubber mats, wood pellet bedding, interceptor drains, and frequent use of the dumping fork to prevent water pollution and improve compost quality. Composting manure is covered to prevent rain from carrying waste to surface water.

Small Farms and Commercial Stables

For the purposes of this plan, the term "small farms" refers to residential properties with horses and other domesticated animals and smaller businesses that raise or care for animals for profit. Examples include production of animal products (such as wool or eggs), recreation (commercial equestrian and veterinary facilities), or dog kennels. Just like larger livestock and animal rearing facilities, these smaller operations have the potential to create pollution by affecting local stream hydrology through land use changes, adding nutrient and bacteria from improper manure handling practices, increasing sediment loading through loss of or change in vegetation in drainage corridors, and removal of riparian vegetation, which eliminates shading and changes the microenvironment around the stream. All small farms in the proximity of a drainage conveyance should contact the Snohomish Conservation District to have a farm plan developed.

Snohomish County is home to a particularly large number of horses, many of which are boarded in commercial stables. Commercial stables typically generate substantial solid wastes when horses are confined to stalls and bedding is used. It is estimated that one horse produces 50 pounds of manure a day…this adds up to over eight tons of manure per year. The additional waste produced from bedding soiled with 8-10 gallons of urine from each horse per day can create a challenge for any small business. It is especially important for these businesses to recognize the importance of proper manure and pasture management to protect water quality. Manure piles should not be located by any water drainage system, including wetlands that connect to local streams. Because wetlands are not suitable for grazing and grass production during much of the year, wetland areas are commonly found close to waste manure piles. Sometimes waste is directly deposited in the wetlands for fill or for convenience. Proper pasture management is also important to ensure that polluted water does not run off site onto neighboring properties or surface waters and that natural groundwater levels are maintained. All commercial stables should have a farm plan developed in conjunction with the Snohomish Conservation District and fully implement all elements relating to water quality protection.

Loss of Base Flows/Altered Hydrology

Changes in stream hydrology play a great role in the water quality of urban, suburban, and some rural areas (Figure 7). When water levels in a stream or creek decrease and pollutant levels stay the same, then the concentration of pollutants in the water becomes greater. It also increases the challenge that we face as a society to reduce pollutants and return streams to good health. Past development practices that quickly shunt stormwater to the nearest creek or stream for disposal cause sudden increases in flow rates, which leads to bank erosion, excessive sediment deposition, and sometimes flooding in downstream areas. This same water, which typically would infiltrate into the ground or be stored in a wetland, is also no longer available during the summer months when there is no rainfall and thus streams are adversely affected in all seasons.

Any area within the basin that has large amounts of impervious surfaces (roads, rooftops, and parking lots) has lost some of its the ability to store water in the winter so that it can feed streams in the summer. This plan will not attempt to identify the many areas where stream flows have been adversely impacted by development. This TMDL recommends that that state and local government work together to advance the use of Low Impact Development (LID) practices in new development and consider LID retrofits as funding and redevelopment opportunities allow.

Loss of Riparian Habitat

As noted earlier in this plan, temperature plays an important role in determining how much oxygen water can hold. When treed stream buffers are removed to establish lawns, establish pasture or cropland, or to make room for development, water temperatures increase due to exposure to warm air and sunlight. Direct shading from trees is one important component that can affect stream temperatures. The other is the size of the buffer around the stream. There is controversy over the proper size of buffers to

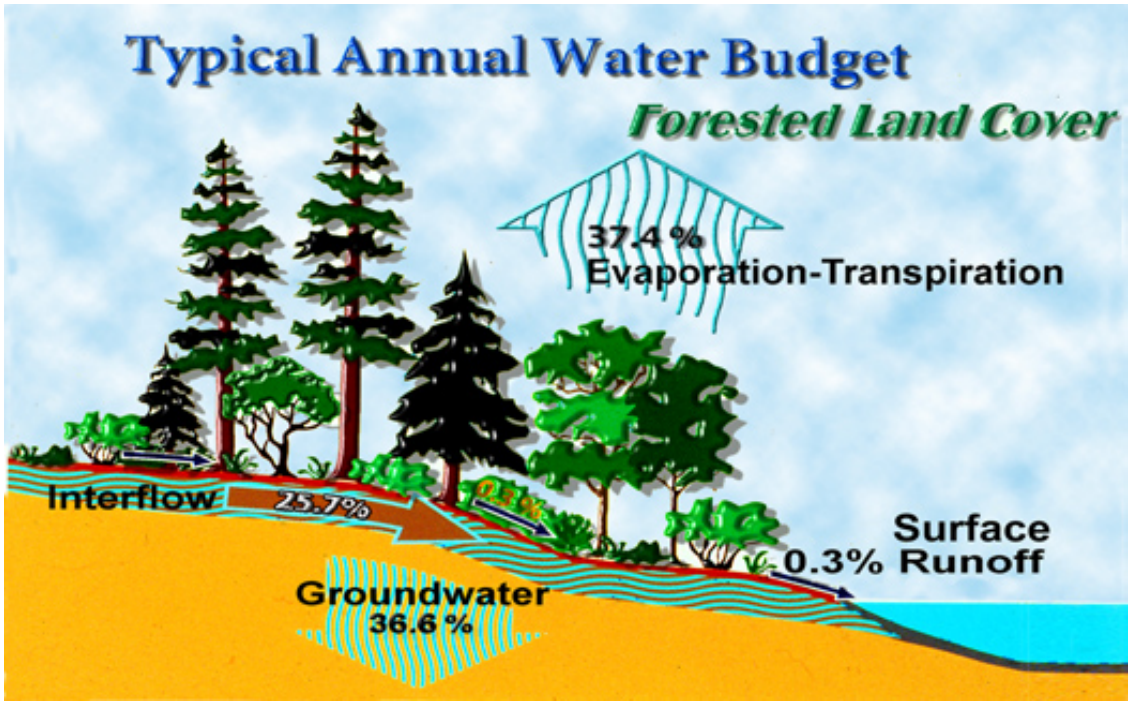
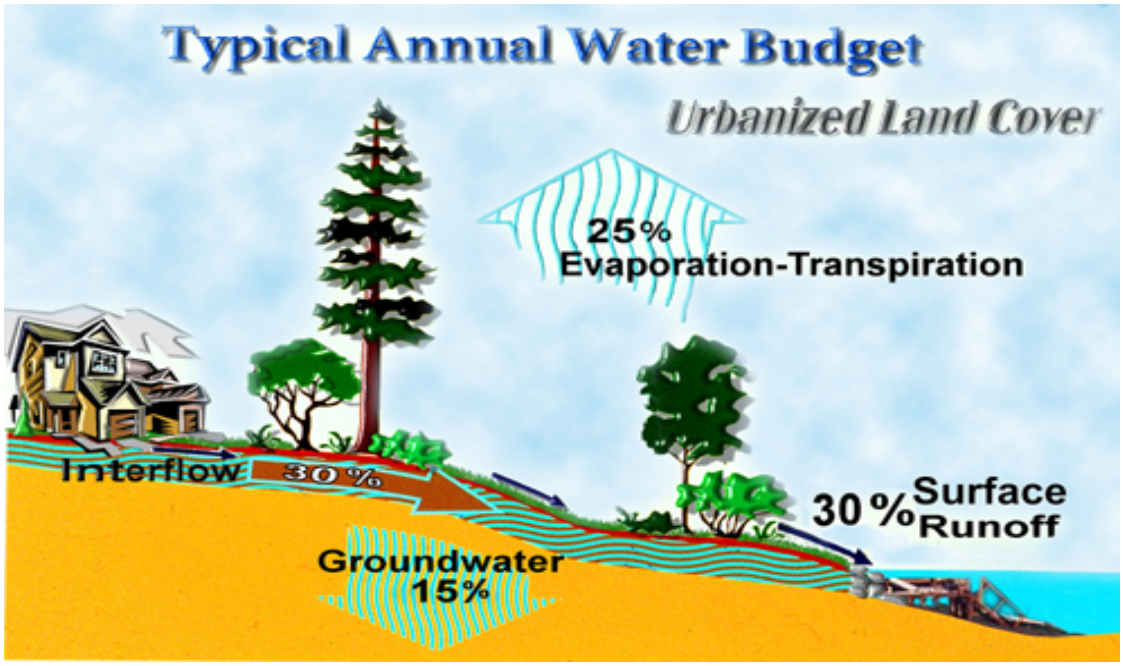


Figure 7. Altered Hydrology. Roads, rooftops, and sidewalks, change the water cycle in significant ways. Where water used to seep into the ground to feed streams in the summer, much of our water resource now runs quickly to a storm drain and is lost to us. Not only can groundwater levels drop (less drinking water) as a result, but when there is less water in streams in the summer, pollution levels rise as well. This same phenomenon contributes to flooding in the winter.



maximize the benefit to streams and stream life. This plan does not seek to answer that question, at this time it encourages all affected landowners and developers to maximize buffer widths consistent with reasonable land use expectations and meeting the goal of providing shading during summer months to help minimize stream temperatures. Regarding the introduction of sediment and other pollutants to streams, certain riparian habitat, such as small shrubs and thickets, can also aid in excluding animals from water and drainage areas while it also helps filter pollutants flowing overland during extended or high intensity rainfall events.

Residential Wastewaters

Residential wastewaters can affect local water quality if treated improperly. Wastewater is created by using toilets, showers, dishwashers, and food grinders (domestic wastewater); car washing; and sometimes when there is excessive lawn irrigation. The health of aquatic life as well as human health can be threatened when wastewater is improperly treated.

Residential wastewater is treated by many means: 1) an individual, on site septic system (OSS), 2) a community OSS, 3) transfer of wastewater to a public sewer system, 4) local storm sewer surface, or 5) surface infiltration and treatment (non-domestic wastes). Residential wastewater transferred to public sewers is not a pollution problem nor a threat to public health in the watersheds addressed by this implementation plan and is not discussed here.

Onsite Septic Systems

Onsite septic systems, both community-based and individual systems are not a problem when designed, sited, and operated properly. A properly functioning OSS uses the soil surrounding the drainfield to remove bacteria and some nutrients from the wastewater. However, soil compaction, clogging of the soil with solids, and hydraulic overload can all cause a failure of the system to adequately treat wastewater. Signs of OSS failure include:

- Odors, surfacing sewage, wet spots, or lush vegetation in the drainfield area,
- Plumbing or septic tank backups,
- Slow draining fixtures, and
- Gurgling sounds in the plumbing system.

If wastewater surfaces as described in the first bullet above, it is possible that this wastewater could go directly to a nearby stream, or it could be carried there when it rains and water travels over the land surface.

Homeowners should contact the Snohomish Health District for assistance if they suspect a problem with their septic tank. Homeowners should have their septic systems pumped and inspected on a regular basis. Information on the location and operation of your septic system is available by calling the Snohomish Health District at http://www.snohd.org/envhealth/www/waste.html or by calling 425-339-5250.

Connecting septic systems to stormwater sewers or piping them directly to surface waters is occasionally discovered and is illegal. Another problem observed in some older septic systems is the subsurface movement of wastewater through extremely porous soils. This latter problem can be a difficult to detect.

Repair costs for failing septic systems can vary greatly and can only be determined on a case by case basis. The Snohomish Housing Authority has a low interest loan program to help moderately-low income residents (family of two less than $46,000 income) to finance septic system repairs. You can contact the Snohomish Housing Authority by calling 425-290-8499 or at http://hasco.org. (See Funding Sources Section for more information).

Home and automotive maintenance activities

Many of the everyday pleasures (or chores, depending on how you look at it) that we take for granted as a normal, acceptable, modern activities can have a dramatic effect on local waters. That is because the local sewers that we find on our street do not take the water to our local sewage treatment plant as one might believe.

Car washing provides a good illustration. Whether we use biodegradable soap or not, the suds that go off our driveway and down the street end up in the local stream. Most folks wouldn't dream of emptying dirty soapy water into the stream but actually, that is just what happens. If water runs off a fertilized lawn, the same thing can happen, although you don't have the suds to let you know the pollution is there—the same goes for pesticides and herbicides we put on our lawns.

Although these sources of wastewater are not sources of bacterial pollution, they can lower the oxygen content of the water far away from where they first enter a stream and cause problems for fish. Pesticides and herbicides are designed to kill, injure, or suppress plant or animal growth, and that is just what they will do in the stream

If possible, wash your car on your lawn—otherwise go to a salmon-friendly charity car wash (the city of Marysville and Snohomish County will help them set the car wash up in an environmentally safe manner), or to a local car wash. Charities operating in the Marysville area can contact the Puget Sound Car Wash Association (PSCWA, 1-800-509-9274) for discount tickets to be used at the Captain Dizzy Carwash on 1203 State Avenue or one of the other 21 participating car washes in the Puget Sound area. If you are interested in having Snohomish County's basin steward talk to you about other ways to reduce your potential to create stormwater pollution through better landscaping, contact Janet Carroll at http://www.co.snohomish.wa.us/publicwk/swm/steward/index.htm.

Figure 8. What's wrong with this picture (other than the plaid shorts?). Car washing water, excess fertilizer, pet wastes, and anything else that can dissolve in water will travel in stormwater runoff and eventually pollute your local lake or stream. Besides washing you car on your lawn or taking it to a car wash, use as little fertilizer and pesticides as you can to help your local creek.

Sediment

Although not generally considered a source of bacterial pollution, sediment can affect local waters in a variety of ways and becomes a problem as a result of land development and use activities. Sediment affects local streams by 1) covering salmon eggs, and 2) filling streams making them wider and shallower. The latter problem affects dissolved oxygen levels by causing water to become warmer due to increased contact with warmer surface air and sunlight. Warmer water holds less oxygen. Two preventable sources are sediment runoff from construction sites and hydraulic scouring caused by increased amounts of stormwater from impervious surfaces.

Fecal coliform bacteria can survive in sediment by bonding to sediment (e.g., clay) or organic matter. The degree to which surface water contamination is affected by contaminated sediments is unknown. This phenomenon has been documented in Puget Sound and is often referred to as "sediment archiving" of bacteria. Agricultural areas are likely locations where sediment archiving of bacteria has already occurred.

Stormwater

Stormwater can be a significant source of bacterial and nutrient inputs to local waterbodies. Ecology's Western Washington Stormwater manual defines stormwater as follows:

> "That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes and other features of a stormwater drainage system into a defined surface waterbody, or a constructed infiltration facility."

However, because this Action Plan addresses both nonpoint and point sources of stormwater pollution, this document must define stormwater very broadly such that it includes 1) rainwater that hits the ground, does not infiltrate at that location and travels to local surface waters without entering a stormwater conveyance system, and 2) rainwater that is collected in stormwater collection systems (pipes or ditches) and is then conveyed to local surface waters. (See the Ecology website @ http://www.ecy.wa.gov/programs/wq/stormwater for more information.) Sources of stormwater pollution that are not conveyed in a regulated stormwater system are discussed individually elsewhere in this chapter.

Urban Stormwater

Urban stormwater can carry bacteria from pet wastes on the ground, surfacing wastewater from failing OSSs, excess nutrients from lawns and gardens, and pollutants associated with activities such as car washing and sidewalk cleaning.

In urban areas around Puget Sound and elsewhere across the country bacteria concentrations in stormwater range from approximately 1,000 to over 100,000 organisms/100 mL (Chang 1999, Doran et al. 1981, Pitt 1998, Varner 1995). In a recent study by the Center for Watershed Protection, mean fecal coliform concentrations in urban stormwater were 15,000 cfu/100 mL (Center for Watershed Protection, 1999). That same study showed that nearly every individual stormwater runoff sample exceeded bacterial standards, usually by a factor of 75 to 100.

Figure 9. Urban stormwater. If there was such as thing as a pollution smorgasbord, urban stormwater would be the ultimate dining experience. Laden with fertilizer, pesticides, petroleum products, heavy metals from tire wear, and bacteria, to name a few, we now know that we must increase our efforts to protect local waters from this pollution source. Most storm drains in Western Washington drain directly to a pond or ditch that empties into fish bearing waters.

DNA ribotyping studies of bacteria found in streams and creeks in urban Puget Sound streams consistently show the presence of bacteria from dogs and cats (Table 2). In a watershed containing 100,000 people, it is estimated that dogs alone generate over two and one half tons of feces each day—that is almost 2 million pounds per year. Although current methods do not allow for quantification of sources, the consistent presence of pet waste in regional studies indicates that BMPs to control these particular sources should begin as soon as possible in obvious public locations where animals are taken for exercise and there is a high potential for stormwater contamination where they may defecate.

Figure 10. Fluffy's pet waste. Studies show that both dog and cat waste are finding their way into our local streams. Citizens associations and local governments should work together to make pet waste disposal as easy as possible where it is needed the most. Shown is a pet waste management station located where urban and suburban residents walk their pets on a daily basis. (Photo courtesy of Dogipot Inc.)

Unfortunately, our ability to accurately quantitate the contribution from any single bacterial source (either domesticated or wild animals) using DNA ribotyping is still a goal.

Corrective/preventative actions for Municipal Stormwater: Federal regulations address urban stormwater through the Phase I and Phase II Municipal Stormwater Permit programs. Snohomish County currently has a Phase I permit and many cities and towns will be covered by the Phase II permit program in the future. Many of the basic provisions of these permit programs will contribute to this TMDL.

The portion of stormwater generated in the SnoTribs focus area that is located in, and conveyed through stormwater systems operated and maintained by Snohomish County, is regulated by Ecology's Phase I General Stormwater Permit for the Island/Snohomish Water Quality Management Area. The county's current permit contains the elements shown below.

1. Eliminate illicit discharges (such as illegal sanitary sewer connections),
2. Analyze, prioritize, and schedule the implementation of stormwater management needs,

3. Establish adequate legal authority to control stormwater discharges from its stormwater system,
4. Monitor the effectiveness of its stormwater management program,
5. Develop watershed-wide coordination mechanisms for shared waterbodies,
6. Develop a program to control runoff from new development, redevelopment activities, and construction sites discharging to the storm sewer system,
7. Ensure appropriate treatment and source control measures are in place to reduce pollutants from existing commercial and residential areas discharging to the storm sewer,
8. Ensure appropriate operation and maintenance of stormwater facilities discharging to the storm sewer system, and
9. Development of an educational program aimed at residents, businesses, industries, and employees whose job functions may impact stormwater quality.

The Phase II Municipal Permit will be issued to communities located within urbanized areas as determined by the U.S. Census. For more information on the Phase II and other stormwater permits, visit NPDES section at the EPA website @ http://www.epa.gov/owm/index.htm. The terms and conditions of Ecology's Phase II Stormwater permit have not been determined yet. During the years 2003-4, Ecology will draft the eligibility requirements and the conditions of the permit for public review. At a minimum, the Phase II Municipal Stormwater permit will require permit holders to address the following federal requirements):

1. Public education and outreach
2. Public participation/involvement
3. Illicit discharge detection and elimination
4. Construction site runoff control
5. Post-construction runoff control
6. Pollution prevention/good housekeeping
7. Implementation of applicable TMDLs
8. Program evaluation and reporting

Although federal requirements for Phase II permittees are frequently cited as being comprised of six minimum measures (Code of Federal Regulations, 40 CFR 122.34(b)), there are also requirements to address applicable TMDLs (40 CFR 122.34(e)) and to perform program evaluations and reporting of such findings (40 CFR 122.34(g)).

Special Permit Requirements for Municipal Stormwater Permits

Federal law requires applicable TMDLs to be addressed when water quality permits are issued. Where a TMDL has been approved, NPDES permits must contain effluent limits and conditions consistent with the TMDL (40 CFR 122.44(d)(1)(vii)(B), 40 CFR 122.34(e)(1)). Additionally, State law (RCW 90.48) does not permit the introduction of polluting matter into state waters. Although effluent limitations are typically expressed in a numerical form,

Table 2. Summary of bacteria sources identified in urban streams in Puget Sound. Data provided is shown as a percentage of the total isolates evaluated. Values shown do not accurately reflect source concentrations from each category (Glennwood, Edgewater, Swamp Creeks per Mathias 2003; Woodland Creek from TCPH 2002).

Source	Glennwood Creek	Edgewater Creek (2000)	Swamp Creek (2000)	Woodland Creek (2002)
Avian	28	3.4	11	11
Cat	14	6.8	1.6	1.5
Dog	21	7.4	14.3	10.3
Canine				14
Opossum	2	2.7	2.4	1.5
Rabbit	0.5			
Raccoon	2	10.8	7.1	5.1
Rodent		2	0.8	5.1
Storm Drain	9			
Human	0.5	1.4	2.4	14.7
Squirrel		1.4	0.8	
Deer				6.6
Multi species				6.6
Beaver				3.7
Horse				3.7
Bovine				3.7
Goose	1.3	1.4	4.8	2.2
Sea gull	0.7	0.7	1.6	1.5
Chicken			2.4	0.7
Duck		2		
Unknown	21	60.1	50.8	8.1
Total	100	100	100	100

effluent limitations for municipal stormwater discharges should be in the form of BMPs. This TMDL recommends an iterative, adaptive management BMP approach be taken.

Each municipality affected by this TMDL faces variations in the number of potential source areas, types and numbers of land uses, financial constraints, and other issues that will affect the scope TMDL-related activities within their jurisdiction. Ecology recognizes this and intends there to be flexibility in the development and implementation of BMPs and water quality monitoring programs associated with this TMDL. It should also be noted, however, that where surface waters have been identified as polluted, it is assumed that existing

resources and programs alone are inadequate to address the problem and additional steps must be taken to resolve existing pollution problems.

In order to demonstrate progress towards meeting water quality standards, the following are actions that Ecology intends to include as permit requirements in Phase I and Phase II Municipal Stormwater NPDES permits for entities whose stormwater discharges are identified as sources of loadings to this TMDL. These requirements will be included in the first permit issued after the completion of the Detailed Implementation Plan. Subsequent permits will include different requirements, depending on the success in achieving the goals of the TMDL.

The baseline requirement for all municipal stormwater permittees includes adoption and enforcement of an ordinance requiring the application of source control BMPs related to bacterial pollutants (equivalent to Volume IV of the 2001 Ecology Stormwater Management Manual for Western Washington) for existing land uses and activities that generate bacterial pollution. Specifically, Volume IV contains BMPs for 1) commercial animal handling areas, 2) commercial composting facilities, and 3) illicit connections to storm drains. Where these activities are not occurring, no action is required.

Where potential sources do exist, operational source control BMPs shall be required for all pollutant generating sources. Only in those cases where a facility is demonstrated to be causing a violation of surface or groundwater standards, or is discharging illegally, shall structural source control BMPs shall be required as related to this TMDL. The provision for structural source control BMPs is not intended to apply to individual municipal stormwater outfalls.

Monitoring for BMP effectiveness is essential to the success of this TMDL. Therefore, one or both of the following implementation strategies must be applied on either a jurisdiction wide or sub-basin scale during the first permit cycle. Strategy A is the default implementation strategy unless the permittee chooses to implement Strategy B in all or part of the area subject to the TMDL:

Strategy A, Targeted Implementation Approach

- Conduct sampling of streams and/or discharges from stormwater conveyances to determine areas with highest bacterial pollutant concentrations (high priority areas)
- Conduct additional monitoring in high priority areas to locate sources
- Develop a Bacterial Pollution Remediation Plan
- Conduct public review of and finalize the Bacterial Pollution Remediation Plan prior to submitting new permit application at the end of permit cycle

Strategy B, Early Action Approach

- Propose Early Action BMP plan within 6 months of permit effective date
- Conduct public review of the Early Action BMP plan
- Implement Early Action BMPs
- Design and implement a water quality monitoring program that assesses whether or not affected waterbodies are meeting state water quality standards

- Update early action BMP plan at the end of the permit cycle to create a Bacterial Pollution Remediation Plan.

The *Targeted Implementation Approach* has the benefit of providing additional assurance that BMPs will be effective when applied in target areas. This approach delays the certainty of BMP implementation until the following permit cycle; however, where the contribution of individual source categories is very unclear, this is a valid and acceptable approach. High priority areas shall be determined for both dry and wet seasons through sampling of stormwater and/or receiving waters. The Bacterial Pollution Remediation Plan is then prepared and reviewed through a public process during the first permit cycle. Implementation of the Plan will be required in the following permit cycle. This TMDL encourages the voluntary initiation of BMPs at the earliest possible date. Determination of pollutant loading levels is highly encouraged as part of this required monitoring.

The *Early Action Approach* has the benefit of focusing available funding immediately on BMP implementation, some of which may already be proposed as a voluntary option in this plan. These BMPs, which will be implemented within one year of the permit effective date, shall specifically address bacterial pollution across MS4s affected by this TMDL. This suite of BMPs shall be accompanied by adequate receiving water monitoring to determine whether surface waters are meeting state bacteria standards during both dry and wet seasons. Activities required in subsequent permits will be based upon the use of adaptive management principles and the documentation of future actions in the updated Bacterial Pollution Remediation Plan. Monitoring of stormwater and determination of pollutant loading levels is highly encouraged as part of this required monitoring.

For each of the strategies above, the actions detailed in Table 3 shall be considered and discussed for inclusion in the Bacterial Pollution Remediation or Early Action BMP Plans.

Pet waste BMPs outside of commercial settings are not being required at this time due to the lack of quantitative data on loadings from this source. However, because of the overwhelming evidence of pet waste in Puget Sound stormwater, the availability of educational techniques and structural facilities to address this pollution source, and the potential for pet waste to harbor and transmit disease to humans, municipal stormwater permittees are highly encouraged to begin the strategic use of BMPs immediately to control pet waste as they develop their stormwater programs.

Industrial Stormwater

At this time, the only identified industrial stormwater pollution source within the SnoTribs TMDL area is composting facilities. This TMDL recognizes the strategic use of compost as a soil amendment. Because of its value in filtering pollutants and reducing stormwater runoff, the use of compost should be promoted as a pollution prevention and remediation tool. In addition, properly operated composting facilities conserve manure as a valuable resource thus helping to ensure it does not enter local waters.

Table 3. Implementation Plan Considerations. Municipal stormwater permittees must consider the applicability of the following approaches in the development of their Bacterial Pollution Remediation Plans. Where Watershed Plans have been developed, permittees should refer to those plans.

Action Item	Phase I	Phase II
Development and implementation of a Livestock Ordinance	X	
Development and implementation of a Pet Waste Ordinance	X	X
Evaluate current water pollution ordinance enforcement capabilities	X	X
Evaluation of critical areas ordinance in relation to TMDL goals	X	X
Development and implementation of a Compost Ordinance	X	
Development of an educational program directed at reducing bacterial pollution	X	X
Investigation and implementation of methods that prevent additional stormwater bacterial pollution through stormwater treatment, reducing stormwater volumes, and preventing additional sources of stormwater in association with new development	X	X
Implementation of activities in the SnoTribs Watershed Management Plans that address bacterial pollution and dissolved oxygen problems	X	X
Ambient water quality and stormwater quality sampling to specifically identify bacterial pollution sources	X	X

Many composting facilities use animal manure in their process and thus have a potential to contribute bacteria to local waters. Composting facilities do not have a wasteload allocation for discharging bacteria to the waters covered by this TMDL. There are several types of composting facilities either present, or anticipated to be present, that need to address their potential to pollute. All facilities applying wastewater or compost onsite need to have a farm plan prepared by the Snohomish Conservation District and should only apply wastes and wastewater at agronomic rates.

Composting facilities that are associated with an active dairy, and which commingle compost leachate or other stormwater with other dairy wastewaters, should manage their compost-related wastewater through their dairy nutrient management plan.

Composting facilities not associated with an active dairy must apply for an industrial stormwater permit. Ecology will review these stormwater pollution prevention plans (SWPPP) on an individual basis to ensure that they adequately address the potential to pollute. Facilities that apply wastewater to land (discharge to ground) will be required to work in conjunction with the Snohomish Conservation District or other suitable professionals to ensure that wastewaters are properly treated and applied at agronomic rates. Where drain tiles are present and where approved by the SWPPP, BMPs should be adopted in the SWPPP to ensure that these pipes do not become conveyance systems for

bacterial and other pollutants. Where necessary, Ecology will require monitoring of stormwater discharges, or ambient monitoring to ensure stormwater discharges are not contributing to bacterial pollution problems.

Wastewater Treatment Plants

Wastewater treatment plants are currently not a significant contributor of fecal coliform bacteria pollution in the area covered by this implementation plan. The only treatment plant in the tributaries addressed here is the Granite Falls WWTP. Wastewater treatment plants treat human sewage to remove solids, biological oxygen demand and nutrients. At the end of the treatment process Granite Falls WWTP disinfects its final effluent using chlorine. The Granite Falls WWTP is currently planning to increase in size and is examining it options regarding the location of its outfall. Currently, Ecology anticipates that the plant will violate its zinc limits if the outfall properties are not changed. Granite Falls will be performing a water quality study in 2003 to evaluate new outfall locations and will perform fecal coliform monitoring of ambient waters during the study.

Wildlife

Similar to other nonpoint sources, wildlife contributes to the level of bacteria in surface waters. Contributions from wildlife are typically not considered pollution. In those cases where man-caused alterations of the natural environment have caused concentrations of wildlife that lead to high bacteria levels, wildlife contributions may be considered a source of pollution that should be reduced. Examples of man-caused alterations may include certain agricultural areas (birds congregating on warm farm roofs for example) or recreational areas offering year-round refuge for large numbers of Canadian geese. At this time, no such areas have been identified in the SnoTribs study area.

Figure 11. Are Wood Ducks contributing to our bacterial pollution problems? Ducks, geese, and other wildlife in their natural settings are not generally considered sources of pollution by this TMDL. However, where human activities are concentrating animal populations and no other sources exist to explain high bacteria numbers, the increased risks to human health should be addressed.

ORGANIZATIONS PARTICIPATING IN CLEAN UP EFFORTS

The following agencies are cooperating on the implementation of the Lower Snohomish Tributaries TMDL. A complete list of the ongoing and planned voluntary actions to improve water quality in the SnoTribs watersheds is provided in Appendix B.

Appendix B contains voluntary actions proposed by participating organizations agencies—it is not intended to identify mandatory BMPs for municipal stormwater permit holders, although projects noted may be incorporated into BMPs at some point in the future. The tables in the appendix describe projects where funding or local commitment has been made, and in some cases projects that the entity would like to accomplish for which funding or staffing do not yet exist. In the case of unfunded projects, a brief description of the strategy to fund/staff the project is provided wherever possible. Where potential funding sources have not been identified, each agency has committed to work with Ecology staff in the future to try and identify one. The schedules for beginning implementation projects were developed by each of the implementing agencies.

Federal, Tribal, and State Entities

Environmental Protection Agency

The 1997 Memorandum of Agreement between the Environmental Protection Agency, Region 10 and Ecology requires that EPA and Ecology jointly evaluate the implementation of TMDLs in Washington. These evaluations will address whether interim targets are being met, whether implementation measures such as BMPs have been put into effect, and whether NPDES permits are consistent with TMDL wasteload allocations. These evaluations must be submitted to the Plaintiffs of a 1998 Settlement Agreement during the following years: 2003, 2008 and 2013. In the absence of Tribal authorization for a CWA program, EPA is also responsible for administering the provisions of the Clean Water Act on Tulalip Tribe lands.

EPA provides technical assistance and funding to states and tribes to implement the Clean Water Act. For example, EPAs 319 grants, and point-source and non-point source SRF loans are made available to stakeholders through Ecology's competitive Water Quality Financial Assistance Program. On occasion, the EPA also has other grant monies available (104(b)(3)) to address storm water pollution problems. The EPA will work with Ecology to contact appropriate stakeholders within the watersheds addressed by this TMDL when these funds are available.

Tulalip Tribes

The Tulalip Tribes are successors in interest to the Snohomish, Skykomish, and other bands and tribes of Indians who inhabited the drainages of the rivers which now bear their names as well as parts of Whidbey and

Camano Islands and the mainland shore from Mukilteo north to the mouth of the Stillaguamish River. Today the adjudicated usual and accustomed fishing area of the Tulalip tribes extends from the Canadian border 120 miles south to the northern end of Vashon Island.

In their work to protect and enhance the fisheries of the Snohomish Basin, the Tulalip Tribe has conducted extensive water quality sampling and is currently involved in many activities to understand the biology and environmental needs of salmon. Currently, the Tulalip tribe has over 30 staff working on natural resource issues. They are the first government in our area to commit to membrane filter technology for municipal wastewater treatment and are looking to the future to use the high quality effluent for groundwater recharge, streamflow augmentation, and habitat creation and enhancement.

The Tulalip Tribe oversees rural residential, commercial, industrial, and suburban areas that have the potential to contribute contaminated stormwater to Quilceda Creek and will work cooperatively with the state and nonprofit groups to identify and resolve bacterial pollution problems such as poor farm management and failing septic tanks. Where it is feasible, the Tulalip Tribe infiltrates stormwater in order to maintain groundwater recharge and thus summer base flows in local creeks—the new Casino is an example of this policy in action. A stormwater management plan for certain higher density areas of the Reservation is currently under development.

WQ Projects

The Tulalip Tribe performed a water quality monitoring study of the lower Quilceda and Allen Creek drainage during 1999. The lower Quilceda site, which is located about 0.4 miles upstream in the main channel, had fecal coliform levels within state standards. Similarly, the Quilceda Tidal Channel was also within bacteria standards. Allen Creek watershed drainages exceeded state water quality standards. Selected sites in Quilceda Creek have been monitored since 1987. The number of sites monitored has varied from year to year depending on project objectives. Most of the sites that have been monitored throughout this period are located on the Reservation. The results of this monitoring effort have been reported in Thornburgh et al. (1991), Halpin et al. (1991), Paul and Nelson (1996).

Specific projects of particular interest to the Tribe and this TMDL include the development of a Biogas-powered energy generation plant that will help local farmers manage and derive additional value from the manure generated by their dairy cows. The Tribe is also interesting in supporting and coordinating the purchase of easements in agricultural areas in order to improve the filtering of bacterial pollutants and increasing shading. Shading is needed to reduce the effect of solar radiation on heating local waters and lowering its ability to hold oxygen vital to supporting salmonids and other aquatic organisms. The Tribe will be investigating their ability to provide sewer service to areas currently served by septic tanks at some time in the future.

Washington State Department of Ecology

Ecology has been delegated authority by the EPA to implement many aspects of the federal Clean Water Act. This includes the National Pollution Discharge Elimination System (NPDES) permitting and the Total Maximum Daily Load (TMDL) program. The Snohomish River Basin is under the jurisdiction of Ecology's Northwest Regional Office (NWRO). The NWRO has one inspector who implements RCW 90.64 (the Dairy Nutrient Management Act outlined earlier in this document) in Snohomish and King Counties. The NWRO also has one permit manager who is responsible for preparing and assisting the regional municipal enforcement specialist to ensure compliance with the permits for the sewer treatment plants. Ecology has one stormwater inspector responsible for Snohomish and Kitsap Counties. Ecology also provides technical support to municipalities as they develop and implement stormwater programs. Through funding from the EPA, Ecology has one regional staff person that oversees the development and implementation of TMDLs across the Island and Snohomish watersheds as well as the North Creek watershed. Ecology's Environmental Assessment Program will assist in effectiveness monitoring approximately five years following TMDL approval.

Through the Centennial Clean Water Fund, 319 Fund and State Revolving Loan Fund Ecology also helps local governments with funding for water quality facilities and activities. The full range of Ecology funding opportunities is discussed under the section "Funding Opportunities." It is essential to the success of this TMDL that Ecology continue to coordinate TMDL activities within the Snohomish Tributaries area and continue to provide grant funding opportunities to assist in funding TMDL activities.

Puget Sound Water Quality Action Team

The Puget Sound Water Quality Action Team (Action Team) works to restore and protect the biological health and diversity of Puget Sound by protecting and enhancing Puget Sound's water and sediment quality; its fish and shellfish; and its wetlands and other habitats. The Action Team includes a chair appointed by the Governor, directors from 10 state agencies, and representatives from tribal, federal and local governments. Its staff works with tribal and local governments, community groups, citizens and businesses, and state and federal agencies to develop and carry out two-year work plans that outline measurable actions, as well as expected results to improve the water quality and habitats for fish, marine animals and other aquatic life in Puget Sound.

The Action Team's local liaison for Snohomish County works directly with cities, tribes, counties, and others to help facilitate and coordinate a wide range of activities related to improving water quality in Puget Sound. Two specific Action Team priority program areas have direct relevance to this TMDL: 1) The Public Information and Education (PIE) program which can provide funding to qualified local governments to educate the public on bacterial pollution problems within the TMDL focus area and 2) Stormwater management and promotion of Low Impact Development practices. This TMDL encourages affected local governments to work with the Action Team to continue spearheading the development of updated models, written guidance, and other tools that

will both educate local governments on and help them to implement LID practices within their jurisdictions.

Natural Resource Conservation Service

The Natural Resources Conservation Service (NRCS) provides technical guidance and funding for a number of programs that affect water quality. The NRCS works primarily with the agricultural community acting as the technical resource for farm plan preparation. In partnership with other parts of the U.S. Department of Agriculture, the NRCS also oversees the construction and operation of dikes, pump stations, and other devices associated with the engineering of floodplain areas to facilitate agricultural activities. The Service also administers several important financial assistance programs including the Conservation Reserve Enhancement Program (CREP), Environmental Quality Incentives Program (EQIP), Wild Life Incentive Program (WHIP), and the Wetland Reserve Program (WRP), which are discussed in more detail later in this document.

This TMDL recommends that NRCS strongly weigh the presence of TMDLs when prioritizing grant funding for water quality improvement projects. There is a special category of EQIP funds targeting innovative projects, which should be explored for developing water quality plans for flood control districts. Continued education to the farming community and expanded outreach and encouragement for participation in CREP, EQIP, WHIP, and WRP can also contribute to this TMDL.

Snohomish County Government

The activities of several branches of Snohomish County Government can affect the overall water quality in the SnoTribs watersheds. The bulk of water quality related activities are carried out by Snohomish County Pubic Works, which performs a variety of pollution identification and prevention activities. Snohomish County Planning and Development Services is also very important as it oversees building and land development activities and performs enforcement. Because past land use practices so greatly affect water quality, the activities of this department are especially important to pollution prevention.

Snohomish County Public Works

Surface Water Management

Surface Water Management is involved in a wide range of water pollution control activities including education, water quality monitoring, riparian restoration, salmon recovery, native plant salvaging, and NPDES permit administration. Education is conducted through the Watershed Keeper's, Salmon Watcher, and other programs as well as the activities of a Snohomish Basin Watershed Steward. Surface Water Management also provides funding and coordinates with the Snohomish Conservation District. Water quality is tracked through ambient, targeted

source identification, illicit connection, and stormwater monitoring. Volunteer monitoring is also coordinated by Surface Water Management staff. Several Surface Water Management staff members have lead roles in the WRIA 7 Salmon Recovery Forum, which includes water quality as a component of its efforts to improve salmon stocks. The proactive and remedial activities of Surface Water Management are essential to the success of this TMDL

Surface Water Management finalized the Quilceda/Allen Watershed Management Plan in 1998 and recently completed the Drainage Needs Report, which provides valuable information on the hydrologic profile of waterbodies within the unincorporated areas of the county's urban growth area (UGA). Because water quantity is integral with water quality, it is important for the county to work with local governments to implement the findings of the study and take other actions as necessary on a watershed scale to help ensure that water quantity management and pollution abatement planning within the UGAs is comprehensive and effective. This TMDL recommends that all such planning efforts focus on maintaining, and improving where possible, the existing hydrologic profiles of local waters so as to not exacerbate the existing water pollution problems.

The county should continue to work in partnership with the Snohomish Health District in identifying and resolving pollution from on site septic systems. When necessary, both parties should work with local sewer districts to point out the long term need for expanding domestic wastewater collection and treatment services. Criteria should be established for determining where sanitary surveys are needed. Partnerships with SHD to provide adequate sanitarian resources to perform sanitary surveys are highly encouraged.

Because of the widespread distribution of bacterial pollution sources, it is important for SWM to identify pollution sources through ambient and targeted water quality monitoring. Source identification efforts are needed in both urban and rural areas. Because local research has shown pet waste to be prevalent in urban stormwater, systematic efforts should be taken to address this source of bacterial pollution. The county is encouraged to explore new and innovative techniques.

Solid Waste Management Division

Solid Waste Management has important programs that affect both pet waste and livestock waste management issues. In collaboration with Surface Water Management, Solid Waste Management develops educational material on how to best manage pet wastes. Because pollution from pet waste is considered widespread throughout the county, it is important that educational material be kept up to date and distributed widely to city governments, who must address this pollution source in their MS4s.

Solid Waste Management also seeks to maximize the value of locally produced compost for improving water quality by promoting its use as both a soil amendment to reduce stormwater runoff and using it as a pollution filtering best management practice. Support for the use of compost in these and other systematic and beneficial ways is an important element for this TMDL. The strategic management of manure is likely to result in a long term environmental and economic improvement of the Snohomish Tributaries watersheds

through its attributes in pollution prevention and ability to generate additional income for the agricultural community. This TMDL encourages the exploration of compost cooperatives and biogas generation.

Snohomish County Planning and Development Services

Snohomish County Planning and Development Services (PDS) develops and administers county regulations for commercial and residential development as well as public projects. The PDS also enforces the Snohomish County Code as it relates to protection of water quality, implements the Critical Areas Ordinance and other development regulations, and works closely with the agricultural community through its agricultural liaison and the Agricultural Advisory Board to help ensure the future of agriculture in the county. An experimental LID ordinance was written in 2001 and county staff are exploring where a pilot LID project may be promoted. The PDS has performed research on stormwater BMPs and provided educational outreach to contractors on proper BMP use.

This TMDL recommends that PDS promote the use of LID practices to prevent the generation of additional, pollution laden stormwater, and to prevent losses in groundwater levels and summer base flows in local creeks. It is important that the county work with the agricultural community to properly manage livestock. Where businesses (dog kennels, commercial equestrian facilities, etc…) or small farms are contributing bacterial pollution to the MS4 system, policies, procedures, and resources should be made available to address this problem. Both technical outreach and enforcement are recommended. In areas where such needs are not already required by the Phase I permit process to prevent bacterial pollution entering the MS4 system, this TMDL highly recommends that similar resources be made available to address those potential pollution sources. In order to aid in the control of bacterial pollution from improper manure management practices, the county should control discharges from composting facilities by adopting and enforcing a compost ordinance.

Due to the temporal nature of many water pollution problems, Code Enforcement staff should work to ensure that referrals from Surface Water Management staff are addressed promptly. When technical assistance is inappropriate or ineffective, Code Enforcement is an essential follow up activity to remove known bacterial pollution sources and also a valuable deterrent to potential violators. Web-based resources should clearly identify the role of Code Enforcement in addressing water quality complaints.

Snohomish County Parks and Recreation Department

The Snohomish County Parks and Recreation Department oversees over 9,000 acres of public land for recreational use and conservation purposes. The Department works with other parts of county government to manage county lands, administers a variety of educational programs, and develops and maintenance of park facilities.

There are a number of Department activities that could be targeted to help improve the quality of local waters addressed by this TMDL. Where opportunities for improving riparian habitat exist through the rehabilitation of existing public land, this TMDL

encourages the Department to identify locations within this TMDL focus area where improved shading can decrease water temperatures and improve the potential to hold dissolved oxygen. Similarly, the Department is encouraged to identify wetlands may be restored to aid in the uptake of excessive nutrients or excessive levels of bacteria. The Department administers county funds for the annual purchase of land for both recreational and conservation purposes. Although many high priority sites exist, it is recommended that areas with significant watershed restoration potential (especially the purchase of drained agricultural areas in headwater areas) receive special consideration based on their long term value to county residents.

Where recreational lands are managed, such as the Centennial Trail and other park systems, opportunities to site pet waste collection systems near waterbodies or stormwater conveyance systems should be evaluated. As funding is available, collection stations and educational kiosks should be installed and maintained at suitable locations. The Department is also encouraged to educate the public on how to best minimize their impact on the environment as they use park facilities.

Cities and Towns

City of Arlington

The city of Arlington is located within the headwaters of the Quilceda watershed providing services to a population of approximately 14,000 residents. Some stormwater generated within the watershed is transferred to the Stillaguamish basin. Land use within Arlington's portion of the watershed is a mix of residential, light industrial, and commercial properties. Edgecomb Creek and three other small streams contribute flows from the city.

The city will be covered under Ecology's new Phase II stormwater permit program, which Ecology expects to issue during 2004. The city has applied for a Phase II permit and is developing its stormwater comprehensive plan, which may be drafted by the end of 2003. In early 2003, a stormwater utility was adopted and the rate structure analysis is being conducted as part of the comprehensive plan development. The city currently contracts out the cleaning of catch basins and will be developing a plan of priority maintenance activities with the development of the comprehensive plan. Ecology's 1992 Stormwater Manual is currently in use and discussions on adopting the new Western Washington Stormwater Manual are ongoing. Water quality and pet waste ordinances are not yet in place but will be evaluated during comprehensive plan development. One measure of the city's concern for environmental issues may be seen at their wastewater treatment plant, which recently received three awards from Ecology for meeting all permit conditions. The city also recently received the U.S. Environmental Protection Agency "Clean Water Partner for the 21st Century award. It is the city's long-term plan to use wetlands and natural systems instead of engineered systems to resolve and prevent environmental problems.

Water quality monitoring within city boundaries is performed at Portage and Prairie Creeks in the Stillaguamish Watershed. The city has referred to Snohomish County monitoring data to assess conditions in the Quilceda basin to date. City staff will be coordinating with Snohomish County, city of Marysville and Ecology in the future to determine where additional monitoring is needed in the Quilceda watershed.

The city works actively with local and surrounding communities on water quality, watershed process and fisheries issues. Among the many vehicles used are the Stormwater Rate Structure Committee, Arlington Watershed Action Committee, Allen/Quilceda Watershed Action (AQWA) Team, the Portage Creek Stewardship Program and the Stillaguamish Implementation Review Committee (SIRC) which functions as the Stillaguamish Watershed Council. The Arlington Utilities Department is working with Ecology on executing a Resource Conservation Program focusing on the wise use of water, recycling and prevention of industrial waste accidental spills. The city also works with the Stillaguamish Tribe on many fisheries issues. A city website is currently under development and will augment the monthly newsletter sent to all residents.

The city has recently constructed a facility to compost biosolids generated at the Arlington Wastewater Treatment Plant. The city intends on using the biosolids at Parks first then will market the product. This TMDL encourages the use of biosolids to amend poor soils and improve moisture holding capabilities. This strategy is considered valuable for reducing stormwater volumes and improving natural hydrologic processes in areas that have undergone development.

This TMDL encourages the city to continue with educational programs and move forward on the installation of pet waste management stations in appropriate locations as early actions to resolve bacterial pollution problems. As in all areas covered by this TMDL, a combination of water quality monitoring and evaluation of land uses is needed to locate specific pollution sources and programs to reduce or eliminate those sources.

City of Everett

The city of Everett is the largest of the six cities within the SnoTribs TMDL area, but only a small fraction of the city contributes to the Marshlands watershed. Everett has enforcement authority for water quality related issues. Surface Water Management, which is part of the city's Public Works Department, has several ongoing programs to address pollutants entering local surface waters. Citizens can report pollution problems to a 24-hour emergency telephone number or send e-mail to the city's surface water web site. The web site also provides information on how citizens and educators can learn more about water pollution issues as well as how to get involved in local activities. The business community can also participate in the city's "Partners for Clean Water" program.

The city sponsors volunteer groups aimed at stenciling storm drains (dump no waste drains to stream), installing Grate Mates, and provides charity benefit car wash kits that prevent illicit discharges to the city's drainage system. The car wash program has been developed to offer residents a way to perform charity car washes while avoiding impacts to local surface waters—efforts such as these help improve dissolved oxygen levels downstream in the Marshlands Flood Control District. Everett was the key sponsor of the Grate Mate program during its development stage. Everett has mapped all detention facilities and drainage lines within city limits using GIS and inspects most detention systems in the Marshlands portion of its service area annually to help control peak flows, stream scouring, and sediment deposition in the Marshlands watershed. The city provides annual payments to the Marshlands Flood Control District to help manage the stormwater they receive from the city's portion of the watershed.

The city of Everett performs quarterly water quality monitoring at its Wood Creek/Larimer Road station. Twenty three measurements have been collected from 1998 to the time of this report (9 dry season, 14 wet season). Although the use of quarterly data is not generally used for determining compliance with state standards due to the possibility of masking temporal trends, the geometric means and 90th percentile values for both seasons are well under standards (27 and 10 cfu/100mL, respectively for geomeans, 80 and 46 cfu/100 mL, respectively for 90th percentile values). Dissolved oxygen levels were over 10 mg/L in all measurements taken since 1998 with the exception of one value of 7.7 mg/L in May 2001. Thus, it appears that the upper portion of the Wood Creek watershed is unlikely to be a major source of bacterial pollution.

City staff view funding as a significant issue in resolving the water quality problems in the Marshland watershed.

Town of Granite Falls

Although several of the municipalities within the area of this plan manage a sewer treatment plant (Monroe, Snohomish, Marysville, Arlington, Lake Stevens, and Granite Falls), only the Granite Falls wastewater treatment plant (WWTP) discharges to a tributary within the SnoTribs basins. Ecology's TMDL study efforts have determined that the discharge from the Granite Falls wastewater treatment plant has very little effect on downstream bacteria levels when the NPDES permit levels are achieved. Ecology has a dedicated municipal compliance specialist to investigate and resolve any compliance problems if they ever occur at the Granite Falls WWTP. The Granite Falls WWTP is currently undergoing improvements.

Like the other municipalities in the study area, the town of Granite Falls will be covered by the Phase II Municipal Stormwater Permit. The town of Granite Falls has not yet applied for a Phase II permit. Ecology staff will be working to ensure Granite Falls develops an appropriate stormwater management program to address bacterial pollution sources.

City of Lake Stevens

The city of Lake Stevens is located within the Pilchuck watershed and provides services to a population of approximately 6,600 residents. Stormwater runoff generally discharges into three sub-basins that drain to Lake Stevens, the outlet channel, or to Catherine Creek. Land use is primarily residential with some commercial areas. Municipal sewer infrastructure services the majority of properties with in the city limits. A small number of septic systems remain and are under joint jurisdictional control. The Snohomish County Health District issues permits for any remaining septic systems. A city ordinance exists, requiring sewer hook-up to any actively used property that is located within 300 feet of and existing sewer conveyance facility. The city is continuing to upgrade and expand the sewer system to service all portions of the city with the intention of eliminating private septic systems where practicable.

The city parallels the activities undertaken by Lake Stevens Drainage District Number 8 on water quality issues regarding Lake Stevens. Lake Stevens traditionally has had problems with algal blooms as a result of shoreline oriented septic drainfields. To combat this problem, a sewer LID improvement was facilitated and installed in the early 1970's. As a supplemental measure, grant and local funding and a cooperative effort by The city of Lake Stevens, Lake Stevens Drainage District 8 and Snohomish County developed a Lake Aeration system that has proven very effective. Public outreach was performed, and an ordinance prohibiting the feeding of water fowl was passed and enforced. As a result, significant reductions in algal blooms have been observed. Another significant factor was the closure of the Cathcart Landfill approximately four years ago. The landfill attracted large numbers of sea gulls to the lake, which contributed to nutrient and bacterial pollution.

The city is currently updating its Stormwater Comprehensive Plan and preparing for its Phase II Municipal Stormwater Permit. A surface water utility is in place and requires residential property owners to contribute $60 annually. The city has vactor equipment and decant maintenance program which at present capacity annually cleans and inspects approximately 65 percent of the existing storm infrastructure. Plans and processes are projected to improve the volume of vactored facilities annually. Although the Western Washington Stormwater Manual is not formally adopted, it is used as guidance until the Stormwater Comprehensive Plan is updated. Citizens can report stormwater code violations via the city website and are engaged in a cooperative effort with the city via the Adopt-a-Street and Adopt-a-Park programs.

This TMDL recommends that the city continue its efforts to expand its educational efforts to both citizen's and business by developing educational kiosks. The city applied to Ecology's Centennial Fund for grant assistance in 2002 but was offered only loan funds. Because stormwater detention through much of the city does not meet current standards, this TMDL also encourages city to continue exploring innovative techniques to provide better treatment, reduce peak flows in local streams, and improve infiltration and summer base flows in the Pilchuck River.

City of Marysville

The city of Marysville is located within the Quilceda and Allen Creek watersheds and provides services to a population of approximately 26,700 residents. Both creek systems originate outside the city limits and empty into the Snohomish River estuary within city limits. Marysville encompasses about 14 percent of the Quilceda/Allen watershed (~ 10 miles^2) and land use is predominately urban industrial/commercial or residential. Land use outside of Marysville is a combination of rural and residential and thus contains a number of potential fecal coliform sources. Land use within city boundaries is a mix of residential and commercial properties. The northwest and northern boundaries of the city are expected to increase in the near future due to the anticipated annexation of the Lakewood residential area and a new industrial area, respectively. The city is located mainly in the Marysville Trough, a relatively flat area with a high groundwater table. In winter months the city is susceptible to flooding because of past development practices and the high groundwater table—this creates a challenge for the city's stormwater management program because the preferred strategy of infiltrating stormwater is less available as an option for city planners and engineering staff.

Marysville is a Phase II Municipal Stormwater permittee. Ecology expects to issue this permit in 2004. The city is preparing its stormwater program based on EPA's six minimum controls and has begun development of a Master Drainage Plan, a revision of its Stormwater Management Comprehensive Plan, and is currently evaluating it's stormwater utility rate structure as it relates to future needs. The Master Drainage Plan will primarily address flooding problems, but will also consider habitat and water quality. The Master Drainage Plan will be done in coordination with the city of Arlington and Snohomish County and will detail a number of capital improvement projects that need to be completed. The city is developing its education and outreach and illicit connection detection programs and hopes to develop a water quality protection ordinance in 2003. Seasonal clearing, pet waste, and erosion control ordinances are in place and are enforced primarily through the efforts of their code enforcement staff person. The city has adopted Ecology's Western Washington Stormwater Manual and their storm sewer system has been mapped using GIS.

Marysville is engaged in a number of activities to control and improve water quality within their jurisdiction. City staff plays a critical lead role in support of the Allen/Quilceda Watershed Action (AQWA) Team, a group of local government representatives, nonprofit environmental organizations, and citizen volunteers working to achieve the goals set forth in the Quilceda/Allen Watershed Management Plan (Carroll, 1999).

In March 2003, the city began an ambient monitoring program to support the efforts of both this TMDL and their stormwater management program. Monitoring of ambient conditions is crucial to the detection and correction of both ongoing and new pollution sources and is essential to the success of this TMDL. Ecology has provided approximately $37,000 to the city to initiate this program. The city has a regularly

scheduled forum for working with local residents called the Marysville University. The city also maintains a website and information kiosks at administration buildings. In combination with other venues for public input such as city council meetings, the city has and will use these public outreach and involvement tools to work with local businesses and residents. Surface Water and Master Drainage Plan Advisory Committees have been created to help the guide the development of city planning documents and the city is a member of the Snohomish Basin Salmon Recovery Forum.

This TMDL encourages the city to continue showing leadership in working with other local governments, citizens, businesses, and the Marysville School District, to resolve water pollution problems facing the Quilceda and Allen Creek watersheds. Riparian restoration projects in Jennings Park will be a valuable investment when restoration in the lower estuary takes place--improvements at Jennings Park could result in a small decrease in fecal coliform discharges due to waterfowl and reduced temperature levels in Allen Creek during critical periods. The installation and promotion of pet waste collection stations and other educational efforts are recommended to increase public awareness of stormwater pollution issues related to this TMDL.

City of Monroe

The city of Monroe is located in both the French Creek and Woods Creek watersheds and provides services to a population of approximately 14,000 residents. Stormwater discharges in much of the western part of the city discharge to French Creek into the drainage conveyances maintained by the French Slough Flood Control District. The eastern portion of the city is located within the Woods Creek watershed. Land use in both areas is a mix of residential and commercial properties.

The city will be covered under Ecology's new Phase II stormwater permit program, which Ecology expects to issue during 2004. The city is currently preparing its stormwater program to meet Phase II requirements and utilizes a stormwater utility fee of $5/mo for each equivalent residential unit to support surface water management activities. Some of this money is passed through to the French Slough Flood Control District through an interlocal agreement because district and city boundaries overlap. City staff conducts inspections of construction sites and mapping of the stormwater system. The city also operates a wastewater treatment plant with an accredited laboratory but currently is not engaged in monthly ambient or stormwater monitoring. A stormwater comprehensive plan has not yet been developed and approved.

While the city has no specific water quality protection or pet waste management ordinances the subjects are addressed in various locations in the Monroe Municipal Code. Section 6.04.030(H) prohibits "the pollution of any public well or cistern, stream, lake, canal or body of water by sewage, creamery or industrial wastes or other substances"; Section 6.08.150(E) prohibits the disposal of animal droppings in the solid waste stream; Section 9.28.060(B) requires the removal of "fecal material deposited by his animal in public parks, on public property, or on public easement"; Section 13.08.050 states "It is unlawful for any person to place, deposit, or permit to be deposited in any unsanitary

manner on public or private property within the city or in any area under the jurisdiction of the city, any human or animal excrement, garbage or other objectionable waste." and the purpose Chapter 15.01 is in part to:

1. Minimize water quality degradation and sedimentation in streams, ponds, lakes, wetlands and other waterbodies;
2. Minimize the impact of increased runoff, erosion and sedimentation caused by land development and maintenance practices;
3. Maintain and protect groundwater resources;
4. Minimize adverse impacts of alterations on ground and surface water quantities, locations and flow patterns;

Code enforcement duties are shared by the city engineers and a code enforcement staffperson located within the Police Department. The city has a website but it currently not used to provide water quality education. Information on water quality is provided at kiosks at City Hall and the wastewater treatment plant.

The city has already adopted Ecology's Western Washington Stormwater Manual. and their storm sewer system is currently being mapped using GIS. New development is encouraged to infiltrate stormwater to reduce the potential for stormwater pollution to reach local creeks and to help maintain groundwater levels. The northern parts of town have favorable soils that allow significant amounts of stormwater to be infiltrated. Lake Tye, which discharges to French Creek, provides both stormwater detention and recreational opportunities for local citizens and has a pet waste management station that helps control bacteria levels for swimmers. The city eliminated a significant source of bacterial pollution to Woods Creek in 2002 when the Highland House apartments were connected to sanitary sewer. Frequent overflows from the onsite septic system had occurred previous to hookup

The city is interested in improving riparian habitat and has worked with nonprofit entities to improve some habitat in the French Creek watershed in recent years. The city is also working with Trout Unlimited to improve fish habitat in Lake Tye. The city completed the "Shoreline Master Program Inventory for the city of Monroe's Shorelines: Skykomish River and Woods Creek" in November of 2002. This document is currently being used to prepare regulations to protect critical habitat and riparian resources in these areas.

City of Snohomish

The city of Snohomish has a population of approximately 8,500 residents. It operates a wastewater treatment facility and stormwater system. The city's stormwater system discharges to both the Pilchuck River and the Snohomish River, and some areas discharge to the wastewater treatment plant.

A portion of the city of Snohomish stormwater drainage discharges to the Pilchuck watersheds. Swifty and Bunk Foss Creeks travel through areas zoned for single family residential use. Much of the eastern edge of the city also discharges to the Pilchuck system, where Morgantown Park, Pilchuck Park, and other public areas exist. Centennial Trail also traverses the eastern part of the city.

The city of Snohomish encompasses a small fraction of the Pilchuck watershed but due to the presence of considerable impervious surface, has the potential for significant stormwater pollution. Several land uses exist that may be contributing stormwater pollution including residential, commercial, and mixed use development. The city may increase in size by expanding to the north, west, and northeast as it grows to incorporate these neighboring urban grown areas

The city will be covered under Ecology's new Phase II stormwater permit program, which Ecology expects to issue during 2004. Pending Ecology's issuance of the final requirements of the Phase II permit, the city is currently preparing its stormwater program. Although a stormwater utility has not been established, $2/month per parcel is dedicated from the general utility fees to support surface water management. The city has a surface water crew responsible for maintaining stormwater ditches, maintaining storm drains, and cleaning of 252 catch basins annually and is currently investigating surface water quality issues through the implementation of its ESA Compliance and Salmon Conservation Strategy. Part of this work involves water quality sampling and the city has recently included bacteria sampling as part of its basic program. The current monthly water quality monitoring is currently scheduled to be completed in December 2003.

The city has not yet adopted Ecology's Western Washington Stormwater Manual but has applied for a Phase II permit. The city's planned stormwater activities will contribute to the goals of this TMDL and are partially listed in Appendix B. The city is also a member of the Snohomish Basin Salmon Recovery Forum.

Special Purpose Organizations

Drainage Improvement District No. 8

Drainage Improvement District No. 8 was originally created in 1928 to address the needs of the area farming community. Over the years, it has evolved into a special district whose key role is to protect the water quality of Lake Stevens for the many beneficial uses it provides for local residents. The district currently assesses about 1,600 parcels and has an annual budget of just over $400,000. Water quality protection efforts are coordinated closely with Snohomish County and the city of Lake Stevens. Land use in the district's service area is primarily residential, with some commercial properties near Route 9 at the watershed's edge.

The district is involved in a wide range of activities throughout the Lake Stevens watershed related to water quality. This includes water quality monitoring, maintenance of several detention ponds, spot checking on land development activities, and working with local homeowners to control nonpoint pollution through education and technical assistance. Additionally, the district shares in the responsibility of operation and maintenance of the lake's aeration system, which was designed to improve lake oxygen levels during the summer and reduce phosphorus levels. District activities are governed by a board of three elected commissioners.

Drainage Improvement District No. 8 activities are highly valued by this TMDL and should be considered for grant funding as it is available. The district has offered to help implement this TMDL in a number of important areas and applied for a Centennial Grant in 2003 to help carry out some of these activities. As a local watchdog, district staff keeps a watchful eye on development activities within the watershed that affect the quality of lake waters. Although they have no direct enforcement powers, staff work closely with Snohomish County, Ecology, and local developers to prevent water quality impacts. Due to the concerns for bacteria in the lake and downstream tributaries in the watershed, the district would also like to integrate bacteria testing into their existing water quality monitoring program. Because the district also monitors Lake Cassidy, fecal coliform testing would be added there as well. The district's responsibilities for stormwater management are interwoven with Snohomish County as their systems are connected sporadically throughout the watershed. The district intends on working closely with Snohomish County to ensure that illicit connection detection programs can be carried out successfully.

Regarding public education, there are several areas in which district involvement can be important. Three to four times per year, festivals are held to celebrate the lake and its connection with the community. At the Aquafest and other public events, the district intends to be present to provide public education on water quality issues. Because of the importance of teaching youth and adults the value of clean water, the district is also working towards creating a watershed resource center at their main office as an educational outlet for parents and children to access information on the environmental impacts of stormwater in their community. As the webmaster for the community web site, they also intend on adding information on improving stormwater quality to their online audience.

French Slough Flood Control District

The French Creek floodplain spans approximately 4000 acres of farmland. Drainage from much of the city of Monroe, upland areas within unincorporated Snohomish County, and area farms is largely regulated by the activities of the French Slough Flood Control District. The district is primarily responsible for maintenance of the main canal and ditch system and operates a pump station and flood control gates to regulate water levels behind a constructed levee system. Some of the district boundary overlaps the Fryelands area of Monroe and an interlocal agreement with the city facilitates the pass-through of approximately 28 percent of district operating costs. Unlike the Marshlands watershed, no funds are provided by Snohomish County to assist with pumping costs

associated from stormwater generated in unincorporated areas outside the district boundaries. There are two dairy farms and a number of cattle and heifer farms. Heifer farms produce less manure and use less water than dairy farms during husbandry operations. There is still considerable manure generated within the floodplain area by farming activities. In recent years, two dairies have shut down thus reducing the potential input of bacteria from farming activities.

The French Slough Flood Control District has discussed various ideas for improving water quality with Snohomish County officials in the past but due to flooding and other concerns, no clear path to improving water quality has emerged. Past water quality monitoring data showed very high fecal coliform counts in the main canal. It is suspected that with recent decrease in dairy farms these counts may have decreased. Approximately 500 acres of a former dairy farm is anticipated to be accepted into the USDA Wetlands Reserve Program.

Education and technical support to the farming community is important to the success of this TMDL; therefore, outreach efforts to farmers within the district are encouraged. This TMDL supports the district's desire to participate in additional water quality monitoring within the French Creek Watershed as well as the funding of a water quality improvement plan for the floodplain. Among the recommended improvement plan focus areas are the following:

- computer modeling/engineering of the lower end of the main canal to decrease detention times while facilitating high winter flows,
- computer modeling of the benefits of providing shading on temperature levels and if possible, dissolved oxygen levels,
- development of a coordinated planting and maintenance plan, and
- investigation of likely funding sources.

The floodplain area, which is now a highly engineered environment designed solely to facilitate society's need for high quality agricultural areas, appears to need additional engineering and improvements to facilitate the needs of both the agricultural community and the aquatic life required to be consistent with French Creek's stated characteristic uses in state regulation.

Marshlands Flood Control District

The Marshlands Watershed is approximately 14,450 acres in size. Somewhat less than 45 percent of this land is composed of farmland that is located in the Snohomish River floodplain. A number of streams, as well as urban stormwater from unincorporated Snohomish County and the city of Everett drain into the floodplain area and are then managed by the Marshland Flood Control District. The district is primarily responsible for maintenance of the main canal and ditch system and operates a pump station and flood control gates to regulate water levels behind a constructed levee system. There are currently six dairy farms and several composting operations. Since the most recent data collection for this TMDL was collected in 1996, several dairies have left the area. The six that remain have been regulated and inspected by Ecology and are in compliance.

There is, however, still considerable manure generated within the watershed area by farming and equestrian activities.

Various ideas for improving water quality and fish passage into the Marshlands watershed have been discussed but there has not yet been a consensus on how to resolve the problems, nor how to fund potential solutions. The water quality monitoring data from 1996 showed very low dissolved oxygen levels at the pump station and at Marsh Road. Similarly, fecal coliform levels did not meet state standards. It is anticipated that with the implementation of farm plans at the remaining dairies, and the departure of other dairies, these counts may have decreased. On the other hand, Ecology recently sampled bacteria levels near the Pacific Topsoils operation and found very high bacteria levels.

Updated water quality monitoring is needed to determine if and where remaining bacterial source inputs exists. This TMDL supports the District's willingness to cooperate in additional water quality monitoring within the Marshlands Watershed as well as the support for governmental funding of a water quality improvement plan for the floodplain. Among the recommended improvement plan focus areas discussed with the District were the following:

- computer modeling/engineering and environmental analysis of providing additional flow from the eastern tip of the floodplain to decrease detention times and improve dilution,
- computer modeling/engineering and environmental analysis of improving flows and fish passage near the pump station by constructing a new side channel,
- pump house improvements to improve flows and fish passage, and
- investigation of likely costs and funding sources.

The floodplain area, which is now a highly engineered environment designed originally to facilitate society's need for high quality agricultural areas, may need additional engineering and improvements to facilitate the needs of both the agricultural community and aquatic life associated with the stated characteristic uses of these waters in state regulation including the Endangered Species Act.

Snohomish Conservation District

The Snohomish Conservation District (SCD) is one of the most critical organizations for improving and maintaining good water quality in the Lower Snohomish Tributaries study area. The SCD provides substantial technical and financial assistance to dairy operators and owners of various livestock and domesticated animals throughout the county.

Snohomish Conservation District is currently funded by an Ecology grant to provide educational outreach and technical assistance to farms in the Marshland watershed through 2006. This Action Plan encourages similar activities across the TMDL focus area. The SCD report that there is inadequate base funding for activities in the

Snohomish Basin; therefore, this TMDL recommends that mechanisms for improving base funding for technical assistance be explored.

The SCD also provides important technical assistance and grant funding for fencing projects, riparian improvements, and other specific projects such as engineered animal crossing structures, manure management facilities, and innovative animal watering strategies. These activities should be continued until pollution problems from small farms and agricultural areas are eventually abated.

The SCD is encouraged to participate in water quality monitoring activities aimed at pollution source identification. Pollution source identification is important to help staff strategically concentrate technical assistance efforts and identify when targeted outreach efforts are no longer needed. All governmental, nonprofit, citizen, and business interests are encouraged to coordinate their outreach efforts in order to reach potential polluters. Activities that directly engage outreach staff (SCD or contract workers) with the public at their place of business or residences are highly encouraged.

Because of their strong link with the agricultural community, it is recommended that the SCD work with local flood control districts to develop and review pollution abatement plans for these areas. These highly engineered environments require special attention in developing operations and maintenance plans and new designs aimed at meeting both water quality concerns and the needs of the agricultural community.

Snohomish Health District

The Snohomish Health District (SHD) has a wide variety of responsibilities to protect human health. Among its four major branches is its Environmental Health Division, which oversees permitting and inspection of various activities and facilities including food establishments, on-site septic systems, small and individual drinking water systems, public swimming pools, and solid waste disposal facilities. A major portion of the activities of the Water and Wastewater Section centers around permitting installation and repair of onsite sewage disposal systems.

Improperly functioning on-site septic systems and poorly handled solid waste can affect both dissolved oxygen and bacteria levels in the area of this plan. The SHD has the exclusive authority to enforce county and state codes regarding the treatment of residential wastewater by individual residential on site septic systems. Similarly, they have specialized skills needed to investigate and evaluate on site systems. On site septic systems are considered a very likely and significant contributor to many areas showing high bacteria levels during summer months. Therefore, the SHD is among the most crucial organizations in resolving the bacterial pollution problems within this TMDL area.

Education is one of two important areas in which the SHD would like to contribute to this TMDL. The SHD maintains information on all on-site systems within Snohomish County as part of their Drainfield Awareness and Vital Education Project (DAVE for

short). This invaluable database provides a platform for providing essential public education and technical assistance to homeowners. The SHD is currently perfecting this system and is now preparing a targeted outreach program for the Quilceda/Allen Watersheds. This TMDL recognizes the need for continuing education as home ownership changes, new on site systems are built, and maintenance reminders.

This TMDL highly recommends the establishment of adequate staffing and resources to meet the need for sanitary surveys and other direct investigative strategies to locate and resolve the problem of failing septic systems. Although current observations suggest that a low interest loan program is not needed, such a program should be pursued in the future if the SHD determines that new needs have arisen.

Nonprofit and Volunteer Organizations

Adopt-A-Stream Foundation

The Adopt-A-Stream Foundation (AASF) is a non-profit 501(c)(3) organization based in South Everett, WA, next to North Creek, a tributary to the Sammamish River. Its adopted mission is "to teach people how to become stewards of their watershed." http://www.streamkeeper.org/foundation.htm.

AASF carries out its mission by out producing and distributing environmental education materials nationally and internationally, conducting S*treamkeeper Academy*™ events for school and community group audiences throughout the Pacific Northwest, and providing local communities with stream and wetland restoration assistance. In addition, AASF is developing the Northwest Stream Center: a regional environmental learning facility that has stream and wetland ecology and fish and wildlife habitat as its central themes. AASF's long-term goal is to stimulate everyone to become a *Streamkeeper*™ taking actions necessary to protect and enhance their home watersheds.

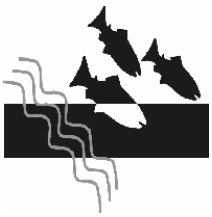
The AASF considers clean water an integral part of a healthy spawning and rearing habitat for wild salmon, steelhead, trout, and other wildlife, and a key element to providing natural settings essential for the rest and relaxation for local residents. During the last five years, AASF completed 65-stream and wetland restoration project in the Stillaguamish, Snohomish, and Sammamish watersheds. These projects ranged from stream bank planting to construction of fish ladders to the restoration of a complex three-acre wetland system from a parking lot.

Recently, AASF completed a survey identifying barriers to fish migration in the Quilceda and Allen Creek watersheds. Now, AASF is working in partnership with the city of Marysville, Grace Academy, and the National Fish and Wildlife Foundation to transfer a tributary of Allen Creek from a roadside ditch next to a city road to a new 1000 foot-long meandering channel complete with a new-forested wetland riparian zone on school grounds.

In order to contribute directly to the efforts of this TMDL, AASF plans to perform "environmental audits" of pollution problems in riparian areas throughout the Snohomish

Tributaries focus area; develop prescriptions for corrective action; and establish partnerships with responsible landowners to carry out prescribed actions. This TMDL places great value on this proposed audit program. It provides a key component missing from many public education and outreach efforts: direct contact with landowners responsible for water pollution and fish and wildlife habitat degradation. It will also result in partnerships with those individuals that lead to the reduction or elimination of water pollution problems, and the enhancement of fish and wildlife habitat. In addition to the audit program, this TMDL encourages funding for other AASF activities that address bacterial pollution in conjunction with efforts to improve dissolved oxygen levels.

Allen/Quilceda Watershed Action (AQWA) Team



The AQWA Team is a group of local government and citizen staff working together to improve the overall health of both Quilceda and Allen Creeks through positive actions for the environment. One project under development is the restoration of a section of Jones Creek and the creation of a permanent outdoor environmental educational center. Jones Creek contributes to Lower Allen Creek in its present configuration and improvements to this stream are expected to improve Allen Creek's dissolved oxygen levels. The committee prepared a brochure called "A Citizen's Guide to Reporting Water Quality Problems," which has been adopted by Snohomish County and is expected to be used by other local governments as well. The team is also planning on performing community education through a newsletter to streamside residents and others as well as sponsoring various restoration and pollution-prevention activities. This TMDL encourages the support of the AQWA Team efforts to improve water quality through community awareness projects and other applicable activities.

Stilly Snohomish Fisheries Enhancement Task Force

The Stilly-Snohomish Fisheries Enhancement Task Force is a 501(c)(3) not-for-profit corporation, registered as a charitable organization with the Washington Secretary of State. The task force's mission is to ensure the future of salmon in the Stillaguamish, Snohomish, and Island County watersheds. In meeting this challenge, task force activities also help to both reduce bacterial pollution and improve dissolved oxygen levels. Funding for Task Force activities come from the Washington Department of Fish and Wildlife, National Fish and Wildlife Foundation, Salmon Recovery Funding Board, grants, donations, and fee-for-service contracts. Their activities are guided by a diverse board of directors that represent sport/commercial/tribal fisheries, agriculture, forestry, and other interests. You can learn more about the activities and opportunities with the Task Force at the website: http://www.stillysnofish.org/activities/projects.

The task force has a core staff of four that forges community partnerships throughout the TMDL focus area by working with Tribes, local governments, private businesses, and citizens to improve riparian function, remove invasive species, and improve fisheries habitat. Their other asset is the tremendous amount of volunteer resources whose activities they organize and coordinate. They are involved in numerous projects across

the TMDL focus area. This TMDL encourages funding sources to consider the task force for the following ongoing and planned activities that will improve water quality as it relates to this TMDL.

- Exclusion of livestock from riparian areas,
- Improvement of riparian areas by increasing buffer widths,
- Door-to-door outreach to private citizens to perform environmental audits,
- Water quality monitoring, and
- Educational programs and activities to increase public awareness of water pollution issues.

MEASURING PROGRESS TOWARD GOALS

Table 4 below summarizes the target geometric means for fecal coliform bacteria set forth in the Lower Snohomish Tributaries TMDL. The target geometric means should be met as soon as possible but no later than by the end of 2009. It is the goal of this plan to have 75 percent of the stations below meeting the state water quality standards by the end of 2007. Ecology's modeling of available data predicts that when the target geometric means are met, that both the geometric mean, and the 90 th percentile values for Class A waters will be within state water quality criteria.

Table 4 - Water Quality Targets (* indicates where two model runs preformed (A/B). Value A is based on Snohomish County monitoring data, Value B is based on Ecology sampling data.

Tributary or Sub-Tributary	**Fecal Coliform Bacteria Levels from previous sampling (Geometric Mean Value)**		**Target Geometric Mean (cfu/100 mL)**	
	Geometric Mean (cfu/100 mL)		Geometric Mean (cfu/100 mL)	
	Wet Season	Dry Season	Wet season	Dry Season
Allen Creek, Site ACLU	392	664	40	62
Allen Creek, Site ACMC	121	585	56	95
Allen Creek, Site ACSF	149	145	50	40
Allen Creek, Site ACNF	108	197	42	91
Allen Creek, Site ACMS	168	332	73	99
Allen Creek, Site ACLD	30	122	n/a	44
Quilceda Creek, Site QCLU	47	209	35	63
Quilceda Creek, Site QCEF	420	1091	47	86
Quilceda Creek, Site QCLS	25	60	Na	55
Quilceda Creek, Site QCWF	131	619	65	78
Quilceda Creek, Site QCMF	119	451	41	94
Quilceda Creek, Site QCMS	198	270	64	99
Quilceda Creek, Site QCLD	213	318	55	94
French Creek, Site FL1	23	407	22	64
French Creek, Site TRUS	11	52	NA	36
French Creek, Site LH2	34	382	NA	49
French Creek, Site FL3	48	179	46	35
French Creek, Site CUS	29	66	21	38
French Creek, Site LH1	56	552	43	56
French Creek, Site FL2	71	220	26	39
French Creek, Site STUS	38	267	NA	66
French Creek, Site STLS	32	136	NA	132
French Creek, Site CCLS	39	394	22	67

	Fecal Coliform Bacteria Levels from previous sampling (Geometric Mean Value)		Target Geometric Mean (cfu/100 mL)	
French Creek, Site CCH2	31	428	NA	39
French Creek, Site FCLU	39	357	29	76
French Creek, Site FCMS	441	682/502*	40	66/50*
French Creek, Site FCDD	135	283	61	42
French Creek, Site FCLD	180	396	40	72
French Creek, Site PUMP	87	346/468*	23	67/99
Woods Creek, Site WCMF	45/8*	158/87*	38/NA*	56/NA*
Woods Creek, Site WCWF	56/9*	160/185*	53/NA*	61/56*
Woods Creek, Site WCUP	2	28	NA	NA
Woods Creek, Site WCDN	26	96	NA	77
Pilchuck River, Site PRUP	3	54	NA	NA
Pilchuck River, Site PR8.6	7	75	NA	60
Pilchuck River, Site PR4.2	12	80	NA	NA
Pilchuck River, Site PRDN	12	56	NA	47
Pilchuck River, Site LPVN	19	234	NA	47
Pilchuck River, Site CCDN	28	132	NA	44
Pilchuck River, Site DCDN	10	166	NA	54
Marshland, Site MLUP	617	473	40	61
Marshland, Site MLDN	705	177	69	61

Figure 12. Water Quality Monitoring. Direct measurement of the quality of surface waters is needed throughout the SnoTribs watersheds in order for this TMDL to be effective. Monitoring surface water helps us find where pollution is coming from and whether or not our implementation efforts have been, and continue to be, effective in protecting local streams.

MANAGEMENT ROLES, ACTIVITIES, AND SCHEDULES

A wide variety of activities is proposed in this Action Plan to reduce bacterial pollution levels. Participating entities include the Tulalip Tribes, Snohomish County, each of the local city governments, and a number of other entities (Table 5). The actions required of National Pollutant Discharge Elimination System (NPDES) stormwater permit holders is anticipated to have a great effect on pollution levels and greatly improve public awareness of the contributions of stormwater pollution and are detailed under the section Sources of Pollution. Many of the activities detailed in this Action Plan are already funded or planned for implementation in the future. Where funding is not currently available, Ecology will be assisting in finding appropriate funding sources.

Appendix B contains voluntary actions proposed by participating organizations agencies—it is not intended to identify mandatory BMPs for municipal stormwater permit holders, although projects noted may be incorporated into BMPs at some point in the future. The tables in the appendix describe projects where funding or local commitment has been made, and projects the entity would like to accomplish for which funding or staffing do not yet exist. In the case of unfunded projects, a brief description of the strategy to fund/staff the project is provided wherever possible. Where potential funding sources have not been identified, each agency has committed to work with Ecology staff in the future to try and identify one. The schedules for beginning implementation projects were developed by each of the implementing agencies.

As noted above, an essential part of this TMDL is the monitoring of surface waters and potential pollution sources. Monitoring is needed during all phases of the TMDL to identify polluted areas, contributing sources, and to verify that corrective actions have been, and remain effective in protecting local waters. The conceptual framework for monitoring related to this TMDL is discussed below.

Monitoring Plan

Monitoring efforts that can contribute to the successful implementation of this plan will take several forms. Phase I and Phase II municipal stormwater permittees will be required to perform monitoring as specified in their individual Bacterial Pollution Remediation Plans, or Early Action BMP Plan. Among the monitoring strategies available are effectiveness monitoring, ongoing ambient monitoring programs, targeted source control monitoring, and special purpose studies. Each of these monitoring elements is discussed below.

Effectiveness Monitoring

The purpose of effectiveness monitoring is to provide assurance that control measures put in place during TMDL implementation achieve the expected load reductions. Ecology is responsible for determining, through effectiveness monitoring, the status of waterbodies subsequent to the development and implementation of each TMDL. The timing of this

monitoring will be dependent upon the pollution parameters addressed in the TMDL, the period after which positive results should be identifiable, and the availability of resources. Effectiveness monitoring priorities will be selected by each regional office and verified through the annual scoping process. Ecology will use all available sources of data when effectiveness monitoring is initiated.

Table 5. Overview of Implementation Activities. Listed below is a brief summary of the voluntary and required actions that will address the bacterial pollution and dissolved oxygen problems in the SnoTribs TMDL area. Detailed information on implementation activities can be found in the section entitled "Organizations Participating in Cleanup Activities" and Appendix B.

Entity	Implementation Activity Summary
EPA	Technical assistance, funding
Tulalip Tribe	BMP implementation, monitoring
Ecology	Monitoring, technical assistance, permitting, funding, enforcement
PSWQAT	Technical assistance, funding
Snohomish County	Monitoring, technical assistance, BMP implementation, enforcement
City of Arlington	Monitoring, BMP implementation
City of Lake Stevens	Monitoring, BMP implementation
City of Marysville	Monitoring, BMP implementation
City of Monroe	Monitoring, BMP implementation
City of Snohomish	Monitoring, BMP implementation
Snohomish Health District	Pollution source identification, technical assistance
Snohomish Conservation District	Monitoring, BMP implementation
Drainage Improvement District No. 8	Monitoring, BMP implementation
French Slough Flood Control District	Monitoring, special studies
Marshlands Flood Control District	Special study
Adopt-A-Stream Foundation	Public outreach, monitoring, BMP implementation
Allen/Quilceda Watershed Action Team	Public outreach, BMP implementation
Stilly Snohomish Fisheries Enhancement Task Force	Public outreach, BMP implementation

In order to be thorough in accomplishing this task, monitoring personnel in Ecology's Environmental Assessment Program (EAP) will follow a review sequence. The sequence will include consultations with the original TMDL modeler to determine critical parts of the implementation plan and to verify critical locations. The EAP will also contact the regional office TMDL coordinator to determine the status of the TMDL implementation

plan and what ongoing monitoring has been initiated as part of implementation activities. On completion of these steps, an examination of the resulting data will be made and a water quality status determination will be announced for the waterbody in an advisory memorandum followed by a technical report.

Ongoing Ambient Water Quality Studies

Ambient water quality samples are generally collected at or near the mouth of major streams and just above the confluence of incoming creeks whenever possible. Sampling sites are also dependent on the presence of public access points or those granted by local landowners. Fecal coliform bacteria samples are collected by hand and tested in an accredited laboratory using the membrane filtration method.

Snohomish County has a number of permanent ambient monitoring sites established throughout the SnoTribs watersheds. Ecology is assisting Marysville in the development and early implementation of its monitoring program through its Centennial Grant Program and working with the city of Arlington, Lake Stevens, Drainage District No. 8, French Slough Flood Control District, and Marshlands Flood Control District to initiate various levels of water quality monitoring programs through intergovernmental contracts. Snohomish County independently funds its water quality monitoring program. Ecology grant funding will continue to be available on a competitive basis in the future for ambient water quality monitoring in the plan area. The city of Monroe will be initiating monitoring in 2004 at approximately 15 locations. Regional Ecology staff intend on supporting the development of new monitoring programs with major stakeholders and others through contracting with targeted funds associated with the CWA 319 grant process as they are available.

Targeted or Source Identification Monitoring

Targeted monitoring is used to pinpoint suspected pollution sources and allow the limited resources of local government and private groups to focus their resources efficiently where they are needed. Targeted monitoring is used when pollution sources are not obvious and additional data is needed to track down the unknown or suspected sources. Events that typically trigger the need for targeted monitoring include:

- When ambient water quality monitoring has identified high bacteria levels on either a consistent or a sporadic basis, and
- Where potential sources of fecal coliform bacteria are identified.

When high bacteria levels are observed, additional sampling can help to track the bacteria source down to a discrete geographic area. Ecology and local government authorities will review the data and determine how to proceed to control the source(s). This TMDL supports funding for targeted monitoring programs to identify pollutant sources and develop programs to reduce or eliminate those sources.

Special Purpose Studies

In some cases, special purpose monitoring studies may be needed to support the goals of this TMDL. There is a great need to improve the efficiency, accuracy, and the scope of water quality monitoring with respect to bacterial source control. Four areas identified at this time are as follows:

- Evaluating the success of individual projects in order to evaluate BMP effectiveness.
- New techniques for source tracking such as DNA ribotyping, antibiotic resistance, bacteriodes testing, etc….
- Effects of sediment archiving where BMPs have been applied and other obvious sources have been addressed.
- GIS-, or landscape scale analyses that include monitoring for model or process verification.

REASONABLE ASSURANCES

When establishing a TMDL, reductions of a particular pollutant are allocated among the pollutant sources (both point and nonpoint sources) in the waterbody – for the SnoTribs Fecal Coliform Bacteria TMDL, both point and nonpoint sources exist. TMDLs (and related DIPs) must show "reasonable assurance" that these sources will meet their allocated amount of reductions. Education, outreach, technical and financial assistance, permit administration, and enforcement will all be used to ensure that the goals of this water clean up plan are met. The first step in implementing control actions will be through a cooperative approach with agencies with technical or financial assistance missions or responsibilities through NPDES permits. When those tools are not effective in achieving implementation of control measures, enforcement will be used. Planned and ongoing control actions that establish reasonable assurance are discussed below.

NPDES Permit Programs

Several NPDES permit programs will be directly affected by this TMDL. These include the municipal stormwater permit programs, industrial permit program, and dairy program. Bacterial contributions from municipal stormwater will be controlled through Snohomish County's Phase I Municipal Stormwater Permit in unincorporated Snohomish County. Phase II stormwater permits will be issued to the Cities of Monroe, Snohomish, Lake Stevens, Marysville, and Arlington, and the town of Granite Falls. Water cleanup activities from these entities are discussed earlier in this document.

Dairies are also regulated by Ecology within although each dairy does not receive an NPDES permit. Ecology will carry out inspections and, as necessary, issue NPDES permits to dairies to ensure they do not contribute bacterial pollution within the SnoTribs watersheds.

Composting operations within the SnoTribs watersheds will be required to apply for an industrial stormwater permit. This permit is currently under appeal by several parties; therefore, specific permit conditions for composting operations are not yet clear.

Ecology Funding Programs

Ecology has a Centennial Grant program is widely used by SnoTribs stakeholders to help fund water cleanup activities. Currently, Snohomish County, the Snohomish Health District, the Snohomish Conservation District, and the city of Marysville are all performing TMDL-related activities within the SnoTribs watersheds. In the 2003 funding cycle, seven grant applications were submitted to do additional TMDL-related activities.

Ecology also has a small amount of intergovernmental contract funding (up to $10,000/annually) that will be available for funding small projects related to the North Creek, SnoTribs, and Snoqualmie TMDLs. When fencing and riparian restoration

projects are identified, stakeholders can also work with the SnoTribs TMDL lead to explore funding through the Coastal Protection Fund.

Other Ecology Programs

Ecology recently published new solid waste rules (WAC 173-350) that include regulations regarding composting facilities. Because composting facilities frequently use animal manure and such facilities are located within the SnoTribs watersheds, these regulations will provide a legal basis for necessary controls to help prevent pollution from these potential sources. As stated in WAC 173-350-220(c)(ii), composting facilities must:

> "Protect surface water and ground water through the use of best management practices and all known available and reasonable methods of prevention, control, and treatment as appropriate. This includes, but is not limited to, setbacks from wells, surface waters, property lines, roads, public access areas, and site-specific setbacks when appropriate."

Other Water Cleanup Activities

In addition to regulatory and grant funding programs in place through the Department of Ecology, there are numerous other water cleanup activities planned, which are detailed in Appendix B. Among the participating entities are the Tulalip Tribes, USDA NRCS, Snohomish Health District, Snohomish Conservation District, French Slough and Marshlands Flood Control Districts, Adopt-a-Stream Foundation, Stilly Snohomish Task Force, Drainage District No. 8, and the AQWA Team.

Adaptive Management

Adaptive management is the process of making needed changes as new information becomes available. There are several likely adaptive management scenarios anticipated to occur during the implementation of this clean up plan.

First, as ambient or targeted monitoring data or other information becomes available in coming years, appropriate responses need to be taken to address the newly identified or unanticipated pollution sources. Examples are additional monitoring or targeted control actions. Similarly, if anticipated funding sources become unavailable to accomplish the plan, new sources need to be identified and pursued.

If ambient water quality targets are not being met and implementation projects are being completed as scheduled then action must be taken to either accelerate planned projects or develop new ones.

If 75 percent of the waterbodies are not meeting state standards following monitoring activities conducted in 2007, Ecology will examine the actions being taken in areas that are making insufficient progress and work to improve the number or type of activities aimed at

reducing bacteria levels. Ecology will be evaluating water quality monitoring data and the implementation of clean up activities regularly during the period 2003 to 2006. Where implementation activities are not being accomplished, Ecology will act to determine the cause of the problem and assist efforts to ensure that the planned obligations are met.

Enforcement.

The Water Pollution Control Act (chapter 90.48 RCW) provides broad authority to issue permits and regulations, and prohibits all illegal discharges to water. The act openly declares that it is the policy of the state to maintain the highest possible standards to ensure the purity of all waters of the state and to require the use of all known, available, and reasonable means to prevent and control water pollution. The act defines waters of the state and pollution and authorizes the Department of Ecology to control and prevent pollution, to make and enforce rules, including water quality standards. The act also designates Ecology as the state water pollution control agency for all the purposes of the federal Clean Water Act. Under this statute, Ecology is authorized to administer wastewater disposal permits and to require prior approval of plans and methods of operation of sewage or other disposal systems. Ecology will also encourage local government to enforce local ordinances.

PUBLIC INVOLVEMENT

The timelines for planned and voluntary implementation activities have been created in consultation with all of the agencies and organizations involved. Actions related to future wastewater permit requirements were prepared solely by Ecology. This document is being reviewed during the public comment period by all parties discussed in the "Organizations Participating in Cleanup Efforts" section.

Ecology had previously anticipated the use of workgroups to guide the preparation of this Action Plan. However, based upon staffing levels and other constraining factors, Ecology has instead held individual meetings with basin stakeholders, or reasonable representatives, to gain additional insight on the activities needed to ensure local waters will eventually meet state standards for acceptable bacteria levels. This new course has not affected the scope of activities listed in this document, nor will it affect the ability of this document to direct local efforts in identifying needed projects or assisting in the funding of those projects needing grant funding.

A comment period was provided to gather input on the Draft Action Plan. The comment period ran from April 21, 2003 through May 16, 2003. Comments received during that timeframe were reviewed and incorporated as appropriate into the final version of the Action Plan. Responses to comments can be found in Appendix A.

An Ecology report on local water quality and announcement of the public comment period was mailed to interested parties during the week of April 13, 2003. A news release and display ads were also sent to all local newspapers serving residents of the SnoTribs watershed.

FUNDING OPPORTUNITIES

There are several sources of funding available from agencies mentioned in this document. The USDA Natural Resource Conservation Service and Snohomish Conservation District make money available to agricultural producers for farm plan implementation and conservation improvements on farms. Ecology funds water quality facilities and activities. Puget Sound Water Quality Action Team funds public involvement and outreach activities. An important aspect of gaining funding for these projects is to have a clear need identified. The following is a partial list of funding opportunities from these entities and other to help accomplish water cleanup activities.

Ecology Funding Opportunities

Centennial/SRF/319 Fund

These three funding sources are managed by Ecology through one combined application program. Centennial and 319 funds are grants and the State Revolving Fund (SRF) is a low interest loan program and each is available to public entities. Grants require a 25 percent match. They may be used to provide education/outreach, technical assistance, for specific water quality projects, or as seed money to establish various kinds of water quality related programs or program components. Grant funds may not be used for capital improvements to private property. However riparian fencing, riparian revegetation, and alternative stock watering methods are grant eligible.

Low-interest loans are available to public entities for all the above uses, and have also been used as "pass-through" to provide low-interest loans to homeowners for septic system repair or agricultural best management practices (loan money can be used for a wider range of improvements on private property), for instance.

Coastal Protection Fund

Since July 1998, water quality penalties issued under Chapter 90.48 RCW have been deposited into a sub-account of the Coastal Protection Fund. A portion of this fund is made available to regional Ecology offices to support on-the-ground projects to perform environmental restoration and enhancement. Local governments, tribes, and state agencies must propose projects through Ecology staff. Stakeholders with projects seeking to reduce bacterial pollution are encouraged to contact their local TMDL lead to investigate fund availability and to determine if their project is a good candidate.

Snohomish Conservation District Programs

Conservation Reserve Enhancement Program (CREP)

The CRP is a voluntary program to establish forested buffers along streams where streamside habitat is a significant limiting factor for salmonids. In addition to providing habitat, the buffers improve water quality and increase stream stability. These same actions can also help reduce bacterial pollutant loadings to local waters. Land enrolled in CREP is removed from production and grazing, under 10-15

year contracts. In return, landowners receive annual rental, incentive, maintenance and cost share payments. The annual payments can equal 100 percent of the weighted average soil rental rate (incentive is 110 percent in areas designated by Growth Management Act).

Conservation Reserve Program (CRP)

A voluntary program that offers annual rental payments, incentive payments for certain activities, and cost-share assistance to establish approved cover on eligible cropland. Assistance is available in an amount equal to not more than 50 percent of the participant's costs in establishing approved practices; contract duration between 10-15 years.

Environmental Quality Incentives Program (EQIP)

This federally funded program is also managed by Snohomish Conservation District. The EQIP program has the following features:

- Provides technical assistance, cost share payments and incentive payments to assist crop and livestock producers with environmental and conservation improvements on the farm.
- $5.8 billon over next 6 years (nationally).
- 75 percent cost sharing but allows 90 percent if producer is a limited resource or beginning farmer or rancher.
- Program funding divided 60 percent for livestock-related practices, 40 percent for crop land.
- Contracts are 1 to 10 years.
- NO annual payment limitation; sum not to exceed $450,000 per individual/entity.

The Public Involvement and Education (PIE) Program

The PIE program is administered by the Puget Sound Action Team. PIE dollars help citizens, schools, businesses, nonprofits, local and tribal governments to:

- Create solutions to local pollution problems
- Protect, preserve and restore habitat
- Motivate people to be environmental stewards
- Partner with others for lasting results

PIE is not a grant program. Instead, through personal services contracts, the Puget Sound Water Quality Action Team obtains the services of individuals and organizations to educate and involve residents of Puget Sound as they carry out the 2001 - 2003 Puget Sound Water Quality Work Plan. The Action Team staff provides guidance on fulfilling a state contract as well as technical assistance related to the project.

If the legislature approves funding for the 2003 - 2005 biennium, the **request for proposals (RFP) for Round 14 of PIE will be distributed during the summer of 2003**. If you would like to receive notification of Round 14, e-mail or phone your contact information to gwilliams@psat.wa.gov, 360-407-7311. To help you decide if PIE is the right program to fund your project, read through the current and past PIE project descriptions .

USDA Programs

Rural Housing Repair and Rehabilitation Loans

The Rural Housing Repair and Rehabilitation Loans are loans funded directly by the federal Government. These loans are available to very low-income rural residents who own and occupy a dwelling in need of repairs. Money may be provided to replace a failing onsite septic system. This loan is a 1 percent loan that may be repaid over a 20 year period.

To obtain a loan, homeowner-occupants must be unable to obtain affordable credit elsewhere and must have very low incomes, defined as below 50 percent of the area median income. They must need to make repairs and improvements to make the dwelling more safe and sanitary or to remove health and safety hazards. Homeowners 62 years and older are eligible for home improvement grants. Other low income families and individuals receive loans at a 1 percent interest rate directly from RHS. More information can be found at the following web address: http://www.rurdev.usda.gov/rhs/Individual/ind_splash.htm#Direct%20Loan%20Program%20(Section or by contacting Chris Ketner at (253) 845-0553.

Wetland Reserve Program (WRP)

The WRP is a voluntary program to restore and protect wetlands on private property (including farmland that has become a wetland as a result of flooding). Landowners can receive financial incentives to enhance wetlands in exchange for retiring marginal agricultural land. Landowner limits future use of the land, but retains ownership, controls access, and may lease the land for undeveloped recreational activities and possibly other compatible uses.

Emergency Watershed Protection

NRCS may purchase easements on floodplain lands and the right to conduct restoration activities, in exchange for limited future use by landowner.

Snohomish Housing Authority

The Snohomish Housing Authority is an independent agency that helps build stronger communities by providing affordable housing and assisting low-income residents in maintaining their homes through low interest loans. When low-income residents face the challenge of replacing a failing septic tank, SHA assistance may be an option. Borrowers need to be

moderately low income; family of two with income less than $45,000 or family of four with income less than $56,000. Homeowners making less than $30,000 may be eligible for 0 percent loans. The home must be owner occupied with a 20 percent equity stake and the housing authority loan must be in 2nd position. The maximum loan is $40,000 for 30 years at 3 percent interest.

REFERENCES

Carroll, Janet, 1999. Quilceda/Allen Watershed Management Plan Snohomish County Public Works, Surface Water Management, 2930 Wetmore Avenue, Everett, WA 98201 http://www.co.snohomish.wa.us/publicwk/swm/steward/index.htm

Center for Watershed Protection. Microbes in Urban Watersheds. Feature article II. Watershed Protection Techniques, Vol 3, No. 1, April 1999. Ellicott City, MD.

Chang, G. 1999. Personal Communication. Austin TX Environmental and Conservation Services Dept. City of Austin, TX. (Cited from Feature Article II, Watershed Protection Techniques, Vol. 3, No. 1, April 1999. Center for Watershed Protection, Ellicott City, MD.

Cusimano, Robert F. July 1995. Snohomish River Estuary Dry Season TMDL Study – Phase I. Water Quality Model Calibration. Publication 95-338. Washington Department of Ecology Water Quality Program, P.O. Box 47600, Olympia, WA, 98504-7600. 29 pps plus figures and appendices.

Cusimano, Robert F. and Randy Coots, September 1997. Water Quality Assessment of Tributaries to the Snohomish River and Nonpoint Source Pollution TMDL Study. Publication 97-334. Washington Department of Ecology Water Quality Program, P.O. Box 47600, Olympia, WA, 98504-7600. 52 pps plus appendices.

Doran, J.W., J.S. Schepers, and N.P. Swanson. 1981. Chemical and bacteriological quality of pasture runoff. Journal of Soil and Water Conservation, May-June: 166-171.

Halpin, L. 1992. Tulalip Fisheries Department on-reservation water quality monitoring program progress report. Tulalip Fisheries Department. Marysville, WA.

Mathias, Dan. 2003. Personal communication regarding DNA ribotyping study data performed on Swamp, Edgewood, and Glennwood Creeks by Dr. Mansour Samadpour, Ph.D. University of Washington for the City of Everett. Dan Mathias, PE, City of Everett Public Works 3200 Cedar Street, Everett, WA, 98201

Memorandum of Agreement Between The United States Environmental Protection Agency And The Washington State Department of Ecology Regarding The Implementation of Section 303(d) of The Federal Clean Water Act, 22 pps. October 29, 1997.

Paul, J. and K. Nelson. 1996. Tulalip Reservation Water Quality Assessment, 1991-1995. Tulalip Natural Resources Division Final Report. Maryville, WA.

Pitt, R. 1998. Epidemiology and stormwater management. In Stormwater Quality Management. CRC/Lewis publishers. New York, NY.

Puget Sound Action Team, 2001. Puget Sound Water Quality Action Team 2001-2002 Work Plan

Samadpour, M. and N. Checkowitz. 1998. Little Soos Creek microbial source tracking. Washington Water RESOURCE. Spring, 1998. University of Washington Urban Water Resources Center.

Thurston County Public Health, 2002. Bacteriological Contamination Source Identification, Henderson Inlet, 1999-2001. Thurston County Public Health Division and Social Services Department, Environmental Health Division, Surface Water Section, 2000 Lakeridge Drive SW, Olympia, WA, 98502-6045.

Thornburg, Kathy, K. Nelson, K. Rawson, and G Lucchetti, 1991. Snohomish System Water Quality Study 1987-90. Tulalip Fisheries Department Progress Report. Tulalip Fisheries Department, Marysville, WA 98270.

Thornburgh, K. and G. Williams, 2000. The State of the Waters, Water Quality in Snohomish County's Rivers, Stream, and Lakes. Snohomish County Department of Public Works, Surface Water Management, Everett, WA.

Varner, P. 1995. Characterization and source control of urban stormwater quality. City of Bellevue Utilities Department. City of Bellevue, Washington.

Wright, Robert J, Randy Coots, and Robert F. Cusimano. 2001. Lower Snohomish River Tributaries Fecal Coliform Total Maximum Daily Load Evaluation Publication 00-10-087. Washington Department of Ecology Water Quality Program, P.O. Box 47600, Olympia, WA, 98504-7600. 24 pps plus appendices.

APPENDIX A: RESPONSE TO COMMENTS

Comments regarding factual inaccuracies, improved wording, or those that clarify policy positions by other government agencies have been directly incorporated into the text of the final submittal report. All other comments are summarized below. In order to avoid redundant responses to similar or related comments, some comments have been combined.

1. Comment: The report states that "…many of the activities are already funded." Since the activities discussed are required to be implemented or the city is likely to be sued or fined we have reallocated resources to fund the activities. However, funding of stormwater activities at the detriment of other activities is not a funding source and additional funding sources are required to fund the stormwater activities.

Response: Ecology acknowledges that this TMDL may result in additional responsibilities on local government where current efforts are not sufficient to protect water quality. Many of the pollution abatement/reduction activities proposed (or in some cases required) address problems that are a result of decades of previous land use and other decisions and resolving those problems will not occur overnight. Therefore, requirements for municipal permittees have been designed to allow maximum flexibility in implementation for municipal permittees while meeting the need for positive forward movement to resolve existing water pollution problems in a timely manner.

Comment: If infiltration is so desirable why does the 2001 DOE stormwater manual make it difficult to use infiltration as a storm water disposal method?

Response: In developing the Western Washington Stormwater Manual (2001), Ecology must ensure that the proposed practices will be protective of both surface and groundwater quality. One challenge to the use of infiltration as a storm water disposal method is the need to provide adequate treatment to protect groundwater supplies. For that reason, Ecology determined that in cases where a pond functions to perform both treatment and disposal, a five foot separation between the bottom of an infiltration pond and the seasonal high groundwater level is needed. However, under certain circumstances the separation may need to be greater than five feet, or can be as little as three feet, depending on site conditions and pond functions. It is the reviewing agency's (city or county) responsibility to make the final decision based upon the specific conditions in consideration of a professional engineer's investigation and reports. One such case where an alternative separation distance might be appropriate is where clean roof water is being infiltrated. Thus, there are some options for local government. Ecology also encourages the use of low impact development strategies to reduce stormwater volumes and thus the need for or size of stormwater conveyance and treatment systems.

3. Comment: The Implementation Plan needs to acknowledge that natural bacterial sources also exist and could preclude attainment of numeric standards. In such cases, the natural levels would actually be the standards (WAC 173-201A-070(2)). Perhaps after a number of efforts to reduce bacterial loading it may be necessary to identify an alternate bacteria target level. Perhaps a use attainability analysis will be needed. These possible outcomes need to be acknowledged in the executive summary and elsewhere in the report.

Response: Ecology acknowledges that whenever natural conditions are of a lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Determining natural conditions in relation to reevaluate load and wasteload allocations may become necessary during the adaptive management phase of this TMDL.

At this time, Ecology believes that the waters addressed by this TMDL can improved so that they are available for their full range of beneficial uses. Concurrently, Ecology acknowledges that our knowledge of specific bacterial pollution sources and ability to control many diverse sources will be a challenge, especially for urban areas where the successful control of bacterial pollution is largely unexplored. This challenge exists for controlling the many human sources of pollution and in some cases, could be made more difficult given high concentrations of bacteria from wildlife sources.

Where natural background levels are established, allocations to point sources must be reduced proportionally to accommodate those natural sources potentially leaving no allocation for point sources.

At this early stage in this TMDL, which will be implemented over many years, Ecology is not considering a lowering of the standards set for local waters nor the long term need for use attainability studies for waters now considered polluted. The suitability of performing a use attainability analysis can be reconsidered during the five-year reassessment of implementation progress and trends in water quality improvement in conjunction with additional BMPs where existing levels of effort do not appear to be effective in resolving local pollution problems.

4. Comment: The figure asserts that Snohomish River Tributaries should be available for recreation opportunities. Recreational activities of concern for bacteria include wading and swimming. Where are the wading and swimming sites? Such sites should be clearly identified for each tributary on a separate figure. Since this is asserted in several places in the text, and since it is human exposure that is the issue, the implementation plan should identify where all these sites are. In the public health interest, if it is considered a problem, then these areas should be posted to warn waders and swimmers. What criteria describe waters suitable for swimming? Seems like a certain depth is necessary. Warm water helps and so does access. So where in the summer is the water deep enough for swimming and where is there access for swimming?

Response: Due to both the dynamic nature of local streams and the infeasibility of enumerating all locations where children, as well as adults, have both access and the ability to become fully submerged, wade, fish, or bath in the Snohomish River Tributaries, this TMDL will not attempt to such locations. State water quality criteria for waters where swimming is a specified beneficial use are contained in WAC 173-201A-030(1) and (2). Ecology considers the posting of warning notices to local citizens to be a responsibility of local health districts.

5. Comment: The Implementation Plan does not include any reliable strategy to identify sources of bacteria. In addition, fish are not adversely affected by fecal coliforms. So, any reference to fish should be in the context of a dissolved oxygen discussion.

Response: The Implementation Plan includes a number of strategies to identify sources of bacteria including water quality monitoring, illicit connection detection programs, door-to-door environmental audits, technical assistance to commercial facilities, and other methods to identify sources of bacteria. Ecology concurs that fish are not adversely affected by fecal coliform bacteria, although they can be affected by reduced oxygen levels that may result from the excessive nutrients that are known to be associated with many fecal coliform sources.

6. Comment: Figure 2 shows wading and inner tubing activity on a stretch of river at least 50 feet across. Are any of the SnoTribs like this picture? If not, don't use it in the Implementation Plan. This picture simply re-emphasizes why it is necessary for Ecology to clearly identify where wading and swimming areas are in each of the Snohomish Tributaries.

Response: Figure 2 is intended to provide the reader with a visual example of swimming, wading, and bathing activities and not to provide an exact representation of any individual recreational opportunity in the SnoTribs TMDL area, or a representation of all possible recreational activity scenarios.

7. Comment: The Implementation Plan states that all of the streams are classified as Class A waters. Many of the streams are actually Class A by default and as such the designated uses under the standards were never actually determined.

Response: The water use and quality criteria set forth in WAC 173-201A are established in conformance with the present and potential uses of surface waters. Washington Administrative Code 173-201A-130(100) specifically notes that Snohomish River upstream from latitude 47°56'30"N (southern tip of Ebey Island at river mile 8.1) to the confluence with the Skykomish and Snoqualmie River (river mile 20.5) are designated as Class A waters. Because the Snohomish Tributaries are part of a watershed system and in order to support the beneficial uses of downstream users, upstream (and tributary) water quality must be at least as high quality as downstream areas.

8. Comment: The Implementation Plan states a goal to return 75 percent of segments to water quality standards by 2007. This goal is unattainable. Of the 42 sites listed, only seven are currently being monitored. Given current monitoring effort and funding, it will be impossible to know if 31 sites (75 percent) are meeting standards by 2005. Furthermore, current funding of restoration efforts and BMPs is unlikely to be sufficient to result in water quality improvements in all the watersheds of the Snohomish Tributaries with the time frames specified in the Plan. The Plan should acknowledge that one future outcome may be the need to do a Use Attainability Analysis.

Response: Based upon the Memorandum of Agreement Between The United States Environmental Protection Agency and The Washington State Department of Ecology Regarding The Implementation of Section 303(d) of The Federal Clean Water Act, Ecology is required to provide timeframes for meeting interim targets and water quality standards in this Action Plan. Ecology believes that goals are necessary to help define both the scope of activities, the timeline for implementation of corrective actions, and the eventual return of local waters to compliance with state standards. Should that goal not be reached, Adaptive Management will be employed as stated in this TMDL.

Ecology intends to work with local governments to help identify available grant resources and will continue to offer Centennial Grant funding annually on a competitive basis—many entities working in the SnoTribs area have used this resource. Response to comment #11 also addresses the relationship of available resources to this TMDL.

Monitoring resources within the SnoTribs TMDL focus area are expected to increase through the requirements of Phase I and Phase II municipal stormwater permits and voluntary efforts of other entities. Ecology efforts will complement these resources when it evaluates TMDL effectiveness after five years. Please refer to the section on Monitoring for more information.

As noted in the response to comment #3, Ecology is not assessing the possible need for use attainability analyses at this time.

9. Comment: The recommendation that developers should maximize buffer widths is inappropriate. Buffer widths are established through the land use authority of local governments and the Growth Management Act. The TMDL should not be used to dictate land use conditions to local government. It is suggested to replace the word "…maximize…" with "…preserve…".

Response: This TMDL does not impose additional regulations or requirements on any parties. Rather, it makes recommendations that should improve local water quality and encourages all stakeholders (citizens, businesses, local government) to participate voluntarily. Thus, the TMDL does not dictate land use conditions to local government, nor does it dictate new requirements to developers. For those cases where buffers are being created, or enlarged as a part of a development project, the current wording is

broader and more inclusive of the possible scenarios than could occur than the proposed change in wording would allow.

In the case of NPDES permits, the authority to incorporate portions of this Action Plan as enforcement elements of a permit are established in the NPDES permit consistent with existing state and federal laws and regulations, not as part of this TMDL document. Those proposed conditions may also be appealed as part of the issuance of an NPDES permit.

10. Comment: The table summarizing DNA testing is quite significant. In spite of the numerous qualifiers and disclaimers in the title, it makes a clear statement that in similar creeks, there are both human and domestic animal sources of bacteria as well as natural wildlife sources. It is fair to lump cats, dogs, humans, horses, bovines and chickens as clearly human caused sources. It is also fair to say that avian, canine, opossum, rabbit, raccoon, rodent, squirrel, deer, multi species, beaver, goose and sea gull are essentially natural sources. Granted, sometimes humans do things to attract some birds, but humans have also been responsible for greatly reducing the amount of wildlife. While Ecology believes the data may not be used to accurately quantitate loadings from each source category, the data probably provide the best information we have at this time. The data clearly suggest that natural bacterial sources may contribute as much as 50 percent of the bacteria. The data therefore suggest that a TMDL reducing the human sources will not achieve the numeric standards. The data also provide a further means to evaluate the success of any BMPs implemented. If the percentages for the human associated sources decrease, the BMPs are having an effect.

Response: Available DNA data provides information on the various sources of bacterial pollution but not their relative contributions on a quantitative level. By itself, the data does not necessary constitute the best information available. For that reason, the data cannot be used to say that nonhuman sources constitute a specific portion of the pollution problem in any of the studies cited. Ecology is encouraging that the use of this scientific procedure be examined further, and if it can be done cost effectively, procedures should be developed to allow for quantification of bacterial sources.

Ecology recommends a number of source identification techniques in this TMDL (see response to comment #5) and believes that local government and citizens need to determine what techniques work best in their watershed. DNA source tracing techniques currently being used can still provide important information; 1) to help confirm the makeup of discrete, high concentration sources identified in conjunction with other source identification techniques including ambient/receiving water monitoring, and 2) to provide a general picture of the range of sources contributing to bacterial pollution in a watershed.

11. Comment: The number and frequency of stormwater discharges sampling in the first year should be specified. It is not feasible for any jurisdiction to sample all their discharges within one year. It is recommended that monthly sampling at a few key stormwater discharges be specified and that based on data obtained, adjustments in sample locations can be made to obtain the most relevant information.

Response: Each municipality affected by this TMDL faces variations in the number of potential source areas, types and numbers of land uses, financial constraints, and other issues that will affect the scope TMDL-related activities within their jurisdiction. Ecology recognizes this and intends there to be flexibility in the development and implementation of BMPs and water quality monitoring programs associated with this TMDL. For these reasons, Ecology has chosen not to specify the number and frequency of stormwater or other monitoring efforts as part of this Action Plan. Similarly, the level of staff resources needed to accomplish required efforts has not been specified. It should also be noted, however, that where surface waters have been identified as polluted, it is assumed that existing resources and programs alone are inadequate to address the problem and additional steps or reallocations of existing resources must take place to resolve existing pollution problems.

12. Comment: The paragraph describing the Early Action Approach should also acknowledge that given the high variability inherent in bacteria data, monitoring could fail to show a change associated with the BMPs.

Response: Ecology acknowledges that monitoring bacterial pollution levels involves data that exhibits relatively high variability—this is reflected in State's use of two water quality criteria (geometric mean and a 90^{th} percentile component) to characterize acceptable bacteria levels. The first criterion is based on the use of a geometric mean to help address this variability. The second criterion is similarly crafted to help address this inherent variability by setting an upper limit on that level of variability.

It is anticipated that in many cases implementation activities will result in the identification and reduction/elimination of pollutant sources resulting in the elimination of many of the peak values observed before pollution reduction activities began. This will reduce variability, which in itself could be a measure of change. Reducing this variability should also improve our ability to detect changes using geomean bacteria levels.

13. Comment: Evaluation of critical areas ordinance should be deleted from the table of Implementation Considerations. The TMDL should not address local land use policies. Local land use polices are more appropriately addressed through the Growth Management Act. The DOE stormwater manual only identifies infiltration as a stormwater treatment BMP that can reduce bacteria. The Snohomish River Tributaries is almost entirely glacial till. Therefore, infiltration isn't feasible in most of the watershed. Therefore, the TMDL should reference source control BMPs, rather than stormwater treatment BMPs, as a means of preventing additional bacterial pollution.

Response: Please refer to response to comment #9 regarding the issue of how the actions contained in this Action Plan relate to existing land use regulations. As noted above, infiltration is a method of reducing bacteria levels in stormwater reaching surface and ground waters; therefore, this TMDL should recommend that preferred option. Although this TMDL has not studied the soil composition throughout the Snohomish Tributaries focus area, many areas have soils suitable for infiltration. In addition, infiltration is also possible on glacial till, with infiltration rates varying with the specific composition of the till. In the case of urban, residential, and road surface stormwater, all options must be considered to reduce runoff volumes such as infiltrating all stormwater using Low Impact Development (LID) techniques, using LID techniques in combination with infiltration or treatment/storage/release strategies, infiltration of clean roof water, and other techniques to both reduce bacterial pollutant loads and maintain natural stream hydrology. These techniques will be needed in addition to source control BMPs.

14. Comment: The TMDL notes that ducks, geese, and other wildlife in their natural settings are "not generally considered sources of pollution by this TMDL." However, they are sources of bacteria and their contributions could be sufficient to prevent attainment of the bacteria standards and the TMDL. Even if human conditions change the distribution of some wildlife, recognize that human conditions also have reduced the total amount of wildlife in the Snohomish Tributaries drainage basin, and what remains should be considered to be "natural".

Response: This TMDL has not documented the effect of human activities on either increasing or decreasing wildlife populations. Similarly, there is no data available on whether or not sufficient habitat exists in remaining urban or other riparian areas to support wildlife levels that may or may not be concentrated by human activities. Should the pollution identification and remediation activities recommended by this TMDL prove to be ineffective, the effect of wildlife populations can be considered as Adaptive Management is used to identify alternate courses of action to improve local water quality.

15. Comment: Fecal coliform counts in surface waters are extremely variable. The coefficient of variance for twelve years of fecal coliforms monitoring by the City of Everett is 1.6. With such an extreme variability it will be very difficult and costly to determine the effectives of any BMP in reducing fecal coliforms. Therefore, effectiveness monitoring should be limited to determining if the BMP has been implemented and is operational rather than trying to prove that the reduction in fecal coliforms attributable to a particular BMP is statistically significant.

Response: Please refer to response to comment #12 regarding variability of bacterial concentration data.

16. Comment: The first paragraph of the Reasonable Assurances section implies that NPDES stormwater permitees will be legally liable for achieving the goals of the TMDL.

As pointed out above, it is not feasible to comply with the numeric water quality standards for fecal coliforms because natural sources are not well understood, but may very well be sufficient to exceed the numeric water quality standards. While the water quality standards include specific allowances for natural conditions, the TMDL and the DIP essentially deny such allowances. Therefore, it will be impossible for permitees to comply with the conditions of their NPDES permits to show that they will meet their allocated amount of reductions. Local governments should not be legally required to comply with an unattainable water quality standard. Therefore, reasonable assurances should be limited to verification that NPDES permitees have implemented the BMPs required by the TMDL.

Response: Ecology does not concur that the referenced text implies NPDES stormwater permittees are legally liable for achieving the overall goals of the TMDL. The TMDL provides wasteload allocations to municipal stormwater dischargers, which are designated as point sources by federal law. As noted in the first paragraph, Ecology will use enforcement when a cooperative approach to "…achieve the implementation of control measures…" is ineffective.

Ecology must establish water-quality-based effluent limitations for NPDES permittees where water quality problems have been documented. This TMDL documents such water quality problems. Although effluent limitations are typically expressed in a numerical form, effluent limitations for municipal stormwater discharges will be in the form of BMPs to be implemented by the permittee. If BMPs are implemented as specified in the NPDES permit, then Ecology, in its role as the designated authority for implementation of the NPDES program, will consider the permittee to be in compliance with its effective discharge limitations. The section on Reasonable Assurances must contain a discussion of all activities expected to lead to local waters meeting state standards.

17. Comment: The fourth paragraph under Adaptive Management intends to set percentile and time targets for meeting state standards, with the focus being to add more clean up activities. The paragraph needs to also acknowledge that adaptive management may help to better understand natural sources and lead to site specific bacteria targets and the need for a use attainability analysis. In such case, modification of the TMDL and the Action Plan will also be necessary. These are clearly allowed outcomes under both state and federal water quality standards, which may prove to be essential in Snohomish River Tributaries and other watersheds.

Response: Please refer to responses to comments #8 and #14 regarding the use of Adaptive Management with respect to meeting TMDL goals.

18. Comment: The City of Everett has conducted quarterly monitoring for fecal coliform and dissolved oxygen at its Wood Creek/Larimer Road station. Since the sampling frequency since 1998 has been quarterly, Ecology has informed the City that compliance with the geometric mean water quality standard cannot be determined. Twenty three measurements have been taken (9 dry season, 14 wet season) with

geometric means being well under standards (27 and 10 cfu/100mL, respectively). In addition, less than 10 percent of the data exceeded the 90th percentile criteria. None of the dissolved oxygen concentrations fell below 8 ppm. Therefore, unlike the other monitoring stations in the watershed, the City of Everett monitoring station already appears to comply with state standards. Downstream of Larimer Road, there are several agricultural land uses within Everett city limits, according to the TMDL implementation plan, are significant sources of bacteria. Given that there area no fecal coliform or dissolved oxygen problems upstream of our monitoring station, the City of Everett proposes to continue our existing level of services and rely upon the Snohomish Conservation District to manage bacteria and dissolved oxygen downstream of Larimer Road.

Response: In this early phase of the TMDL, Ecology concurs that there is sufficient data to lower the priority for acting in the watershed upstream of the Larimer Road monitoring site. Typically, more frequent monitoring is necessary to determine compliance with state standards, especially when the purpose of the monitoring is to determine whether or not corrective actions are necessary. Many factors however, affect data interpretation and the key to interpreting Ecology's regulations is requirement that data be collected and analyzed so as to not mask possible trends. Other factors should also be considered when examining the time period over which data is examined. One such factor is changes in land use within a focus watershed.

All Phase I and Phase II communities affected by this TMDL will still be required to address the minimum requirements for municipal stormwater permittees contained earlier in this document. It should be noted that the TMDL does not specifically identify significant sources of bacteria in the land downstream of the Larimer Road monitoring station.

19. Comment: In order to meet the enforcement goals that are specified throughout the TMDL document, the number of code enforcement officers may need to be increased and specific training will be required. However, it will be difficult to provide manpower during this period of economic slowdown and budget shortfalls. Sustained funding will be necessary in order to meet the recommended enforcement requirements. In addition, county drainage codes and potentially the Water Pollution Control Ordinance may need to be re-written before the BMPs from the Western Washington Stormwater Manual (2001) can be required.

Response: Please refer to the response to comment #11.

20. Comment: Table 4 is a summary of Implementation Plan Considerations. Adoption of these requirements is inconsistent with subsequent recommendations pertaining to alternative strategies for pollution abatement and application of BMPs. The County has a legal responsibility under the stormwater permit to reduce pollution entering the County stormwater system. The statutory requirement is for compliance with the water quality

standards. Although development and adoption of these recommended codes is one mechanism to meet compliance with the water quality standards, there are other mechanisms to achieve the desired results. It is inappropriate to list these specific ordinances until we have implemented other approaches suggested in the plan and monitored their effectiveness. Better community education and watershed councils which implement the action items in their own specific communities are alternatives. Alternative language suggestions are as follows; "The following list of actions items constitute guidance that may be considered by municipal stormwater permittees. Effective alternative actions are also acceptable."

Response: The Implementation Plan considerations provided in Table 4 constitute the most common tools available to local governments to help address the water quality problems identified in this TMDL. Lacking specific information on alternative control mechanisms being considered by the many jurisdictions affected by this TMDL that would constitute a reasonable alternative to these approaches, Ecology believes that the requirement to consider the strategies in Table 4 is necessary. As stated in the text, municipal permittees are required only to consider the use these approaches, not necessarily to adopt each one. For example, if it is determined by the permittee that one of the listed action items is unsuitable for addressing pollution sources within its jurisdiction, then that permittee would choose not to use that control strategy. It is however, Ecology's expectation that each of these tools be evaluated for their usefulness in addressing bacterial pollution within the Snohomish Tributaries TMDL area. Different approaches are encouraged and where adopted should be documented in the Bacterial Pollution Remediation Plan or Early Action Plan as necessary.

In addition, please refer to response to comment #11.

21. Comment: The reference to the county adopting and enforcing a composting ordinance is confusing in light of the discussion of composting facilities elsewhere in the document. On page 25 under the heading Industrial Stormwater the document states that there is no waste load allocation for composting facilities. On page 54, the document states that composting facilities are regulated pursuant to WAC 173-350. Thus, we are unclear about the rationale for a composting ordinance.

Response: Federal law pertaining to the control of municipal stormwater requires that Phase 1 municipal stormwater permittees have the legal authority to control pollutants entering its municipal separate storm sewer system; therefore, entities must have the proper ordinances, inspection, and enforcement capabilities in place if they are needed. Unless specified otherwise in an NPDES permit or other legal agreement with Ecology, municipal governments are expected to enforce local ordinances, including conducting inspections, even if the facility is under permit by another entity, such as Ecology or the local health department. When enforcement is necessary, municipalities may refer stormwater pollution problems associated with facilities covered under the Industrial Stormwater General Permit to Ecology unless the municipality has stricter stormwater pollution control requirements than those imposed by the facility's permit and those requirements have not been enforced.

22. Comment: Please delete the sentence "When necessary, both parties should work with local sewer districts to point out the long term need for expanding domestic wastewater collection and treatment services." Determining areas for future sewer services is a long-range planning function and is not a part of the mission of the Surface Water Management Division.

Response: This comment seems to be referring to planning activities under the Growth Management Act and this TMDL is not suggesting a reapportioning of local responsibilities to carry out that act. However, where through bacterial pollution source identification activities it is determined that there are areas with multiple failing onsite systems due to the neglect of these systems, outdated designs, poor siting characteristics, or other factors, the extension of wastewater collection services may become a needed implementation activity related for this TMDL. Therefore, Ecology recommends that Surface Water Management play a lead role in educating both local sewer districts and other appropriate staff within city and county governments as to the value of extending service to those troubled areas.

APPENDIX B: IMPLEMENTATION SCHEDULES

The following actions have been proposed by the implementing agencies to improve water quality in the SnoTribs TMDL area. Some tasks are funded and other are not. Funding sources, both existing and future, have been identified wherever possible.

Those tasks associated with the Municipal Stormwater Permits are likely to be incorporated into the respective Stormwater Management Programs following the issuance/reissuance of permits by Ecology and approval by city or county councils. Schedule dates provided are based upon an anticipated permit revision date of 2004. Schedule dates are therefore subject to change based if permit issuance is delayed.

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Department of Ecology

Pollution Source	Action	Schedule	Implementation Strategy
Education/Technical Assistance			
Stormwater	Provide technical assistance (T/A) to municipalities developing stormwater programs using Western Washington Stormwater Manual.	Ongoing	One position has been filled for the geographic area covered by the NWRO. One position filled in Ecology's HQ in Lacey.
Agriculture	Technical assistance to dairy operators		One position to perform all dairy inspection, enforcement, and technical assistance in King and Snohomish Counties
All Sources	Report on Lower Snohomish Tributaries TMDL implementation	9/03	To be accomplished by Ecology watershed lead which is funded.
Financial Assistance			
All nonpoint sources.	Provide funding through 319 Funds, Centennial Grants, and State Revolving Loan Funds. Assist local and private entities in locating grant sources.	Ongoing	Funded, established ongoing program.
Water Quality Permitting			
Stormwater, Agriculture	Issue Phase I and Phase II Municipal Stormwater, Industrial Stormwater, and Construction Stormwater General NPDES permits under Clean Water Act. Issue Granite Falls WWTP Individual NPDES Permit. Permit Dairies as needed under the Dairy Nutrient Management Act (RCW 90.64).	Ongoing.	One dairy inspector for King/Snohomish Counties. General permits issued from HQ office. Permit manager assigned to Granite Falls. One stormwater inspector assigned to cover Kitsap and Snohomish Counties. Anticipated issue date for municipal permits is 2004. Industrial Stormwater Permit currently under appeal.
Enforcement/Inspection			
Stormwater, Agriculture	Inspect/enforce as needed at dairies, construction sites clearing > 5 acres, industrial stormwater permit holders, and municipal wastewater conveyance systems. Enforce state Water Pollution Control Act (RCW 90.48). Perform oversight of Phase I/II permits to municipalities.	Ongoing	• One dairy inspector responsible for Snohomish and King Counties. • One stormwater inspector responsible for Snohomish and Kitsap Counties. • Either permit manager or enforcement officer may conduct inspection.

Environmental Protection Agency

Pollution Source	Action	Schedule	Implementation Strategy
Enforcement			
All sources	Enforce Clean Water Act on tribal lands and perform oversight of state responsibility to implement NPDES and TMDL program.	Ongoing	
Financial Assistance			
All Sources	Grants to states and tribes to fund water quality facilities and activities through 319 and SRF funding (administered through Ecology's Water Quality Financial Assistance Program)	Annually	
Point sources	104(b)(3) grant funding opportunities	Annually	
Education			
Stormwater	Provide guidance on stormwater BMPs	Ongoing	EPA currently provides information on a variety of BMPs to improve stormwater quality at the following website: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/menu.cfm

Tulalip Tribes

Pollution Source	Action	Schedule	Implementation Strategy
Water Quality Monitoring			
Non-point	Continue to monitor historical Sites on the Reservation.	Monthly	Tribal and possibly grant funds.
Riparian Restoration			
Agriculture	Coordinate purchase of easements for improving riparian habitat, filtering of bacterial pollutants, reducing stream temperatures, and improving dissolved oxygen content.	Annually	Apply for grant funding.
Planning and Development			
Agriculture	Develop a pilot Biogas generation facility to improve manure management and create a high quality soil amendment needed for local stormwater management projects.	Annually	Apply for grant funding.
Stormwater	Stormwater associated within the Business Park will be handled with and combination of infiltration and detention facilities as well as other treatment methods. Projects are under review and approval by Tribal Government	Ongoing	Tribal and private funding.
Stormwater	Stormwater Management Plan	(In progress)	Will be applied in the more densely populated areas.

Puget Sound Water Quality Action Team

Pollution Source	Action	Schedule	Implementation Strategy
Technical Assistance			
Stormwater	Tech. assistance to local governments addressing water quality problems.	Annually	Funded. One FTE coversSnohomish County. One FTE specializing in stormwater and LID areas.
	Develop and distribute LID tools to affected local governments.	Ongoing	Partially funded. Currently grant funded to research nationwide LID techniques and prepare regional resource guide. Also collection of information to support update of Ecology stormwater modeling software. Continue to apply for funding of additional work as opportunities become available.
Education			
All Sources	Provide web-based literature & publish the Soundwaves newsletter to educate public re:bacterial water pollution.	Ongoing	Funded. Publications can be found at the following website: http://www.wa.gov/puget_sound/Publications/Pub_Master.htm
Financial Assistance			
Stormwater	Administer the Public Education and Information (PIE) Personal Services Contract Program to provide education and technical assistance on water quality issues.	Biannually	Funded. Provide funding every two years. Funding amounts will vary each biennium based on legislative appropriations.

Snohomish Health District

Pollution Source	Action	Schedule	Implementation Strategy
Education/technical assistance			
Residential	Distribute educational material on proper operation and maintenance of OSSs	Ongoing	Currently performing educational outreach in the Quilceda/Allen Watershed. Apply for Centennial Grants, PIE Grants, and other funding as available annually to cover all TMDL areas within 6 years.
On-site system repair			
Residential	Respond to 5 requests for assistance from local governments when illicit connections are detected	Annually	Funding currently available to investigate a minimum number of failing systems. Additional funding needed for additional work.
Sanitary surveys			
Residential	Assist in the development of criteria for determining the need for and location of sanitary surveys	Summer 2003	Work w/Snoh. Co. Surface Water Mgnt to determine criteria for future work in locating & investigating failing on site systems.
Residential	Perform sanitary surveys in TMDL areas suspected to have substandard onsite systems.	January 2005 and annually as needed	Currently unfunded. Apply for Centennial funds in partnership with Snohomish County SWM staff. Apply for funding on a watershed basis to ensure best results and gain efficiencies with other water cleanup activities (monitoring, outreach, etc…).

Snohomish Conservation District

Pollution Source	Action	Schedule	Implementation Strategy
Education/technical Assistance			
Agriculture	Outreach, technical assistance, and cost sharing to farmers in the Marshlands Watershed	2003 through 2006 Annually	Funded by Centennial Grant Primarily unfunded after 2006, apply for other funding as needed.
	Outreach, technical assistance, and cost sharing to farmers in the Quilceda/Allen Watershed	2004 through 2005 Annually	Unfunded, apply for Centennial Grant or other funding as needed.
	Circulate 1000 newsletters to small farms and flood district members	Annually	Partially funded by Snohomish County PDS
	Provide workshops, tours, and educational activities	Annually	Unfunded after 2006, seek other funding as needed.
Establish Riparian Vegetation/Restoration			
Agriculture	"Hedgerows" Establish native tree and shrub plantings along riparian areas that have been degraded by livestock access and overuse.	2001 through 2003 2002 through 2003	Funded by Centennial Grant Partially funded by Conservation Commission Apply for Centennial Grant of other funding as needed.
	Install fencing for livestock exclusion And provide off-stream water as needed.	2003 through 2006	Funded by Centennial Grant Primarily unfunded after 2006, apply for other funding as needed.
Financial Assistance/Implementation			
Agriculture	Prepare approximately 6 farm plans per quarter through June 2003 then 4-6 per quarter afterwards, if needed.	2003 through 2006	Funded by Centennial Grant Partially funded by Snohomish County PDS Partially funded by CC Other funding such as EQIP or CREP should be sought after for implementation
Monitoring			
Agriculture	Perform bacterial source identification monitoring to locate pollution from agriculture and small farms including equestrian facilities	2004 through 2006	Partially funded by Centennial Grant. Seek other funding prioritizing WQ monitoring.
	Prioritize watershed efforts as a result of monitoring	Annually	Unfunded. Apply for Centennial grants as available.

Snohomish County

Pollution Source	Action	Schedule	Implementation Strategy*
Plan Review and Approval			
Stormwater	Promote LID practices in new development	Ongoing	
Planning and Regulation Development			
Stormwater	Detailed drainage mapping outside the urban growth area to assist in tracing pollution sources		Currently unfunded.
	Work cooperatively w/Economic Development Council to implement low impact development (LID) strategies	Ongoing	Beginning in fall 2003, get support for LID through county development codes
	Perform literature reviews, local surveys, focus groups, and monitoring data analysis as needed to develop a residential pet waste management program	February 2003	Currently unfunded. Applied in 2003 for Ecology grant funding for a multi-year program to design and implement a pet waste management program.
Stormwater, Agriculture	Provide basin steward assistance to help Snohomish Conservation District identify problem farms and implement solutions.	Ongoing	Explore funding possibilities as they are available.
	Work with the Snohomish Conservation District to provide technical assistance to kennels and commercial operations (equestrian facilities) with the potential to create bacterial pollution		Applied for Ecology Grant in 2003…Explore other funding possibilities as they are available.
Loss of natural hydrologic functions	Conduct a hydro-geologic inventory to identify potential groundwater problems. Identify strategies to improve identified problems.	ongoing	Partially funded. Getchell Plateau study for Snohomish basin will be completed July 31, 2003. Explore other funding possibilities as they are available.
Inspection and Monitoring			
All sources	Continue ambient monitoring at current core sites within the plan area.	Ongoing	Currently funded
Stormwater	Perform stormwater outfall monitoring to support pollution source identification activities and enforcement activities.	Ongoing	Continue current actions. Discuss program changes in new permit.
	Implement program to inspect, maintain, and retrofit county detention facilities.	Ongoing	Continue current actions. Discuss program changes in new permit.
	Identify commercial sites (kennels, equestrian facilities, etc..) w/potential to contribute bacterial pollution to MS4	2004	Work in cooperation with the Snohomish Conservation District if grant funding is available.
	Inspect commercial sites to ensure source control BMPs are being implemented.	2005	Explore other funding possibilities as they are available.
Residential wastewater	Assist the Snohomish Health District in identifying failing onsite septic systems.	Annually	Work in cooperation with the lead entity (Snohomish Health District) as resources allow.
Riparian restoration			
All sources	Stream Savers program for private landowners	Ongoing	Funded
	Develop revegetation plans for detention ponds, swales, ditches, and connections to streams.	Ongoing	Currently funded

Pollution Source	Action	Schedule	Implementation Strategy*
Loss of natural hydrologic functions	Develop restoration plans and hydraulic analyses for urban wetlands.	Annually	The county will work with Ecology on investigating a basin-wide approach to assessing the value of wetlands to prevent downstream flooding and provide water quality benefits. Upon successful project development, grant funding will be sought.
	Establish a Conservation Futures Fund for the purchase of critical farmlands for preservation or wetlands restoration.	Ongoing	Currently funded.
Education and Community Outreach			
All sources	Develop an educational program addressing bacterial pollution in MS4	Ongoing	Currently funded
	Continue the Watersheds of Snohomish County Program (Watershed Keepers)	Twice yearly	Currently funded
	Participate in AQWA (Allen Quilceda Watershed Action) Team Activities	Ongoing	Currently funded
	Assist with a French Creek Watershed Management Plan Implementation Committee	After plan completion	Explore other funding possibilities as they are available.
	Provide web-based information on WQ monitoring data, publications, and volunteer and educational opportunities	Ongoing	Currently funded
	Develop and support citizen action groups throughout TMDL focus area	Ongoing	Currently funded through activities of basin steward
	Mark stream crossings and other appropriate areas with signage to increase public awareness	Ongoing	Continue existing program
	Meet twice per year with SCD to review farm plan development and implementation	Ongoing	Currently funded
	Develop incentive programs for implementation of bacterial control BMPs at businesses and small farms		Currently unfunded. Apply to Ecology and others for grant funding
	Provide technical assistance to businesses to control bacterial pollution	Ongoing	Funded
	Develop county-wide pet waste outreach program.		Currently unfunded. Apply for grant funding.
	LID retrofit program to reduce peak flows and improve recharge	2006.	Apply for grant funding
	Basin Steward for Snohomish Tributaries basin	Ongoing	Currently funded
Enforcement			
All sources	Enforcement of the Critical Areas Ordinance. Enforcement of county WQ Ordinance (Chpt 7.53 SCC)	Ongoing	Currently funded

*****Funded as of the date of this report

City of Arlington

Pollution Source	Action	Schedule	Implementation Strategy
Education			
Stormwater	Continue Coordinating with the Arlington School District on including ecological curriculum	Ongoing	
	Continue development of new and management of existing local Environmental Education Sites for use by local schools.	Ongoing	Portions currently unfounded, will work with students and teachers looking for grant sources
	Develop and distribute water quality/at-home recharge information to new/all residents through the billing process.	9/03, annually thereafter	To be incorporated into stormwater management activities
	Write two stormwater-related articles per year in city newsletter	9/03, biannually thereafter	Funded
	Provide web-based information on watershed problems including water quality via website	2/04, ongoing	Funded
	Continue storm drain marking program	Ongoing	Funded
	Placement of signs along streams, stream buffers, wetlands, wetland buffers, and at watershed boundaries.	Ongoing, but mostly complete	Maintenance of signs to be accomplished through stormwater utility.
	Streamside savvy booklet distribution @ front counter, libraries, public safety building, and other locations	Develop with comprehensive plan	Currently unfunded. To be integrated into Phase II stormwater program
	Create or adopt brochure on pet waste ordinance, distribute through monthly billings, kiosks, and veterinary offices, pet stores.	Coordinate w/other local governments, Ecology and Snohomish County 2003-4	Currently unfunded. To be integrated into Phase II stormwater program
	Provide outreach and education on new fundraising techniques to replace car washes. Build/purchase storm drain inserts to be loaned to civic groups.	2004	Currently unfunded. To be integrated into Phase II stormwater program
Planning and Development			
Stormwater	Update Critical Areas Ordinance	Completed and waiting for council adoption and public review process	Would like to adopt in 2003
	Develop pet waste ordinance	1/04	To be evaluated during development of Stormwater Comprehensive Plan in 2003
	Develop Water Quality Ordinance	1/04	To be evaluated during development of Stormwater Comprehensive Plan in 2003

Pollution Source	Action	Schedule	Implementation Strategy
Enforcement			
Stormwater	Ensure compliance with city ordinances that affect water quality	Ongoing	Funded. City has one code enforcement staff person.
All sources	Provide web-based and brochure information on how citizen's can report local water quality problems.	12/03	Web site currently under development. City will modify brochure prepared by AQWA Team and distribute to local residents.
Operations and Maintenance			
Stormwater	Install pet waste collection stations in appropriate public locations. Install 3 stations/year until all areas have coverage. Arrange for related waste pickup as needed.	9/2003, annually thereafter	Currently unfunded. To be integrated into Phase II program or earlier if grant funds are available.
Riparian Restoration			
Loss of riparian habitat	Stream improvement activities to provide shading and reduce temperatures in Quilceda Creek Tributaries. Plant 100 ft or more of streambank per year until finished	Seasonally in conjunction with Stilly/Snohomish Task Force, Stillaguamish Tribe	Unfunded. City will seek Centennial grants, Coastal Protection Fund grants, and other sources for individual projects. Coordination with Stillaguamish Tribe and Stilly/Sno task force providing funding for trees.
Wetland creation/acquisition			
Loss of natural hydrology	Acquire and improve wetland(s) and other aquatic features. (Estimated 2 acres/yr)	Annually, through 2010	In house funding as available, other grants as available
Environmental Monitoring and pollution identification			
All sources	Monitor water quality in Quilceda Creek Tributaries	6/04	Currently unfunded. To be incorporated into Phase II program or earlier if in house funding or grant funding becomes available.
	Illicit connection detection program. Perform streamwalks of local streams. Examine 1 mile per year	Annually, until all stream segments analyzed.	To be integrated into Phase II stormwater program

City of Everett

Pollution Source	Action	Schedule	Implementation Strategy
Education			
Stormwater	School Newsletter	Ongoing	Distribute newsletter annually to all schools within the Marshlands watershed within City limits. The newsletter will announce the available school presentations and programs the City will offer that school year.
	School Presentations	Ongoing	Funded. Surface water presentations will be offered to up to 50 percent of the grade schools each year within the city's portion of the Marshland watershed.
	Neighborhood/business Presentations	Ongoing	Funded. Offer at least one surface water management presentation each year to neighborhood associations and/or business organizations within the city's portion of the Marshland watershed.
	Surface Water Brochure	Ongoing	Funded. Produce and distribute at least one surface water brochure each year.
Public Involvement			
Stormwater	Catch Basin Stenciling	Ongoing	Funded. Stencil at least 100 catch basins within the Marshland watershed over five years.
	Stream Cleanup Days	Ongoing	Funded. Conduct at least one stream cleanup day within the Marshland watershed over five years.
	24-hour Water Quality Hotline	Ongoing	Funded. Reply to all calls received on the water quality hotline within 48 hours.
Operations and Maintenance			
Agriculture	Outreach and Technical Assistance	Ongoing	Rely upon the Snohomish Conservation District to provide outreach and technical assistance to agricultural land uses with Everett City limits.
Residential Wastewater	Public Sewer Connection Incentive	Ongoing	Funded. Continue to offer up to $4,000 zero interest loans to Everett residents to connect to the public sewer system.
Sediment	Catch Basin Cleaning	Ongoing	Funded. 50 catch basins within the city's Marshland Tributary service area will be cleaned over 5 years.
Sediment	Street Sweeping	Ongoing	Funded. All streets within the city's portion of the Marshland Tributary will be swept at an average frequency of once every two months.

Pollution Source	Action	Schedule	Implementation Strategy
Stormwater	Erosion and Sediment Control Plans for Construction Sites	Ongoing	Funded. Each construction site greater than or equal to one acre shall be required to submit and obtain City of Everett approval of an erosion, sediment and source control plan. Each plan shall include BMPs designed to minimize the discharge of sediment and other pollutant sources during construction.
	Erosion and Sediment Control Plan Inspections	Ongoing	Funded. Each construction site greater than or equal to one acre shall be inspected for compliance with their approved erosion, sediment and source control plan at least once per week for projects not actively under construction during the rainy season. For projects actively under construction, an inspection will be made at least three times per week during the rainy season.
	Small Parcel Erosion and Sediment Control	Ongoing	Funded. Each single-family residential lot within a subdivision of greater than one acre shall receive an initial inspection to review the need for erosion and sediment control.
	Stormwater Plan Review	Ongoing	Funded. Each development or re-development site greater than or equal to one acre shall be required to submit and obtain City of Everett approval of a stormwater plan. Each plan shall include BMPs designed to minimize the discharge of stormwater-related pollutant during the post-development phase.
	Stormwater Plan Inspection	Ongoing	All development and re-development sites greater than or equal to one acre shall be inspected for compliance with the approved stormwater plan prior to final approval.
	Stormwater BMP Maintenance	Ongoing	Funded. All stormwater BMPs for single-family development and within a public right-of-way-or easement shall be maintained by the City of Everett. For all other developments, the private property owner will be responsible for stormwater BMP maintenance. The City of Everett will annually inspect privately maintained new development and re-development sites greater than or equal to one acre. The city will notify all property owners whose stormwater BMPs are not being maintained in accordance with the approved stormwater plan within two weeks of the annual inspection. Unless an extension is requested and granted by the city, property owners will be required to correct all deficiencies within 60 days of the notice of deficiency.
	Municipal Operations	2006	Funded. All municipal operations will comply with the Regional Road Maintenance Program

Pollution Source	Action	Schedule	Implementation Strategy
Riparian Restoration and Protection			
Loss of Riparian Habitat	Critical Areas Ordinance	Ongoing	Funded. Enforce City of Everett stream and wetland buffer requirements.
Environmental Monitoring and pollution identification			
	Illicit connection inspection	2005	Provided the city has legal access and as funding allows, fifty percent of all commercial and industrial sites within the Marshland watershed within city limits shall be inspected for illicit discharges over five years.
	Illicit connection correction	2005	As funding allows, illicit connections with the potential to pollute surface water found during inspections shall be provided a notice to disconnect within 5 days of inspection. Corrective action will generally be required within 60 days of the notice to disconnect.

City of Lake Stevens

Pollution Source	Action	Schedule	Implementation Strategy
Education			
Stormwater	Develop a cooperative Introductory Watershed education program. Coordinate with Lake Stevens High School horticulture program.	Ongoing	Cooperation already exists in the form of landscape materials and will be expanded to native and beneficial species. Expand program to include water quality basic information.
	Assist in development of local Environmental and rehabilitation projects.		Currently unfunded. Apply for Ecology Centennial Grant or Coastal Protection fund Grant, look for alternative grant sources.
	Develop and distribute water quality/at-home recharge information to new/all residents through billing process.	9/03, annually thereafter	To be incorporated into stormwater management activities
	Write quarterly stormwater quality -related articles per year in city newsletter	9/03, quarterly thereafter	Funded
	Provide web-based information on local water pollution problems via website	3/03, ongoing	Funded
	Develop enhanced storm drain marking program	Develop program by 2/04	Funded
	Implement storm drain marking program	Every three years, as needed	Currently unfunded. To be integrated into Phase II stormwater program.
	Create brochure on pet waste ordinance; distribute quarterly through monthly sewer billing newsletters,	Begin coordination	Currently unfunded. To be integrated into Phase II stormwater program.

Pollution Source	Action	Schedule	Implementation Strategy
	information kiosks, veterinary offices, and pet stores.	with other local governments and Snohomish County 2003-4	
Enforcement			
Stormwater	Ensure compliance with city ordinances that affect water quality	Ongoing	Public works and planning staff of eight to ten are dedicated to ordinance compliance. Local residents can report water quality problems via the city website.
Riparian Restoration			
Loss of riparian habitat	Improve shading and reduce temperatures in Pilchuck Tributaries.	Annually, in conjunction with Stilly Snohomish Task Force, AASF, or other organization	Unfunded. City will seek Centennial grants, Coastal Protection Fund grants, other sources for individual projects.

City of Marysville

Pollution Source	Action	Schedule	Implementation Strategy
Education			
Stormwater	Develop Introductory Watershed education program. Coordinate with Marysville School District	As funding/staff resources allow.	A basic program may be initiated with current resources. Additional grant funding may be sought.
	Assist in the development of an outdoor environmental educational site and integrated curriculum utilizing the Jones Creek Environmental Education Site	As funding/staff resources allow.	Currently unfunded. Possible application for Ecology Centennial Grant or Coastal Protection fund Grant, look for alternative grant sources.
	Develop and distribute water quality/at-home recharge information to new/all residents through billing process.	As funding/staff resources allow.	To be incorporated into stormwater management utility activities.
	Hold one water quality seminar at Marysville University	As funding/staff resources allow.	Coordinate with Ecology and city staff to develop and present this seminar
	Provide web-based information on Quilceda/Allen Watershed via website	As funding/staff resources allow.	As staffing resources permit.
	Develop and implement enhanced storm drain marking program	As funding/staff resources allow.	Currently unfunded.
	Streamside savvy booklet distribution @ front counter, libraries, public safety building, and other locations	As funding/staff resources allow.	Currently unfunded.
	Distribute brochure on pet waste ordinance, distribute through monthly billings, kiosks, vet. offices, pet stores.	As funding/staff resources allow.	Currently unfunded
Enforcement			
Stormwater	Ensure compliance with city ordinances that affect water quality	Ongoing	1 FTE is currently funded to do code compliance work.
All Sources	Provide web-based and brochure information on how to report water quality problems to city staff.	As funding/staff resources allow.	N/A
Operations and Maintenance			
Stormwater	Determine all locations where Mutt Mitts are needed.	Ongoing	Funded. Mutt Mitts already available at several Jennings Park locations.
Stormwater	Install 5 pet waste management stations per year until all needed sites have coverage. Arrange for related waste pickup as needed.	As funding/staff resources allow.	Unfunded.
Environmental Monitoring, Pollution Identification and Riparian Restoration			
Loss of riparian habitat	Stream Cleanup and riparian restoration activities to improve shading and reduce temperatures, and prevent pollution in Quilceda Allen watershed.	Ongoing	As funding and staff resources permit.
All sources	Monitor water quality	Begin 4/03	Currently funded for one year through combined city and Ecology funding

City of Monroe

Pollution Source	Action	Schedule	Implementation Strategy
Education			
Stormwater	Distribution of written materials.	09/2003 then annually	• Mail 4,000 stormwater management brochures annually with the utility billings. Each year a different topic will be covered, such as: pet waste management, proper disposal of wastes, protecting and restoring riparian vegetation, proper use of and disposal of landscape and garden chemicals. • Distribute stormwater management brochures in public buildings (city hall, library). Subjects to include pet waste management, proper disposal of wastes, septic system maintenance, protecting and restoring riparian vegetation, proper use and disposal of landscape and garden chemicals, and how to become involved in local stream and habitat restorations efforts. • Distribute stormwater management brochures in four business locations annually (pet stores, veterinary offices, garden supply stores). Content to depend on location and will include the following: {pet waste management, proper disposal of wastes, septic system maintenance, protecting and restoring riparian vegetation, proper use and disposal of landscape and garden chemicals, and how to become involved in local stream and habitat restoration efforts.
	Web-based information.	2/04, ongoing	Provide web-based information on local water pollution problems via website using material provided by DOE
	Field signage/markings	Develop program by 4/04, ongoing	Storm drain stenciling and marking program. • Develop storm drain stenciling and marking program by April 2004. • Develop a list of priority locations for marking by April 2004. • Mark 100 storm drains per year.
All Sources	Placement of signs along streams, stream buffers, wetlands, wetland buffers, and at watershed boundaries.	Ongoing	Placement of signs along critical area buffers. • Initial placement required at time of platting. • Maintenance by homeowner's assoc./city per plat conditions.

Pollution Source	Action	Schedule	Implementation Strategy
Planning and Development			
Stormwater	Ensure compliance with city ordinances that affect water quality	Ongoing	Ordinance requiring erosion and sediment controls and sanctions to ensure compliance. • Review existing ordinance by April 2004. • Draft new ordinances for public comment by October 2004, if needed. • Adopt new ordinance by April 2005, if needed. Ordinance requiring maintenance of site and disposal of waste to avoid adverse impacts to water quality. • Review existing ordinance by April 2004. • Draft new ordinance for public comment by October 2004, if needed. • Adopt new ordinance by April 2005, if needed. Develop written procedures to use during site plan review. • Review existing procedures by April 2004. • Draft new procedures for public comment by October 2004, if needed. • Adopt new procedures by April 2005, if needed.
Operations and Maintenance			
Temperature, sediment control	Improved Stormwater Facility maintenance	Ongoing.	Develop written procedures for operation and maintenance of Best Management Practices. • Review existing procedures by April 2004. • Draft new procedures for public comment by October 2004, if needed. • Adopt new procedures by April 2005, if needed.
Sediment control	Improve Public Works operations	Ongoing	Develop ESA compliant operation and maintenance Best Management Practices. • Review existing procedures by April 2004. • Draft new procedures for public comment by October 2004, if needed. • Adopt new procedures by April 2005, if needed.

Pollution Source	Action	Schedule	Implementation Strategy
Stormwater, residential wastewater	Control of inappropriate animal waste disposal		Develop ordinance allowing disposal of pet waste. • Review existing ordinances by April 2004. • Draft new ordinance for public comment by October 2004, if needed. • Adopt new ordinance by April 2005, if needed. Determine all locations where pet waste disposal stations are needed by 05/2005. Install 1 station/year until all areas have coverage. Arrange for related waste pickup as needed.
Riparian Restoration			
Loss of riparian habitat	Improve shading to reduce temperatures in tributaries to French Creek.	Ongoing	Current project underway for habitat restoration and shading along French Creek tributary east of Fryelands Boulevard and south of SR 2. City is working in conjunction with Monroe School District, Trout Unlimited, and other organizations.
Wetland creation/acquisition			
Loss of natural hydrology	Preservation of natural wetlands.	Ongoing	The city has obtained a 47.24 acre wetland which is preserved as the Fairgrounds Educational Wetland.
Environmental Monitoring and pollution identification			
All sources	Monitor water quality	Monthly beginning 04/04.	Test of temperature, fecal coliforms, and dissolved oxygen • Develop list of testing sites (approximately 15). • Test monthly.
Residential wastewater, illicit discharges	Eliminate illicit discharges	Ongoing	Surveying and testing of illicit discharges. • Develop prioritized strategy for examining storm sewer systems for illicit discharges that contribute pollutants by April 2004. • Examine 2 miles of ditch per year. • Test unusual discharges as needed for high fecal coliform levels. Provide information on how citizens can report unsuspected illicit discharges. Post information on city website by September 2003.

City of Snohomish

Pollution Source	Action	Schedule	Implementation Strategy
Education			
Stormwater	Obtain and distribute environmental education information and make available at city's front counter.	12/04, ongoing	Funded. To be incorporated into stormwater management activities
	Provide web-based information on local water pollution problems via website	2/05, ongoing	Funded
	Develop enhanced storm drain marking program	Develop program by 2/05	Funded
	Implement storm drain marking program	3/05, ongoing	Funded. Support local volunteer groups, post notices of activities on webpage.
	Placement of signs along Swifty and Bunk Foss Creek, appropriate stream buffers, wetlands, wetland buffers, and at watershed boundaries.	2005	Funded. Year 1-2 (2003-4) prepare and adopt ordinance. Years 3-5 enforce ordinance.
	Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste	2005	Funded. Year 1 inform public employees. Years 2-3 inform businesses. Years 4-5 inform general public
Enforcement			
Stormwater	Create ordinances prohibiting nonstormwater discharges into MS4 and from construction sites.	2005	Adopt ordinances by 2006.
	Ensure compliance with city ordinances that affect water quality	2007	Enforce all new ordinances relating to water quality protection.
Environmental Monitoring and pollution identification			
All sources	Monitor water quality	11/02, ongoing	Funded. Consultant sampling at various sites currently funded through 2003. Create future volunteer monitoring opportunities thereafter.
	Develop illicit connection detection program	6/04	Funded. Year 1 identify outfalls; Year 2 develop procedures to trace sources
	Illicit connection detection program.	6/07	Follow through on detecting and eliminating illicit discharges in high priority areas.

French Slough Flood Control District

Pollution Source	Action	Schedule	Implementation Strategy
Education			
All sources	Distribute educational material to all district members as needed (when are permits needed, tech. assist. contacts, grant programs for environmental improvement)	1/04, ongoing	Work with local government to collect information and make available at district office or through district manager.
	Sponsor a meeting for district residents to discuss water quality issues, habitat improvement opportunities, etc…	Annually, begin in 2003	Work with NRCS, SCD, Snohomish County, and Ecology to develop meeting program and timely subjects for presentation.
Water Quality Monitoring			
All sources	Perform water quality monitoring at 5 or more locations throughout District Service Area	Annually until 2010 or until TMDL goals met	Unfunded. Ecology to research funding sources to provide laboratory testing equipment and short-term laboratory budget.
	Provide reasonable access to District property for performing of water quality monitoring by others.	Annually, as needed	
Capital Improvements and O&M			
All sources	Scope project to prepare water quality study.	Summer 2003	Meet with SCD, local environmental firms, others to develop project scope and schedule.
	Hire consultant or otherwise participate in study on how to improve water quality through drainage system capital improvements and O&M procedures (also develop strategy and potential funding sources to implement findings as applicable).	Annually, apply for funding as opportunities become available	Unfunded. Work with Ecology and other government agencies to apply for grant funds as opportunities become available

Marshlands Flood Control District

Pollution Source	Action	Schedule	Implementation Strategy
Capital Improvements and O&M			
All sources	Hire consultant or otherwise participate in study on how to improve water quality through drainage system capital improvements and O&M procedures (also develop strategy and potential funding sources to implement findings as applicable).	Annually, until accomplished	Unfunded. Work with Ecology and other government agencies to apply for grant funds as opportunities become available

Drainage Improvement District No. 8

Pollution Source	Action	Schedule	Implementation Strategy
Water Quality Monitoring			
All Sources	Perform water quality monitoring of Lake Stevens and its tributaries.	Annually	Partially funded. The district will add fecal coliform monitoring to its current list of parameters and will seek grant funding to do a phosphorus loading study to complement Ecology TMDL efforts.
Education			
All Sources	Provide public education on water quality issues at various local lake festivals	Annually	Funded. The district intends to attend Aquafest, Crew Team Celebration, and Salmon Fest activities.
	Work with local school district to develop and implement environmental curriculum	9/2003	District Administrator will meet with local school superintendent to collaborate on environmental education at local schools.
	Add information on water quality to local community web site	9/2003, monthly as needed	The district will provide timely information on water quality topics, and local events regarding water quality improvement.
	Development of local outdoor environmental learning center	3/2004	The district will discuss the development of their 14-acre parcel with local school officials, the city of Lake Stevens, and others within the community.
Enforcement			
Stormwater	Help monitor local development projects and encourage Low Impact Development practices	Ongoing	District engineers will continue to evaluate all local projects and provide input to reduce water quality impacts.
	Routine inspection of construction sites and construction activities	Ongoing	District field staff will regularly monitor all construction activity in the watershed to ensure compliance with BMP implementation and effectiveness
Capital Improvements			
Stormwater	Coordinate with local governments to install pet waste management stations and/or kiosks in appropriate locations. Install stations in strategic locations within district boundaries until all sites covered.	12/03, annually thereafter	Unfunded. Meet with Snohomish County and city of Lake Stevens staff to develop plan of action. Work with Ecology and other agencies to procure funding as it becomes available.

Stilly Snohomish Fisheries Enhancement Task Force

Pollution Source	Action	Schedule	Implementation Strategy
Riparian Restoration and Pollution Prevention			
Agriculture	Install fencing and other appropriate exclusion devices to prevent livestock from direct access to streams.	Ongoing	Partially funded. Additional funding from grants and other sources will be needed on a project-by-project basis.
All sources	Work with basin stakeholders to improve riparian habitat, increase shading, reduce water temperatures, and improve dissolved oxygen content.	Ongoing	Partially funded. Additional funding from grants and other sources will be needed on a project-by-project basis.
All sources	Perform door-to-door outreach to landowners to perform environmental audits including bacterial pollution assessments as a component.	2/03, annually as needed	Apply for Centennial Grant program funds to work in TMDL focus areas.
Planning and Development			
Agriculture	Coordinate the purchase of easements for improving riparian habitat, filtering of bacterial pollutants, reducing stream water temperatures and improving dissolved oxygen content.	Annually, until at least one project is achieved in the SnoTribs area.	Apply for grant assistance from applicable funding sources.
Water Quality Monitoring			
All sources	Perform water quality monitoring at sites where bacterial pollution prevention has occurred or perform general water quality monitoring.	Annually	Apply for grant funding as available.

AQWA Team

Pollution Source	Action	Schedule	Implementation Strategy
Water Quality Monitoring			
All sources	Coordinate volunteer monitoring projects within the Quilceda and Allen Watersheds	6/05	Water quality monitoring projects will be promoted as funding and availability of volunteers allows.
Riparian Restoration			
All sources	Work w/basin stakeholders to improve riparian habitat, promote animal exclusion from streams, increase shading, reduce water temps, improve dissolved oxygen content	Annually	Perform one planting or other riparian restoration event.
Education			
All sources	Develop a newsletter for streamside residents that addresses water quality issues and opportunities to participate in community environmental activities	Annually	Currently unfunded.

Adopt-A-Stream Foundation

Pollution Source	Action	Schedule	Implementation Strategy
Riparian Restoration and Pollution Prevention			
All Sources	Conduct a physical and biological survey of tributary streams to identify, photograph and map locations of fish and wildlife habitat degradation and water pollution sources. Reduce water temperatures and improve dissolved oxygen content by improving riparian habitat. Install fencing and other appropriate exclusion devices to prevent livestock from direct access to streams whenever possible.	Ongoing	Completed inventory of barriers to fish migration in Quilceda and Allen Creek sub-basins. Funded for Grace Creek Restoration Project. Additional funding from grants and other sources will be needed on a project-by-project basis.
	Perform door-to-door outreach to landowners to perform environmental audits including bacterial pollution assessments as a component.	2/04, annually as needed	Unfunded. Apply to Centennial Grant program to work in TMDL focus areas.
Education			
All sources	Work with community groups, schools, businesses, and private citizens to increase awareness of water quality issues	Annually	Currently unfunded for extensive work in the Snohomish Tributaries area. Continue to work with all parties as resources allow.
Water Quality Monitoring			
All sources	Perform water quality monitoring at sites where bacterial pollution prevention has occurred or perform general water quality monitoring.	Annually	Unfunded. Apply for grant funding as available from the following sources: