



Nooksack River Watershed Bacteria Total Maximum Daily Load

Detailed Implementation Plan

January 2002
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by
Steve Hood

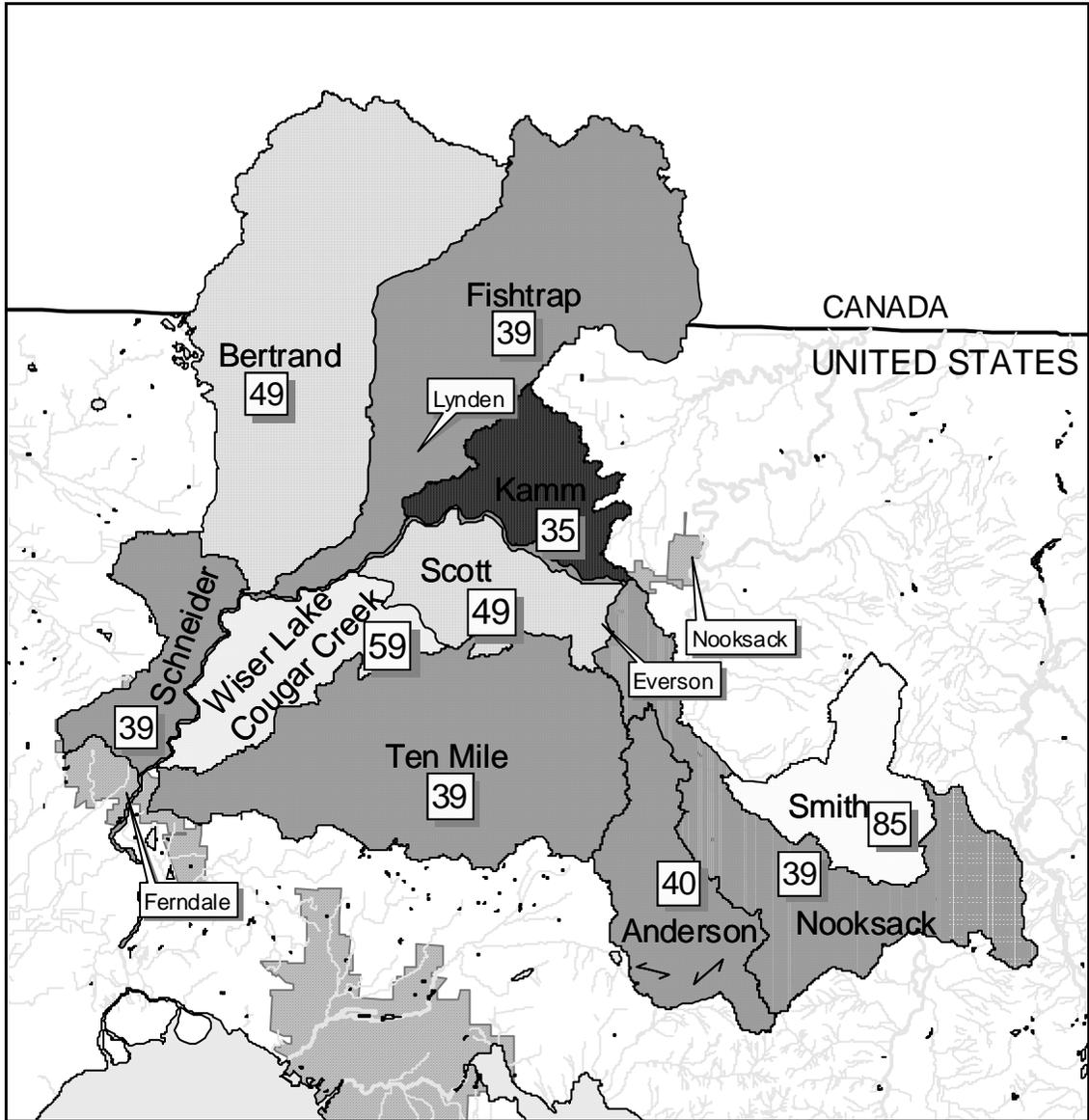
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Lower Nooksack Basins Showing Target Geometric Mean

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EXECUTIVE SUMMARY

The following plan details how and when pollution reductions will be achieved to meet water quality standards in the Nooksack River watershed.

Violations of standards for fecal coliform, ammonia, and dissolved oxygen were documented in 1997 and 1998 through extensive sampling of the Nooksack River and key tributaries. In June 2000, the Washington Department of Ecology established fecal coliform pollution limits for the Nooksack watershed through adoption of its “total maximum daily load” (TMDL) analysis.

As required under an agreement between Washington State Department of Ecology and United States Environmental Agency, the following plan details how implementation will occur to achieve pollution reductions specified in the Nooksack River TMDL.¹

This document provides a framework for implementing wasteload allocations and load allocations established in the Nooksack TMDL. The responsibilities of each of the parties, and the means of tracking results, are also established.

The pollution reduction targets of the Nooksack TMDL are based on bacterial criteria of the Washington State Water Quality Standards. There are two criteria for bacteria. The first criterion sets a maximum for the geometric mean criteria. The second criterion sets a maximum density of bacteria for the 90th percentile. Experience has shown that when correcting non point pollution sources both the geometric mean and the 90th percentile will drop at similar rates. For this study the 90th percentile criterion was the most stringent criterion. As a result, geometric means targets are below the criterion of 100 cfu/100 ml established in the Water Quality Standards. It is against the target geometric mean that tracking will primarily take place.

Permits under the federal Clean Water Act regulate several municipal sewage treatment plants and three dairies in the Nooksack watershed. In addition, more than 126 dairies are regulated under Washington’s Dairy Nutrient Management Act. The Nooksack TMDL is predicated on these facilities meeting the target geometric mean established in the TMDL for any wastewater discharged so that water quality criteria is met with out a dependence upon dilution.

In the Nooksack TMDL, the pollution limits to the municipal sewage treatment plants and the three permitted dairies, are based on a “wasteload allocation“ of zero (0). For the permitted dairies, a wasteload allocation of “0” means that pollution in excess of that meeting the target geometric mean and the 90th percentile density will be a violation.(The land area available for nutrient management of a dairy is part of the load allocation.)

A wasteload of “0” allocated to the sewage treatment plants is explained in the Nooksack TMDL as a discharge that would not only meet water quality criteria at the point of discharge, but also meet the more restrictive Nooksack TMDL target geometric mean. The target geometric means are thus treated as if they were the water quality standard. These wasteload allocations will be implemented as bacteria limits in the individual NPDES permits.

¹ The “detailed implementation plan” as required and described in the Memorandum of Agreement Between The United States Environmental Protection Agency and Washington Department of Ecology Regarding the Implementation of Section 303(d) of the Federal Clean Water Act

The implementation of the load allocation is based on the assumption that existing rules, regulations and programs, if fully implemented, will achieve our goals for the Nooksack watershed. Adaptive management methods will be used to quickly identify whether additional effort or focus from existing programs is needed. If adaptive management demonstrates that existing programs are not adequate new programs will be developed.

The primary means of ensuring compliance is a quarterly comparison of water quality monitoring data with established targets. Also tracked will be implementation milestones to be achieved by a variety of organizations. Several agencies have begun working to meet the objectives of the Nooksack TMDL. Already, at the mouth of the Nooksack River, water quality criteria are being met. Most of the tributaries are meeting the interim targets.

I. INTRODUCTION

The federal Clean Water Act requires the U.S. Environmental Protection Agency or delegated states to develop water cleanup plans for rivers, lakes and streams that fail to meet water quality standards. The Nooksack River and several of its tributaries are among more than 650 waterbodies in Washington State that fail water quality standards.

A plan to clean up fecal coliform in the Nooksack River watershed was adopted by the Washington Department of Ecology and U.S. Environmental Protection Agency in 2000. This water cleanup plan, called a “total maximum daily load” (TMDL), sets forth the goals, objectives and tactics for achieving clean water in the Nooksack watershed.

As part of an agreement on the implementation of section 303(d) of the federal Clean Water Act, Washington State must prepare a “detailed implementation plan” which includes a monitoring plan and a measures of success.

This document is the “detailed implementation plan” for the Nooksack River watershed.² Other documents related to the Nooksack TMDL are available through the Washington State Department of Ecology web site at <http://www.ecy.wa.gov/programs/wq/tmdl/index.html>.³ This plan is based on the technical assessment, and decisions contained in those documents

The basic implementation concept for achieving pollution reductions in the Nooksack watershed is that existing programs and requirements, if fully enforced, should result in meeting the Nooksack TMDL targets. This document provides the detail of how monitoring of water quality and implementation activities will be used to track progress as well as indicate when adaptive management procedures need to be employed.

The entire available loading capacity has been assigned to nonpoint sources (load allocation, LA). Point sources (wasteload allocation, WLA) are either “0” (i.e., National Pollution Discharge Elimination System [NPDES] permitted dairies), or must meet Nooksack TMDL targets at the point of discharge (i.e., sewage treatment plants discharging to the Nooksack River).

This document is organized as follows:

- Section I is this introduction.
- Section II outlines the general approach to implementing the Nooksack TMDL.
- Section III identifies and describes bacteria sources and agencies responsible for implementing source control measures.
- Section IV describes pollution sources, organizations responsible for achieving pollution reductions, and performance schedules.

² The Nooksack TMDL is written to meet the requirements of the Memorandum of Agreement Between The United States Environmental Protection Agency and Washington Department of Ecology Regarding the Implementation of Section 303(d) of the Federal Clean Water Act, October 29, 1997.

³ “Lower Nooksack River Basin Bacteria Total Maximum Daily Load Evaluation” (Joy, 2000); Submittal Report, “Nooksack River Watershed Bacteria -Total Maximum Daily Load” (Hood et al., 2000).

- Section V presents the quarterly goals for ambient water quality.
- Section VI describes the various water quality monitoring efforts.
- Section VII describes existing methods for investigating problems and identifying additional control measures.
- Section VIII addresses enforcement and compliance.
- Section IX contains the references cited in the text.
- Appendix A contains details of the implementation schedules.
- Appendix B contains details of quarterly targets for each tributary of the Nooksack River.

II. APPROACH

Evaluation of water quality monitoring data and status reports from each organization responsible for achieving reductions in fecal coliform will be required quarterly toward the goal of meeting water quality standards within five years. The evaluation criteria and possible outcomes are summarized below in Table 1.

- State I: Both water quality and implementation goals are met, no change in scheduled activities is needed.
- State II: Ambient water quality goals are not being met, but implementation goals are being met: the immediate response will be to accelerate implementation activities. If after three subsequent quarters, accelerated implementation proves insufficient to meet water quality goals, additional control measures will be developed and implemented.
- State III: Ambient water quality goals are being met, but implementation goals are not being met; implementation will be accelerated to meet implementation goals by the next quarter. This is consistent with the goal of meeting water quality standards as soon as possible.
- State IV: Neither ambient water quality nor implementation goals are being met; an accelerated implementation schedule or additional control measures will be required. Decisions will be made based on results of source identification monitoring as outlined in Section VI.C.

The quarterly water quality goals are based on a decrease in the geometric mean of fecal coliform density over the maximum five-year timeline. Due to significant variations in fecal coliform densities and in environmental conditions at a given point in time, we believe implementation activities should continue, even when quarterly targets are met. For instance, several tributaries of the Nooksack are currently meeting interim water quality targets, but the area has experienced an unusually dry summer and fall during 2001. The reduction of rain may, at least partly, account for reduced bacteria in watersheds that drain agricultural lands.

By continuing full implementation, a level “playing field” is assured for the regulated community and Portage Bay shellfish beds will again be certified for commercial production within the five-year timeline.

Table 1 - Water Quality Conditions and Nooksack TMDL Implementation

	Water Quality Targets Met	Water Quality Targets Not Met
Implementation Schedule Met	State I - No Change Needed	State II – Accelerate implementation schedule and/or add additional control measures
Implementation Schedule Not Met	State III – Meet implementation schedule	State IV – Meet implementation schedule and/or add additional control measures

III. POLLUTION SOURCES AND ORGANIZATIONS RESPONSIBLE FOR REDUCTIONS

A. POLLUTION SOURCES

Table 2 summarizes potential sources of bacteria pollution.

Table 2 - Potential Bacteria Sources

Source	Explanation
Agriculture	Animal waste pollution from improper grazing, manure application or storage practices
On-Site Septic Systems (OSS)	Sewage treated by separation of solids and liquids in a septic tank and further filtration of liquids in a drainfield and underlying soils
Sediment	Bacteria may be “stored” in sediments and re-suspended under certain conditions
Sewage Treatment Plants	Facility upset or facility overwhelmed by influent flow, usually during storm events

Source	Explanation
Stormwater	Hobby farm and residential pet waste, illegal connections of sewage systems to storm drainage system
Wildlife	Is considered as part of the “background” bacteria level, but has not been quantified

1) Agriculture - Non Permitted

Any agricultural activity that is not required to operate under an NPDES permit is considered “non permitted” as described below. In Whatcom County, the most common are dairy farms.

Dairy farm “headquarters” typically include the home site, cattle housing and confinement areas, milking facilities, feed storage areas, equipment sheds, and waste handling collections and storage facilities. The average dairy milks about 250 cows and maintains replacement stock. Many dairy farms in Whatcom County are located in flood plains or are adjacent to rivers, lakes or streams (surface water). During nearly half the year, from November through March, soils are saturated with rain resulting in high water tables. Feed waste, silage leachate, milk-house drainage and manure from animal confinement areas or manure storage facilities are common sources of polluted runoff from these dairy “headquarter” operations. Major concerns include nutrient and bacterial pollution of surface and ground water.

Farm management systems will be designed and constructed to collect, handle, transfer and store manure, feed waste, silage leachate and milking center wastewater. Runoff from animal confinement areas, including outside lots and slabs, will be collected and diverted from waste storage facilities. Livestock will be excluded from direct access to surface water. Vegetated buffers will provide habitat and help to reduce nutrient, bacteria and organic matter inputs to watercourses. These controls will apply to all livestock operations.

Class A dairies are regulated by Washington’s Dairy Nutrient Management Act, RCW 90.64, and must have and implement a dairy nutrient management plan. A nutrient management plan describes how to manage nutrient-rich by-products of dairy operations. In most cases, these byproducts will be applied to pasture and hay lands. When manure is applied to land, the plan must identify when growing plants are able to capture and use nutrients for plant growth. The plan also must identify times of year and weather conditions when land application of these byproducts could pollute surface or groundwater (and therefore should not be land-applied). Plans are approved by the Whatcom Conservation District and all plans must be approved by July 1, 2002.

The final step is certification of the DNMP. This is a two-part process in which:

1. The Whatcom Conservation District certifies that the practices necessary to manage the byproduct nutrients from the dairy operation have been properly installed; and
2. The dairy producer certifies that he or she is managing the nutrients as described in the plan.

All plans are to be implemented by December 31, 2003. An estimated 85 of the 123, or roughly two thirds, of the dairies in the Nooksack watershed have developed dairy nutrient management plans. Assuming that funds requested by the Whatcom Conservation District to fully implement its review and certification of plans, the statutory goals and deadlines will be met for dairies that are active in seeking and implementing plans.

Non-Dairy Commercial Livestock

Commercial livestock operations are similar to dairies except that they don't include milking facilities. Also, with commercial livestock operations, the animals tend to spend more time on pasture. These farms typically include fenced livestock pastures or feedlots.

Conservation practices recommended for livestock operations are selected to improve forage production, nutrient utilization and wildlife habitat. Water quality concerns will be reduced or eliminated by practices that include collection and proper storage of manure during winter, improving plant cover through management or reseeded, diverting clean water and "armoring" heavy-use areas with wood chips or similar materials. Livestock management is crucial. Animals will be excluded from watercourses. They will be managed to improve forage production and water quality.

2) Agriculture - Permitted

Any dairy which meets the definition of a combined animal feeding operation (CAFO) in the federal Clean Water Act is required to operate under the NPDES General Permit for Dairies. In general any farm with over 700 animals confined will be a CAFO. In addition, any dairy, which is a documented source of pollution, though doesn't meet the definition of a CAFO, may still be required to apply for an NPDES permit. The statutory timeline provided for in RCW 90.64 applies to permitted dairies unless an administrative order specifies an earlier date. The Whatcom Conservation District elected to operate at compliance Level IV under the Compliance Memorandum of Agreement between the Department of Ecology, Conservation Commission and the Whatcom Conservation District, the most stringent level of compliance. Technical assistance is afforded to dairy referrals on a high priority basis.

3) OSS

Residential septic systems are designed to use unsaturated soil beneath the drainfield to remove bacteria from sewage and household wastewater. Soil compaction, clogging with solids, and system overload from too much water can all cause failures of a septic system. The Department of Ecology has provided \$300,000 to the Whatcom County Health and Human Services (HSS) for disbursing loans and grants to homeowners whose septic systems are in need of repair or replacement. The health department provides information on operation and maintenance to one fifth of the residents in the county each year. Working on referrals from Department of Ecology, the health department will also follow up with residential septic inspections when agricultural operations are ruled out as bacteria sources in specific sub-basins.

Sediment

Bacteria and other organic matter can collect, and in a condensed form, "adhere" to sediments, until they are released and re-suspended in water. It is unknown to what degree contamination measured in water may be attributed to bacteria present in the substrate (e.g., sediments). Sediment has been isolated as a source of bacteria in at least one case locally where a specific

and documented discharge of manure into a waterway resulted in high bacteria levels well after the time at which the direct input of manure had ceased. This phenomenon has been documented elsewhere in Puget Sound and is often referred to as “sediment archiving” of bacteria.

4) Sewage Treatment Plants

Human sewage is a significant source of bacteria. Treatment plants separate solids and liquids and further disinfect wastewater using either ultraviolet radiation or chlorine. Three municipal sewage plants are located in the Nooksack River watershed and are regulated under the NPDES permit program.

- The city of Everson STP is meeting the target set in the Nooksack TMDL. Its new permit, to be issued in the fall of 2001 will include discharge permit limits in compliance with the WLA.
- The Lynden STP will be issued a compliance schedule to meet the targets set in the Nooksack TMDL. A new permit issued by early 2002 will include more stringent limits (one-half of the technology-based limits). When construction of a new sewage plant is completed in the next two years, the NPDES permit will be reissued to reflect the WLA established in the Nooksack TMDL.
- Ferndale’s STP permit will be reopened by the end of the implementation schedule to revise the bacteria limits and enforce the WLA.

5) Stormwater

Stormwater can carry bacteria through cross-connections with sewer systems or through contact with nonpoint sources such as pet waste. All three municipalities – Everson, Lynden and Ferndale -- have developed basic stormwater plans as defined in the Puget Sound Action Team Work Plan 1997-99, with the following elements.

- a) Ordinances that address off-site impacts: the use of best management practices (BMPs); effective treatment of storm size and frequency specified in Ecology’s Stormwater Manual for new development; infiltration, with appropriate safeguards, as a first consideration; protection of aquatic resources; erosion and sediment control; and enforcement.
- b) An operation and maintenance program.
- c) An approved stormwater management manual containing BMPs.
- d) An education program.
- e) Incorporation of stormwater controls in comprehensive land-use plans and intergovernmental coordination within shared watersheds.

All three cities are working on revising their stormwater programs to reflect recommendation in the Puget Sound Action Team 2001-2003 work plan and to reflect the new Ecology Stormwater Guidance Manual. All three municipalities will have, by Dec. 2002, updated programs that include:

- Incorporation of stormwater management into growth management planning.
- Stormwater controls for new development and redevelopment, including the requirement of specific BMPs and the adoption and use of Ecology’s stormwater manual or an approved alternative.

- Review of site plans and regular inspection of construction sites to ensure that stormwater control measures are adequate and consistent with local requirements.
- Required maintenance of all permanent public and private stormwater facilities.
- Specific ordinances to prohibit dumping and illicit discharges, provide for enforcement and encourage low-impact development;
- Additional analysis and prioritization of water quality problems, education of citizens and businesses to build awareness and continued watershed planning;
- Development of local funding capacities;
- Monitoring of implementation, conditions, budget needs and resources, and environmental trends over time.

6) Wildlife

Similar to other nonpoint sources, wildlife waste contributions are part of the load allocation. It may be necessary in some locations to adjust load allocations if it is evident that the wildlife contribution is significant or causing load allocations to be exceeded. Where the wildlife component and the human component can be separated, the wildlife component will be subtracted from the load allocation and the remainder will become the new load allocation. If the wildlife component exceeds the load allocation, no human caused increase will be allowed and other load allocations may need to be revised to ensure that downstream waterbodies can meet water quality standards.

B. ORGANIZATIONS RESPONSIBLE FOR POLLUTION REDUCTION

The following agencies are cooperating on the implementation of the Nooksack TMDL

1) Washington Department of Ecology

Ecology has been delegated authority by the EPA to implement many aspects of the federal Clean Water Act. This includes the National Pollution Discharge Elimination System (NPDES) permitting and the Total Maximum Daily Load program. Ecology has two inspectors in the Bellingham Field Office (BFO) who implement RCW 90.64 (the Dairy Nutrient Management Act outlined above in section III.A.1). The BFO also has one permit manager who is responsible for preparing and enforcing the permits for the sewer treatment plants. It is through NPDES permits, inspection and enforcement programs that the WLAs of the Nooksack TMDL will be enforced. Ecology also helps local governments meet water quality goals through technical assistance and grants or loans, providing more than \$40 million for area projects in the past decade.

2) Washington Department of Health

The Department of Health collects monthly water samples in Portage Bay at established stations, pursuant to a shellfish consent decree and in consultation with Lummi Nation.⁴ The Washington

⁴*United States v Washington [Shellfish]*, Civil Number 9213, Sub proceeding 89-3, Western District of Washington, 1994.

Department of Health is also responsible for assuring federal Food and Drug Administration (FDA) standards are met in all commercial shellfish growing waters in Washington State,.

3) U.S. Environmental Protection Agency

The Environmental Protection Agency is responsible for validating the Department of Ecology's implementation of the Nooksack TMDL and enforcement of the Clean Water Act. EPA provides funding to states and tribes to implement the Clean Water Act. Some of the funding Ecology receives from EPA is the source for the competitive grants made each year.

4) Municipalities - Everson, Ferndale, Lynden

Each of the municipalities manages sewage treatment plants that must meet waste load allocations set in the Nooksack TMDL.

- Everson's NPDES permit will be renewed in the third quarter of 2001; revised bacteria limits will reflect the WLA, though Everson already is meeting those targets.
- Ferndale's permit will be reopened by Dec. 2004 and reissued with new bacteria limits reflecting the WLA.
- Lynden's permit will be issued in fall 2001, with new bacteria limits of one-half of the technology-based limits. The WLA will be imposed in a new permit for a newly constructed plant, scheduled for completion by Dec. 2003.

All three municipalities manage stormwater and will be developing comprehensive programs by Dec. 2002 (as outlined above in section III.A.5).

5) U.S. Natural Resource Conservation Service

The Natural Resources Conservation Service (NRCS) provides the technical guidance in developing farm plans; these plans are critical components of good environmental practices by agricultural operations. The NRCS also administers financial assistance programs, in partnership with the Whatcom Conservation District.

6) Whatcom County Health and Human Services (HHS)

HHS administers a residential septic system program that includes regulatory oversight of all septic systems in Whatcom County. This oversight includes:

- Site application review for new, repaired or expanded septic systems
- Permit issuance
- Survey, construction and operational inspections
- Subdivision, boundary-line adjustment and conditional use review
- Complaint investigations
- Enforcement of OSS ordinances WCC 24.05 implementing state regulation WAC 246-272
- Homeowner education
- Financial assistance for repair of failing septic systems
- Certification of septic system pumps, installers and operation specialists

7) Whatcom County Planning and Development Services

Whatcom County Planning and Development Services enforce ordinances related to environmentally critical or sensitive areas under the state's growth management requirements. One element of the critical areas ordinance (CAO) mandates buffers with native vegetation on all streams unless land is managed under an approved and implemented farm plan. Another element is a locally initiated ordinance limiting times of year in which manure can be spread or applied on fields. The manure management ordinance prohibits the application of manure on bare ground or corn stubble in the winter. Both have proved to be valuable tools in eliminating contaminated runoff.

8) Whatcom County Public Works

Whatcom County Public Works acts as the agent for special drainage and diking districts of Whatcom County. Public Works has secured funding from Ecology's competitive grant program to fund the establishment of riparian vegetation buffers.

9) Whatcom Conservation District

The Whatcom Conservation District provides substantial technical and financial assistance to dairy operators throughout the county. However, there are scant resources available to all other livestock operations at this time.

IV. MANAGEMENT ROLES, ACTIVITIES AND SCHEDULES

Appendix A contains detailed implementation schedules for organizations responsible for pollution reductions, as well as a description of performance measures for each agency. Table 3 shows the management responsibilities of each of the organizations above as well as some that are likely to become involved in the future. The source or sources for which the organization is most directly associated is also provided; the final column on performance measures summarizes and references much of the information included in Appendix A. There is not a one-to-one correspondence between the items in the columns headed Authority/Responsibility, Sources and Performance Measures. Some areas of responsibility apply to more than one source and some areas of responsibility or sources are not amenable to setting performance measures.

Each implementing agency has established the appropriate performance measures and quarterly goals for its respective implementation activities and responsibilities. Schedules were developed based on historic capacity and the projected needs of respective agencies or organizations. At this time there are no additional resources identified. Over time, additional funding needs may develop and will be reported.

Table 3 - Implementing Agencies, Organizations

Agency	Abbreviation	Authority / Responsibility	Sources	Performance Measures
Department of Ecology	Ecology	<p>Education Provide technical assistance to municipalities on developing stormwater programs. Report on Nooksack TMDL implementation</p> <p>Financial Assistance Provide funding through 319 Funds, Centennial Grants, and State Revolving Loan Funds.</p> <p>Enforcement Inspects dairies under Dairy Nutrient Management Act (RCW 90.64). Delegated by the EPA to Issue NPDES permits under Clean Water Act. Establish Water Quality Standards. Establish TMDLs. Enforce state Water Pollution Control Act (RCW 90.48)</p>	<p>Agriculture - non permitted Agriculture – permitted</p> <p>Sewer Treatment Plant</p> <p>Stormwater</p>	<p>23 Dairy Inspections per quarter. See Table A</p> <p>Permit issuance See Table</p> <p>Quarterly reports on Nooksack TMDL implementation</p>
Washington Department of Health	DOH	<p>Education Ambient monitoring of marine water over shellfish beds pursuant to the Shellfish Consent Decree following the National Shellfish Sanitation Program (NSSP) protocols.</p>	N/A	Report sample data monthly

Agency	Abbreviation	Authority / Responsibility	Sources	Performance Measures
Environmental Protection Agency	EPA	Enforcement Enforce Clean water act including oversight of state responsibility to implement NPDES and TMDL program Financial Assistance Grants to states and tribes to fund water quality facilities and activities.	N/A	Review quarterly reports from Ecology on Nooksack TMDL implementation
Municipalities Everson, Ferndale, Lynden	N/A.	Education Requirement for public information under new stormwater program. Enforcement Manage storm water Manage sewer treatment plant.(STP) under NPDES permit.	Stormwater Sewer Treatment Plant	Revised stormwater plans by end of 2002 Compliance with NPDES permits
Natural Resource Conservation Service	NRCS	Education Provides technical guidance for WCD Provides technical and financial assistance to farmers. Formerly known as the Soil Conservation Service (SCS). Financial Assistance	Agriculture non permitted Agriculture permitted	\$600,000 per year to dairies in cost share funds. See Table
Northwest Indian College	NWIC	Education Fresh water ambient water quality monitoring. This has been conducted under grant funding and contract to date. The NWIC is not a regulator and does not have a responsibility to monitor water quality for the Nooksack TMDL.	N/A	Monthly reports on sample results.

Agency	Abbreviation	Authority / Responsibility	Sources	Performance Measures
Portage Bay Shellfish Protection District	PBSPD	<p>Education Public education and outreach.</p> <p>Enforcement Coordinate implementation of control measures in response to shellfish closure and evaluate water quality progress towards Nooksack TMDL targets.</p>	All	Annual reports
Whatcom County Environmental Health and Human Services	WC HHS	<p>Education & Enforcement Manages OSS program Inspect OSS in areas with suspected failing systems.</p> <p>Financial Assistance Coordinate decisions for low interest loans for repair of failing OSS.</p>	OSS	<p>Educational material to 5000 residents per year</p> <p>Quarterly review of pumping records.</p> <p>Inspect 10 residences per quarter</p> <p>3 loans per quarter</p> <p>See Table</p>
Whatcom County Planning and Development Services	WC PDS	<p>Enforcement Enforcement of the Critical Areas Ordinance. Enforcement of Manure Management ordinance.</p>	Agriculture non permitted	<p>Respond to 3 referrals per quarter.</p> <p>See Table</p>

Agency	Abbreviation	Authority / Responsibility	Sources	Performance Measures
Whatcom County Public Works	WCPW	Financial Assistance Riparian vegetation establishment Enforcement Manage stormwater program for areas outside municipal jurisdiction.	Agriculture non permitted Agriculture permitted Stormwater	4 miles of vegetation established each year See Table
Whatcom Conservation District	WCD	Education Provides technical assistance to farmers in the form of Farm Plans Financial Assistance Allocates financial assistance to farmers. Manage funds for OSS Loan Program	Agriculture non permitted Agriculture permitted. OSS	20 farm plans per quarter through June 2002 then 3 per quarter. Allocate \$400,000 in 2001 See Table
Washington State University— Cooperative Extension	WSU	Education Public education and outreach Financial Assistance Technical assistance for agriculture. Funding for agriculture.	Agriculture non permitted Agriculture permitted	N/A N/A
British Columbia, Canada, Ministry of the Environment	MOE	Enforcement Reduce or eliminate contamination from Canada.	N/A	N/A
Unknown		Investigate background levels associated with wildlife Investigate sediment archiving Investigate alternate forms of bacteria transport	Wildlife Sediment Other	N/A

V. MEASURING PROGRESS TOWARD GOALS

Table 4 below summarizes the target geometric means and the load allocations made in the Nooksack TMDL. The target geometric means should be met as soon as possible, but no later than July 2005.

Quarterly targets for each of the major tributaries are attached as Appendix B, though tributaries that do not drain directly to the Nooksack are not included. Appendix B also includes water-sampling data to date; data are displayed graphically for those stations where more than one data point is available.

It is assumed that if an identified tributary is meeting targets, it is not necessary to track that specific sub-area. If targets are not being met, however, it may be necessary to begin tracking a sub-area to help focus efforts. If tracking becomes necessary, sub-areas will comply with the same target geometric means as the overall area. For instance, if violations are found in Kamm Creek, quarterly reporting for Mormon Ditch – a tributary to Kamm -- would be required, meeting the same targets and schedules of the larger Kamm Creek watershed

The quarterly targets are based upon a decrease in the geometric mean over five years, with each quarter's target being a percentage of the previous quarter's target. This rate of decline was selected as it was expected that the most rapid gains would be available early in the process.

Table 4 - Water Quality Targets

Tributary or Sub-Tributary	Target Geometric Mean (cfu/100 mL)	Load Allocation (average annual CFS*cfu/100 mL)
Smith Creek	85	2,067
Anderson Creek	40	2,505
Kamm Creek	35	3,109
Mormon Ditch	35	994
Scott Ditch	49	7,017
LLPL Ditch	19	421
Fishtrap Creek	39	16,189
Double Ditch Drain	39	2595
Benson Road Ditch	39	792
Depot Road Ditch	39	1011
Bender Road Ditch	39	667
Bertrand Creek	49	40,162
Duffner Ditch	49	3538
Wiser Lake Outlet	59	2,113
Keefe Lake Outlet	45	2,045
Tenmile Creek	39	6,431
Deer Creek	39	1238
Nooksack at Brennan	39	517,461

* Load Allocation is the average annual flow times the geometric mean FC concentration

VI. EFFECTIVENESS MONITORING PLAN

There are three levels of monitoring, 1) ambient water quality, 2) implementation and 3) source identification. Each is used to evaluate the adequacy of implementation of control measures [e.g., “best management practices” (BMPs)]. Each quarter Ecology will prepare and publish a status of monitoring efforts and data; these reports will be provided to the WRIA 1 Watershed Management project and EPA, if needed.

A. AMBIENT WATER QUALITY

Water quality samples are currently collected and analyzed by the Northwest Indian College and by an EPA contractor. Samples are collected at or near the mouth of all of the major tributaries to the Nooksack and analyzed for fecal coliform using the membrane filtration method.

At the end of each quarter the geometric mean of the last 30 samples is compared to the targets. When the record for a site is less than 30 samples, all the samples are used to calculate the geometric mean. Limited duration grants obtained by the Whatcom Conservation District, Lummi Nation, and the EPA have funded the water quality monitoring since completion of the data collection component of the Nooksack TMDL. It is anticipated that grant funding will continue to be obtained for ambient water quality monitoring. The first report will include a summary of how long funding has been secured.

Appendix B contains targets for each quarter for each of the tributaries that discharges to the Nooksack River. The quarterly results to date are also included for those quarters where a history of at least ten samples in the last year is available to calculate results. Following the tables, figures showing a plot of quarterly goals and actual geometric means for the stations, which have more than two quarters of data are presented.

The stations, which have been established for water quality monitoring, are summarized below in Table 5. The stations that are in italic type are not currently being sampled by the NWIC, but have been sampled in the past or may be sampled in the future with funding from a recently awarded Centennial Clean Water Fund grant. The stations that are used to compare to the targets presented in appendix B are shown in bold type.

Table 5 - Monitoring Stations

Station Description	Station Name	UTM (X)	UTM (Y)
<i>Mainstem Nooksack River at Everson @ E. Pole Rd</i>	<i>M5</i>	<i>547869</i>	<i>418195</i>
Mainstem Nooksack River at Lynden @ Hannegan Rd	M4	540954	420257
Mainstem Nooksack River at Ferndale @ Axton Rd	M2	530163	409948
Mainstem Nooksack River at Marietta @ Marine Dr	M1	530132	404139

Station Description	Station Name	UTM (X)	UTM (Y)
Bellingham Bay @ Lummi Shore Rd	2	528073	399684
Portage Bay @ Lummi Shore Rd	51	526643	397416
Portage Bay @ Lummi Shore Rd	50	526682	396682
Deer Creek @ Northwest Rd	DRC	533689	410226
Keefe Lake Outlet @ Gravel Road	KF	532461	415666
Wiser Lake Outlet @ Wiser	WIS	533708	415391
LLPL Ditch @ Meridian	LLPL	537694	417734
Mormon Ditch @ Northwood	MD	543476	421716
Anderson Creek @ Roberts	AND	548719	411630
Smith Creek @ Lind Road	SMI	552603	411161
Scott @ Blysm Rd	S1	539280	418329
<i>Scott @ Hannegan Rd</i>	S2	540923	418531
Scott @ Thiel Rd	S3	542561	418248
Kamm @ Hampton Rd	K1	540949	421203
Kamm @ Northwood Rd	K2	543460	421289
Bertrand Creek @ Wileys Rd	B1	534495	418863
Bertrand Creek @ Birch Bay-Lynden west	B2	533047	420114
Bertrand Creek @ Birch Bay-Lynden east	B3	533995	420109
Bertrand Creek @ Bertrand -H St Bridge	BH	535952	426682
Bertrand Creek @ Bertrand- Jackman Rd	BJB	536557	426748
Tenmile Creek @ Barrett Rd	T1	531298	411128
Tenmile Creek @ W. Laurel	T2	534306	411303
<i>Tenmile Creek @ Guide Meridian</i>	T3	537671	412596
Tenmile Creek @ Tenmile Rd	T4	541312	412910
<i>Fishtrap Creek @ River Rd</i>	F1	535115	417754
Fishtrap Creek @ Flynn Rd	F2	536905	419135
Fishtrap Creek @ E. Main	F3	538846	421375
Fishtrap Creek @ E. Main (7th)	F4	539597	421360
Duffner- below Sconefield Dairy	DF1	534994	418863
Duffner-Stremler Grave	DF2	537208	420027
<i>Duffner- Tromp Rd</i>	DF3	537402	420521
Double Ditch-E. Main West side	DD1	538444	421372
Double Ditch-E. Main East side	DD2	538536	421407
Double Ditch-W. Badger Rd West side	DD3	538470	423332
Double Ditch-W. Badger Rd East side	DD4	538560	423349
Double Ditch-Boundary Rd West side	DD5	538539	426675
Double Ditch-Boundary Rd East side	DD6	538612	426712
Fishtrap Creek @ Badger/Benson Rd	FT1	538615	427839
Fishtrap Creek @ Bager/Depot Rd	FT2	539357	423353
Fishtrap Creek @ Badger/Bender Rd	FT3	540181	423381
Fishtrap Creek @ Badger/Vinup Rd	FT4	541011	423314
Fishtrap Creek @ Pangborn/Depot Rd	FT5	541728	423297
Fishtrap Creek @ Pangborn/Bender Rd	FT6	540164	424957

Station Description	Station Name	UTM (X)	UTM (Y)
Fishtrap Creek @ Assink/Pangborn Rd	FT7	541028	424951
Fishtrap Creek @ Halberstick Rd	FT8	542927	426651

B. IMPLEMENTATION

The Portage Bay Shellfish Protection District has been coordinating some of the responses by implementing agencies to the shellfish closure. Ecology will work with the district to provide quarterly status reports of implementation.

C. SOURCE IDENTIFICATION

Where ambient water quality monitoring identifies persistent hot spots, an Ecology inspector will follow up with additional sampling to track the bacteria source. Any necessary referral will be made by Ecology to ensure that the pollution problem is addressed by the organization with the most direct authority. This model has proven effective in cases where ongoing bacteria problems in an agricultural area have in fact been traced back to failing residential septic systems, for which Whatcom County Health and Human Services is directly responsible, or to “hobby farms,” which must comply with the county’s Critical Areas Ordinance.

VII. ADAPTIVE MANAGEMENT RESPONSE AND INVESTIGATIONS

A. ADAPTIVE APPROACH

The basic adaptive approach is described in Section II. Ambient water quality monitoring, along with implementation tracking, are expected to yield one of four possible outcomes, or water quality conditions, as outlined in Table 1. It is when ambient water quality targets are not being met and implementation targets are being met (State IV) that adaptive management is required.

The first response will be source identification monitoring, Section VI.C. If tracking the source and applying existing implementation activities does not or is not expected to result in achieving targets, then further source identification will be conducted and appropriate control measures developed and implemented.

The following thresholds are established for certain milestones.

- Additional implementation focus will be placed on the two poorest performing sub-areas following each quarterly status report. Performance will be measured by the ratio of the quarterly target and the geometric mean of the last 10 samples. Each quarter, sub-areas will be evaluated based on the ratio of the samples collected in the current quarter, and two new basins will be identified as needing additional attention.
- If, after nine months (three quarters), sub-areas still fail to meet targets despite the thorough assessment and remedy of all potential pollution sources, the efficacy of required or recommended “best management practices” (BMPs) will be evaluated.

For the adaptive approach to be successful there must be a good understanding of pollution sources and bacteria transport mechanisms. The following investigations will be important for an effective adaptive approach.

B. INVESTIGATE ALTERNATE SOURCES

Two sources that have not been locally investigated are contributions from archived sediments (as described in Section 0 and wildlife (as described in Section III.A.6). These sources can be investigated and alternate sources may become apparent during source identification. Agencies with the ability to investigate these potential sources should begin doing so at the earliest opportunity.

It has also been suggested that further characterization of the types of bacteria may be helpful to determine the source of elevated bacteria densities (e.g., use of *E. coli* in addition to fecal coliform, which would provide insight into non-animal contributions to the fecal coliform densities). This may be used when refinement of source identification is needed.

C. INVESTIGATE BACTERIA TRANSPORT MECHANISMS

A potential route of bacteria contamination that has been suggested but not studied is the transport of bacteria through ground water to rivers, lakes and streams.

Septic system design and manure management assume that unsaturated soil will remove bacteria through adsorption. During portions of the year when wet weather conditions prevail, there may not be adequate depth of unsaturated soil to provide the degree of treatment or filtering expected from soils. This phenomenon should be investigated. There may be other transport mechanisms. As these are identified they should be investigated.

D. INVESTIGATE BMP EFFECTIVENESS

General tracking of BMP effectiveness is an ongoing part of monitoring implementation and measuring results. Evaluation of the effectiveness of individual BMPs is needed. BMP evaluation on a watershed scale is problematic unless all recommended or required BMPs are being applied throughout the watershed. As a surrogate measure, dairy BMPs will be evaluated in 2003. After that date, BMP effectiveness will be easier to measure on a watershed scale.

Source monitoring will provide insight into BMP effectiveness on a local scale, particularly through identification of failing BMPs. If a small portion of a watershed has fully implemented farm plans it may make a good case to test the effectiveness of the combination of BMPs used. Agencies will work together to identify opportunities and cooperate to design a study and evaluate the data.

VIII. REASONABLE ASSURANCES

Control Actions are steps taken either by an agency or an individual to eliminate bacteria from entering waters of the state. As outlined in column "Authority/Responsibilities" in Table 3 agencies have several types of responsibility. Those that are considered control actions are education, financial assistance, and enforcement. Education might take the form of technical assistance or public outreach. These control actions are directed at informing individuals what actions are appropriate, removing financial barriers to taking those actions, and finally ensuring the appropriate actions are taken.

Ecology, through delegation from EPA, ultimately has enforcement responsibility for elements of this plan. Education, outreach, technical and financial assistance, and enforcement will be used to ensure compliance with the Nooksack TMDL. Generally, the first step in implementing control actions will be a referral to agencies with technical or financial assistance missions. When those tools are not effective in achieving implementation of control measures enforcement will be used.

IX. PUBLIC INVOLVEMENT

The timelines for implementation activities have been created in consultation with all of the agencies and organizations involved. Earlier versions of this document has been presented to all agencies with responsibilities outlined for comment prior to publication and has also been presented to the Portage Bay Shellfish Protection District, and the WRIA 1 Watershed Management Project Water Quality Technical Team. No comments were received on the implementation schedules, so no changes to them have been made in this proposal.

An electronic form of the public comment draft was posted on Ecology's web site on November 14, 2001. Notification of the availability of the document and an invitation to submit comments was sent to a wide distribution of interested public, implementing agencies and others with an interest in water quality issues in the Nooksack Basin. The notification had a December 18, 2001 deadline. Appendix C contains response to the comments received.

During the entire TMDL implementation period, monitoring data and status reports will be available for public review, and periodic updates will be provided to area media and other interested parties. Special programs to recognize sewage treatment plants and dairies with exemplary compliance records are already administered by Ecology.

X. FUNDING OPPORTUNITIES

There are several sources of funding available from agencies mentioned in this document. The Natural Resource Conservation Service and Whatcom Conservation District make money available to agricultural producers for farm plan implementation and conservation improvements on farms. Ecology funds water quality facilities and activities. Puget Sound Water Quality Action Team funds public involvement and outreach activities. An important aspect of gaining funding for these projects is a clearly identified need. For that reason, forecasts of funding shortfalls will be included in quarterly reports. Potential sources of funding will be shared through the Portage Bay Shellfish Protection District to ensure coordination.

XI. REFFERENCES

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

Joy, Joe. “Lower Nooksack River Basin: Bacteria Total Maximum Daily Load Evaluation,”# 00-03-006. Washington Department of Ecology Environmental Assessment Program, Olympia, WA, March 2000, 87 pgs.

Hood, Steve and Joy, Joe. “Nooksack River Watershed: Bacteria Total Maximum Daily Load,”# 00-10-036. Washington Department of Ecology Water Quality Program, Olympia, WA, October 2000, 53 pgs.

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

APPENDIX A

QUARTERLY IMPLEMENTATION SCHEDULES

APPENDIX A - QUARTERLY IMPLEMENTATION SCHEDULES

Dairy inspections by Ecology are scheduled according to specific watersheds, taking into consideration such factors as how ambient water quality in the Nooksack River and tributaries compare to the quarterly geometric mean bacteria targets established for the TMDL. The inspection targets are for an average over a year, some quarters may have more than or less than the average quarterly target of inspections.

Table A.1- Implementation Schedule for Department of Ecology Enforcement of Dairy Nutrient Management Act

Quarter	Number of Inspections	Number of Inspections	Referrals made
	Goal	Result	
4Q98			
1Q99			
2Q99			
3Q99			
4Q99			
1Q00			
2Q00			
3Q00			
4Q00			
1Q01			
2Q01			
3Q01	23	11	3 to WC Planning 3 to WC HHS
4Q01	23		
1Q02	23		
2Q02	23		
3Q02	23		
4Q02	23		
1Q03	23		
2Q03	23		
3Q03	23		
4Q03	23		
1Q04	23		
2Q04	23		
3Q04	23		
4Q04	23		
1Q05	23		
2Q05	23		

Table A.2- Implementation Schedule for Department of Ecology Sewage Treatment Plant NPDES

Quarter	Everson		Lynden		Ferndale	
	Goal	Result	Goal	Result	Goal	Result
4Q98						
1Q99						
2Q99						
3Q99						
4Q99						
1Q00						
2Q00						
3Q00						
4Q00						
1Q01						
2Q01						
3Q01	Draft permit out for public comment	Final		Public Comment Complete		
4Q01	Permit issued		Draft permit out for public comment			
1Q02			Permit issued			
2Q02						
3Q02						
4Q02						
1Q03					Begin drafting permit modification	
2Q03						
3Q03					Draft permit out for public comment	
4Q03					Permit issued	
1Q04						
2Q04						
3Q04						

The Natural Resource Conservation Service estimates that \$600,000 will be expended annually. The cost was prorated evenly across all four quarters of the year.

Table A.3– Implementation Schedule for Natural Resource Conservation Service

Quarter	Cost Share \$		
	Goal	Result	
4Q98			
1Q99			
2Q99			
3Q99			
4Q99			
1Q00			
2Q00			
3Q00			
4Q00			
1Q01			
2Q01			
3Q01	\$150,000	\$100,000	
4Q01	\$150,000		
1Q02	\$150,000		
2Q02	\$150,000		
3Q02	\$150,000		
4Q02	\$150,000		
1Q03	\$150,000		
2Q03	\$150,000		
3Q03	\$150,000		
4Q03	\$150,000		
1Q04	\$150,000		
2Q04	\$150,000		
3Q04	\$150,000		
4Q04	\$150,000		
1Q05	\$150,000		
2Q05	\$150,000		

The Whatcom County Health and Human Services estimates 5,000 pieces of educational material will be mailed annually in the area affected by the Nooksack TMDL; this has been prorated across the four quarters of the year. The inspections are based on anticipated referrals by Ecology. Loans are based on anticipated requests for loans for repair of failing septic systems.

Table A.4– Implementation Schedule for Whatcom County Health and Human Services

Quarter	Educational Material		OSS inspections		Loans made	
	Goal	Result	Goal	Result	Goal	Result
4Q98						
1Q99						
2Q99						
3Q99						
4Q99						
1Q00						
2Q00						
3Q00						
4Q00						
1Q01						
2Q01						
3Q01	1250	1718	10	10	3	3 - \$101,049
4Q01	1250		10		3	
1Q02	1250		10		3	
2Q02	1250		10		3	
3Q02	1250		10		3	
4Q02	1250		10		3	
1Q03	1250		10		3	
2Q03	1250		10		3	
3Q03	1250		10		3	
4Q03	1250		10		3	
1Q04	1250		10		3	
2Q04	1250		10		3	
3Q04	1250		10		3	
4Q04	1250		10		3	
1Q05	1250		10		3	
2Q05	1250		10		3	

Table A.5– Implementation Schedule for Whatcom County Planning and Development Services

Quarter	Referrals Resolved		
	Goal	Result	
4Q98			
1Q99			
2Q99			
3Q99			
4Q99			
1Q00			
2Q00			
3Q00			
4Q00			
1Q01			
2Q01			
3Q01	3	0	
4Q01	3		
1Q02	3		
2Q02	3		
3Q02	3		
4Q02	3		
1Q03	3		
2Q03	3		
3Q03	3		
4Q03	3		
1Q04	3		
2Q04	3		
3Q04	3		
4Q04	3		
1Q05	3		
2Q05	3		

Table A.6– Implementation Schedule for Whatcom County Public Works

Quarter	Miles Vegetated		
	Goal	Result	
4Q98			
1Q99			
2Q99			
3Q99			
4Q99			
1Q00			
2Q00			
3Q00			
4Q00			
1Q01			
2Q01			
3Q01			
4Q01			
1Q02	2		
2Q02			
3Q02			
4Q02			
1Q03	2		
2Q03			
3Q03			
4Q03			
1Q04	2		
2Q04			
3Q04			
4Q04			
1Q05	2		
2Q05			

The Whatcom Conservation District has \$400,000 to allocate in 2001. Half of that is prorated over the last two quarters of 2001.

Table A.7– Whatcom Conservation District Implementation Schedule

Quarter	Farm Plans Approved		Cost Shares Allocated	
	Goal	Result	Goal	Result
4Q98				
1Q99				
2Q99				
3Q99				
4Q99				
1Q00				
2Q00				
3Q00				
4Q00				
1Q01				
2Q01				
3Q01	20	74 (223 in fist three quarters)		
4Q01	20			
1Q02	20		\$100,000	
2Q02	20		\$100,000	
3Q02	3			
4Q02	3			
1Q03	3			
2Q03	3			
3Q03	3			
4Q03	3			
1Q04	3			
2Q04	3			
3Q04	3			
4Q04	3			
1Q05	3			
2Q05	3			

APPENDIX B

QUARTERLY WATER QUALITY TARGETS

APPENDIX B - QUARTERLY Water Quality Targets

Table A.1 - Water Quality Targets for Marine Drive, Ferndale and Scott Creek

Quarter	Marine Drive Goal	Marine Drive Result	Ferndale Goal	Ferndale Result	Scott Goal	Scott Result
4Q98	73	27	73	31	233	132
1Q99	71	30	71	36	219	130
2Q99	70	39	70	51	206	137
3Q99	68	58	68	73	194	207
4Q99	66	68	66	71	183	278
1Q00	65	76	65	68	173	341
2Q00	63	50	63	54	163	351
3Q00	62	38	62	53	153	345
4Q00	60	31	60	46	144	277
1Q01	59	26	59	43	136	225
2Q01	58	22	58	39	128	158
3Q01	56	24	56	37	121	79
4Q01	55	22	55	32	114	51
1Q02	54		54		107	
2Q02	52		52		101	
3Q02	51		51		95	
4Q02	50		50		89	
1Q03	49		49		84	
2Q03	47		47		79	
3Q03	46		46		75	
4Q03	45		45		70	
1Q04	44		44		66	
2Q04	43		43		62	
3Q04	42		42		59	
4Q04	41		41		55	
1Q05	40		40		52	
2Q05	39		39		49	

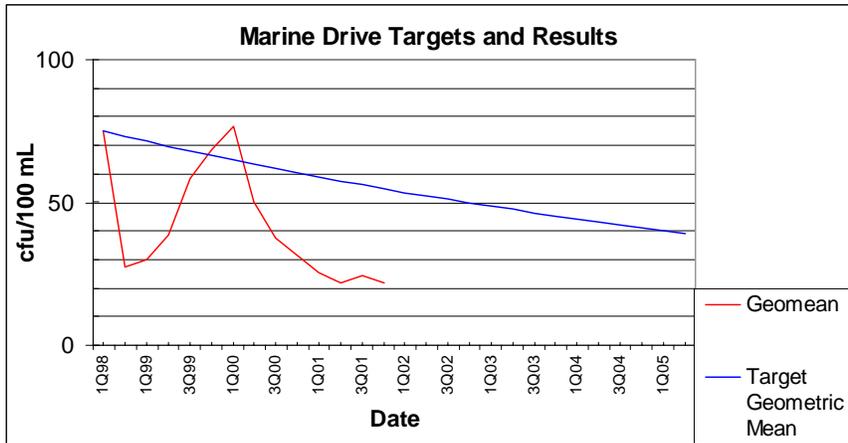


Figure B 1 - Plot of Results for Nooksack River at Marine Drive

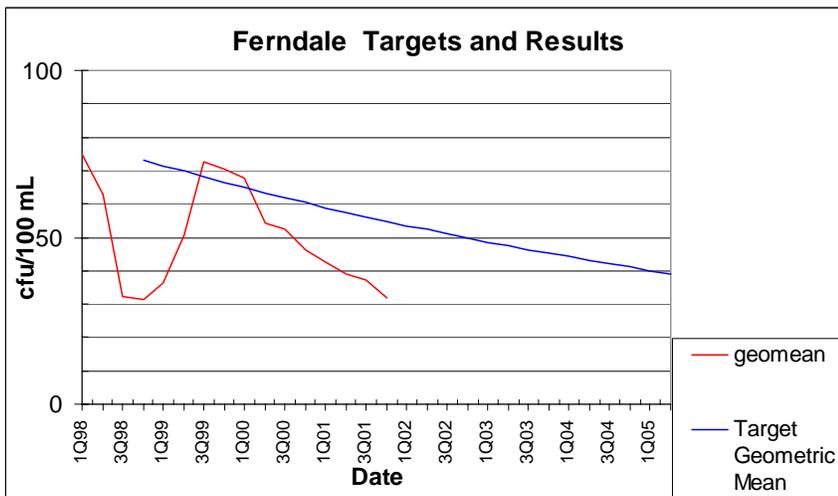


Figure B 2 - Plot of Results for Nooksack River at Ferndale

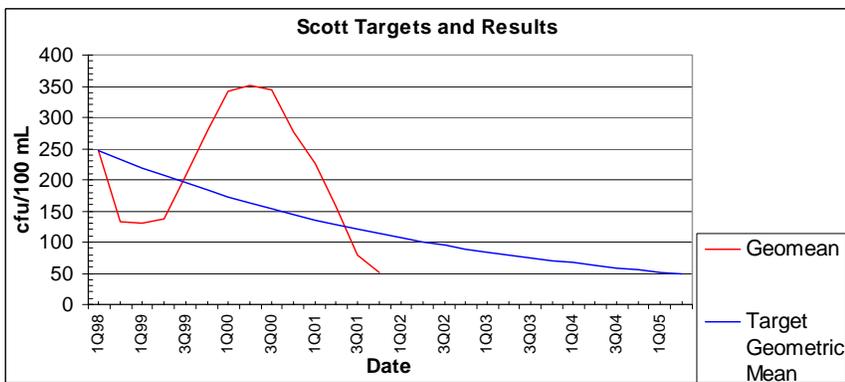


Figure B 3 - Plot of Results for Scott Creek

Table A.2 - Water Quality Targets for Kamm Creek, Tenmile Creek, and Bertrand Creek

Quarter	Kamm Goal	Kamm Result	Tenmile Goal	Tenmile Result	Bertrand Goal	Bertrand Result
4Q98	525	480	282	114	281	96
1Q99	473	366	261	112	263	181
2Q99	426	254	242	100	246	175
3Q99	385	291	224	119	230	180
4Q99	347	226	208	175	215	175
1Q00	313	189	192	183	201	156
2Q00	282	188	178	201	188	155
3Q00	254	196	165	246	176	173
4Q00	229	207	153	245	164	155
1Q01	206	198	142	183	154	113
2Q01	186	186	131	179	144	87
3Q01	168	202	122	162	134	84
4Q01	151	135	113	117	126	71
1Q02	136		104		117	
2Q02	123		97		110	
3Q02	111		90		103	
4Q02	100		83		96	
1Q03	90		77		90	
2Q03	81		71		84	
3Q03	73		66		78	
4Q03	66		61		73	
1Q04	60		57		69	
2Q04	54		53		64	
3Q04	48		49		60	
4Q04	44		45		56	
1Q05	39		42		52	
2Q05	35		39		49	

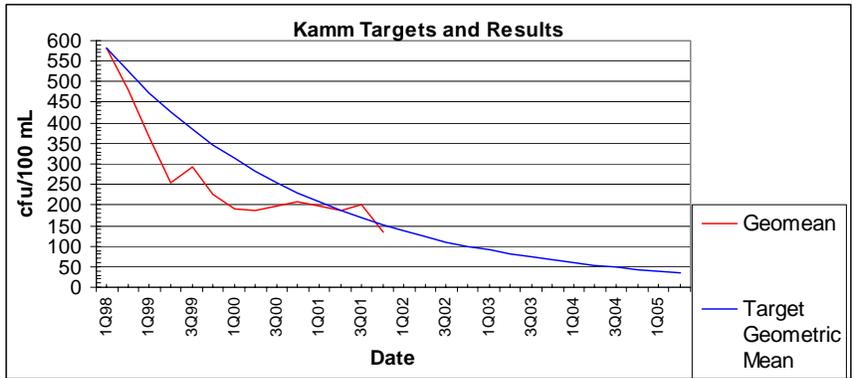


Figure B 4 - Plot of Results for Kamm Creek

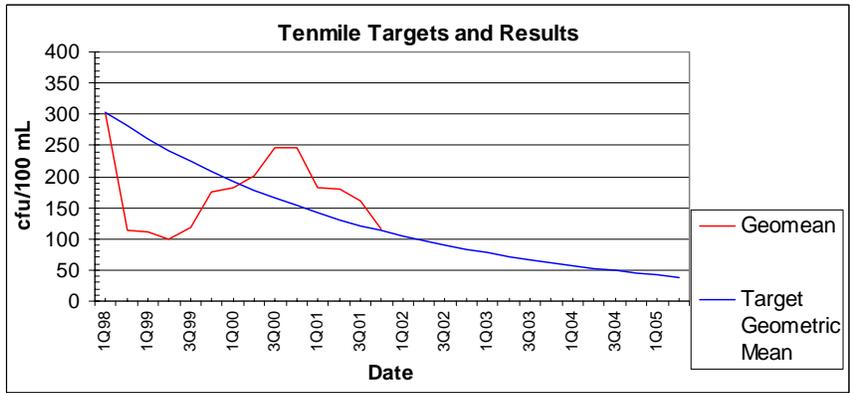


Figure B 5 - Plot of Results for Tenmile Creek

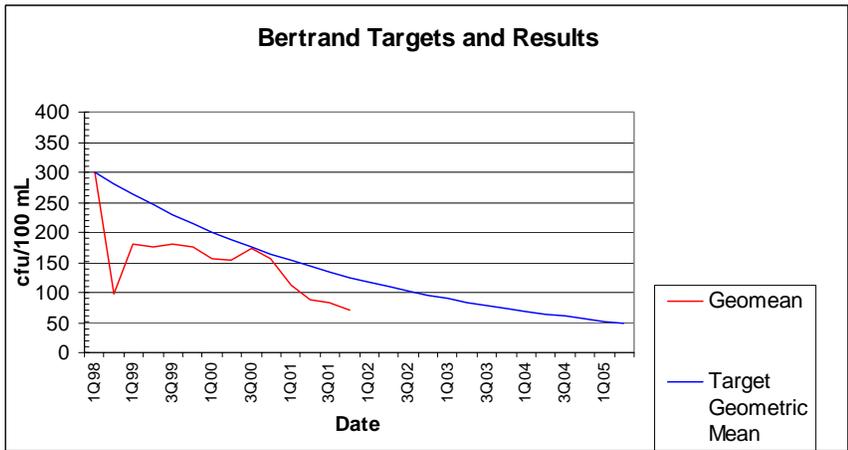


Figure B 6 - Plot of Results for Bertrand Creek

Table A.3 - Water Quality Targets for Fishtrap Creek, Keefe Outlet, and Wiser Outlet

Quarter	Fishtrap Goal	Fishtrap Result	Keefe Goal	Keefe Result	Wiser Goal	Wiser Result
4Q98	417	235	87		76	
1Q99	381	560	85		76	
2Q99	348	440	82		75	
3Q99	318	537	80		74	
4Q99	290	438	78		73	
1Q00	265	422	76		73	
2Q00	242	429	74		72	
3Q00	221	294	73		71	
4Q00	202	247	71		71	
1Q01	185	178	69		70	
2Q01	169	166	67		69	
3Q01	154	160	65		69	61
4Q01	141	134	64		68	16
1Q02	128		62		67	
2Q02	117		61		67	
3Q02	107		59		66	
4Q02	98		58		65	
1Q03	89		56		65	
2Q03	82		55		64	
3Q03	75		53		63	
4Q03	68		52		63	
1Q04	62		51		62	
2Q04	57		49		62	
3Q04	52		48		61	
4Q04	47		47		60	
1Q05	43		46		60	
2Q05	39		45		59	

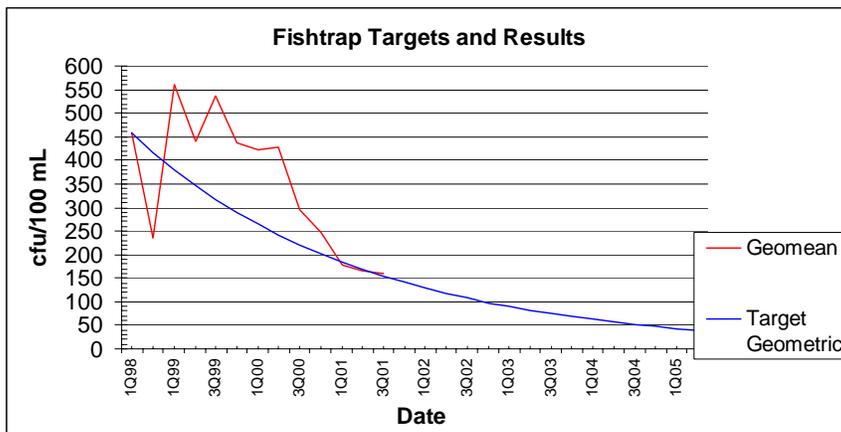


Figure B 7 - Plot of Results for Fishtrap Creek

Table A.4 - Water Quality Targets for Anderson Creek and Smith Creek

Quarter	Anderson Goal	Anderson Result	Smith Goal	Smith Result	LLPL Goal	LLPL Results
4Q98	327		208		700	
1Q99	302		201		609	
2Q99	278		194		530	
3Q99	257		188		461	
4Q99	237		181		402	
1Q00	218		175		349	
2Q00	201		169		304	
3Q00	186		164		265	
4Q00	171		158		230	
1Q01	158		153		200	
2Q01	146	135	148		174	
3Q01	134	123	143		152	207
4Q01	124		138		132	
1Q02	114		133		115	
2Q02	105		129		100	
3Q02	97		124		87	
4Q02	90		120		76	
1Q03	83		116		66	
2Q03	76		112		57	
3Q03	70		109		50	
4Q03	65		105		43	
1Q04	60		101		38	
2Q04	55		98		33	
3Q04	51		95		29	
4Q04	47		92		25	
1Q05	43		88		22	
2Q05	40		85		19	

APPENDIX C

Response to Comments

APPENDIX C- Response to Comments

An electronic version of the plan was made available on the internet. Notification of the availability was sent to interested parties including implementing agencies, tribes, and others with an interest in water quality in the Nooksack Basin. Two comments were received in the November 15, 2001 to December 18, 2001 comment period.

Whatcom County Health and Human Services

1 – A correction to the description of residential septic system function was offered.

Response: The correction has been included verbatim in the final draft.

2 – There was a request to substitute HHS for health department throughout the document.

Response: References to Whatcom County Health Department have been changed to HHS.

3 – Page 9 item 6) bullet 6 should read “Enforcement of OSS ordinances”

Response: the bullet has been changed to read

- Enforcement of OSS ordinances WCC 24.05 implementing state regulation WAC 246-272

Whatcom County Agriculture Preservation Committee

The following is the full text of the comment.

The APC Board has concerns over the implementation of the fecal bacteria TMDL program on the Nooksack River basin. While we are generally in agreement with the draft implementation plan we continue to have grave concerns over the targets identified. We question: 1) if the low target numbers can truly be reached with the notoriously fickle fecal coliform test, and 2) if non-domestic sources (i.e. geese, deer, etc.) are adequately considered as likely sources of fecal coliform. It is difficult for us to see how you will quantify the wildlife contribution.

Our concern is that we will not be able to reach the targets identified. Then what? A change from the current regulatory system is worrisome. We may not like the current system of reliance on BMPs found in farm plans but it is hard to argue that the goals of this program are unreasonable. A shift from this approach based on the inability to reach target goals must be done very carefully and in close consultation with the agriculture community. We simply do not want to be party to a TMDL program that sets us up for failure and then punishes us for failing.

We request that the APC be invited to participate in any process that evaluates the effectiveness of BMPs or considers alternative means to reach the target goals of the TMDL.

Thank you for your work on putting this program together. We share your hope that it will help guarantee clean water in the least burdensome manner possible for those who farm within the basin.

1 - The ability to achieve the targets is questioned.

Response: The targets were established in the TMDL submittal which was approved by EPA in August 2000. No comments regarding the achievability of the targets were received during the comment period on the TMDL submittal. As evidence that the targets are achievable by June 2005, in Fishtrap Watershed at the end of the October 2001, more than 70 percent of the needed reductions have already been met. See Appendix B.

1A – The reliability of the fecal coliform test is questioned.

Response: The bacteria targets and interim targets are based on a rolling geometric average. The last 30 samples (see page 16) are used at the end of the quarter to calculate the geometric mean. This long averaging period removes variation due to the standard error of the test.

2 – How wildlife sources will be quantified is questioned.

Response: Because streams in natural areas typically meet bacteria standards it was decided to not focus on quantifying the wildlife contribution. Instead effort will be focused on controlling human generated sources. See section III.A.7. on page 7. for more about wildlife sources.

3 - The question on what will happen when targets are not achieved is raised.

Response: See section VII.A on adaptive management for more detail on proposed response when targets are not met. Adaptive responses are a more precise application of existing regulations based on more refined source identification.

4 - There is a request to be party to the evaluation of the effectiveness of BMPs.

Response: At present, the water quality sampling results show that the streams are meeting interim targets. Indicating that BMPs will be adequate to protect water quality. Therefore no BMP evaluation program is currently being planned. When and if such evaluation becomes necessary, participation by volunteers from the Agriculture Preservation Society will be welcomed.