Snohomish River Tributaries
Fecal Coliform
Total Maximum Daily Load

Submittal Report

June 2001
Publication Number 00-10-087
printed on recycled paper

Snohomish River Tributaries
Fecal Coliform
Total Maximum Daily Load

Submittal Report

by
Robert J. Wright
Randy Coots
Robert F. Cusimano

Washington State Department of Ecology
Water Quality Program
Post Office Box 47600
Olympia, Washington 98504-7600

June 2001
Publication Number 00-10-087

printed on recycled paper

For additional copies of this document contact:

Department of Ecology
Publications Distribution Center
P.O. Box 47600
Olympia, WA 98504-7600

Telephone: (360) 407-7472

If you have special accommodation needs or require this document in an alternative format, please call the secretary at (360) 407-6404. The TTY number is 711 or 1-800-833-6388
.

Table of Contents

List of Figures

List of Tables

Introduction

Under the Clean Water Act, every state has its own water quality standards designed to protect, restore, and preserve water quality. Water quality standards consist of designated uses, such as cold water biota and drinking water supply, and numeric criteria, to achieve those uses. When a lake, river, or stream fails to meet water quality standards after application of required technology-based controls, the Clean Water Act requires the state to place the water body on a list of "impaired" water bodies and to prepare an analysis called a Total Maximum Daily Load (TMDL).

Section 303(d) of the Federal Clean Water Act mandates that Washington State establish TMDLs of pollutants for surface waters that do not meet standards after application of technology-based pollution controls. The U.S. Environmental Protection Agency (EPA) has established new regulations (Title 40, Part 130 of the Code of Federal Regulations or 40 CFR 130) and developed guidance (EPA, 2001) for determining TMDLs. The goal of a TMDL is to set baselines and boundaries on the discharge of pollution into waterbodies in order to attain water quality standards.

A TMDL includes a written, quantitative assessment of water quality problems and of the pollutant sources that cause the problem. The TMDL determines the amount of a given pollutant that can be discharged to the water body and still meet water quality standards. The TMDL also determines the **loading capacity** and allocates that loading capacity among the various sources. If the pollutant comes from a discrete source (referred to as a **point source)** such as an industrial facility's discharge pipe, that facility's share of the loading capacity is called a **Wasteload Allocation (WLA).** If pollution comes from a diffuse source (referred to as a **nonpoint source)** such as agricultural land or neighborhoods, that nonpoint share is called a **Load Allocation (LA).**

The TMDL must include a margin of safety that takes into account lack of knowledge about the causes of the water quality problem or its loading capacity. The TMDL must also account for seasonal variability and address future growth. The sum of the individual allocations and the margin of safety must be equal to or less than the loading capacity.

The Snohomish River Tributaries Fecal Coliform Total Maximum Daily Load is being established to address impairments to contact recreation and to help protect fish and fish habitat that has been degraded due to low oxygen, high nutrient loading, and bacteria from fecal coliform sources. The geographic scope of this TMDL includes the main tributaries of the Snohomish River: Quilceda, Allen, French and Woods Creeks, the Pilchuck River and the Marshlands.

TMDLs must be approved by the EPA and made available for public comment. Following the approval of this TMDL, a Detailed Implementation Plan will be developed as a result of the information in this document.

Background

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 is comprised of the main Snohomish River tributaries: Quilceda, Allen, Woods, and French Creeks, the Marshlands and Pilchuck River (Figure 1) and is referred to as the Snohomish River Tributaries Watershed in this document. Historical land uses in the basin have been mainly agriculture and forest related, but are being rapidly developed for residential and commercial use. Increased urbanization and land development activities are impacting water quality in the basin with riparian corridor alteration, conversion of forests, inadequate retention/detention of stormwater from new impervious surfaces, and poorly treated stormwater run-off.

Nonpoint water pollution most commonly results from poor land use management, such as inadequate agricultural practices, failing on-site septic systems, and untreated stormwater runoff. The Snohomish River tributaries are susceptible to agricultural nonpoint pollution with large rural areas and farmland in the watershed. Approximately 20 dairies are located within the Snohomish River Tributaries Watershed, as well as numerous commercial livestock and small farms. Many areas of the watershed have poor soils for locating on-site septic systems, resulting in failing or inadequate septic systems that may also contribute pollutants. Stormwater from urban areas may carry pet wastes to nearby streams. Urban development is continually increasing in certain areas of the Snohomish River Tributaries Watershed, and water quality impacts from urban stormwater runoff are increasing. The watershed is also rich in wildlife, such as waterfowl, elk, deer, and beaver. A portion of fecal coliform bacteria found in Snohomish River tributaries will originate from these natural sources.

A TMDL study for point source discharges of oxygen-depleting substances to the lower Snohomish River estuary system has been completed (Cusimano 1995, 1997). As part of the study, historical data were reviewed and water quality data collected on all the major tributaries to the system. Results of the review and data collection efforts suggest that major tributaries to the Snohomish River have poor water quality.

Quilceda and Allen Creeks

Quilceda and Allen Creeks flow south through the city of Marysville (see basin map in Appendix B) 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 flow south to the Snohomish River delta near Marysville. The upper portion of the Quilceda/Allen watersheds consists primarily of agricultural and rural land uses while the lower watersheds are rapidly urbanizing with increased industrial development. Approximately fifty-three (53) percent of the Quilceda/Allen watershed is in unincorporated Snohomish County. Discharges from the county's storm sewer system are permitted in the Snohomish County Phase I Municipal General NPDES Stormwater Permit.

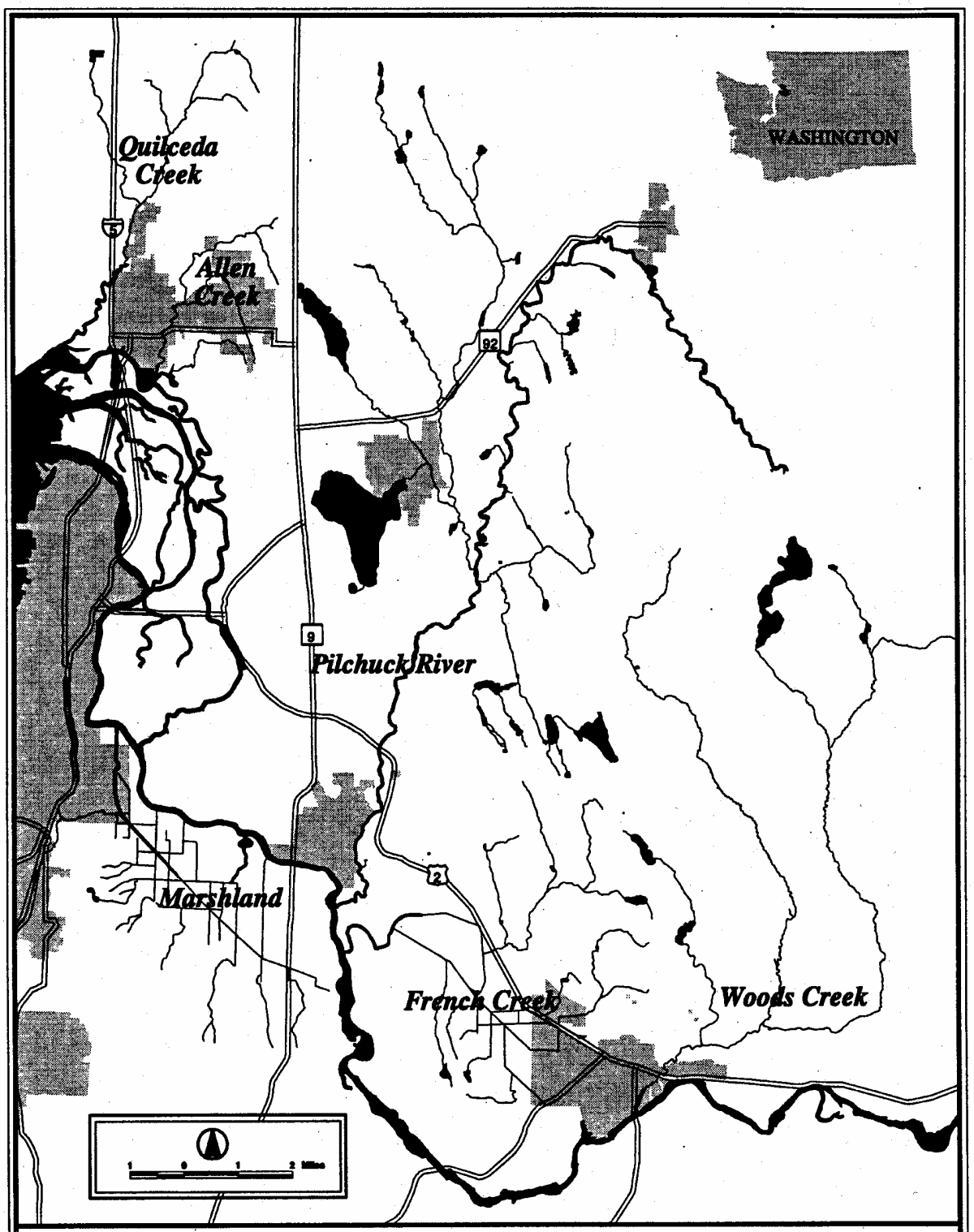


Figure 1. Study Area Map

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 and commercial runoff, septic systems, manure, fertilizers, and animal access to the creeks.

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. (See basin map in Appendix B.) Approximately 49 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 wastewater treatment plant (WWTP), which discharges secondary treated effluent to the river. The discharge from the Granite Falls WWTP is located more than six 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 is classified as AA waters, with the lower river designated as Class A waters in the state water quality standards.

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 primarily around Lake Stevens and the city of Snohomish.

The 1994 Ecology 305(b) report (Ecology, 1994) listed the Pilchuck River as a threatened water body due to potential impacts from further development and agriculture. Contaminants of concern are sediment and bacteria. The sources of the problems appear to be livestock access to the stream, inadequate pasture management, on-site sewage disposal systems, and improper fertilizer application.

French Creek

French Creek flows westerly for approximately 11 miles and encompasses about 28 square miles. French Creek is a Class A water body that drains a portion of south central Snohomish County north of the city of Monroe and southeast of the city of Snohomish, some of which is part of the Snohomish River floodplain (See basin map in Appendix B). A small portion of the French Creek watershed is located within 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 and dairies dominate the lower reaches.

A number of water quality studies have identified problems in the French Creek watershed. Violations of fecal coliform and dissolved oxygen standards have been reported (Thornburgh *et al.,* 1991). Turbidity and nutrient levels are high (Thornburgh *et al.,* 1991; Cusimano, 1995). These monitoring results indicate French Creek is impaired and not suitable for swimming, wading, and salmon and other fish spawning, migration, rearing, and harvesting (Ecology, 1994).

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. The Marshland is a channeled irrigation and drainage ditch system (See basin map in Appendix B). 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.

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. Tributary watersheds, on the hillsides above the Marshland agricultural area, are primarily residential. One of these tributaries, Wood Creek, is listed for dissolved oxygen on the 1998 303(d) list. After flowing through commercial agricultural land, discharge from Marshlands to the Snohomish River is controlled by a pumping station operated by the Marshland Flood Control District. Poor agricultural practices and inadequate stream buffers along the channeled portion of the creek are causing water quality problems in the drainage. 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).

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. Draining about 62 square miles of land, Woods Creek flows southerly from near Lake Roesiger entering the river at Monroe (See basin map in Appendix B). Land use in the lower portion of the creek is mostly residential (around Monroe) and rural residential with some small-scale, non-commercial 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. Fecal coliform concentrations consistently violate water quality criteria throughout the year (Thornburgh *et al.,* 1991; Cusimano, 1995). The creek carries high levels of sediment during storm events (Thornburgh *et al.* 1991). Impaired uses of Woods Creek are swimming, wading, and salmon and other fish spawning, migration, rearing, and harvesting (Ecology, 1994). 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).

Applicable Criteria

In Washington State, water quality standards are published pursuant to Chapter 90.48 of the Revised Code of Washington (RCW). Authority to adopt rules, regulations, and standards as necessary to protect the environment is vested with the state Department of Ecology. Under the federal Clean Water Act, the EPA Regional Administrator approves the water quality standards adopted by the state (Section 303(c)(3)). Through adoption of these water quality standards, Washington has designated certain characteristic uses to be protected and the criteria necessary to protect these uses (WAC 173-201A). The current standards were adopted in November 1997.

This TMDL is designed to address impairments of characteristic uses and to set stream-specific targets for fecal coliform in Snohomish River tributaries that have high fecal coliform levels. The Snohomish River tributaries are designated as Class A or excellent waters. The characteristic uses designated for protection in the Snohomish River tributaries are as follows:

Characteristic uses shall include, but not be limited to, the following:

(i) Water supply (domestic, industrial, agricultural).

(ii) Stock watering.

(iii) Fish and shellfish:

Salmonid migration, rearing, spawning, and harvesting.

Other fish migration, rearing, spawning, and harvesting.

Clam and mussel rearing, spawning, and harvesting.

Crayfish rearing, spawning, and harvesting.

(iv) Wildlife habitat.

(v) Recreation (primary contact recreation, sport fishing, boating, and aesthetic enjoyment).

(vi) Commerce and navigation." [WAC 173-201A-030(1)&(2)]

The State of Washington Water Quality Standards describe criteria for the protection of characteristic uses. Since the Snohomish River tributaries are designated as Class A or excellent waters, they have been assigned the following fecal coliform criteria:

> *"fecal coliform organism levels shall both not exceed a geometric mean value of 100 colonies/100 ml, and not have more than 10 percent of all samples obtained for calculating the geometric mean value exceeding 200 colonies/100 ml."*
>
> [WAC 173-201A-030(2)(c)(i)(A)]

The Water Quality Standards limit the averaging period used in calculating the applicable geometric mean for fecal coliform:

> *"In determining compliance with the fecal coliform criteria in WAC 173-201A-030, averaging of data collected beyond a thirty-day period,... shall not be permitted when such averaging would skew the data as to mask noncompliance periods."*

In cases where natural background conditions exceed a standard, the Water Quality Standards state the following:

> *"Whenever the natural conditions of said waters are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria."*

Water Quality and Resource Impairments

Fecal coliform bacteria are indicators of animal wastes. Livestock, failing septic systems, domestic pets, and wildlife can all contribute to elevated levels. Violations of fecal coliform water quality standards were frequent at all Snohomish Tributary monitoring stations. Samples collected by Snohomish County (Thornburgh *et al.,* 1991: Thornburgh and Leif, 1992, Thornburgh, 1996) and by Ecology (Cusimano, 1995) show that fecal coliform criteria are exceeded in Quilceda, Allen, Marshlands, Pilchuck River, French Creek, and Woods Creek. Wood Creek, tributary to Marshlands, was 303(d) listed in 1996 and 1998 for dissolved oxygen. These waterbodies are included on the Washington State 1998 Section 303(d) list of impaired waters and most have been listed since 1990.

Data used in the water quality technical study consisted of long-term monitoring and special short-term study data collected by Ecology and Snohomish County during the period November 1992 to April 1996 (Cusimano, 1995, 1996). A statistical trend analysis of the county's fecal coliform data, collected from November 1992 to January 2000 for the long-term monitoring sites in the study basins, shows that fecal coliform concentrations have not changed (Appendix G).

Table 1. Snohomish River tributaries on the 1996 Section 303(d) list for fecal coliform, temperature and oxygen.

Waterbody Segment Number	Stream Name	Fecal Coliform	Temperature*	Dissolved Oxygen
WA-07-1012	Allen Creek	X		X
WA-07-1015	Quilceda Creek	X		X
WA-07-1019	Marshlands			X
WA-07-1052	French Creek	X		X
WA-07-1163	Woods Creek	X		
WA-07-1030	Pilchuck River	X		
WA-07-1040	Pilchuck River	X	X	

* not addressed with this TMDL

Table 2. Snohomish River tributaries on the 1998 Section 303(d) list for fecal coliform, oxygen and temperature.

Stream Name	Listed Parameter	Segment Location (Township-Range-Section)
Allen Creek	Fecal Coliform	30N-05E-11, 30N-05E-22, 30N-05E-28
	Dissolved Oxygen	30N-05E-11, 30N-05E-28, 30N-05E-33
Quilceda Creek	Fecal Coliform	30N-05E-10, 30N-05E-16, 31N-05E-27 31N-05E-29, 31N-05E-34, 31N-05E-35
	Dissolved Oxygen	30N-05E-16, 30N-05E-29, 31N-05E-27 31N-05E-29, 31N-05E-34
Wood Creek (Marshlands)	Dissolved Oxygen	27N-06E-12
French Creek	Fecal Coliform	28N-06E-23, 28N-06E-27,28N-06E-29
	Dissolved Oxygen	28N-06E-27, 28N-06E-29,28N-06E-30
Pilchuck River	Fecal Coliform	28N-06E-18, 29N-06E-21
	Temperature*	29N-06E-16
Woods Creek	Fecal Coliform	27N-07E-06, 28N-07E-16, 28N-07E-28 28N-07E-33, 28N-07E-34

* not addressed with this TMDL

Fecal coliform bacteria levels in the Snohomish River tributaries are variable, but do show a significant pattern of seasonal variation. Fecal coliform levels at all sampling stations were higher in the dry season (May - October) than in the wet season, except for the Marshland (See Appendix C, Tables 3 & 4). The reason for the higher dry-season concentrations of bacteria in five of the six tributaries may be that manure application takes place generally during the summer months, and low flow periods allow the least amount of dilution. Fecal coliform criteria violations have been observed during both winter and summer periods, high and low flows, and wet and dry weather conditions. There are a variety of conditions that produce fecal coliform bacteria levels that exceed standards, so there is no single "critical condition" that applies to this TMDL. Therefore, while seasonal variation has been taken into account, this TMDL will apply to each tributary year round.

The city of Granite Falls WWTP discharges secondary-treated effluent to the Pilchuck River. Discharge Monitoring Reports (DMRs) submitted to Ecology by Granite Falls indicate that there have been no effluent violations for fecal coliform over the past five years. The fecal coliform effluent limitation for the plant is 200 colonies per 100 ml as a monthly geometric mean and 400 colonies per 100 ml as a maximum weekly geometric mean. The Fact Sheet developed for the city's NPDES Permit determined that even under critical conditions, such as periods of lowest river flow, there is no predicted violation of state surface-water quality standards.

Impaired uses of the Snohomish River tributaries include swimming, wading, and salmon and other fish spawning, migration, rearing, and harvesting. All Snohomish River tributaries have current or historical salmon usage and are listed under the Endangered Species Act as containing two threatened species; Chinook salmon, and Bull Trout. Bacteria levels at several swimming beaches in the Snohomish River Tributaries Watershed have periodically been high enough for the local health district to post public health warnings.

Sources of Pollution

Bacterial pollution in the Snohomish tributaries originates from numerous diffuse sources. The predominant sources can be grouped into the categories of agriculture, on-site disposal (septic) systems, and post-development activities attributable to urban development *(e.g.,* domesticated animals). Agricultural inputs include animal waste from pasture and concentrated animal areas, waste storage facilities, land application, and stream access. Animals with access to the streams contribute both fecal coliform bacteria and oxygen-demanding organic matter. Data for fecal coliform bacteria and nutrients indicate that animal access is a major source of diffuse pollution caused by poor management practices.

Septic systems, when improperly located, poorly maintained, or failing, can contribute bacterial contamination to streams through surface or groundwater flows. Extensive areas of Snohomish tributaries watershed remain unsewered and, even though sewer service is provided in many areas, there may be a substantial number of homes that use on-site disposal systems, because hookup is not always required when a new sewer line is installed.

Stormwater runoff creates many opportunities for polluting our waterways. As development continues, stormwater runoff from ever-expanding impervious areas has become more pronounced. Pets and waterfowl bacteria are conveyed by stormwater runoff in urbanized areas By EPA dictate, stormwater within Snohomish tributaries watershed that is located in unincorporated Snohomish County is regulated by Ecology's National Pollutant Discharge Elimination System (NPDES) Municipal Phase I Stormwater Management Program and is classified as a point source. Stormwater generated by industrial sites and by construction sites clearing greater than five acres are permitted by Ecology's General Stormwater Permit Program as point source discharges.

Technical Analysis

The Clean Water Act requires states to establish a Total Maximum Daily Load (TMDL) for each pollutant violating water quality standards. In the simplest terms, a TMDL process determines the sum of all point and nonpoint source loads that a waterbody can receive and still meet water quality standards. Loads are measured in mass/time units such as pounds per day or colonies/day. The quality of the water itself (*i.e.*, the way it directly affects organisms, including humans) depends on the concentration of pollutants - measured in mass/volume units such as mg/L or colonies/100m1.

This report recommends a two-pronged approach for addressing the 303(d) listings for Fecal Coliform and Dissolved Oxygen. A TMDL is established for bacteria control measures. Most of the sources of bacteria are also sources affecting dissolved oxygen. After the bacteria control measures are implemented, the follow-up monitoring will also determine if dissolved oxygen is in compliance with the standard, or if a separate TMDL for dissolved oxygen will be necessary.

Loading Capacity for Fecal Coliform Bacteria

The fecal coliform concentration-based nonpoint TMDL for each basin is the Freshwater Class A fecal coliform standard (WAC 173-201A-030-2):

> *Fecal coliform organism levels shall not exceed a geometric mean (GM) value of 100 colonies/100 mL and not have more than 10 percent of all samples obtained for calculating the geometric mean value exceeding 200 colonies/100 mL.*

The nature of bacteria loading makes assignment of fixed allocations for point and nonpoint source discharges challenging. Instead, water quality based allocations are recommended that reflect the expected reduction of in-stream bacteria under defined flow conditions. The loading capacities for each Snohomish Tributary are developed for the purpose of determining the total amount of pollutant that can pass by each tributary monitoring station without causing violations of the water quality standard. Each station provides a reference for calculating the amount of pollutant reduction needed in order to meet standards. This TMDL, involving large rural areas and diffuse sources, addresses loading capacity in terms of in-stream concentration. The loading capacity at each of the tributary monitoring stations for each season is the concentration needed to meet the two, separate and distinct, parts of the Class A fecal coliform bacteria criteria:

- "Fecal coliform organism levels shall not exceed a geometric mean value of 100 colonies/100mL."

- "....shall not have more than 10 percent of all samples obtained for calculating the geometric mean value exceeding 200 colonies/100 mL."

Modeling Approach

The Statistical Theory of Rollback (STR) was used to calculate target percent reductions and target geometric means for the Snohomish Tributaries TMDL (Ott, 1995). Allocations for fecal coliform bacteria are based on meeting both parts of the Water Quality Standards criterion at site-specific control points within each tributary during both wet (November-April) and dry (May-October) seasons. Next, "Target Percent Reduction" values were established by selecting the more restrictive of the "Percent Reductions Needed" for the two parts of the criterion. Finally, a "Target Geometric Mean" (GM) was calculated for each site and season. The GM of future fecal coliform data for each season from each monitoring station must be equal to or less than the appropriate target value to ensure meeting both parts of the WQ criterion. Implementing control measures for fecal coliform is expected to mitigate other water quality concerns in the Snohomish River tributaries, such as high nutrients and low dissolved oxygen.

Load and Wasteload Allocations

An allocation is defined as the portion of the receiving water loading capacity that is attributed either to one of its existing or future sources of pollution, or to natural background sources. The pollutant loading allocation assigned to a particular point source is termed wasteload allocation (WLA), and that assigned to a nonpoint source is termed load allocation (LA). The wasteload allocations (WLA) and load allocations (LA) for fecal coliform are expressed in units of concentration and percent reduction for the point source and nonpoint sources, respectively. Fecal coliform concentrations are reported in units of "colonies per unit volume", which can not be meaningfully translated into units of mass per unit time. Federal regulations allow TMDLs to be expressed in "other appropriate measures" (40 CFR 130.2(i)). The sum of these allocations is equal to the loading capacity needed to meet the water quality standards. The specific numeric allocations for the Snohomish River Tributaries Fecal Coliform TMDL are shown in Appendix E (Tables 4 and 5 of Cusimano, 1997) and are described below.

The stormwater contributions of fecal coliform in the Snohomish tributaries originate from both point and nonpoint sources of pollution. Point sources include those discharges currently covered by NPDES stormwater permits, as well as those municipal separate storm sewer systems that are not currently covered by NPDES stormwater permits but which meet the regulatory definition of point sources at 40 CFR 122.2. Because the data collected during development of this TMDL do not distinguish between point and nonpoint sources of stormwater, equal reductions in both point and nonpoint source stormwater, as measured in-stream, are targeted.

Load Allocations:

- To meet the TMDL, concentration-based load allocations were established for all monitoring stations in the Snohomish River Tributary drainages. Load allocations were developed as percent reductions within each waterbody of the Snohomish River tributaries and are listed in Tables 3 & 4 (Appendix C). Tables 3 & 4 in Appendix C list the dry and wet season levels for both the geometric means and the 90th percentiles estimated from the monitoring data for each site. The tables also list the geometric means and percent reduction required to meet the standard at each site for both parts of the criteria. The percent reductions required by each part of the criteria were compared, and the most restrictive criterion was used to establish the recommended target level or load allocation. The statistical method used to set the targets is discussed in Ott (1995). These site-specific allocations will be used to monitor the success of source control management measures taken in each subbasin.

Wasteload Allocations:

- Each of the three NPDES permitted commercial dairies located within the Snohomish tributaries watershed is allocated a fecal coliform wasteload of zero.

- Because point and nonpoint sources of stormwater were not distinguished in the study, equal reductions in both point and nonpoint source stormwater as measured in-stream, are targeted (Tables 3 & 4).

□ The Granite Falls WWTP is located on the Pilchuck River and is the only municipal wastewater treatment point source discharging to the Snohomish River tributaries. The location of the treatment plant discharge is approximately six miles upstream of the uppermost Pilchuck River segment on the 303(d) list. This section of the Pilchuck River has been meeting water quality standards for fecal coliform bacteria and is therefore not on the 303(d) list. The technology-based fecal coliform water quality effluent limitation for the Granite Falls WWTP discharge has proven to be adequate to protect the Pilchuck River and; therefore, a wasteload allocation is not necessary at this time.

Seasonal Variation

Fecal coliform levels at all sampling stations were higher in the dry season (May – October) than in the wet season, except for the Marshland (See Appendix C, Tables 3 & 4). Key findings were:

- Fecal coliform bacteria levels are significantly higher during the dry season than during the wet season.

- High dry season fecal coliform bacteria levels may be due, in large measure, to extreme low flows and little dilution.

Seasonal variation is addressed in this TMDL study by establishing target geometric means and percent reductions for both a wet and dry season.

Margin of Safety

The Clean Water Act requires that a margin of safety be identified to account for uncertainty when establishing a TMDL. The margin of safety can be explicit in the form of an allocation or implicit in the use of conservative assumptions in the analysis. Conservative assumptions inherent in the Snohomish Tributaries TMDL are as follows:

- The implementation of bacteria source control measures and cleanup of the Snohomish River tributaries has already begun and will continue even when standards are met.

- The statistical rollback method used to establish the target geometric means for the concentration-based allocations provides a more restrictive geometric mean count, in most cases, than the Class A geometric mean criteria. The lower geometric mean provides an implicit margin-of-safety for meeting the concentration-based TMDL.

- As control measures are implemented and additional data are obtained through monitoring, the success of source control measures can be assessed at each control point in the watershed. In the event that target allocations are not met, TMDL implementation will be adaptively managed by adjusting existing control measures or implementing new controls in any given segment. The adaptive management process of responding to monitoring results provides an implicit margin-of-safety, because compliance can be determined for each control point in the watershed and control measures will have a cumulative effect downstream.

Summary Implementation Strategy

Introduction

The 1997 Memorandum of Agreement between the U.S. Environmental Protection Agency and the Washington State Department of Ecology requires that a TMDL submittal include a Summary Implementation Strategy. The purpose of the summary strategy is to present an outline or "blueprint" of how the state and watershed stakeholders will make progress toward achieving water quality standards in the impaired water bodies.

Overview

The implementation of the Snohomish River Tributaries Fecal Coliform TMDL will be guided by Washington's Water Quality Management Plan to Control Nonpoint Source Pollution (Ecology, 2000). This plan was developed to include all nonpoint source pollution control efforts by federal, state, tribal, and local governments as well as citizen groups. The development of the plan was a collaborative effort that identifies gaps in existing programs, sets a strategy for improving those programs, provides tools, recommends timelines, and outlines methods for determining success. The plan meets federal mandates in Section 319 of the Clean Water Act and Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990.

The cooperation of and coordination with local agencies will be major factors in the successful implementation of nonpoint source control measures within the target timeframe. Local agencies, such the Snohomish Conservation District, Snohomish County Public Works, Drainage Improvement District #8, and the Snohomish Health District, have already begun working cooperatively on nonpoint TMDL issues that will control bacterial sources of pollution. Ecology plans to support the existing watershed action plans prepared under WAC 400-12, such as the one developed by Snohomish County for Quilceda/Allen Creek and the one currently under development for French Creek, to help reach TMDL goals.

This document will inventory existing activities, evaluate how extensively they have been implemented, and assess the effectiveness of current and past activities. It is anticipated that watershed planning and implementation activities currently underway by Snohomish County in Quilceda, Allen, and French creeks can address nonpoint water quality issues, including fecal coliform bacteria, in other tributaries of the Snohomish River when they are applied there as well. Ecology will build upon these efforts to refine existing programs and will promote strategies that address nonpoint issues not otherwise managed by existing programs.

Ecology anticipates that the Snohomish County General NPDES Stormwater Permit will contribute to the TMDL implementation process. The county currently has an NPDES stormwater permit which covers an aggregate area of roughly sixty-one (61) percent of the watershed addressed in this TMDL. Under Federal Phase II stormwater rules, Everett and Marysville will be required to obtain NPDES permit coverage, and other municipalities in this watershed may become permittees pending the 2000 census figures.

Ecology has authority to protect water quality under RCW 90.48, and will implement many of the nonpoint source control activities through local jurisdictions, resource agencies, and landowners. Ecology will also coordinate with and, when possible, facilitate joint projects and efforts with local watershed planning groups initiated under the watershed planning process set

forth in Chapter 90.82 of the Revised Code of Washington (RCW) and the Washington State Salmon Recovery effort.

The 1998 Dairy Nutrient Management Act (DNMA) significantly changed how Ecology addresses water pollution from commercial dairy farms. The law established a technical assistance inspection program for dairy farms to achieve compliance with water quality laws. The DNMA required inspections of each dairy in the state within two years beginning in October 1998, and required an ongoing regular program of follow-up dairy inspections. For dairies that are not in compliance and not responding to technical assistance, Ecology can use its full enforcement authority and can conduct multiple inspections to achieve water quality compliance.,

Ecology anticipates that if state and local coordination proceed as expected, by December 2005 seventy five percent of all sampling stations within the Snohomish River Tributaries Watershed will be within water quality standards for bacteria. If implementation resources remain at current levels, the Snohomish River tributaries will be meeting bacteria water quality standards within eight years after TMDL approval.

Development of the Implementation Plan

This Summary Implementation Strategy will be used as an outline for developing a Detailed Implementation Plan, which is required under the Memorandum of Understanding between Ecology and EPA. The Detailed Implementation Plan for the Snohomish River Tributaries Fecal Coliform TMDL will be developed in cooperation with local agencies, tribes, land owners, and citizen groups and will be coordinated with current local watershed planning and ESA efforts. The following is a description of the key agencies that will provide regulatory authority and have involvement or participate in a coordinated effort to implement the TMDL.

Ecology

Ecology has been delegated authority under the Federal Clean Water Act by EPA to establish water quality standards, administer the NPDES wastewater permitting program, and enforce water quality regulations. Ecology responds to complaints, conducts inspections, and issues NPDES permits in the Snohomish River watershed as part of its responsibilities under state and federal laws and regulations. The state of Washington passed RCW 90.64, the DNMA in 1998. This law, which requires Ecology to conduct inspections of all dairies within two years, also requires all Class A dairies to have developed a farm plan by July 1, 2002, and to fully implement the plan by December 31, 2003.

During the last two years, all 21 active dairies in the Snohomish River Tributaries Watershed have been inspected at least once by Ecology. To date, water quality concerns at nine dairies in this TMDL area have been addressed by Ecology, and three dairies with documented water quality problems have been given coverage under the Dairy Operation NPDES and State Waste Discharge General Permit. Ecology will continue to conduct follow-up inspections and respond to water quality complaints regarding dairies in the Snohomish River Tributaries Watershed. In the next two years, another round of dairy inspections will be completed and full implementation of the DNMA-required farm plans (required by December 31, 2003) should help significantly reduce dairy waste loading to the Snohomish River tributaries. Ecology will pursue implementation of farm plans and "Best Management Practices" (BMPs) and will use formal enforcement, including fines, if voluntary compliance is unsuccessful under the DNMA.

Ecology has recently added resources in Ecology's Northwest Regional Office to conduct nonpoint water quality enforcement. These resources are dedicated to the investigation and compliance of nonpoint source activities that adversely impact salmon. All the waterbodies addressed by this TMDL are home to salmon. Ecology will coordinate with Snohomish County Public Works and the Snohomish Conservation District for documentation, response, and correction of water quality problems at commercial livestock operations and small farms. Ecology expects that within five years nonpoint pollution from commercial dairy farms in the Snohomish River Tributaries Watershed will be significantly reduced.

In the Snohomish River Tributaries Watershed, there are seven municipally owned and operated domestic wastewater sewer systems, but only Granite Falls WWTP discharges to a Snohomish River tributary pertinent to this TMDL. Ecology regulates these facilities through the NPDES permit program. In the event of a sewer spill or leak from a sewer collection system, state law requires the responsible sewer district to notify Ecology within 24 hours. This notification helps ensure that the local health district is contacted immediately and that steps are taken to control and clean up the sewage. A written report is due to Ecology within five days detailing the events, circumstances, and corrective measures surrounding sewage spills.

In 1995, Ecology issued a municipal stormwater permit to Snohomish County under Phase I EPA rules. Within two to three years, Ecology will be issuing Phase II municipal stormwater permits to several other municipalities within the Snohomish River Tributaries Watershed. Ecology expects that these permits will include stormwater monitoring components that will contribute to the follow-up monitoring needed for this TMDL.

Snohomish Conservation District

The Snohomish Conservation District (SCD) is a non-regulatory public agency that provides many services to commercial dairies and small farmers. These services include education, technical assistance, farm planning, and financial assistance. A planner is available to help small farm owners develop BMPs for the protection of water quality. The SCD currently has several cost-share programs targeted for the protection of water quality within the Snohomish River Tributaries Watershed, including fencing, manure management, gutters, and riparian corridor management. When Ecology or a local jurisdiction documents a bacteria water quality problem at a farm, the farm is referred to SCD for development of a farm plan. The farm plan must meet or exceed standards and specifications established by the Natural Resources Conservation Service (NRCS). Ecology will work closely with Snohomish County to identify and prioritize farm-related bacterial water quality problems and refer them to the SCD for farm planning.

Ecology, Snohomish County, and the Snohomish Conservation District need to work together to review the success of agricultural water quality improvement approaches to date and to identify and implement the specific approaches to reduce agricultural pollution which have proven to be effective. It is expected that within five years, as more farms develop and implement farm plans, fecal coliform levels in the Snohomish River tributaries will be measurably reduced.

Natural Resource Conservation Service

The Natural Resource Conservation Service (NRCS), a federal service agency within the U.S. Department of Agriculture, has developed design standards and specifications used in the development of farm plans. The NRCS has a long history of developing and revising BMPs for the protection of surface and ground waters from activities related to agricultural practices. Many of these BMPs are designed to control animal waste run-off to surface waters, which is a major source of bacterial water pollution in some areas of the watershed. The Environmental Quality Incentives Program through the NRCS offers financial, educational, and technical assistance for the installation or implementation of water quality BMPs. The Farm Service Agency administers cost share programs to provide funding for farm improvements and farm plan implementation. In order for the proposed improvements to be eligible for cost share monies, they must meet or exceed the standards and specifications developed by the NRCS.

Snohomish County

In 1995, Snohomish County completed the Quilceda/Allen Watershed Management Plan under WAC 400-12. The County Council adopted "A Motion Providing That Snohomish County Concurs with the Recommendations of the Quilceda/Allen Watershed Management Plan" in 1998. The plan identifies land uses and activities that contribute to water quality problems, including nutrient and bacterial water pollution. Some of the many recommendations included in the plan are general in nature, but they identify sources of bacteria pollution and control remedies related to specific locations and activities. The county has demonstrated leadership in developing the Quilceda/Allen Watershed Management Plan and is committed to implement the activities in the plan to the extent that resources are available. The county is also currently finalizing a watershed management plan for French Creek.

Snohomish County also adopted a Water Pollution Control Ordinance (Chapter 7.53 SCC) in March 1998. The purpose of this ordinance is to protect the quality of Snohomish County's surface and ground waters by providing technical assistance, requiring BMPs, and establishing an enforcement process. The Water Pollution Ordinance prohibits the discharge of animal wastes to Snohomish County streams. The county has worked cooperatively with Ecology to investigate and resolve water quality problems related to animal wastes using technical assistance and enforcement strategies. The county will respond to water quality complaints at the request of Ecology, or be available to conduct joint investigations as staff time is available.

Snohomish County has been and will continue to conduct ambient monitoring of surface water quality in the county. Ecology has used much of the county's data in the decision process for 303(d) listings within the county. There are several joint monitoring efforts ongoing between Ecology and Snohomish County and coordination of ambient water quality monitoring between Ecology, Snohomish County, Tulalip Tribes, and the Snohomish Health District will continue to minimize duplication of effort and maximize the assessment of Snohomish River tributaries.

Snohomish County has a strong public outreach program, which consists of educational programs for students, teachers, and the general public. The county also has a native plant salvage program that generates hundreds of hours of volunteer time each year in watershed restoration projects, and a watershed steward is assigned to work with citizens on water quality projects throughout the basin.

Snohomish County is the primary regulatory authority for land uses within the Snohomish River Tributaries Watershed. Chapter 32.10 of the County Code establishes Critical Areas Regulations as required under the Washington State Growth Management Act. Standard buffer width

requirements are set for urban and rural streams in the county. In February 1999, the county approved an Endangered Species Act (ESA) Early Action Program in which a review of wetland and stream buffer widths is scheduled to be conducted by the county before the end of 2001.

Snohomish Health District

The Environmental Health Division of the Snohomish Health District (SHD) issues Solid Waste Permits, oversees the On-Site Sewer System Program, and conducts some water quality monitoring for bacteria in the county. The SHD is responsible for investigating complaints of failed on-site septic systems and requiring corrective measures. The SHD also certifies septic system installers and requires a license for septic system pumpers. The SHD has a public outreach program for homeowners on the proper operation and maintenance of septic systems, but as yet does not have a low interest loan program for assisting low income property owners in repairing failed systems.

The SHD recently amended their Sanitary Code to help protect individuals using natural swimming areas. The goal of Chapter 7.1.2 of Snohomish Health District Sanitary Code (passed August 31, 2000 by Snohomish Board of Health) is to reduce risk of illness due to swimming associated with freshwater beaches and educate the public on how to protect their health while using natural swimming areas. The code amendment requires educational material be posted to discourage the feeding of waterfowl, excludes pets from swimming areas and nearby flowing streams, and discourages children who are not toilet trained from entering the water.

Neither the county nor the SHD has an established program for the inspection of commercial dog kennels. In Chapter 8 of the Snohomish Health District Code, dog wastes can be placed in the garbage, buried on site, or discharged to sanitary sewer pending local sewer district approval. The SHD has brochures on the proper disposal practices for dog wastes available to the public.

Local Governments

The cities within the Snohomish River Tributaries Watershed are Everett, Marysville, Snohomish, Arlington, Lake Stevens, Granite Falls, and Monroe. The Growth Management Act requires each city to establish critical areas The development and enforcement of water pollution control ordinances, pet waste ordinances, and the establishment of adequate buffer widths will help reduce the discharge of nonpoint source pollution to watershed streams. Future efforts of municipalities as part of the Phase II Municipal Stormwater permitting program will also contribute to the goals of this TMDL.

Tulalip Tribes

The Tulalip Tribes are a sovereign nation with land use authority within their reservation. In addition, the Tulalip Tribes have a Water Quality and Fisheries Department which conducts ambient water quality monitoring that may be useful in targeting priority areas of the watershed and assessing success of implementation activities. Coordination of county, state and tribal monitoring efforts within the TMDL area will be pursued by Ecology.

Implementation Activities

Of all the watershed management efforts within the Snohomish Tributaries Watershed, the Quilceda/Allen Watershed Plan is most developed and most likely to result in water quality

benefits. Ecology is working with Snohomish County and local jurisdictions to implement the Quilceda/Allen Watershed Management Plan. A system has been developed by the Quilceda/Allen Watershed Committee to rank and prioritize a variety of water quality improvement activities within the watershed. The Quilceda/Allen plan should be updated if needed and implemented to the extent that resources are available. Watershed planning approaches and actions that prove successful in Quilceda/Allen may serve as templates for watershed planning efforts in other Snohomish Tributary watersheds. Responsible parties are Snohomish County, Ecology, Snohomish Conservation District, Quilceda/Allen Watershed Committee and various municipalities and local and state agencies identified within the Quilceda/Allen Watershed Plan.

All commercial and small livestock farms in the Snohomish River Tributaries Watershed should develop and implement a farm plan that meets or exceeds the standards and specifications established by the NRCS. Ecology will work with Snohomish County and the Snohomish Conservation District to develop an outreach program to educate commercial and small livestock farms on the need to have an adequate farm plan. Responsible parties are Snohomish Conservation District, Snohomish County, and Ecology.

The county has regulatory authority over land uses including farming. The county will work collaboratively with livestock owners, the Snohomish Conservation District, citizen groups, property owners, and resource agencies towards developing a Livestock Ordinance. Responsible parties are Snohomish County and the Snohomish Conservation District.

Ecology will work with Snohomish County, Snohomish Health District, and the state Department of Health to develop a program to provide education and financial assistance to low-income property owners for maintenance, repair or replacement of failed on-site septic systems. Responsible parties are Ecology, Snohomish County, and Snohomish Health District.

Woods Creek and the Marshlands should develop and implement Watershed Management Plans to speed up the attainment of water quality standards for these water bodies. Ecology will work with the county and other local jurisdictions through the 2514 watershed planning process to assist watershed planning efforts in the basin. Responsible parties are Snohomish County, Ecology, and the Snohomish Conservation District.

Ecology is the regulatory authority for sewer districts and municipalities that operate sewage treatment plants through an NPDES discharge permit. In systems where combined stormwater and sanitary sewers do not exist, Ecology does not permit the collection system to include high flow bypasses. Ecology will work with local municipalities to determine if the sanitary sewer collection systems within the Snohomish River Tributaries Watershed include high flow bypasses. If found, a compliance schedule will be established for their correction. Responsible parties are Ecology and local sewer districts.

The Snohomish Health District will work with Snohomish County and local municipalities in the development and review of pet waste handling and disposal BMPs and for the protection of public health and surface waters from pet wastes. Responsible parties are Snohomish Health District and Snohomish County.

Strategies should be developed to discourage, exclude, or limit access to waters and their adjacent areas from large numbers of waterfowl and to increase public awareness of waterfowl impacts to public health and water quality. Ecology will work with Washington State Department of Fish & Wildlife, U.S. Fish & Wildlife Service, Snohomish County, and the cities

to identify public areas adjacent to surface waters with potential for impact from waterfowl. Responsible parties are Ecology, Department of Fish & Wildlife, U.S. Fish & Wildlife, Snohomish County, and local governments.

Adaptive Management

The adaptive management approach for the Snohomish River Tributaries TMDL includes evaluation within three years of TMDL initiation whether Best Management Practices (BMPs) are effective at causing Snohomish tributaries to attain water quality standards. If BMPs are not proven to make sufficient progress toward meeting water quality standards within three years, then BMPs shall be made more stringent or revised in such a way as to improve water quality toward meeting state standards for fecal coliform bacteria. In addition, adaptive management for the Snohomish Tributaries TMDL includes a contingency to sample stormwater outfalls and evaluate stormwater wasteload in terms of mass loading in the event that Snohomish Tributaries do not attain water quality standards within five years.

Many of the implementation activities associated with this TMDL have already begun, and the rest will commence as scheduled in the Detailed Implementation Plan. For the first several years of this TMDL, the emphasis will be on implementation. As fecal coliform source control measures and activities are successfully completed, the implementation of this TMDL will be based on the adjustment of source control efforts throughout the watershed as determined by ambient water quality monitoring. If new fecal coliform sources are found that were not previously identified, they will be corrected through appropriate jurisdictions.

The on-going ambient monitoring being conducted by Ecology, Snohomish County, and Tulalip Tribes will enable the implementing jurisdictions to revise and shift implementation efforts as necessary in order to bring all tributaries back into compliance with water quality standards.

Reasonable Assurances

To support this TMDL, Ecology is currently in the process of conducting follow-up inspections of every commercial dairy in the Snohomish River Tributaries Watershed. All of these dairies were previously inspected between October 1998 and April 2000. Any manure management or other bacteria-related water quality problems that are found will be corrected through an NPDES permit or appropriate enforcement mechanism. These follow-up inspections will be completed by November 30, 2001, and the DNMA mandates that farm plans will be implemented by December 31, 2003. Ecology will also prioritize this TMDL for the involvement of nonpoint source enforcement resources to investigate animal waste complaints from small farms.

Ecology has required Granite Falls to conduct and submit the results of a receiving water and effluent study for their sewage treatment plant by January 2002. The TMDL target allocations for the Pilchuck River will be modified if the results of this study reveal the need for a bacteria wasteload allocation for the Granite Falls WWTP.

The Snohomish Conservation District has a Centennial Clean Water Fund Grant from Ecology to provide small farm planning technical assistance. This grant provides for farm improvements that protect water quality and targets farms located in the Snohomish River Tributaries Watershed. Grant monies will be available through December 2001.
Snohomish County has already begun implementation of bacteria control measures for the Quilceda/Allen Creek watershed through the nonpoint implementation committee that was

established under the Quilceda/Allen Watershed Management Plan. The county plans to establish a French Creek Watershed Management Plan nonpoint implementation committee before December 31, 2001. Human and animal waste source control measures are major elements of the French Creek Watershed Management Plan.

The Snohomish Health District will work with Ecology and the county to identify a geographical area of the TMDL where a sanitary survey evaluating on-site sewage system performance can be effectively conducted by September 30, 2001. The SHD, Ecology, and the county will then develop a plan for a joint sanitary survey of this location. The SHD has agreed to work with Ecology and the county to develop and implement a public outreach pilot project in the Allen Creek watershed on the proper operation and maintenance of on-site septic systems. This joint, public outreach pilot project will be completed within one year of EPA TMDL approval. Results of the pilot project may be useful in application to other areas within Snohomish Tributaries watershed where on-site system failures are an issue.

Summary of Public Involvement Methods

Snohomish River Tributaries Water Quality Technical Study

Ecology met with staff from Tulalip Tribes, Snohomish Conservation District, and Snohomish County Public Works to introduce study findings. Ecology held a workshop for local government and interested parties in Everett on May 4, 2000, to explain the TMDL process, present study findings, and elicit input on implementation strategies. A public meeting was held on the technical Water Quality Study on May 16, 2000. The meeting was advertised in local newspapers. A focus sheet on the water quality study was mailed to over 300 affected and interested parties in April 2000. A public comment period was conducted from April through June 2000.

Snohomish River Tributaries Fecal Coliform TMDL Submittal Report

The public meeting held on May 16, 2000, was used to gather input on nonpoint water quality issues related to bacterial water pollution and control measures. A draft of the Fecal Coliform TMDL Submittal Report (also called a water cleanup plan for bacteria) was circulated for review and comment. The public comment period lasted through June 2000. Before being sent to EPA, the final draft of the submittal report/water cleanup plan was presented for public comment in January of 2001.

Public involvement will continue in the Detailed Implementation Planning phase of the TMDL. This will include the use of workgroups comprised of members from key local agencies and citizen groups that will be leading or assisting in much of the implementation, public meetings, and the development of public outreach materials. Local agencies, tribes, interest groups, and the public will have opportunities to review drafts of the detailed implementation plan. Public involvement tasks are outlined in Appendix A.

Monitoring Strategy

EPA (1991) guidance calls for a monitoring plan for TMDLs where implementation will be phased over time. The monitoring is conducted to provide assurance that the control measures will achieve attainment with water quality standards. Long-term monitoring will be important to ensure compliance with the requirements of the Snohomish River Tributaries Fecal Coliform TMDL.

Ecology does not currently have any long-term monthly ambient monitoring stations in any of the Snohomish River tributaries for fecal coliform. Most of the data used to assess the quality of Snohomish River tributaries was from the Snohomish County ambient water quality monitoring program. Ecology will continue to rely on the use of Snohomish County monitoring data to track success of source control implementation. Within five years Ecology will conduct follow-up monitoring in the Snohomish River tributaries for fecal coliform. Under Ecology's watershed approach, temporary monitoring stations are deployed at strategic locations for a one-year period every five years within the Snohomish River Tributaries Watershed. These stations can be used to assess long-term trends in specific waterbody segments of Snohomish River tributaries.

For monitoring the effectiveness of the Snohomish River Tributaries Fecal Coliform TMDL, Ecology will develop a monitoring plan that will be based on data provided by Snohomish County and Ecology's periodic watershed monitoring and any other available sources. Fecal coliform bacteria will be monitored at the sampling locations where the fecal coliform allocations were established within each tributary to determine if target fecal coliform levels are being met. Long-term periodic monitoring of fecal coliform bacteria will be conducted in tributary streams and drainage areas that are meeting water quality standards to ensure their continued compliance with standards. Quality assurance plans will be developed for all monitoring. These plans will identify appropriate monitoring objectives, strategies, schedules, and resources. Monitoring will be conducted by Ecology, Snohomish County or by other interested parties such as tribes, local governments, watershed groups, or drainage districts.

Potential Funding Sources

Local agencies that develop implementation projects under this TMDL can potentially be funded through the Centennial Clean Water Fund, State Revolving Loan Fund Program, and the Federal Section 319 Grant programs. All three of these programs have the same annual application cycle, which ends in February of each year.

The Washington State Legislature has provided substantial grant monies for salmon recovery projects. Many stream enhancement projects have been proposed for Snohomish River tributaries in relation to salmon recovery. Some of these projects will protect and/or enhance riparian corridors and are expected to result in improved control of nonpoint source bacterial pollution.

The Snohomish Conservation District, NRCS, and Snohomish County currently have a number of grants, loans and/or cost share monies that are oriented towards addressing nonpoint agricultural water pollution issues. An example of one of these programs is the Environmental Quality Incentive Program (EQIP). These programs assist farmers/landowners with implementation of BMPs that help minimize nonpoint water pollution.

TMDL related monitoring and assessment projects could be funded through the Department of Ecology's Environmental Assessment Program (EAP). Project proposals can be developed through regional Ecology staff. Proposals are evaluated annually in February. EAP staff develop project designs and are open to cooperation with local agencies on joint project efforts.

References Cited

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

Caroll, J., and K.K. Thornburgh, 1997. French Creek Watershed Characterization Snohomish County, Washington. Snohomish County Department of Public Works, Surface Water Management, Everett, WA.

Cusimano, R.F., 1995. Snohomish River Estuary Dry Season TMDL Study - Phase I: Water Quality Model Calibration. Washington State Department of Ecology, EILS Program, Olympia, WA. Publication No. 95-338.

Cusimano, R.F., 1997. Snohomish River Estuary Dry Season TMDL Study - Phase II: Water Quality Model Confirmation and Pollutant Loading Capacity Recommendations. Washington State Department of Ecology, EILS Program, Olympia, WA. Publication No. 97-325.

Ecology, 1994. 1994 Washington State Water Quality Assessment [305(b)] Report. Washington State Department of Ecology, Water Quality Program, Olympia, WA. Publication No. WQ-95-65a.

Ecology, 2000. Washington's Water Quality Management Plan to Control Nonpoint Source Pollution. Washington State Department of Ecology, Water Quality Program, Olympia, WA. Publication No. 9-26, 381 pp.

Larson, A.G., and P.B. Marti, 1996. Relationship Between Ground Water and Surface Water in the Quilceda Creek Watershed. Washington State Department of Ecology, EILS Program, Olympia, WA. Publication No. 96-333.

MEL, 1994. Manchester Environmental Laboratory. Laboratory User's Manual. Fourth Edition. Washington State Department of Ecology, EILS Program, Olympia, WA.

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

Snohomish County, 1994. Quilceda/Allen Watershed Characterization. Department of Public Works, Surface Water Management Division, Everett, WA.

Thornburgh, K., 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.

References Cited
(Continued)

Thornburgh, K., and W. Leif, 1992. Ambient Water Quality Monitoring Program Quality Assurance Project Plan. Snohomish County Department of Public Works, Surface Water Management, Everett, WA.

Thornburgh, K.K., 1996a. The State of the Waters, Water Quality of Snohomish County Rivers, Streams, and Lakes. Snohomish County Department of Public Works, Surface Water Management, Everett, WA.

Thornburgh, K.K., 1996b. Snohomish County Ambient Water Quality Monitoring, Summary Report for 1992-1995. Snohomish County Department of Public Works, Surface Water Management, Everett, WA.

U.S. Environmental Protection Agency, 1996. Interim Permitting Policy for Water Quality-Based Effluent Limitations in Stormwater Permits, Environmental Protection Agency, August 1.

U.S. Environmental Protection Agency, 2001. Protocol for Developing Pathogen TMDLs, EPA 841-R-00-002, Office of Water, Washington D.C., First Edition, January 2001.

WAS, 1993. Field Sampling and Measurement Protocols for the Watershed Assessments Section. Ecology Manual, Washington State Department of Ecology, ELLS Program, Watershed Assessments Section, Olympia, WA.

Appendix A

Summary of Public Involvement
and
Responses to Comments

Summary of Public Involvement for Snohomish River Tributaries Water Quality Technical Study and TMDL Submittal Report

On January 13, 2000, Ecology met with staff from Snohomish County Surface Water Management and the Tulalip Tribes to introduce the Snohomish River Tributaries Fecal Coliform TMDL Technical Study findings and elicit input on TMDL priorities in the Snohomish Basin. Subsequently, Ecology held similar meetings with the Snohomish Conservation District (January 18, 2000), Drainage Improvement District #8 (February 9, 2000), and Washington Trout (March 30, 2000).

On April 17, a focus sheet was mailed out to 240 public and local government contacts within the region announcing a public meeting on May 16, 2000. The purpose of the meeting was to introduce the Snohomish River Tributaries Fecal Coliform TMDL technical study findings, and request input on implementation strategies to control nonpoint bacterial water pollution. The meeting was advertised in several local newspapers.

On May 4, 2000, Ecology held a workshop in Everett for the purposes of describing the state's TMDL process, presenting the Snohomish River Tributaries Fecal Coliform TMDL technical study findings, and receive input on implementation strategies. Attending the workshop were representatives from Puget Sound Water Quality Action Team, Drainage Improvement District #8, Snohomish Conservation District, Snohomish County Surface Water Management, the Snohomish Health District, Lake Stevens Sewer District, and the cities of Lake Stevens, Snohomish, and Everett.

On May 16, 2000, a public meeting was held in Everett where study findings were explained and implementation strategies were discussed. A public comment period was conducted from mid-April through the end of June 2000.

Another public comment period was held before the submittal report was sent to EPA in January of 2001. Telephone calls and telephone surveys of known interested parties were conducted before the public comment period. Notice was placed in the newspapers of the watershed - the Everett Herald, Everett Tribune, Monroe Tribune, Snohomish Tribune, the Lake Stevens Journal that also circulates in Granite Falls, the Marysville Globe, and the Arlington Times. A focus sheet was mailed to approximately 250 addressees. About ten meetings with various interested organizations and agencies took place during the public comment period.

Information from the contacts during the public comment period in January 2001, will be used to prepare for the detailed implementation. Public involvement will continue and even increase in the Detailed Implementation Planning (DIP) phase of the TMDL. This will include the use of a workgroup comprised of members from key local agencies and citizen groups that will be leading or assisting in much of the implementation, public meetings, and the development of public outreach materials. Local agencies, tribes, interest groups, and the public will have the opportunity to review of drafts of the detailed implementation plan.

Public Notice Materials

Contacts with the public about the Snohomish River Tributaries Fecal Coliform TMDL are listed below. Other informal contacts with individuals living in Snohomish County preceded these official notices. During sampling and reconnaissance work in 1996 and 1997, Ecology personnel

contacted Snohomish County officials to gather information about existing data and ongoing monitoring. These contacts all involved explaining Ecology's work on the TMDL. Listed below are the formal notices regarding the TMDL Study.

- Thirty-five copies of the Water Quality Assessment of Tributaries to the Snohomish River and Nonpoint Source Pollution TMDL Study (Ecology Publication # 97-334) were distributed to interested staff from city and county governments, tribes with interest in the area, environmental groups, and individual citizens who requested information.

- On April 17, 2000, 240 focus sheets were mailed announcing a public meeting on May 16, 2000, to introduce findings of the Snohomish River Tributaries Fecal Coliform TMDL technical study and to receive input on potential bacteria pollution control strategies.

- Information regarding the TMDL was posted on the Washington Department of Ecology WEB site starting on April 19, 2000.

- On May 10, 2000, a public advertisement was published in the Lake Stevens Journal, the Snohomish Tribune, the Marysville Globe and the Everett Herald announcing the May 16, 2000 public meeting on the TMDL.

- The public meeting was held at Snohomish Public Utilities District #1 in Everett on May 16, 2000.

- A public comment period was held from April 17, 2000, to May 31, 2000, on the Snohomish River Tributaries Fecal Coliform TMDL Submittal Report.

- A focus sheet and the TMDL Technical Study (Ecology Publication # 97-334) were placed in main Branch of the Snohomish County Library in Everett.

- A public comment period was held from December 27, 2000, to January 31, 2000 on the final draft of the Snohomish River Tributaries Fecal Coliform TMDL.

- On December 27, 2000, a public advertisement was published in the Lake Stevens Journal, Snohomish Tribune, Everett Tribune, Monroe Tribune, the Marysville Globe, Arlington Times, and the Everett Herald announcing the public comment period.

- A focus sheet and the submittal (Ecology Publication # 00-10-087) were mailed to about 20 interested agencies, organizations, and persons. The focus sheet alone was mailed to more that 200 more citizens in the watershed.

- Copies of the focus sheet and submittal were placed in the Everett Library in Everett and the Snohomish Library in Snohomish.

- The focus sheet and submittal report were also placed on Ecology's Internet under Water Quality's web page, the TMDL web page, and in the publications Biblio file.

Response to comments received during the May 2, 2000, Local Government TMDL Workshop

Comment: There was a concern about relying on the existing WAC 400-12 nonpoint plans for implementation of nonpoint TMDL activities.

Response: Ecology intends to use past and present planning and implementation efforts as a key component of TMDL implementation strategies. The Quilceda/Allen Watershed Management Plan will serve as a guide for nonpoint source pollution control efforts in that sub-basin as will the one currently under development by the County for French Creek. Ecology would like to build upon these existing efforts, refine existing programs, and find where new implementation strategies need to be developed to address nonpoint issues that are not being adequately addressed by existing programs.

Comment: What types of funding options does Ecology have available for doing additional water quality monitoring?

Response: Currently there is one main funding source for doing additional TMDL monitoring. That is the Centennial Clean Water Fund grant or loan program. This program includes Centennial, Section 319 and State Revolving Funds. Under the current evaluation system, if a project is addressing an approved or developing TMDL, it will be awarded extra points in the rating process.

Comment: Ecology needs to focus TMDL implementation activities on known and existing problems and minimize more general approaches to address nonpoint pollution sources. There is a need to work on known nonpoint problems.

Response: Ecology intends to focus its efforts on finding and correcting nonpoint problems by working with local jurisdictions and landowners. Ecology will rely on cooperative efforts for the most part, but will use it's authority under RCW 90.48 (Water Pollution Control Act) as necessary to require corrective measures if water quality impacts are documented and cooperative efforts fail.

Comment: Leaking and failing septic systems may be a major problem in some of the tributaries such as Allen Creek. Will the TMDL address the differences between pollution from failing septic systems and other sources?

Response: Snohomish County has had an effective On-Site Septic (OSS) System program that includes education, sanitary surveys, an extensive database of county on-site systems, and a correction process for fixing failing systems. This process is still the best way to identify failing OSS systems separate from other human fecal coliform sources that may result from urban/rural development.

Comment: A follow up to the above comment was a discussion about fecal coliform tracking.

Response: The tracking of fecal coliform sources to determine if a source is coming from humans or a different animal species is being done in certain areas. It can be very expensive to conduct, due to the large number of samples necessary for statistical confidence in the results. Other less expensive options for distinguishing human fecal coliform sources are to track

chemical residues, such as caffeine and surfactants, which tend to show up in human sources such as septic systems.

Comment: Can experience from other TMDL efforts be used to help with developing the Snohomish River Tributaries TMDL?

Response: Ecology intends to use internal TMDL experience as much as possible in assisting with the Snohomish River Tributaries TMDL. The TMDL coordinator for the Snohomish Basin will coordinate with others who have worked on fecal coliform TMDLs. Ecology also needs to evaluate past TMDL reports that deal with issues similar to those being dealt with in the Snohomish basin.

Comment: There is a concern by local government of the potential workload generated by TMDL implementation. What kind of implementation schedule is being considered? What will Ecology/EPA do if implementation strategies are not carried out by a local agency?

Response: Ecology intends to work with local agencies and groups throughout the development of the TMDL Detailed Implementation Plan. A key part of developing the plan is working out a reasonable implementation schedule with the designated agencies. Ecology will take into consideration such issues as workload in developing this schedule. If a local agency or group cannot meet their agreed-upon implementation commitments, then Ecology is willing to work out reasonable timelines to accommodate the situation.

Comment: How does the TMDL fit in with the Snohomish Basin Watershed Planning effort (HB 2514)?

Response: The Tulalip Tribes and the City of Everett (HB 2514 co-applicants) have not yet come to agreement on the foundation of the HB 2514 plan for the Snohomish Basin. It is therefore, currently in limbo.

Comment: Some dairy farms are now doing their own water quality sampling. The sampling for the TMDL study was done mainly in 1996. Will more recent water quality information be taken into consideration in the development of TMDL implementation strategies?

Response: A number of new programs have been initiated since 1996, including the Dairy Nutrient Management Act. These programs have led to certain water quality improvements in the basin that will be measured over time. Ecology will take into consideration more recent monitoring data to guide the focus on areas of remaining problems. New monitoring data will be used to assess whether tributaries meet their target bacteria allocations as long is as the data meets Ecology's quality assurance monitoring standards. We realize that the 1996 data from the TMDL study may not reflect present water quality conditions in certain areas. Follow-up monitoring in key areas to evaluate implementation programs may be needed.

Comment: Can water bodies that document that they are meeting water quality standards be removed from the TMDL list?

Response: No formal process is in place to remove water bodies from the 303d list outside of the TMDL process. However, if a local agency or group believes that they have sufficient water quality data to justify a stream de-listing, it can be documented and sent to Ecology. Documentation should include a chronology of the monitoring findings, a list of improvements that lead to the water quality improvements, and a statement concerning the data QA/QC.

Additional information on the procedure followed by Ecology's Water Quality Program can be found in WQ Policy 1-11, which is currently available on Ecology's internet site. This policy will be revised during 2001.

Response to comments received during the May 16, 2000 public meeting on the TMDL

Comment: Will people's behavior change if all Snohomish River tributaries on the 303(d) list for fecal coliform were posted with signs indicating that they are polluted and may not be fit for contact recreation?

Response: The posting of swimming beaches for public health considerations is the responsibility of the Snohomish Health District. A program for testing and posting swimming beaches within the county is already being developed by the District. The posting of all tributaries on the 303 (d) list for fecal coliform bacteria should not be done without the involvement of the District. If and when it is done, it will likely change peoples behavior and certainly raise the level of awareness regarding the issue of nonpoint pollution.

Comment: Ecology/EPA settlement agreement, what are the key elements?

Response: Key components were outlined in an overhead to the group as follows:

-Establish a 15--year schedule to develop TMDLs from the 1996 303(d) list.
-Increase public participation and tribal involvement.
-Build on Ecology's five-year watershed approach.
-Build on existing nonpoint source programs for TMDL implementation.
-Require Ecology to track and monitor listed waters and TMDLs
-EPA will "backstop" if Ecology does not complete TMDLs on the agreement schedule.

Comment: What is the role of EPA in the TMDL process?

Response: EPA reviews and approves the TMDL submittal report. They participate as deemed necessary in the development of the TMDL. Recent negotiations between Ecology and EPA on how to coordinate on TMDLs should lead to EPA playing a more proactive role in individual TMDLs, especially the ones they designate as high priority.

Comment: Are there many examples of completed TMDLs or case studies that could be used to assist with TMDL work in the Snohomish River Tributaries TMDL?

Response: Many of the completed TMDLs have focused on point sources. There are a several nonpoint TMDLs, which are currently under development in other regions of the state, that Ecology staff will use to assist them with work in the Snohomish River tributaries.

Comment: Question about the role of volunteer monitoring and consideration of annual variation in water quality.

Response: Ecology intends to focus monitoring efforts and monitoring funding as effectively as possible for pinpointing water quality problems. Water quality data from local agencies and through volunteer efforts can be used by Ecology staff in the TMDL if the data and data collection methods meet Ecology's quality assurance standards. In Snohomish County, a number

of volunteer monitoring efforts have been funded through our Centennial Grants Program. Efforts like these are required to comply with Ecology standards and should be valid to use in TMDL efforts.

Comment: What about monitoring for E-Coli bacteria? Is the state going to change its standards to include E-Coli?

Response: Ecology is currently working on revising the water quality standards and is proposing to switch from fecal coliform to E-Coli bacteria. The ratio of E-Coli bacteria to fecal coliform in freshwater is relatively constant. Ecology is already discussing internally a strategy for dealing with fecal coliform TMDLs when (and if) the standards change to E-Coli.

Comment: Will this monitoring information be used for enforcement?

Response: Ecology water quality monitoring information, whether ambient or for TMDL studies, is not intended to used for enforcement purposes. However, this does not preclude the use of this information in enforcement actions. When ambient monitoring indicates a water quality problem is potentially linked to a specific activity, Ecology's water quality enforcement staff will conduct follow-up investigations.

Comment: Explain how the State water quality standards determine water body typing?

Response: Beneficial uses of waterbodies are used to determine water typing. State standards are also based on protected uses. Class AA streams tend to be located in the headwaters of basin, which usually contain the less impacted environments. The process to determine the protected beneficial uses and the appropriate water body class to protect those uses, is called a "Use Attainability Analysis."

Comment: Ecology should take the time and effort to establish a TMDL project that will clearly demonstrate a success. A successful demonstration project can then be publicized.

Response: Ecology agrees that a successful demonstration project would be great public outreach and education tool.

Comment: What is the timeframe for completing the Snohomish River Tributaries TMDL?

Response: Ecology intends to submit the TMDL submittal report to EPA by the end of 2000. Development of the detailed implementation plan will begin as soon as the plan is submitted to EPA. Bringing the Snohomish River tributaries into compliance with TMDL and water quality standards will likely take many years because of the number of waterways involved. The strategy under a phased management approach is to conduct follow-up monitoring within five years of TMDL approval and reprioritize efforts based on monitoring results.

Comment: There was a discussion on degraded riparian habitats and value of the quality of riparian buffers.

Response: Riparian buffers help shade the stream and control elevated temperatures. They also provide a filtration buffer strip for reducing animal waste from entering streams. Restored riparian zones will help increase streamflows and increase the stability of stream banks.

Comment: Compost and topsoil manufacturers in the watershed were identified as potential sources of fecal coliform bacteria. A comment was made that compost and topsoil manufacturers were not believed to be a water quality problem.

Response: As part of a fecal coliform TMDL effort, all potential sources of bacterial water pollution should be identified. Numerous compost and topsoil manufacturers have recently begun operations in the Snohomish River Tributaries Watershed. The county does not yet have clear regulatory oversight of this industry, and studies in King County have documented water quality problems with some compost and topsoil facilities.

Comment: What is Ecology's enforcement role in implementing TMDL strategies?

Response: Enforcement is one of tools that Ecology uses to gain compliance with water quality laws and standards. Ecology also gains compliance by working with local agencies, such as the Snohomish Conservation District or Snohomish County, and providing technical assistance. There are a number of incentive programs through the Conservation District that can be used to gain compliance. When it is deemed necessary and appropriate, enforcement will be used to address difficult compliance situations.

Comment: What group will oversee the implementation of the detailed implementation plan strategies?

Response: Ecology will oversee TMDL implementation and will work closely will local implementing authorities and landowners during the development of the detailed implementation plan. Ecology will ultimately be responsible for seeing that all implementation activities occur.

Comment: What agency will end up investigating unknown pollution sources in the tributaries? Does Ecology assign the County or City to investigate pollution sources?

Response: Ecology is the lead authority in the state for the investigation and resolution of water quality violations. Ecology works closely with local agencies to establish a cooperative process for investigating water quality complaints. Many local jurisdictions conduct their own water quality investigations when deemed necessary.

Response to comments received during Public Comment Period December 27, 2000, through January 31, 2001

This is a response to the written comments that were received for the public comment period on the Snohomish River Tributaries Fecal Coliform Total Maximum Daily Load Submittal Report. The public comment period was held from December 27, 2000, through January 31, 2001. Notice of the public comment period was published by display ads in the following local newspapers: Everett Herald; Everett Tribune as well as other Mac Publishing papers in the cities of Snohomish and Monroe; Lake Stevens Journal which also distributes to the City of Granite Falls; Marysville Globe; Arlington Times. A notice was also mailed to a list of about 230 people, and the document was mailed to about 30 of the stakeholders.

Telephone surveys were conducted with stakeholders previous to the public comment period. The survey identified stakeholders interested in meeting with Ecology staff or sponsoring a presentation or workshop on either TMDLs in general and/or the Snohomish River Tributaries TMDL in particular. Ecology, therefore, met with a number of the community and stakeholder

groups during the public comment period. The groups are: Quilceda/Allen Watershed Implementation Committee on 12/21/00; 3-E Coalition on 1/20/01; Marysville City Council on 1/22/01; Snohomish County Surface Water Management on 1/25/01; and a Marysville neighborhood gathering on 2/1/01. The meetings with these and other groups are continuing into the development of the Detailed Implementation Plan.

The commentors were:

Randall K. Brower, City of Marysville, Surface Water

Randal Darst, Snohomish Health District, Water and Wastewater Program

Mary Keppler

Marc Mechling

Michael Papa

Christine Psyk, U.S. EPA, Watershed Restoration Unit

Kathy Thornburgh, Snohomish County, Surface Water Management

Bruce Tipton

Original comments may be found in the Administrative Record for this TMDL, which is located in Ecology's Northwest Regional Office Central Files.

For the purposes of this response, the comments have been summarized and grouped with similar issues.

1. Comment: The document is lacking in that it does not mandate local jurisdiction enforcement of Critical Areas ordinances and Storm Water Management Plans.

Response: Ecology expects that local ordinances and stormwater management plans will be implemented and enforced. TMDL approval does not automatically bring operators within the affected basin into a permit or regulatory program. During the development of the Detailed Implementation Plan (DIP) by the local workgroups, if the group identifies weak local jurisdictional enforcement as an issue, solutions that help bring more effective enforcement may be included in the DIP.

2. Comment: TMDLs will need to be enforced to be effective and to make sure that local agencies enforce their rules and ordinances.

Response: The preamble to the federal rules for TMDLs acknowledges that no new additional implementation authorities are created with the approval of a TMDL. TMDLs are to be implemented through the existing government authorities and through support from local organizations and citizen groups. Ecology will enforce the laws and regulations that currently exist to restore water quality in the Snohomish Tributaries watershed. Ecology has limited authority to compel local jurisdictions to enforce their regulations, although some does exist. Ecology is working to support the local agencies' policies and procedures, as well as community voluntary and incentive-based programs, to move effectively toward meeting the TMDL goals.

3. Comment: The document is lacking in that it does not increase the Snohomish Health District (SHD) responsibility for investigation and enforcement independent of citizen complaints.

Response: Ecology does not have the regulatory authority to require the SHD to conduct inspections or complaint responses. The SHD has demonstrated a willingness to assist Ecology with some water quality complaint investigations and does conduct their own independent investigations and has agreed to participate in an on-site septic system survey in the Allen Creek watershed in connection with this TMDL.

4. Comment: The document is lacking in that it does not make administrative or financial assistance available to watershed citizen group efforts toward small projects and education.

Response: An important element of the TMDL is the identification of available resources such as grants, loans and cost share programs. Ecology's priority on water clean-up work has resulted in TMDL-related grant applications receiving increased scoring relative to other projects. Ecology Water Cleanup staff can devote limited assistance to small projects and watershed education. As citizens participate in the workgroup developing the DIP, Ecology will work with the group to obtain resources for implementation. Refer to the Grant and Loan Webpage on Ecology's Website (http://www.ecy.wa.gov/fap.html), as well as the EPA Watershed Homepage and the Salmon Recovery Team Homepage for additional funding source information.

5. Comment: The document is lacking in that it does not provide incentives for local jurisdictions to increase problem identification and solutions.

Response: Local jurisdictions are expected to participate in the workgroups that will be developing the Detailed Implementation Plan. It is through the implementation workgroup process that the specific issues relating to the identification and resolution of water quality problems will be worked out.

6. Comment: The document is lacking in that it does not provide incentives for school district education of watershed issues, facility improvements and student involvement in problem identification and solutions.

Response: The Submittal Report includes only the outline of an implementation strategy. The details of the strategy will be developed by the implementation workgroups and will be included in the Detailed Implementation Plan. It is a great idea to involve schools and students in watershed education and water quality protection projects, and DIP workgroups should consider these activities and their value toward meeting TMDL goals.

7. Comment: The document is misleading on page 6, The Pilchuck River (4^{th} paragraph) "The source of the problems appear to be livestock access to the stream, inadequate pasture management, on-site sewage disposal systems, and improper fertilization application. Adding "City of Snohomish urban drainage" would more accurately complete the list.

Response: The reference on page 6 is to an Ecology 305(b) (Ecology, 1994) report that does not mention Snohomish storm drainage. You are correct in that the Snohomish storm drainage system probably contributes contaminants, including bacteria, to the Pilchuck River. However, sampling data collected by Ecology in 1996 did not indicate a significant contribution of bacterial contamination to the Pilchuck River below Highway 2 (Cusimano and Coots, 1997). Ecology expects that the contribution of bacteria from Snohomish stormwater is not as significant as the other sources listed, but this will be confirmed by future water quality monitoring.

8. Comment: The document is misleading on page 12, Wasteload Allocations "The only point source discharge located in the Snohomish River Tributaries Watershed is the Granite Falls WWTP...." Adding a description of the city of Snohomish stormwater outfall at the Sixth Street bridge would more accurately reveal a discrete, or point source.

Response: The EPA defines stormwater that discharges to surface waters from NPDES municipal stormwater permitted areas as point sources. The city of Snohomish is not currently an NPDES municipal stormwater permitted entity, but this may change as recent stormwater regulations are implemented. The Submittal Report has been changed to acknowledge point source discharges to the watershed from areas covered by the Snohomish County General NPDES Stormwater Permit.

9. Comment: Stormwater outfalls must be considered as *point sources* of bacterial pollution and be assigned *waste load allocations.* MS3's should themselves be assigned **waste load allocations** - dependent upon the individual biological conditions within them. It is a fatal flaw of this TMDL that they are not considered **point sources** of pollution bacteria.

Response: EPA has stated that, ". . a new general permit (e.g., a stormwater general permit) that includes best management practices, rather than numerical limitations on the mass or concentration of pollutants in the discharge, is adequate for the purposes of ensuring implementation of a wasteload allocation." (Federal Register Part VI, 2000). Also see response to comment #8.

10. Comment: The document is in error on page 18, (6th paragraph) "Strategies should (suggest 'will') be developed to discourage...waterfowl impacts...Responsible parties are..." Adding an incentive for local jurisdictions to work with 'watershed groups' may more effectively potentiate efforts to reduce waterfowl domination.

Response: The topic of waterfowl control is one of the most difficult issues to resolve in watershed planning and water quality improvement efforts. The water quality impacts of waterfowl were generally accounted for in the TMDL, and the Detailed Implementation Plan should identify specific areas where nonmigratory waterfowl are a significant water quality problem. Where it is determined that waterfowl control should be part of the Detailed Implementation Plan, State Department of Fish and Wildlife and local jurisdictions are expected to participate in the development of site-specific control and/or discouragement plans.

11. Comment: The document is in error on page 59, in that there is no trend analysis for the Pilchuck River represented.

Response: There was not sufficient data available to conduct a thorough trend analysis for the historical bacteriological contamination in the Pilchuck River. The purpose of the trend analysis in the other watersheds in this TMDL was to look at more recent data to see if there has been a change in ambient levels of bacteria. Based on the trend analysis of the four other sub-basins, it is assumed that bacteria levels in the Pilchuck River have not changed significantly since the original study was conducted.

12. Comment: The document is in error in that there is no mention of the ity of Snohomish Water Plant.

Response: The Snohomish has a water diversion dam located on the Pilchuck River upstream of Granite Falls. The water treatment plant does not discharge effluent to the river.

13. Comment: Removal of the French Creek pump station is imperative. The question is how to do that? The riverbed is higher than the stream.

Response: Removal of the French Creek pump station may not be feasible, but several agencies are in the early stages of working on strategies to mitigate its effect on water quality and fish. The goal is to restore a more adequate system for passing fish while still providing flood protection.

14. Comment: Five years before follow-up monitoring is too long.

Response: Ecology is proposing to conduct a follow-up monitoring study within five years of the approval of the TMDL. Ongoing monitoring efforts are necessary and most likely will be conducted by local agencies and included in the Detailed Implementation Plan. Ecology will support any monitoring initiatives to track bacterial levels in these waters. The ongoing monitoring by Ecology, the county and other local jurisdictions will continue to be very important in tracking progress and shifting focus to where necessary.

15. Comment: Revise Development of the Implementation Plan, page 17, paragraph 2 to state that, "The SHD recently amended their Sanitary Code to *help* protect *individuals* using natural swimming areas. …." This emphasizes the intended purpose of the regulation being to protect the public health rather than protect the swimming area.

Response: The comment is acknowledged and the recommended language is included in the revised submittal report.

16. Comment: Revise Implementation Activities, page 18, paragraph 5. SHD regulations focus on protecting public health. Health District solid waste regulations address issues of accumulation of solid waste of public health significance. The SHD would not assume responsibility for developing a program to protect surface waters from pet wastes. The SHD would be willing to participate in the review of proposed best management practices as a preventative public health measure.

Response: The comment is acknowledged and the recommended language is included in the revised submittal report.

17. Comment: Implementing the action items in this document will be dependent upon additional funding. Long-term action items will need ongoing program funding rather than one-time grant awards in order to be successful.

Response: Ecology recognizes that implementation of this and other water clean-up efforts face resource and funding challenges. According to the federal rules, no new resources, including financial, are given to implement TMDLs, and no government agency is relieved of the obligation to bring the waters of our state into compliance with the Water Quality Standards. Ecology is continually seeking additional financial resources to assist in the implementation of specific activities related to this TMDL, but long-term funding does not seem to be an option at this time. Currently, Ecology offers a scoring advantage to TMDL-related proposals over other projects competing for Centennial Clean Water funds.

18. Comment: How does urban and commercial runoff introduce fecal coliform to the Quilceda and Allen Creeks?

Response: Stormwater run-off from urban and commercial areas is usually contaminated to some extent with fecal coliform bacteria. Bacterial sources include pets, rodents, birds, litter, recreational vehicles and leaking sanitary sewers.

19. Comment: Page 17 in the submittal report states, "A system has been developed to track implementation activities and rank remaining plan elements for priority implementation. The plan should be updated if necessary and fully implemented." What is this system and who is currently maintaining and managing it?

Response: The Quilceda/Allen Nonpoint Implementation Committee is made up of citizens from the watershed and representatives from several agencies. This committee has ranked a list of implementation activities that came out of the Quilceda/Allen Watershed Management Plan and is tracking their implementation.

20. Comment: Page 18 in the submittal report states, "Ecology will work with the County and other local jurisdictions through the 2514 watershed planning process to assist in the watershed planning process in the basin." How can more information regarding the 2514 watershed planning process be obtained?

Response: Ecology has published a document called "Planning as Process: A Community Guide to Watershed Planning" which can be found on our Nonpoint Home Page (http://www.ecy.wa.gov/programs/wq/nonpoint/). Another source of information is the Watershed Planning web page on Ecology's website (http://www.ecy.wa.gov/watershed/).

21. Comment: Page 19 "The SHD has agreed to work with Ecology and the county to develop and implement a public outreach pilot project in the Allen Creek watershed on the proper operation and maintenance of on-site septic systems. This joint, public outreach pilot project will be completed by September 30, 2001." Who is the lead contact for this program and how may they be reached?

Response: Ralph Svrcjek is Ecology's contact for the implementation of this TMDL. He will be tracking the work on this pilot project and can be reached at (425) 649-7165.

22. Comment: The draft plan relies too heavily on the implementation committee and the existing Quilceda/Allen Watershed Plan to bring our area into compliance with water quality standards. The biggest impediments to the committee actually accomplishing anything are: 1) the committee has no statutory authority; 2) the committee has no budget; and 3) the committee is made up of citizens and staff of the various agencies, some of whom don't bother to participate, and who are not the decision makers.

Response: This TMDL supports the Quilceda/Allen Watershed Plan to the extent that it assists in reducing the bacterial loading within the Quilceda/Allen sub-basin. Implementation problems that may exist related to the Quilceda/Allen Watershed Plan are not necessarily problematic for the potential success of the Snohomish River Tributaries TMDL. Success of this TMDL is based in large part on the proper enforcement of existing regulations by all jurisdictions and specific actions of local organizations and citizen groups. Technical assistance, education and innovative strategies will be necessary to solve nonpoint water pollution problems. Ecology is thoroughly committed to the TMDL process and is dedicating significant resources toward this effort.

23. Comment: There is concern regarding relying on the county for monitoring over the next several years. What provision has been made should the county's budget make it impossible to continue their current level of monitoring?

Response: Ecology will continue to be extremely interested in monitoring the results of water cleanup efforts. Over the next 3-5 years, Ecology is expected to initiate monitoring in the Snohomish River Tributaries or provide incentives for local government to do so. In any case, Ecology will work with the county, the Tulalip Tribes and other local jurisdictions to ensure that an adequate level of baseline monitoring continues.

24. Comment: What will happen to this TMDL if a change is made from using enterococci instead of fecal coliform as the indicator bacteria?

Response: If the standard changes, Ecology will work with the county and others to ensure that ongoing monitoring continues to allow the tracking of water quality trends and TMDL implementation during the transitional period from the old to the new standard. The needed source control BMPs will not change. The analytical methods will change but sampling locations, frequencies, etc. will remain similar. Some transition period will be needed to establish a sufficient database to allow for water quality trend analysis and correlation with previous trends. The new enterococci bacteria standard will be at least as protective as the old one and more relevant in terms of risk to human health. The goal of this TMDL will remain - to attain water quality standards for bacteria in these waters.

25. Comment: High levels of fecal coliform can be due to urban growth and the source of pet wastes. Even though there are posted creeks and hundreds of letters mailed out, owners still do not act responsibly.

Response: The Detailed Implementation Plan will be developed by the workgroups of local citizens and agency staff. Ecology anticipates that the workgroup will not rely solely on postings and mailings for source control for urban growth and pet wastes. It is intended that new and innovative strategies will be developed during the development of the plan.

26. Comment: The document does not address illegal connections to the surface water system. There are incidences of several homes whose entire side sewer was connected to the surface water system, not the sanitary sewer, without the awareness of the current owner.

Response: The current general municipal stormwater permit requires a program to detect, remove, and prevent illicit discharges to municipal separate storm systems. Phase II municipal stormwater permits have not yet been written; however, one of the six minimum control measures that EPA has outlined to be part of the permit includes a similar provision. It should also be noted that Ecology recognizes that a compliance schedule is necessary to meet state water quality standards where current stormwater discharges do not comply with those standards. Thus, the development and implementation of an approved stormwater program is acceptable to Ecology and represents acceptable progress toward meeting those standards. The identification and elimination of all cross-connections of sanitary sewers into storm sewers is a challenging project. Monitoring of stormwater discharges in conjunction with camera systems designed for exploring sewer pipes are among the limited tools for positively identifying such problems. Citizen observations of potential cross connections can also be a valuable tool for beginning the process of resolving this problem.

27. Comment: The Tulalip Tribes conducted a study several years ago that identified failing septic systems. Did the Snohomish Health District ever follow up on those systems?

Response: In 1991 the Tulalip Tribes published a document called "Sources of Point and Nonpoint Pollution in the Quilceda-Allen Watershed." SHD staff have indicated that any specific information regarding failed septic systems brought to their attention as a result of that study would have received an investigation. Any information regarding septic system failures should be addressed to the attention of the SHD.

28. Comment: This TMDL does not adequately address the 303(d) listed parameter for low dissolved oxygen. Meeting the water quality standard for fecals will not necessarily solve the DO problem.

Response: By controlling the sources of bacterial pollution, which are human and animal wastes, organic loading to streams will be reduced. With a reduction in amount of nutrients and organic matter going into these streams, DO levels are expected to improve (Cusimano and Coots, 1997). If DO levels are still not meeting standards following implementation of this bacteria TMDL and a future temperature TMDL, a separate TMDL will be conducted in the Snohomish River Tributaries for DO.

29. Comment: The concentration-based approach versus the loading capacity approach is inadequate in urban areas serviced by stormwater pipes and roadside ditches. The TMDL should be based on load allocations that have a basic internal growth equation dependent upon nutrients and temperature that allow bacteria to reproduce outside of the intestinal tracts of animals. The TMDL should expend more effort in addressing the nutrients (animal excrement for the most part) that may allow bacterial reproductions within the system.

Response: While the dynamics of bacterial survival and reproduction are important issues, this TMDL is based on instream water quality. The goal is to achieve water quality standards for fecal coliform bacteria regardless of the sources of pollution. One of the benefits of changing the Water Quality Standards to use the enterococcus group of indicator bacteria is that they do not multiply outside the intestinal tract. In addition, concentrations of enterococci more closely correlate with incidents of illness so the switch should provide us with a more accurate predictor of the potential for human health impacts from bacterial contamination in our surface waters.

30. Comment: Concentration-based approach may be inconsistent with CFR 122.4 (i)(1). Ecology should clarify within the "Summary Implementation Strategy" of this TMDL exactly how CFR 122.4(i)(1) and other legal references to **pollutant load allocations** will be interpreted if the TMDL is legally challenged? Will **concentration levels** be interchangeable with **pollutant loads?** Exactly how are **concentration levels** allocated?

Response: Ecology has been consulting with the U.S. Environmental Protection Agency (EPA) on these issues. EPA (and Ecology) do not interpret quantification of loads as always requiring the direct monitoring of sources of pollutant loads or the pollutant load within a waterbody (Federal Register Part VI, 2000). Given all the tools available to Ecology at this time, concentration-based load allocations were established for all monitoring stations in the drainages for this TMDL. The concentration-based target load reductions are being used to achieve instream water quality standards for fecal coliform bacteria regardless of the sources of pollution.

In it's preamble to *Revisions to the Water Quality Planning and Management Regulation and Revisions to the NPDES Program in Support of Revisions to the Water Quality Planning and Management Regulation: Final Rules*, EPA states that, ". . . a new general permit (e.g.,. a stormwater general permit) that includes best management practices, rather than numerical limitations on the mass or concentration of pollutants in the discharge, is adequate for the purposes of ensuring implementation of a wasteload allocation." (Federal Register Part VI, 2000).

31. Comment: The introduction of catfish into detention ponds that never go dry may reduce pollution.

Response: Catfish would be seen as a risk to salmonids and be prohibited by the Washington State Fish & Wildlife Department, but triploid grass carp have been used in many instances around the state to control nuisance plant growth in a variety of lakes and ponds. Using triploid grass carp may control nutrients in some cases, but probably would not affect bacterial levels much.

32. Comment: Ecology should collect verbal comments if requested to do so.

Response: Verbal comments received by Ecology staff during meetings or phone conversations are important in the development of Ecology's position. However, the workload is too much to keep track of all the comments and to show how they effect the decision making of Ecology, which we do during formal public comment periods. A decision is usually made before the comment period to take comments in writing or both in writing and orally. Ecology will take comments orally as well as written for the next public comment period on this subject.

33. Comment: Under the Summary Implementation Strategy portion of the TMDL, Ecology should introduce the concept of giving jurisdictions TMDL credit for taking significant blocks of land out of developable status.

Response: There are no TMDL "credits" per se. However, actions such as purchasing conservation easements or establishing riparian buffers are generally recognized as beneficial to water quality.

34. Comment: Ecology continually refers to the antidegradation policy as an effective enforcement tool. Ecology should make it clear that in practice, the antidegradation policy applies if, and only if, there is an application for an NPDES permit to discharge specific pollutants to waters of the US. I hereby request that Ecology place a reference to every case in which they have in fact cited and argues the antidegradation policy during an enforcement action (not the issuance of an NPDES permit). Without a requirement for individual NPDES permits for storm water discharges the antidegradation policy might never find application in the areas of TMDLs.

Response: This comment does not refer to the TMDL document. The state's antidegradation policy in WAC 173-201A is currently being revised. This comment appropriately addresses the revisions of the Water Quality Standards.

35. Comment: Ecology is recklessly pushing for voluntary compliance, even in the face of a court order to develop TMDLs. An overall reading of this TMDL indicates that without further citizen action in the courts the plan is overtly designed to fail. It is a mere exercise in futility to

satisfy court imposed requirements for legal paperwork. It is a delay tactic until a mootness argument can be made that the waters are permanently polluted waste carrying conduits.

Response: The federal rules do not give additional authority to Ecology to implement the TMDL process. We must address our impaired water bodies using voluntary efforts and incentive-based programs, as well as all existing regulations and authorities. Ecology believes that much can be done with voluntary compliance. Ecology has made good progress in greatly reducing dairy waste run-off to these waters. The county has a water pollution ordinance and there are several cost share programs helping farmers implement BMPs. The most difficult water pollution sources to control and correct are from small properties and individuals. The people in the watershed with pets, hobby farms, and septic systems must do their part. Continued citizen involvement with the process is necessary for the accountability and success of TMDL implementation.

36. Comment: Ecology touts the watershed approach as if it is working to clean up the watershed. The Summary Implementation Strategy should take many of the recommendations of the Quilceda/Allen Watershed Plan and give them force of law as conditions of obtaining NPDES permit for new discharges of storm water into MS4's or waters of the US. Every recommendation in the Quilceda/Allen Plan should be gone over to see if it can legally be made a condition of obtaining an NPDES permit for new discharges of storm water either into an MS4 or directly into waters of the US, including the recommended buffers along streams and the recommended impervious surface free zones around streams. Gradually adding recommendations of the watershed plans as conditions for a new NPDES permit on a periodic 6-month review could be part of the movement toward a strict and aggressive enforcement policy.

Response: Ecology favors permit conditions which result in water quality improvement and protection, but has limited authority to mandate extensive new restrictions as conditions to NPDES stormwater discharge permits. Imposing such conditions without sufficient resources for implementation will have limited potential for success. When an existing permit expires, Ecology will evaluate, in accordance with federal regulations, whether the effluent limitations or conditions within the permit are consistent with the load reduction targets in the TMDL (Federal Register Part VI, pg. 43622). In controlling nonpoint water pollution, a proven strategy for success is to include and empower the people that live and work in these watersheds. Bringing listed waterbodies back to meeting water quality standards will take personal and institutional commitments and considerable time.

37. **Comment:** Ecology has the authority to require point sources covered by the General Stormwater Permit to obtain individual permits. CFR 122.28(b)(3). I hereby petition the director of Ecology to establish a program to require certain point source discharges of stormwater, now covered by a General Permit, to apply for and obtain individual permits.

Response: The commentor's petition has been conveyed to director Fitzsimmons. Ecology does have an NPDES permit program which has the authority to require certain point source discharges to obtain individual permit coverage if deemed necessary. Through a "cost-benefit" analysis of numerous individual stormwater permits versus a General Stormwater Permit, Ecology has determined that the General Permit provides better water quality protection for the associated cost of implementation and enforcement. If a specific stormwater discharge is documented to be a "problem," Ecology can use its authority under RCW 90.48 to resolve the matter or consider on a case-by-case basis whether an individual permit is more appropriate.

38. Comment: A request under the Freedom of Information laws of the state for a complete list of all point sources (within the area covered by this TMDL) that are discharging to stormwater and are covered under any NPDES General Stormwater Permit. I request that the resultant list also be included in this document - or at minimum attached to my comments.

Response: Ecology has responded to this comment as a Freedom of Information Act request. Thus, the commentor has been contacted and provided an opportunity to view this information. Interested parties can access a list of all point source discharge permits on the Ecology Web Site at http://www.ecy.wa.gov/programs/wq/permits/wplcs/index.html. Point source discharges that are covered under the Snohomish County General Municipal Stormwater permit are on file and viewable upon contacting and arranging a visit with the Snohomish County Surface Water Management Division at (425) 388-3464.

39. Comment: Unpermitted discharges of stormwater from point sources should be identified and required to obtain individual NPDES permits.

Response: Ecology issues NPDES stormwater permits to certain designated industrial categories, construction sites over 5 acres, and NPDES general stormwater permits to municipalities over 100,000. Within two years, Ecology will also cover construction sites down to one acre and will issue NPDES stormwater permits to some additional municipalities within a defined urban corridor in accordance with the new federal Phase II NPDES stormwater rules.

40. Comment: This TMDL should be a mixed-point TMDL.

Response: This TMDL is a mixed source TMDL, which means that both point and nonpoint sources are included. All of the stormwater discharges from unincorporated Snohomish County are defined by federal regulation as point sources and were addressed along with the documented and assumed nonpoint sources in this TMDL.

41. Comment: Under CFR 122.4(d)(1)(iii), general stormwater permits should be abandoned in the areas where TMDLs are in progress or are done. This TMDL should make it clear that new developments are required to obtain individual permits to discharge pollutants.

Response: The comment may be referencing CFR 122.44(d)(1)(iii). Ecology will carefully consider the need for an individual permit to industrial and construction stormwater permitted facilities on a case-by-case basis. EPA has stated that a stormwater general permit that includes best management practices, rather than numerical limitations on the mass or concentration of pollutants in the discharge, is adequate for the purposes of ensuring implementation of a wasteload allocation (Federal Register Part VI, pg. 43623). Ecology is not anticipating the need to issue individual permits for individual storm drain outfalls.

42. Comment: This TMDL should address compliance assurance with the required effluent limits of point sources of bacterial pollution and address the notification requirements for violations of effluent limits.

Response: Ecology anticipates that the implementation of source control measures in this TMDL will reduce bacteria levels in the identified receiving waters. In some instances, the loadings from nonpoint sources can only be feasibly quantified on an aggregate basis. EPA does not interpret quantification of loads as always requiring the direct monitoring of sources of pollutant loads or pollutant load within a water body (Federal Register Part VI, pg. 43621).

Some outfall monitoring is expected to be included as part of ongoing follow-up monitoring to assist in the assessment of where BMPs are needed most and to track success of implementation efforts.

43. Comment: CFR 122.62(a) yields cause for modification of general stormwater permits as they apply to areas where TMDLs have been developed.

Response: It is true that NPDES permits can be modified by Ecology to address TMDLs. When an existing permit expires, upon re-issuance of that permit, Ecology will evaluate, in accordance with federal regulations, whether the effluent limitations or conditions within the permit are consistent with the load or wasteload allocations in the TMDL.

44. Comment: CFR 122.64 provides Ecology with the authority to terminate the general stormwater permit within areas covered by TMDLs.

Response: The general NDPES stormwater permit issued to Snohomish County is a useful tool in the protection of water quality and it's termination is not being considered. Rather, the County's general NDPES stormwater permit is currently under consideration for re-issuance. The NPDES municipal stormwater permit is considered to be a vital component of an overall strategy to protect and improve water quality.

45. **Comment:** CFR 122.4 may prevent the addition of new outfalls of stormwater until the waters are cleaned up. This document should require that general stormwater permits be suspended in the area of the TMDLs.

Response: Ecology is not currently issuing general NPDES stormwater permits to any new dischargers which discharge to 303(d) listed waters pending the outcome of a legal challenge. EPA has stated that a stormwater general permit that includes best management practices, rather than numerical limitations on the mass or concentration of pollutants in the discharge, is adequate for the purposes of ensuring implementation of a wasteload allocation (Federal Register Part VI, pg. 43623).

46. Comment: The state should design a scientific poll to ask the public if they desire recreational waters that are safe for human contact. The stakeholders are often mainly the "profit takers."

Response: Ecology assumes the general public supports safe recreational waters. Businesses within watersheds are given equal opportunity as part of the general public to comment and participate in development of Water Cleanup Plans.

47. Comment: Snohomish County Surface Water Management has requested a review of the legal requirements for implementation of the plan by Ecology's attorneys. We reserve the right to make additional comments based on the results of that review. The county needs greater clarity about the relationship of the TMDL to the NPDES permit and the requirements that the county will have under the permit.

Response: On January 25, 2001, seven Ecology staff involved with stormwater and TMDLs, met with several county staff in an attempt to clarify the relationship of the TMDL to the county's NPDES permit. Ecology is currently rewriting the Phase I Municipal Stormwater Permit and is reviewing the language addressing the relationship between the TMDL program and the permit. Snohomish County is participating in the external review of the draft language for the new

permit and will therefore be kept abreast of developments on this issue including a review of legal requirements, when they are available.

48. Comment: Page 15, Snohomish Conservation District. "When Ecology....documents ...bacterial water quality problem at a farm... Ecology's responsibility is to ensure that a farm plan be developed and implemented." Insert at the end of this section: "Ecology, Snohomish County, and the Conservation District need to work together to review the success of agricultural water quality improvement approaches to date and to identify and implement specific approaches to reduce agricultural pollution the effectiveness of which can be demonstrated."

Response: The comment is acknowledged and the recommended language is included in the revised submittal report.

49. Comment: Page 16, Snohomish County. Implementation of the Quilceda/Allen Water Management Plan will occur to the extent that resources are available. The county will respond to water quality complaints at the request of Ecology or be available to conduct joint investigations as staff time is available.

Response: Ecology will always seek to work as efficiently as possible with local jurisdictions since resources are limited at all levels.

50. Comment: Page 16, Snohomish County. Insert after third paragraph: "Snohomish County has a strong public outreach program which consists of educational programs for students, teachers, and the general public; a native plant salvage program which generates hundreds of hours of volunteer time each year in watershed restoration projects; and a watershed steward assigned to work with citizens on water quality projects throughout the basin."

Response: The comment is acknowledged and the recommended language is included in the revised submittal report.

51. Comment: Page 17, Implementation Activities. The Quilceda/Allen plan should be updated if necessary and efforts to implement it should be pursued.

Response: The language has been changed to ".... updated if needed and implemented to the extent practicable."

52. Comment: Page 18, Implementation Activities. The County has a legal responsibility under the stormwater permit to reduce pollution entering the County stormwater system from farms or agricultural activities. Developing a Livestock Ordinance is only one method of achieving this goal.

Response: Ecology has been informed that the county is working on a livestock ordinance, and recognizes that other additional or alternative strategies may meet this need.

53. Comment: Page 19, Reasonable Assurances. We ask Ecology to work closely with Granite Falls to monitor their WWTP effluent to the Pilchuck River. The county has documented several violations in the vicinity of the WWTP outfall.

Response: Ecology has required Granite Falls to complete a receiving water and effluent study by January 2002. Based on the results of this study, the NPDES wastewater permit will be

modified as necessary to be protective of the Pilchuck River. Ecology will establish wasteload allocations for the Granite Falls Wastewater discharge if the study reveals such a need.

54. Comment: Page 19, Reasonable Assurances. The county is willing to work with the Snohomish Health District and Ecology to develop and implement a public outreach pilot project in the Allen Creek watershed. The SHD, as lead agency, has not yet contacted the County to plan this project. We are concerned that the project will not be completed by September 30, 2001.

Response: The September 30, 2001 date was suggested in good faith by all parties. Language in the TMDL has been changed to reflect a completed pilot project within one year after TMDL approval.

55. Comment: The percentage of fecal coliform loading contributed by storm water has not been quantified. EPA Region 10 requires all TMDLs to include a description of the sources and magnitude of pollution in order to determine whether the resultant load and waste load allocations will meet or exceed the loading capacity of the waterbody.

Response: A percent breakdown of point versus nonpoint sources of stormwater has been included in this TMDL.

56. Comment: According to CWA, Section 402(p) and the regulations at 40CFR 122.26(b) (8) and 40CFR 122.2, municipal separate storm sewer systems are point sources. Waste load allocations must be assigned to each point source discharging the pollutant of concern under most circumstances. It may be difficult to establish individual waste load allocations for each stormwater outfall, but EPA will work with Ecology in developing an approach that is practical and that acknowledges pollution contributions from stormwater.

Response: This TMDL has been modified to recognize stormwater that discharges from NPDES municipal stormwater permitted areas as point sources. Waste load allocations were established using the same methodology used for the load allocations.

References Cited

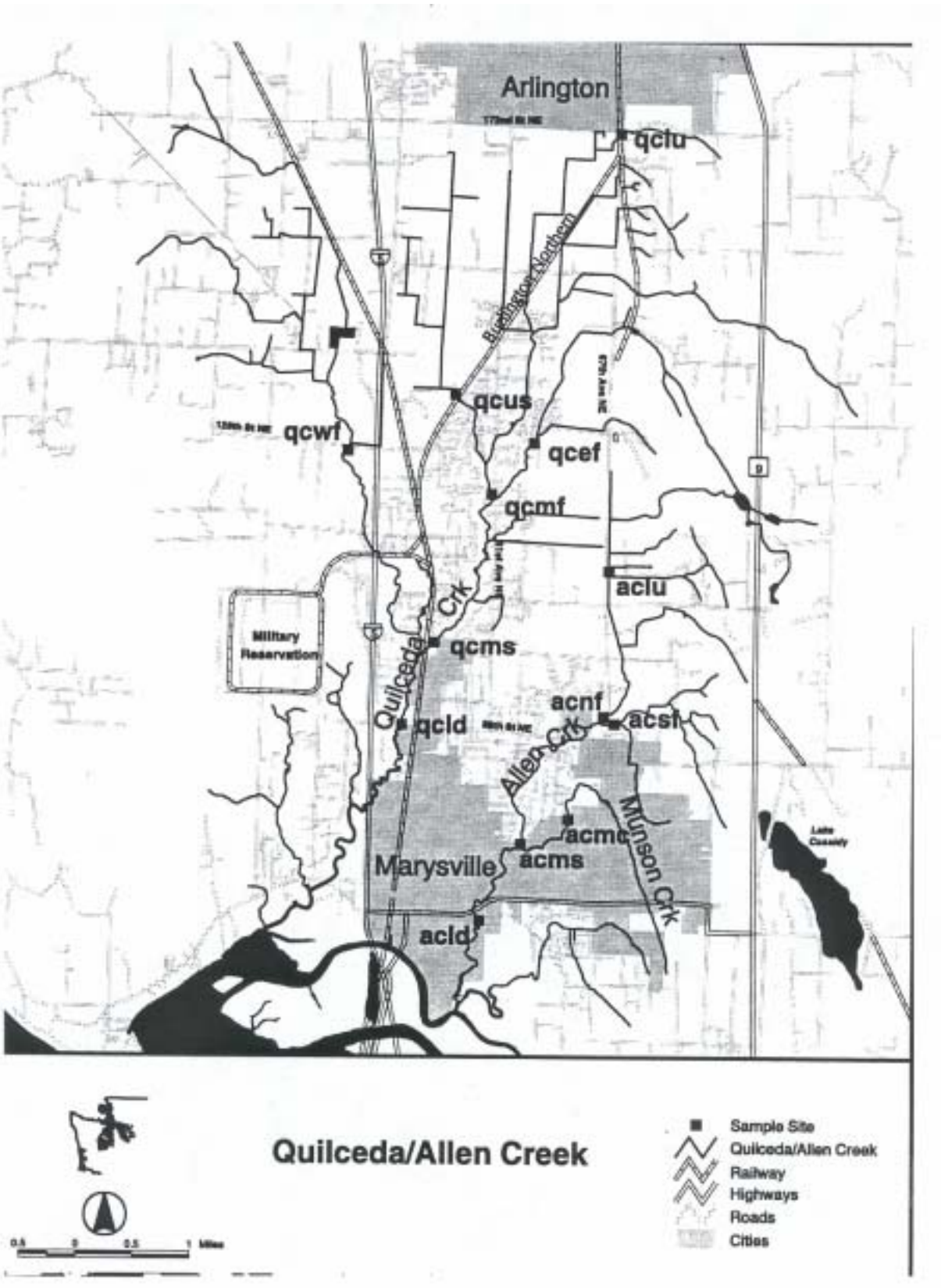
USEPA, 2001. *Protocol for Developing Pathogen TMDLs.* EPA 841-R-00-002. Office of Water (4503F), United States Environmental Protection Agency, Washington DC., January 2001, 132 pp. (available on the internet at; *http://www.epa.gov/owow/tmdl/techsup.html)*

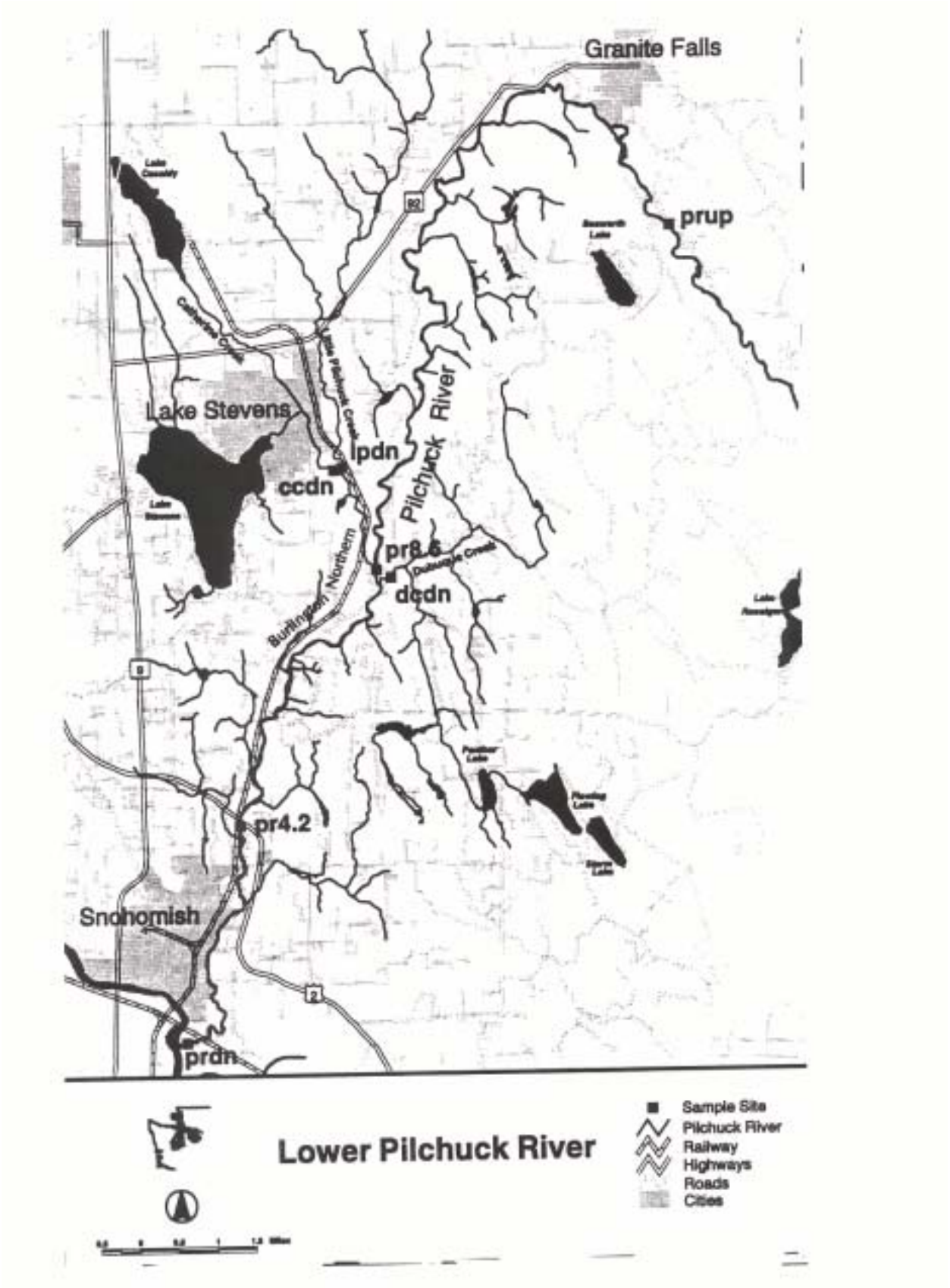
Federal Register Part VI, 2000. Environmental Protection Agency 40 CFR Part 9 et al.; *Revisions to the Water Quality Planning and Management Regulation and Revisions to the NPDES Program in Support of Revisions to the Water Quality Planning and Management Regulation; Final Rules.* Vol. 65, No. 135, July 13, 2000, pgs. 43586 through 43670.

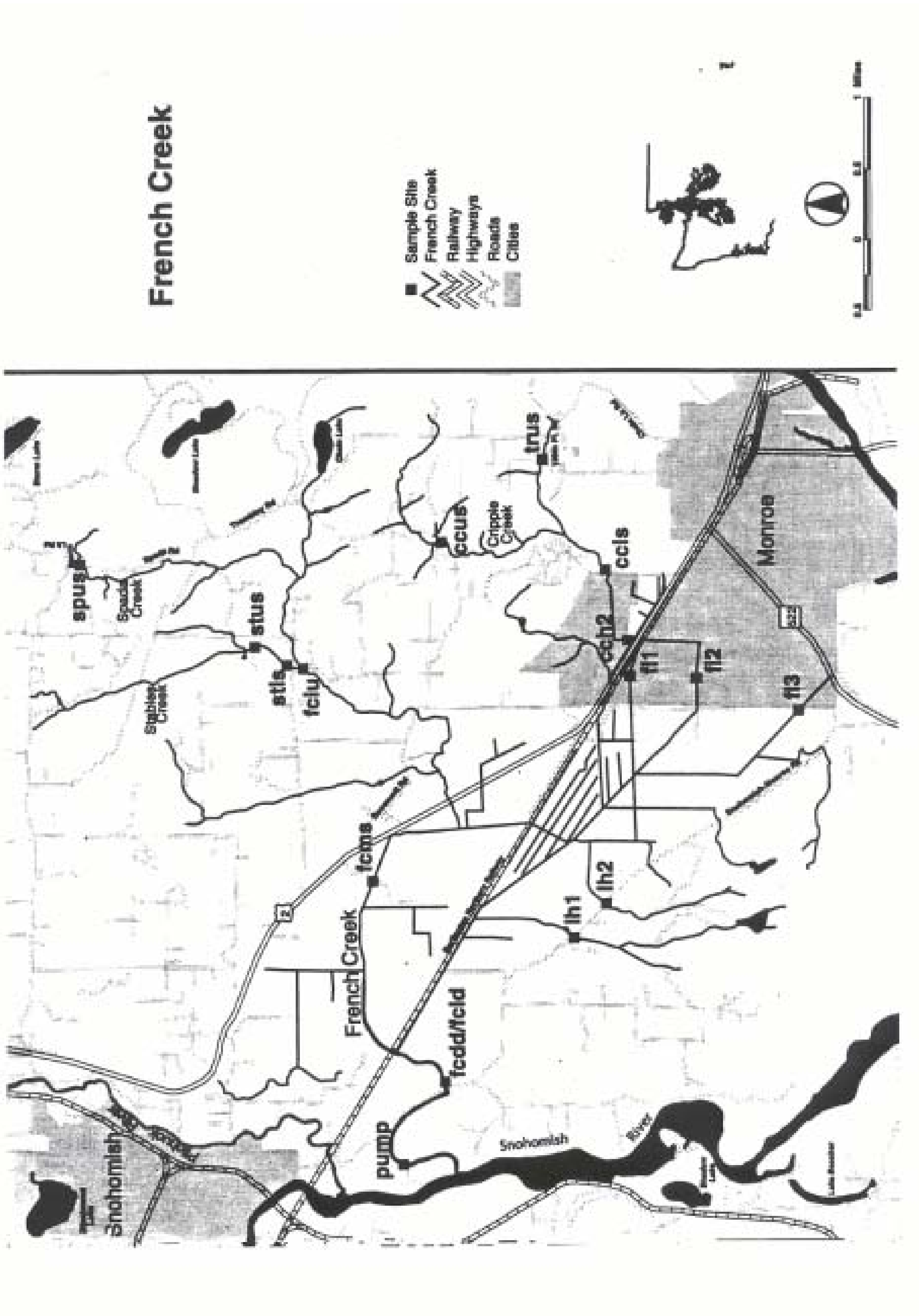
Cusimano, R.F., and R. Coots, 1997. *Water Quality Assessment of Tributaries to the Snohomish River and Nonpoint Source Pollution TMDL Study.* Washington Department of Ecology, Publication No. 97-334, September 1997, 52 pp.

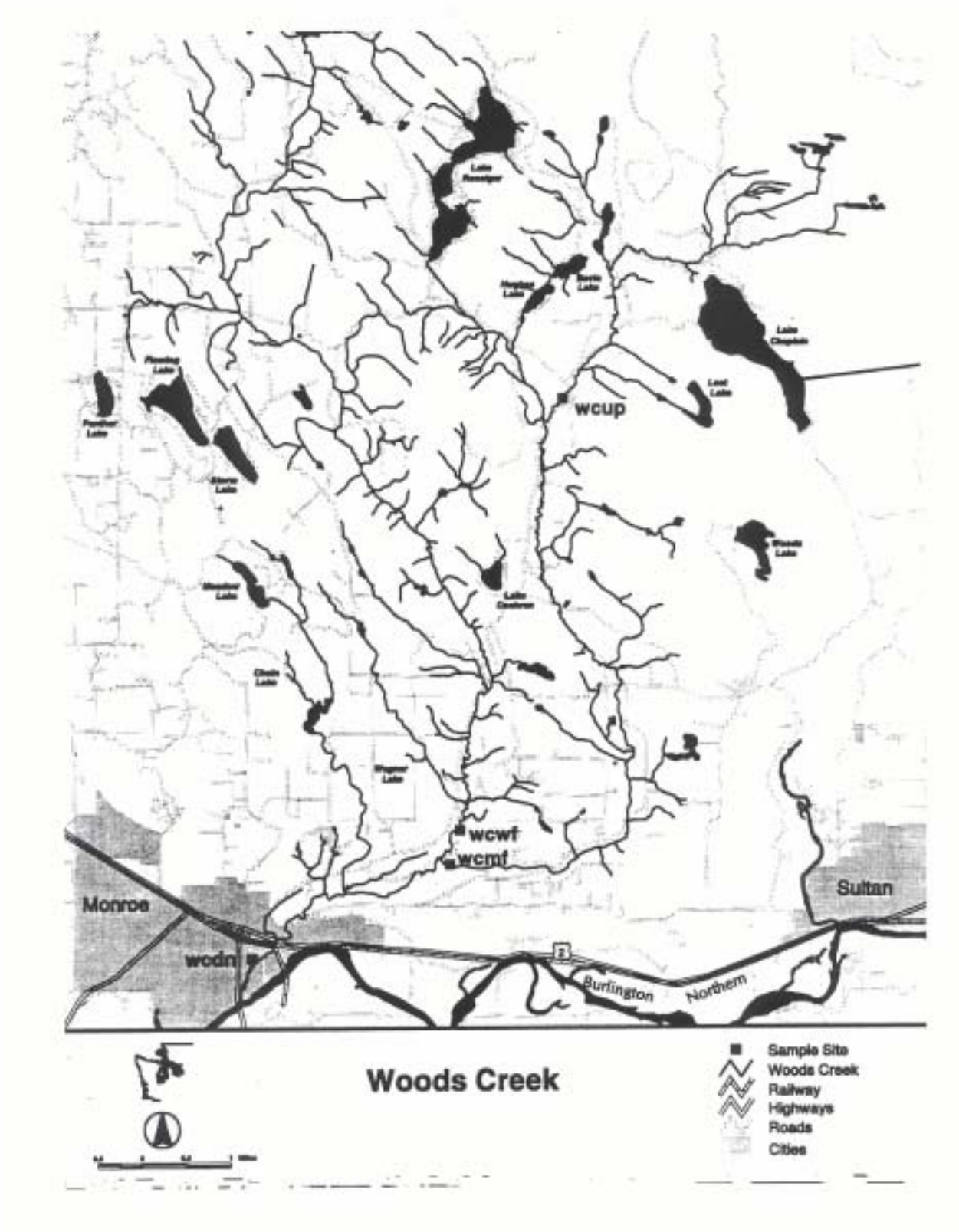
Appendix B

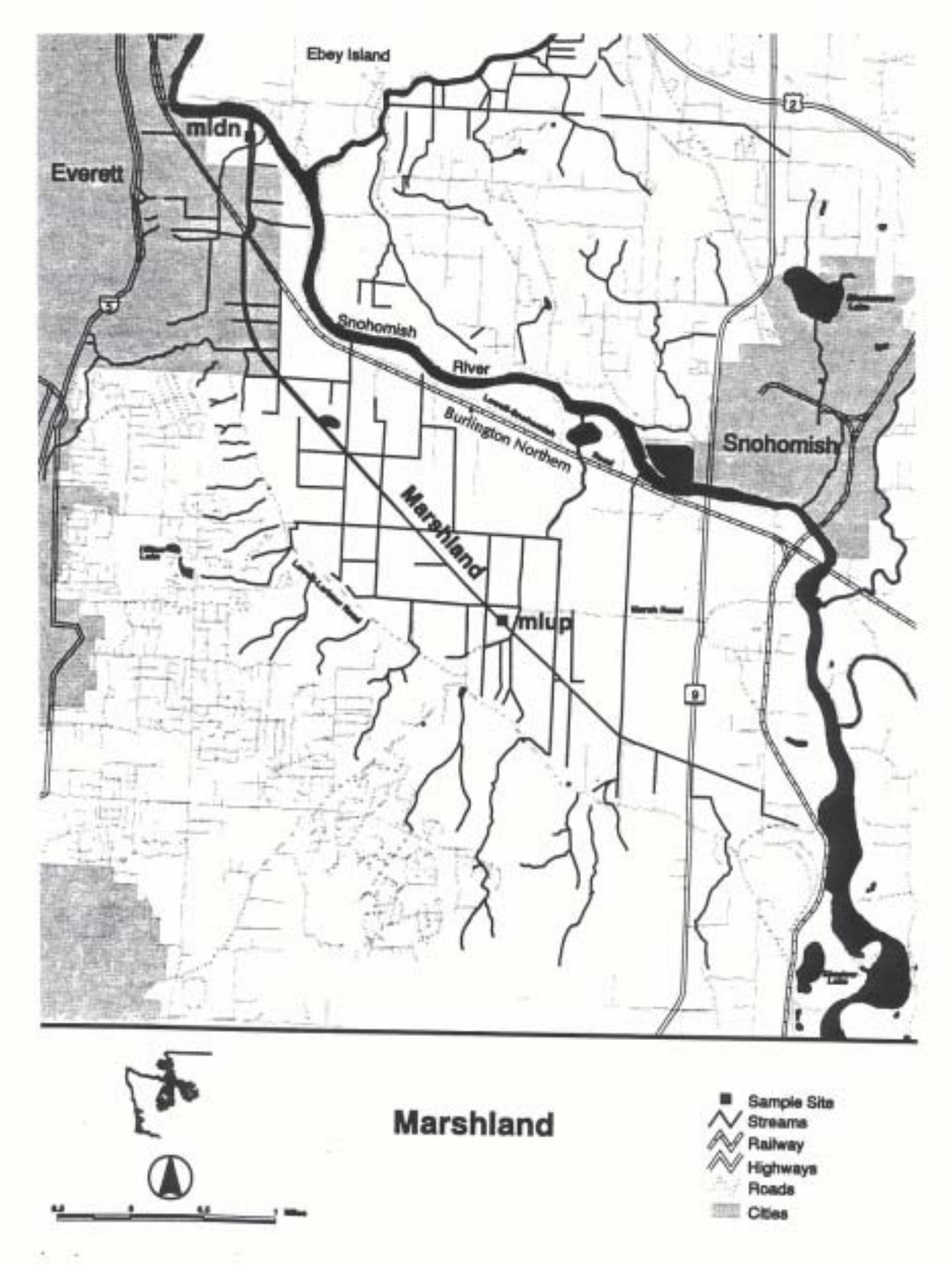
Sub-basin Drainage Maps


Arlington
qclu
Burlington Northern
qcus
qcwf
qcef
qcmf
aclu
Military Reservation
Quilceda Crk
qcms
acnf
qcld
acsf
Allen Crk
Munson Crk
acmc
acms
Marysville
acld
Quilceda/Allen Creek
Sample Site
Quilceda/Allen Creek
Railway
Highways
Roads
Cities


Granite Falls
prup
Lake Stevens
lpdn
ccdn
Pilchuck River
pr8.6
dcdn
Burlington Northern
pr4.2
Snohomish
prdn
Lower Pilchuck River
Sample Site
Pilchuck River
Railway
Highways
Roads
Cities


French Creek
Sample Site
French Creek
Railway
Highways
Roads
Cities
Snohomish
Monroe
Snohomish
River
French Creek
spus
stus
stls
fclu
fcms
fcdd/fcld
pump
ccus
ccls
ccb2
trus
fl1
fl2
fl3
lh1
lh2
Stables Creek
Cripple Creek
Spada Creek


wcup
wcwf
wcmf
wcdn
Monroe
Sultan
2
Burlington Northern
Woods Creek
Sample Site
Woods Creek
Railway
Highways
Roads
Cities


Ebey Island
mldn
Everett
Snohomish
River
Burlington Northern
Snohomish
Marshland
mlup
Marshland
Sample Site
Streams
Railway
Highways
Roads
Cities

Appendix C

Recommended Target Levels Needed to Meet Criteria for each Snohomish River Tributary

Table 3. Recommended wet and dry season target needed to meet criteria for the Snohomish River tributaries.

Water body	Site	Drainage Area (acres)[a]	First Criterion: Geometric Mean <100 (colonies/100 mL)		Second Criterion: 90% of Samples <200 (colonies/100 mL)		Recommended Target Levels Needed to Meet Ccriteria			
			Sample Geometric Mean		Sample 90th Percentile		Target Geometric Mean		Target Percent Reduction	
			Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season
Allen Creek	ACLU	490	392	664	5358	4,137	40	62	90	91
Allen Creek	ACMC	940	121	585	549	1,646	56	95	54	84
Allen Creek	ACSF	1,090	149	145	870	1,240	50	40	66	72
Allen Creek	ACNF	1,570	108	197	773	498	42	91	61	54
Allen Creek	ACMS	3,610	168	332	565	735	73	99	57	70
Allen Creek	ACLD	5,130	30	122	169	842	n/a	44	0	64
Quilceda Creek	QCLU	320	47	209	316	920	35	63	26	70
Quilceda Creek	QCEF	2,820	420	1,091	4,094	4,073	47	86	89	92
Quilceda Creek	QCUS	2,570	25	60	51	220	n/a	55	0	7
Quilceda Creek	QCWF	5,560	131	619	487	2,489	65	78	50	87
Quilceda Creek	QCMF	7,440	119	451	928	1,254	41	94	66	79
Quilceda Creek	QCMS	11,680	198	270	845	603	64	99	68	63
Quilceda Creek	QCLD	19,160	213	318	1,216	830	55	94	74	70
French Creek	FL1	80	23	407	207	2,113	22	64	2	84
French Creek	TRUS	220	11	52	40	353	n/a	36	0	32
French Creek	LH2	240	34	382	99	3,270	n/a	49	0	87
French Creek	FL3	430	48	179	214	2,267	46	35	5	80
French Creek	CCUS	540	29	66	366	446	21	38	29	42
French Creek	LH1	580	56	552	287	4,075	43	56	23	90
French Creek	FL2	830	71	220	1,034	2,456	26	39	64	82
French Creek	STUS	910	38	267	181	1,175	n/a	66	0	75

Water body	Site	Drainage Area (acres)[a]	First Criterion: Geometric Mean <100 (colonies/100 mL)		Second Criterion: 90% of Samples <200 (colonies/100 mL)		Recommended Target Levels Needed to Meet Ccriteria			
			Sample Geometric Mean		Sample 90th Percentile		Target Geometric Mean		Target Percent Reduction	
			Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season
French Creek	STLS	980	32	136	124	1,878	n/a	32	0	77
French Creek	CCLS	1,740	39	394	547	1,877	22	67	44	83
French Creek	CCH2	1,950	31	428	121	6,392	n/a	39	0	91
French Creek	FCLU	3,530	39	357	310	1,337	29	76	24	79
French Creek	FCMS	7,150	441	682	6,098	3,822	40	66	91	90
French Creek	FCDD	17,170	135	283	555	3,064	61	42	55	85
French Creek	FCLD	17,170	180	396	1,780	1,645	40	72	78	82
French Creek	PUMP	17,680	87	346	1,862	1,589	23	67	73	81
Woods Creek	WCMF	18,920	45	158	252	780	38	56	15	64
Woods Creek	WCWF	17,020	56	160	216	686	53	61	6	62

Table 4. Ecology 1996 sampled drainages: wet and dry season fecal coliform geometric means, 90th percentiles, and recommended reductions needed to meet criteria.

Water body	Site	Drainage Area (acres)[a]	First Criterion: Geometric Mean <100 (colonies/100 mL)		Second Criterion: 90% of Samples <200 (colonies/100 mL)		Recommended Target Levels Needed to Meet Ccriteria			
			Sample Geometric Mean		Sample 90th Percentile		Target Geometric Mean		Target Percent Reduction	
			Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season
Pilchuck River	PRUP	3,410	3	54	6	100	n/a	n/a	0	0
Pilchuck River	PR8.6	42,840	7	75	27	264	n/a	60	0	19
Pilchuck River	PR4.2	78,150	12	80	23	192	n/a	n/a	0	0
Pilchuck River	PRDN	82,620	12	66	27	320	n/a	47	0	29
Pilchuck River	LPDN	12,010	19	234	105	1,789	n/a	47	0	80
Pilchuck River	CCDN	8,990	28	132	94	936	n/a	44	0	67
Pilchuck River	DCDN	8,540	10	166	23	890	n/a	54	0	67
French Creek	FCMS[b]	7,150		502		4,536		50		90
French Creek	PUMP[b]	17,680		468		1,119		99		79
Marshland	MLUP	6,500P	617	473	10,017	2,771	40	61	93	87
Marshland	MLDN	14,580	705	177	3,633	784	69	61	90	65
Woods Creek	WCUP	8,230	2	28	4	61	n/a	n/a	0	0
Woods Creek	WCMF	18,920	8	87	23	159	n/a	n/a	0	0
Woods Creek	WCWF	17,020	9	185	49	974	n/a	56	0	70
Woods Creek	WCDN	39,890	26	96	148	261	n/a	77	0	20

[a] Estimate of drainage area upstream of sampling site.
[b] No data collected by Ecology during the wet season.

Appendix D

Quality Assurance Project Plan

Data Quality Objectives and Analytical Procedures

Analytical methods and the reporting or precision limits for field measurements and laboratory analyses conducted during the wet and dry season water quality surveys are listed in Table 6.

Sample Collection and Field Measurement Methods

All water quality samples collected for laboratory analysis were grab samples. The grabs were collected just below the water surface at wrist depth from the main body of stream flow, except at the Marshland and French Creek pump stations, where samples were collected from the standing pool using a telescoping extension rod. Replicate samples were collected at specified sites by repeating the sampling effort immediately after the first sample was collected. A minimum of one replicate set, which included all parameters, was collected each survey day.

All samples for laboratory analyses were preserved as specified by Manchester Environmental Laboratory (MEL) and delivered to MEL within 24 hours of collection. Throughout the study laboratory analyses were performed within holding times except the February 13 nitrite samples, which were flagged as estimates in the database. All field and laboratory measurements, target detection limits, and methods are listed in Table 6 and were performed in accordance with MEL (1994). Field sampling and measurement protocols followed those specified in WAS (1993) for temperature (alcohol and mercury thermometer), pH (Orion Model 250A meter and Triode pH electrode), conductivity (Beckman Model RB-5), dissolved oxygen (Winkler titration), and stream flow (Marsh-McBirney 201 and 2000).

The only USGS gauging station currently active in the study streams was located in the lower Pilchuck River near Snohomish (USGS Station #12155300). Discharge information for other study streams was unavailable. Flow measurements were collected at some of Ecology's stream sites in the study and are included in the data set listed in Appendix E. All discharge measurement protocols followed those described in WAS (1993).

Quality Control Procedures

Snohomish County data were collected, analyzed, and reported according to their ambient water quality monitoring program QAPP, which was reviewed and approved by Ecology (Thornburgh and Leif, 1992). Ecology data were reported by MEL as usable with data qualifiers noted.

Total variation for field sampling and laboratory analysis were assessed by collecting replicate samples. Approximately ten percent of the total number of laboratory samples per parameter were replicate samples. Ten percent of the field measurements (pH, temperature, conductivity, dissolved oxygen and flow) were also replicated. Replicate precision for chemistry parameters was estimated by calculating the root mean square error of the coefficient of variation of the replicate pairs. The results are listed in Table 7. The replicate precision for Snohomish County nitrite-nitrate and total suspended solids data appear to be high relative to the Ecology data and historical precision found in other projects.

A laboratory comparability study was conducted on March 27 to assess the relative bias and comparability of Snohomish County and Ecology field and laboratory data. Ecology and Snohomish County sampling teams split samples collected at eight of the County's French Creek sample sites. Samples were analyzed by their respective laboratories for fecal coliform, nitrate-nitrite, total phosphorus, and total suspended solids. Field parameters for split sample

comparisons included conductivity, dissolved oxygen, and temperature. Fecal coliform and conductivity data were found to be significantly different (paired t-test, $\propto = 0.05$). Snohomish County data were higher for these two variables. The data are presented in this report as either Ecology or Snohomish County data.

Data Assessment Procedures

Laboratory data reduction, review, and reporting followed procedures outlined in MEL's Users Manual (MEL 1994). All water quality data were entered into an Excel spreadsheet software program. Data were verified by reviewing 100% of the data after entry for errors. Snohomish County Data were transferred to Ecology in an electronic format (also EXCEL spreadsheet format).

Data analysis includes evaluation of data distribution characteristics and, when necessary, appropriate distribution transformations. Estimation of univariate statistical parameters and graphical presentation of the data (box plots, time series, regressions) were made using SYSTAT/SYGRAPH computer software.

Table 5. Summary of field and laboratory measurements, precision or reporting limits, and methods.

Parameter (all measurements are of water except where sediment is indicated)	Precision Limit (for field Measurements and turbidity) or Reporting Limit (all others)	Method[1]
Field Measurements		
Velocity	0.05 f/s	Current Meter
PH	0.1 SU	Field Meter/Electrode
Temperature	0.2 C	Alcohol Thermometer
Dissolved Oxygen	0.06 mg/L	Gas Probe/Winkler Titration
Specific Conductivity	20 μmhos/cm	Field Meter/Conductivity Bridge
General Chemistry		
Fecal coliform	lcfu/100 mL	SM 18 Membrane Filter 9222D
Total suspended solids	1 mg/L	EPA 160.2
Ammonia nitrogen	0.01 mg/L	EPA 350.1
Nitrate + nitrite nitrogen	0.01 mg/L	EPA 353.2
Total persulfate nitrogen	0.01 mg/L	SM 4500 NO3-F Modified
Orthophosphate	0.01 mg/L	EPA 365.3
Total phosphorus	0.01 mg/L	EPA 365.3
Chloride	0.1 mg/L	EPA 300.0
Turbidity	1 NTU	EPA 180.1
Hardness	1 mg/L	EPA 130.2
Chlorophyll *a*[2]	0.05 μg/L	SM 10200H(3), Fluorometer

[1] For method reference see MEL 1994.
[2] Dry season only

Table 6. Field replicate pooled precision estimates.

Parameter	Root Mean Square of the Coefficient of Variation (%)	
	Ecology	Snohomish County
Fecal Coliform	23	25
Nitrite-Nitrate	1	17
Total Phosphorus	21	28
Total Suspended Solids	9	55
Conductivity	1	2
PH	<1	<1
Hardness		6
Temperature	<1	
Dissolved Oxygen	1	
Ammonia	6	
Nitrite	1	
Ortho-phosphate	5	
Total Persulfate Nitrogen	13	
Turbidity	9	
Chloride	<1	
Chlorophyll *a*	8	
Pheophyton	3	

Appendix E

TMDL Technical Report

Bound Separately as Ecology Publication Number 97-334 September 1997
"Water Quality Assessment of Tributaries to the Snohomish River and Nonpoint Source Pollution TMDL Study"

Appendix F

Washington's Water Quality Management Plan To Control Nonpoint Sources of Pollution

Executive Summary

Executive Summary

Nonpoint pollution is pollution that enters a water body from water-based or land-use activities, including atmospheric deposition; surface water runoff from agricultural lands, urban areas, and forest lands; subsurface or underground sources; and discharges from boats or other marine vessels.

Nonpoint source water pollution is a growing threat to the environment and public health. It's the accumulation of sediment, chemicals, toxics, nutrients, debris and pathogens that rain water and snow melt pick up and carry into the nearest body of water. Sometimes nonpoint pollution can be traced to several sources; sometimes it cannot be traced at all.

Washington has been a leader in addressing NPS pollution for many years. We already have many tools to achieve cleaner water through nonpoint source management. Some are regulatory while the majority are voluntary programs. Watershed efforts have addressed problems in most parts of the state. There are numerous examples of innovative approaches to management and funding.

In spite of all the work accomplished to date, salmon recovery and protection require more urgent efforts to control NPS pollution. Ground water contamination and shellfish downgrades are further indicators that pollution is increasing faster than our efforts to prevent it or clean it up. Development and changing landscapes are significant sources of the emerging problems. Non-urban land uses are shrinking but continue to produce chronic problems.

Though many innovative approaches are available in Washington, several factors limit their success: the high cost of fixing old problems, local land use decisions, the lack of agency coordination and focus, and the lack of information concerning watershed processes and conditions.

The President's Clean Water Action Plan requires each state to update its plan for managing nonpoint pollution in 1999, in order to qualify for grants under the Clean Water Act (CWA) (Section 319). Washington's potential share is about $3.8 million per year, half of which is typically awarded to local governments and private nonprofit organizations.

This plan also addresses a separate set of federal requirements under the Coastal Zone Management Act Reauthorization Amendments of 1990 (Section 6217). This statutory requirement affects approximately $2.8 million in federal coastal zone management funds.

The plan is a statewide look at protecting Washington's natural resources from nonpoint pollution. It is a collaborative effort of a wide range of entities. It identifies gaps in existing programs, sets a strategy for improving those programs, recommends timelines, and outlines methods for determining success.

We have used three approaches to evaluate and plan these efforts:

- Nine "Characteristics of a Successful Nonpoint Program" provided by EPA in 1996 under section 319 of the federal Clean Water Act,

- Fifty-six Management Measures provided in 1992 by EPA and NOAA which describe the minimum elements that coastal states should include in NPS programs, and

- Opinions and ideas of agencies and organizations in the nonpoint arena.

This plan reflects current efforts and creative, practical new ideas from all our partners and interested citizens. The recommendations focus on how we can improve existing efforts by stronger implementation, increased funding, or doing something new.

Appendix G

Evaluation of Snohomish County Surface Water Management's

Long-Term Water Quality Monitoring Sites

in support of Report # 97-334
Water Quality Assessment of Tributaries to the Snohomish River
and
Nonpoint Source Pollution TMDL Study

Water quality data were presented in the subject report that were collected by Snohomish County (County) and Ecology. The county data consisted of long-term monitoring and special short-term study data collected during the period November 1992 to April 1996 from Quilceda, Allen, French, and Woods Creeks. Ecology collected data bi-weekly from February through April and July through September 1996 from French Creek, Woods Creek, the lower Pilchuck River, and the Marshland. In addition to summarizing the data collected in the report, nonpoint fecal coliform TMDLs and LAs (referred to as target concentrations in the report) were recommended. The TMDLs and LAs were established based on the waterbodies meeting Washington State's numeric standards for fecal coliform.

The attached graphs show the results of statistical trend analyses of the county's fecal coliform data for the long-term monitoring sites in the study basins. The trend tests were conducted using the current data record (November 1992 to January 2000). The results show that fecal coliform concentrations have not changed in the study basins.

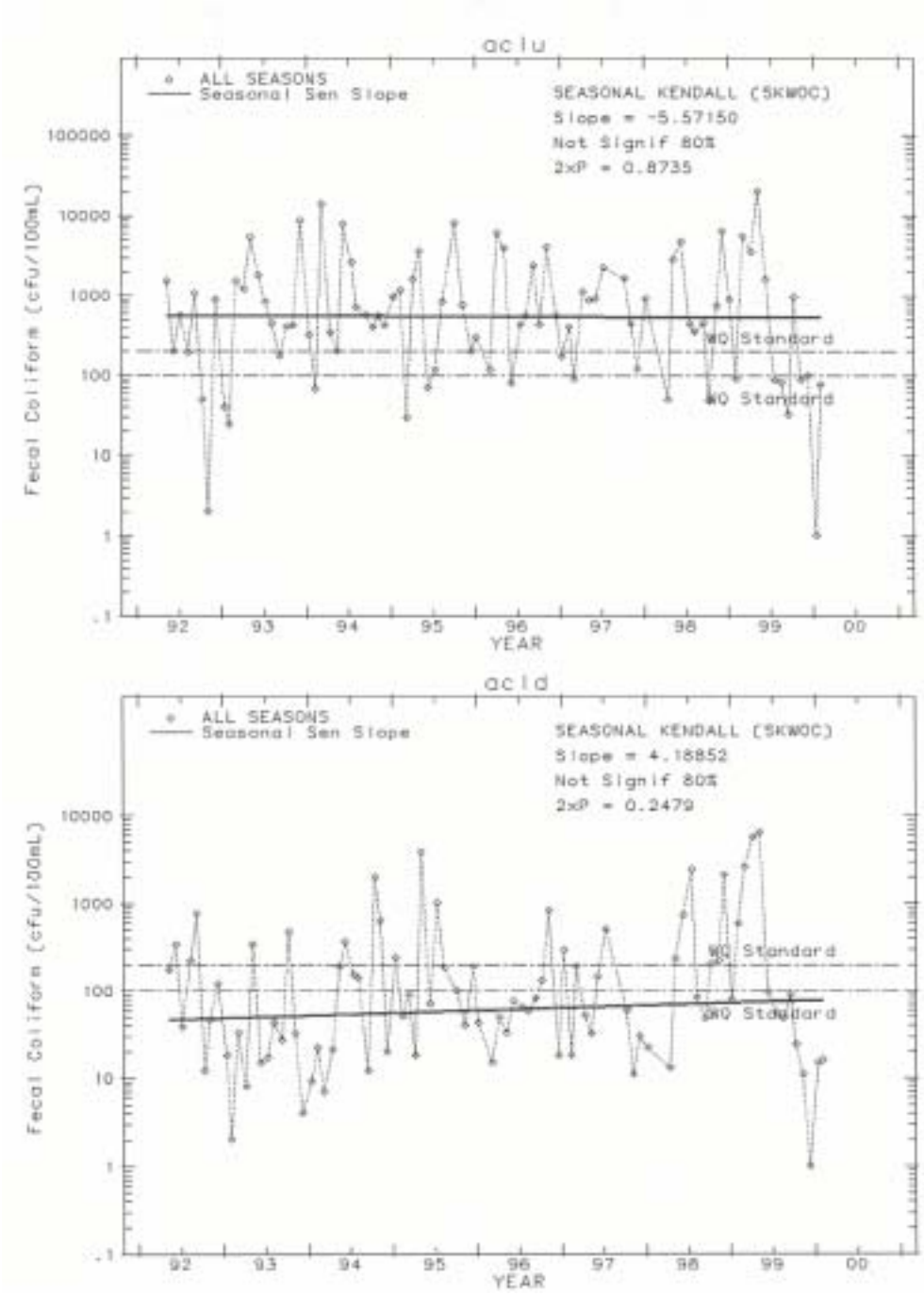


Figure 7. Trend analysis results for Allen Creek long-term monitoring sites.

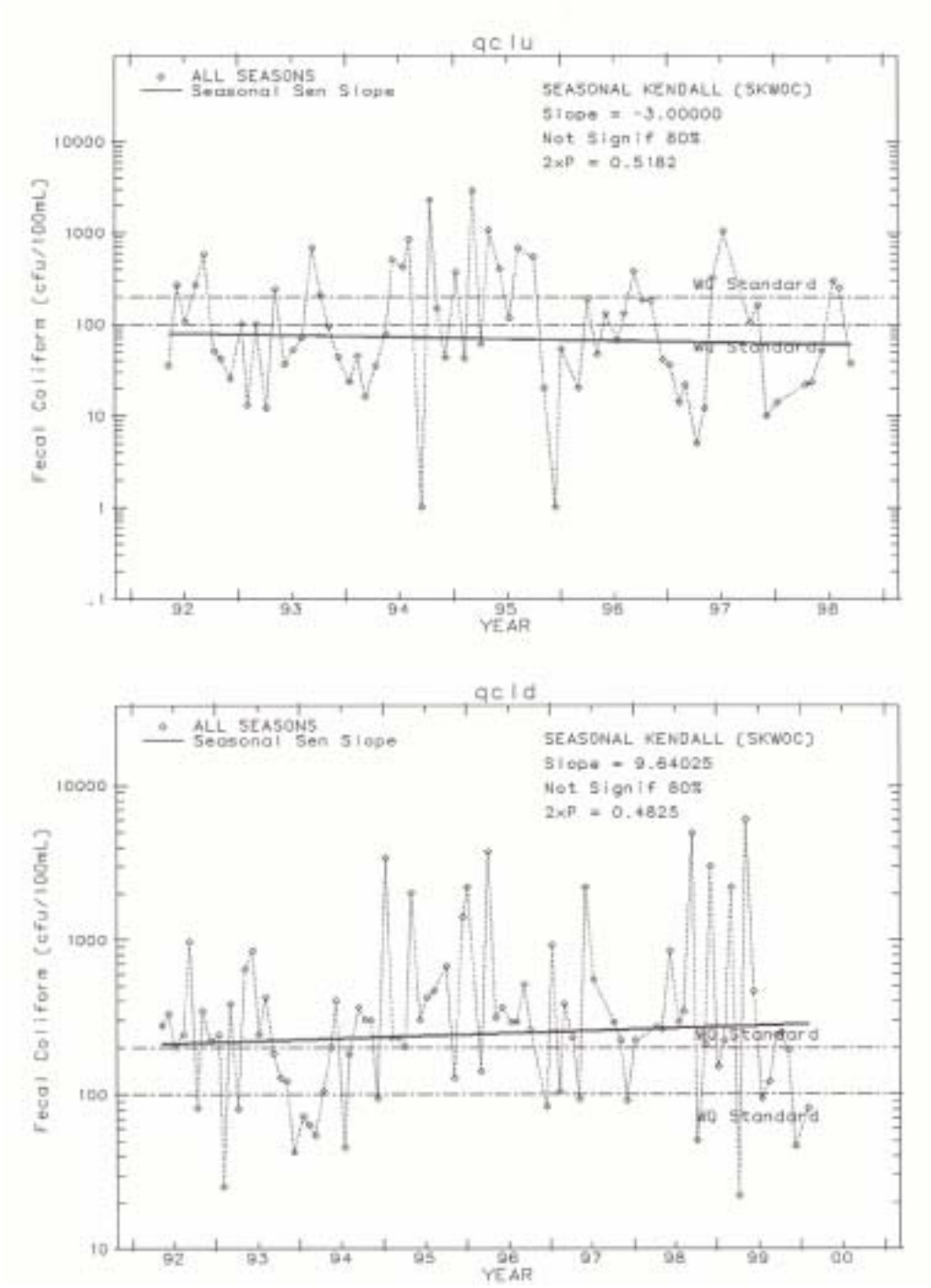


Figure 8. Trend analysis results for Quilceda Creek long-term monitoring sites.

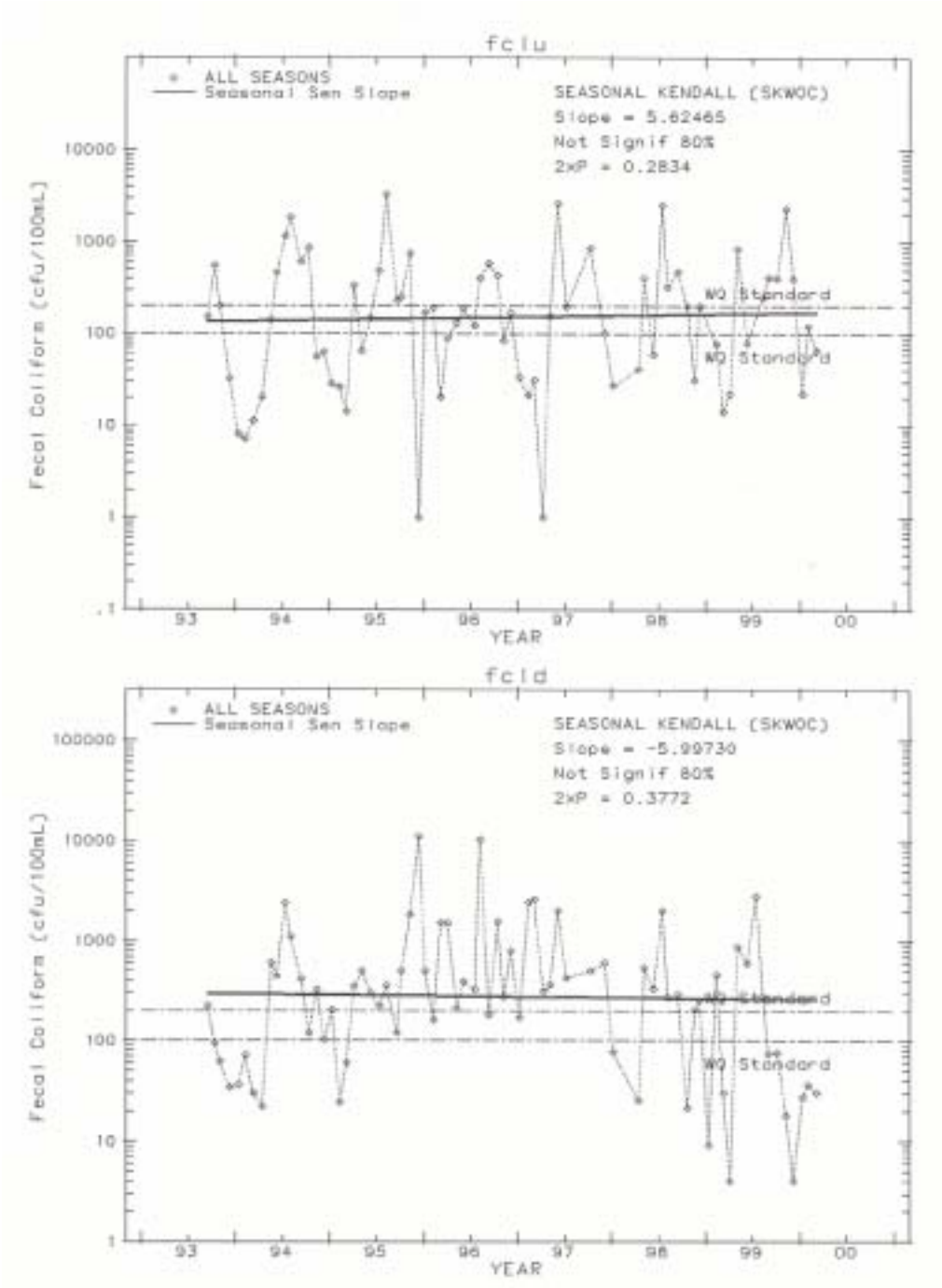


Figure 9. Trend analysis results for French Creek long-term monitoring results.

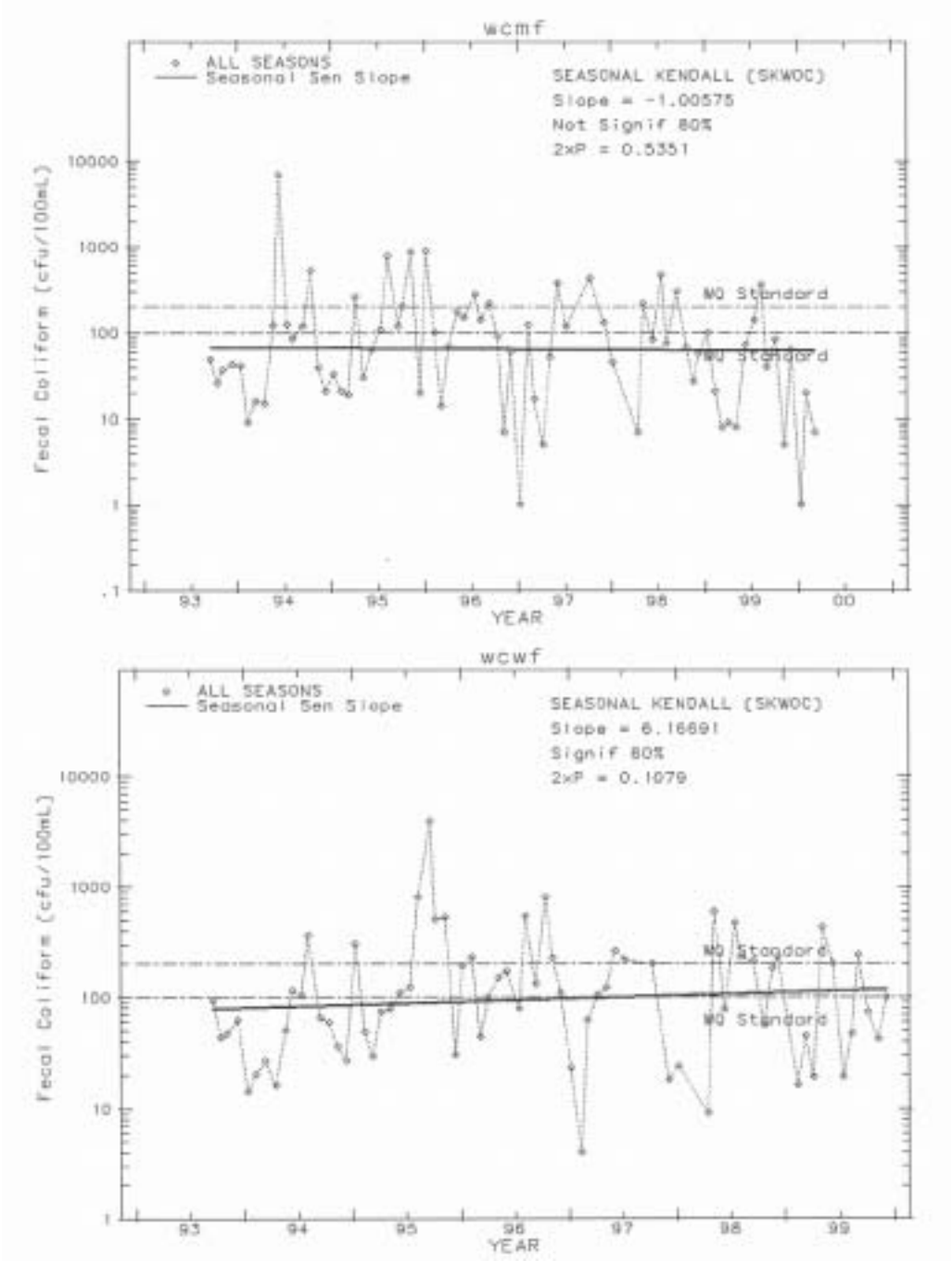


Figure 10. Trend analysis results for Woods Creek long-term monitoring results.