WASHINGTON STATE DEPARTMENT OF ECOLOGY

Nisqually River Basin Fecal Coliform Bacteria and Dissolved Oxygen Total Maximum Daily Load

Water Quality Implementation Plan

May 2007
Publication No. 07-10-016

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February 2007
Publication No. 07-10-016

Publication Information

This report is available on the Department of Ecology's Web site at

www.ecy.wa.gov/biblio/0710016.html

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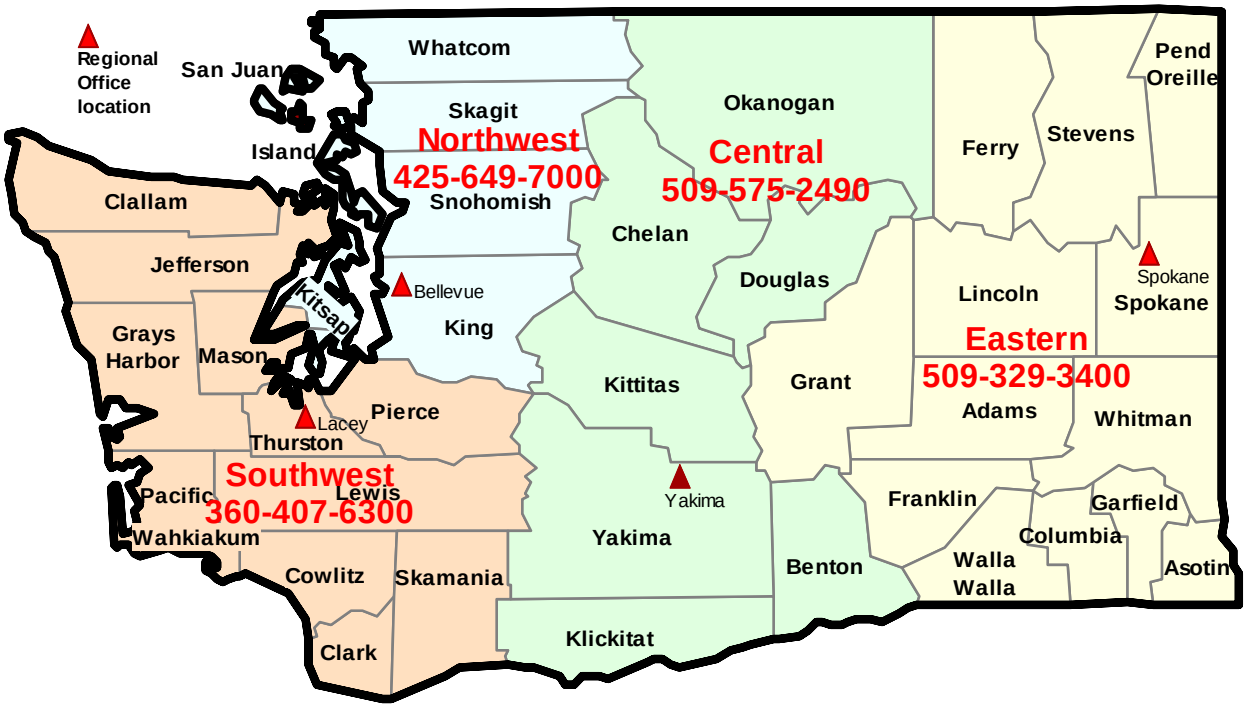

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Executive Summary

The Clean Water Act requires that a Total Maximum Daily Load (or TMDL) be developed for each of the water bodies on the 303(d) list. A TMDL identifies how much pollution needs to be reduced or eliminated to achieve clean water. Ecology works with the local community to develop a strategy to control the pollution and a monitoring plan to assess effectiveness of the water quality improvement activities.

The Nisqually River, Nisqually Reach and Ohop Creek were on the 1996 303(d) list of water bodies that do not meet water quality standards for fecal coliform bacteria. The 1998 303(d) list included the water bodies listed above as well as McAllister Creek for deviations of dissolved oxygen and fecal coliform bacteria, and Red Salmon Creek for fecal coliform bacteria only.

Ecology conducted a TMDL study from March 2002 through September 2003. Low dissolved oxygen levels found in McAllister Creek were determined to be largely due to natural conditions. A combination of low dissolved oxygen in the groundwater, wetland influences, and physical conditions impede re-aeration. Bacteria levels in Ohop Creek have improved greatly since 1990, but load allocations were identified for several sites downstream of Ohop Lake in the dry season and one tributary, Lynch Creek, in the wet season.

Results also showed that the Nisqually River and most of the Nisqually Reach met fecal coliform water quality standards and showed improving trends. Therefore, no load reductions were recommended. However, continued monitoring was suggested.

The goal of the Nisqually Fecal Coliform Implementation Plan is to reduce the amount of fecal coliform reaching the water bodies located in this watershed that are above the state water quality standards for fecal coliform. There are four main focus areas (Red Salmon Creek, Ohop Creek, Lynch Creek, and McAllister Creek). Fecal coliform reductions needed in the watershed range from 10 to 83 percent. The primary areas that need attention are agriculture, storm water, and on-site sewage systems. Ecology acknowledges that the unique situation in the Nisqually area the implementation activities that have occurred prior to the publication of this document. However, there are still areas that need action to achieve water quality standards. There are also recommendations for actions to improve dissolved oxygen in McAllister Creek.

An advisory committee was formed consisting of interested tribal, state agency, and governmental entities to help direct the development of this Water Quality Implementation Plan. The committee used the recommendations in the technical study as the basis for exploring possible implementation actions. Implementation of those actions is expected to help the water bodies meet state water quality standards by the year 2015.

After publication of the implementation plan, the members of the advisory committee will meet annually to analyze any data that has been collected. The next step is to determine if actions listed in this plan are achieving the fecal coliform reductions needed. If not, then additional actions will be suggested.

What is a Total Maximum Daily Load (TMDL)?

Federal Clean Water Act requirements

The Clean Water Act established a process to identify and clean up polluted waters. Under the Clean Water Act, each state is required to have its own water quality standards designed to protect, restore, and preserve water quality. Water quality standards consist of designated uses for protection, such as cold water biota and drinking water supply, as well as criteria, usually numeric, to achieve those uses.

Every two years, states are required to prepare a list of water bodies – lakes, rivers, streams, or marine waters – that do not meet water quality standards. This list is called the 303(d) list. To develop the list, Ecology compiles its own water quality data along with data submitted by local state and federal governments, tribes, industries, and citizen monitoring groups. All data are reviewed to ensure that they were collected using appropriate scientific methods before they are used to develop the 303(d) list. The 303(d) list is part of the larger water quality assessment.

The water quality assessment is a list that tells a more complete story about the condition of Washington's waters. This list divides water bodies into one of five categories:

Category 1 – Meets standards for parameter(s) for which it was tested

Category 2 – Waters of concern

Category 3 – Waters with no data available

Category 4 – Polluted waters that do not require a TMDL because:

- 4a. – Has a TMDL approved and it is being implemented
- 4b. – Has a pollution control plan in place that should solve the problem
- 4c. – It is impaired by a non-pollutant such as low water flow, dams, culverts

Category 5 – Polluted waters that require a TMDL (303(d) list)

TMDL process overview

The Clean Water Act requires that a TMDL be developed for each of the water bodies on the 303(d) list. The TMDL identifies pollution problems in the watershed and then specifies how much pollution needs to be reduced or eliminated to achieve clean water. Ecology works with the local community to develop an overall approach to control the pollution, called the implementation strategy, and a monitoring plan to assess effectiveness of the water quality improvement activities. Once the TMDL is approved by EPA, a water quality implementation plan must be developed within one year. This plan identifies specific tasks, responsible parties, and timelines for achieving clean water.

Elements required in a TMDL

The goal of a TMDL is to ensure the impaired water will 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 standards (the loading capacity) and allocates (assigns) that load among the various sources.

If the pollutant comes from a discrete source (referred to as a point source) such as a municipal or industrial facility's discharge pipe, that facility's share of the loading capacity is called a wasteload allocation. If it comes from a set of diffuse sources (referred to as a nonpoint source) such as general urban, residential, or farm runoff, the cumulative share is called a load allocation.

The TMDL must also consider seasonal variations and include a margin of safety that takes into account the lack of knowledge about the causes of the water quality problem or its loading capacity. A reserve capacity for future loads from growth pressures is sometimes included as well. The sum of the wasteload and load allocations, the margin of safety and any reserve capacity must be equal to or less than the loading capacity.

Total maximum daily load analyses: loading capacity

Identification of the contaminant loading capacity for a water body is an important step in developing a TMDL. EPA defines the loading capacity as "the greatest amount of loading that a water body can receive without violating water quality standards" (EPA, 2001). The loading capacity provides a reference for calculating the amount of pollution reduction needed to bring a water body into compliance with standards. The portion of the receiving water's loading capacity assigned to a particular source is a load or wasteload allocation. By definition, a TMDL is the sum of the allocations, which must not exceed the loading capacity.

TMDL = Loading Capacity = sum of all Wasteload Allocations + sum of all Load Allocations + Margin of Safety

Why did Ecology conduct a TMDL study in this watershed?

Overview

Ecology conducted a TMDL study in this watershed because the Nisqually River, Nisqually Reach, McAllister Creek and Ohop Creek all had segments that are on the 303(d) list of water bodies that do not meet water quality standards (Figure 1). These four water bodies were all listed for fecal coliform bacteria. McAllister Creek was also listed for dissolved oxygen (DO) (Table 1). In addition, review of historical data on Red Salmon Creek, a tributary to Nisqually Reach, showed that it violated water quality standards for fecal coliform bacteria in the past

The TMDL suggested that lower DO levels are partly a natural condition on McAllister Creek. However, excessive plant growth during the summer months may contribute to lower than natural DO levels downstream. A combination of low DO in the ground water, wetland influences, and physical conditions impedes re-aeration. It was not possible to quantify the contribution of anthropogenic sources to the low DO levels, therefore no specific prescriptions were advised. However, there were recommendations for monitoring, studies, and best management practices (BMPs).

The TMDL study was conducted from March 2002 through September 2003. The submittal report was approved by the United States Environmental Protection Agency (EPA) on August 15, 2005.

The TMDL results for 303(d) listed locations were as follows:

> The Nisqually River at RM 3.4 met water quality standards for fecal coliform bacteria.
>
> Ohop Creek upstream of Ohop Lake met water quality standards for fecal coliform bacteria, but just below the lake at RM 6.0 it did not meet water quality standards during the wet or dry season.
>
> Red Salmon Creek at RM 1.44 met fecal coliform freshwater standards, but Wash Creek (Figure 2) did not. However, even if both Red Salmon RM 1.44 and Wash Creek met the extraordinary primary contact standards, Red Salmon would not meet marine standards during the low tide period. Red Salmon Creek must meet the criteria for *Extraordinary* quality waters. The downstream sample sites at RM 1.4 and the unnamed tributary at RM 1.3T are both classified as marine water due to salinity, while the upstream sites are freshwater. Upstream sites need to meet the more stringent water quality marine standard so that Red Salmon RM 1.4 can meet the marine standard.
>
> McAllister Creek did not meet the fecal coliform standard at 3 sites: RM 4.3, RM 3.7 and RM 0.1. There are also many reductions needed for tributaries and tide gates to McAllister Creek.

An advisory committee was formed to address the listings in this watershed. The implementation plan advisory committee began meeting in December 2005 to come up with implementation recommendations. Six meetings and several smaller group meetings were conducted and implementation strategies are listed in Table 2. It is expected that these implementation activities will achieve water quality standards by 2015.

Cleanup of bacteria pollution in the Nisqually watershed will focus primarily on the issues identified in the TMDL study, which are on-site sewage systems, agricultural practices, and stormwater management.

As a result of the findings in the TMDL, the recommended cleanup actions are needed in specific areas referred to as focus areas. The focus areas are Nisqually Reach, Ohop Creek, Lynch Creek, Red Salmon Creek and McAllister Creek.

Table 1: Study area water bodies on the 1998 303(d) list for fecal coliform and dissolved oxygen

Water Body	Parameter	Location	New ID #	Old ID #
Marine Water – WRIA 11*		*Latitude/Longitude*		
Nisqually Reach	Fecal coliform bacteria	47.115, 122.695	390KRD	WA-PS-0290
Freshwater – WRIA 11		*Township/Range/Section*		
Nisqually River	Fecal coliform bacteria	18N 01E 08	OE72JI	WA-11-1010
McAllister Creek	Fecal coliform bacteria and dissolved oxygen	18N 01E 37 and 18N 01E 38	LD26OX	WA-11-2000
Ohop Creek	Fecal coliform bacteria	16N 03E 25	MW64EV	WA-11-1024
Red Salmon Creek	Fecal coliform bacteria	19N 01E 01 and 19N 01E 09	No ID	WA-PS-0290

*WRIA – Water Resource Inventory Area

Watershed Description

The Nisqually basin covers 761 square miles in the greater Puget Sound watershed (Figure 1). The basin includes portions of Thurston, Pierce, and Lewis counties. The Nisqually River flows generally in a northwesterly direction. At its origin, the Nisqually River is formed from the melt waters of the Nisqually and other glaciers on Mount Rainier.

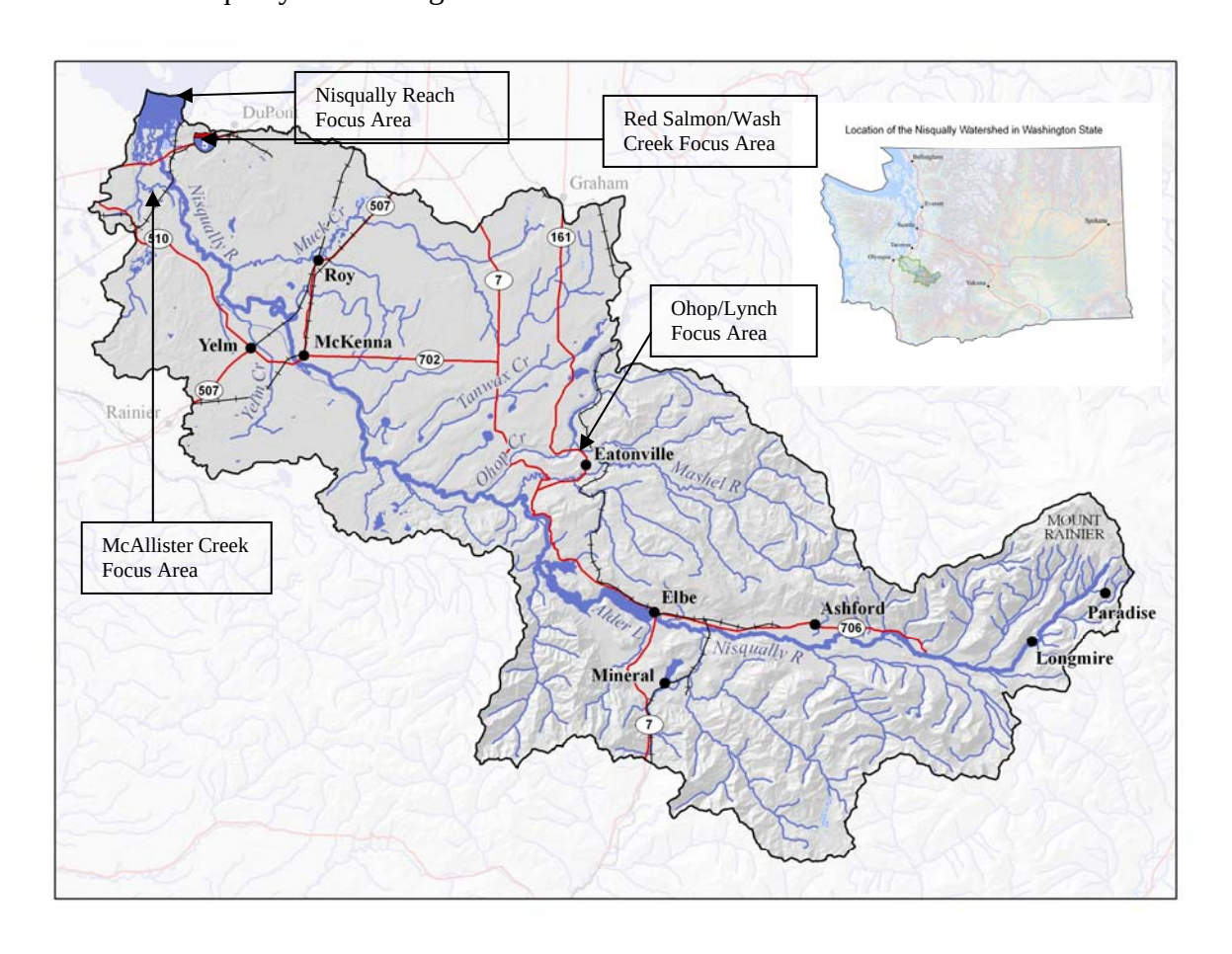

Figure 1: Map of the Nisqually River Basin Watershed with focus areas

Nisqually River

From its headwaters to the Nisqually River's discharge to Puget Sound, the river is approximately 78 miles long. Two dams in the upper Nisqually River watershed regulate river flow for electrical power generation for the city of Tacoma. The United States Geological Survey (USGS) has maintained a continuous discharge record for the Nisqually River at McKenna since 1947. The average annual discharge is 2100 cubic feet per second (cfs), providing approximately half the total freshwater discharge to southern Puget Sound (Whiley et al., 1994).

The Nisqually Reach (Focus Area)

The Nisqually Reach is the area where the Nisqually Delta and deeper waters of Puget Sound meet. The Nisqually Delta, formed by the Nisqually River, consists of broad mudflats and salt marsh. Two smaller creeks flow into the Nisqually Reach in water resource inventory area (WRIA) 11: McAllister and Red Salmon Creeks, and Sequalitchew Creekin in WRIA 12.

Red Salmon Creek (Focus Area)

Red Salmon Creek is a small independent tributary on the eastern edge of the Nisqually Delta (Figure 2). The creek originates from a series of diffuse springs and seeps in wetlands north of Interstate-5 (I-5). The creek drains to the eastern portion of the Nisqually River delta as well as being connected to the Nisqually River though an eastern tributary of the mainstem Nisqually River. The saltwater wedge penetrates at least up to RM 1.2, with tidal influence extending above this point (Kerwin, 1999). From its origin, the creek flows westerly through an area of low-density residential houses, non-commercial farms, and agricultural lands before flowing under the Burlington Northern railroad tracks. It is joined by a small tributary that drains agricultural lands from the west and south.

Figure 2: Red Salmon/Wash Creek and Nisqually River sample sites

Ohop Creek/Lynch Creek (Focus Area)

Ohop Creek joins the Nisqually River at RM 37.3. It is the second largest tributary in the lower Nisqually basin in terms of flow, and third in drainage area (Figure 3). The average annual discharge is 67 cfs, and the basin covers 44 square miles. The main tributaries include Twenty-five Mile and Lynch creeks. The dominant hydrologic feature in this sub-basin is Ohop Lake (RM 6.3).

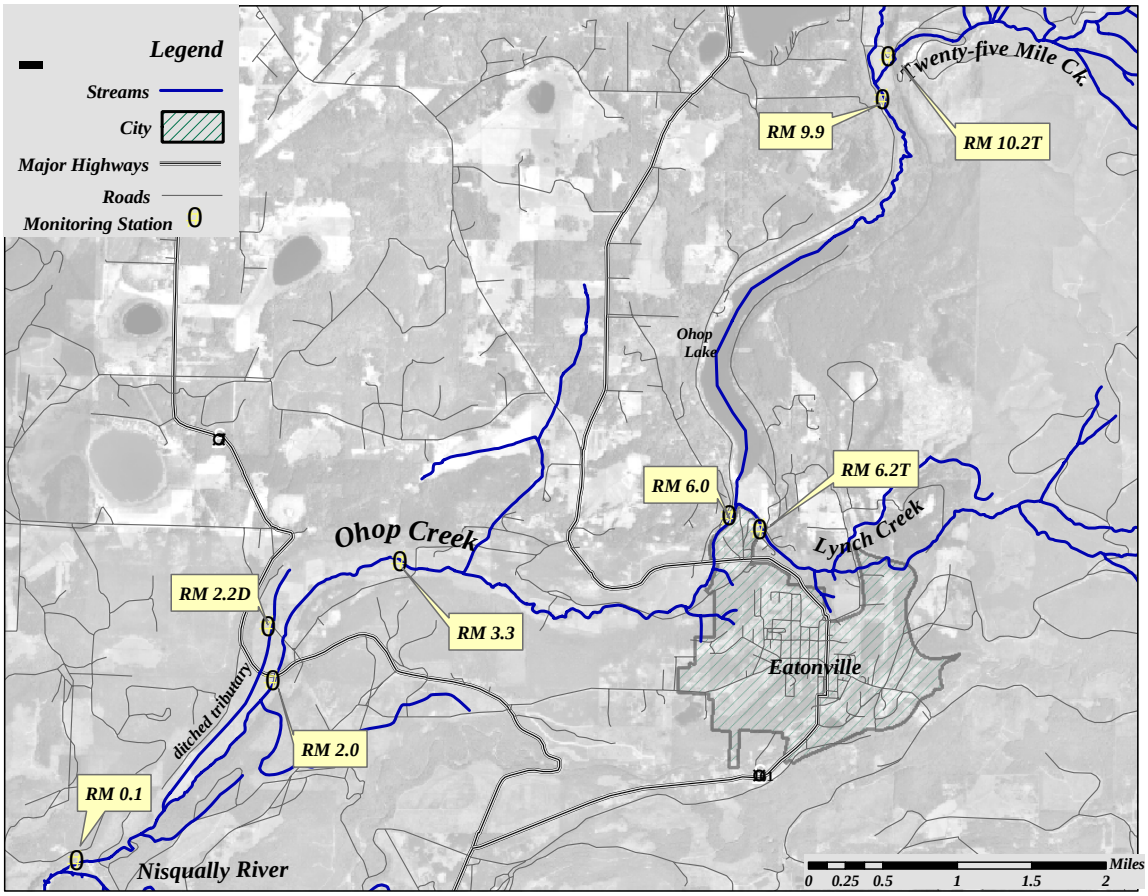

Figure 3: Ohop/Lynch Creek sampling sites

There is relatively dense residential development around Ohop Lake. The lower Ohop valley, downstream of Ohop Lake, is currently in transition from commercial agricultural use (primarily dairy farms) to non-commercial farms and rural residential development. The lower valley reach is low gradient with no intact natural riparian zone. The lower 0.3 miles include some hardwood forests.

Lynch Creek joins Ohop Creek at RM 6.2, flowing from commercially-owned timberlands to rural residential and non-commercial farms in the lower mile. The town of Eatonville's stormwater collection system discharges into Lynch Creek. Eatonville will not be considered for a Phase II municipal stormwater National Pollutant Discharge Elimination System (NPDES) permit as an individual entity. However, its discharges will be covered by Pierce County's Phase

I municipal stormwater NPDES permit. Twenty-five Mile Creek flows from commercially-owned timberlands through an area of non-commercial farms and a recently abandoned clay mining operation before joining Ohop Creek at RM 9.9 (Kerwin, 1999).

McAllister Creek (Focus Area)

McAllister Creek (Figure 4) originates in a low-lying, horseshoe-shaped basin fed by three large springs and many small ones. The estimated average annual discharge is 62 cfs, and the basin covers 39.2 square miles (Watershed Professionals Network, 2002). The creek flows north for 6.3 miles to empty into Nisqually Reach near Luhr Beach. McAllister Springs, at the stream's headwaters, is the major source of drinking water for the city of Olympia, providing approximately 80% of the city's total water demand. The springs are only 6.7 feet above mean sea level. From the springs to RM 5.6, the creek flows through a large undisturbed wetland owned by the city of Olympia. Several springs join McAllister Creek in this stretch, including the larger Abbott Spring and Lodge Spring.

Between RM 5.6 and 4.3, the creek flows through agricultural pasture until it reaches the Steilacoom Road bridge. This reach is lined with dikes and has almost no tree or shrub cover for most of its length. The dikes and tide gates prevent saltwater from entering the adjacent agricultural lands. Numerous agricultural ditches drain into the creek on both banks in this reach. The flow direction changes with the tide from RM 5.6 to the mouth, and water level fluctuates up to five feet at RM 4.3. Little McAllister Creek enters McAllister Creek in this stretch at RM 5.3 through a double tide gate. Its flow originates from springs near The Meadows subdivision at the top of the bluff and from wetland drainage to the south of Highway 510. The Meadows stormwater detention ponds contribute flow to the creek during peak storm periods. The combined flow travels down a heavily eroded ravine to the lower valley. Once there, the Little McAllister Creek has been routed through a drainage ditch to McAllister Creek. Just upstream of Steilacoom Road is the McAllister Creek Fish Hatchery owned by Washington Department of Fish & Wildlife (WDFW). Due to budget constraints, this hatchery closed operations in June 2002.

Below Steilacoom Road is the only residential development adjacent to the creek, located along its west side between RM 4.7 and 4.4. Large trees shade most of this reach and vegetation is fairly undisturbed. Agricultural land along the east side of the creek is drained by tide gates. Medicine Creek enters the creek at RM 4.4. Medicine Creek is 3.5 miles long. The creek has been extensively ditched and altered. The creek is highly disturbed as it passes through nine culverts in an area used for agriculture and residences. Currently there is almost no canopy cover, and the channel is narrow, weed-choked, and frequently dry above the Steilacoom Road crossing (Thurston County WWM, 1993).

Just downstream of RM 4.3, McAllister Creek enters a diversion channel that flows under Martin Way, then flows into a newer diversion channel under Interstate-5, and finally re-enters the natural channel at RM 2.4. Rock rip-rap lines the channel throughout this reach. Occasional trees provide some high cover, but there is almost no low overhanging vegetation. Land use in this reach includes a recreational vehicle park and commercial development located near I-5. Two stormwater discharges enter the creek in this reach. Thurston County stormwater discharge

from Martin Way and the surrounding area drains to a stormwater pipe that enters the creek just upstream of Martin Way. Washington State Department of Transportation's (WSDOT) stormwater discharge from I-5 flows into the creek under the I-5 bridge.

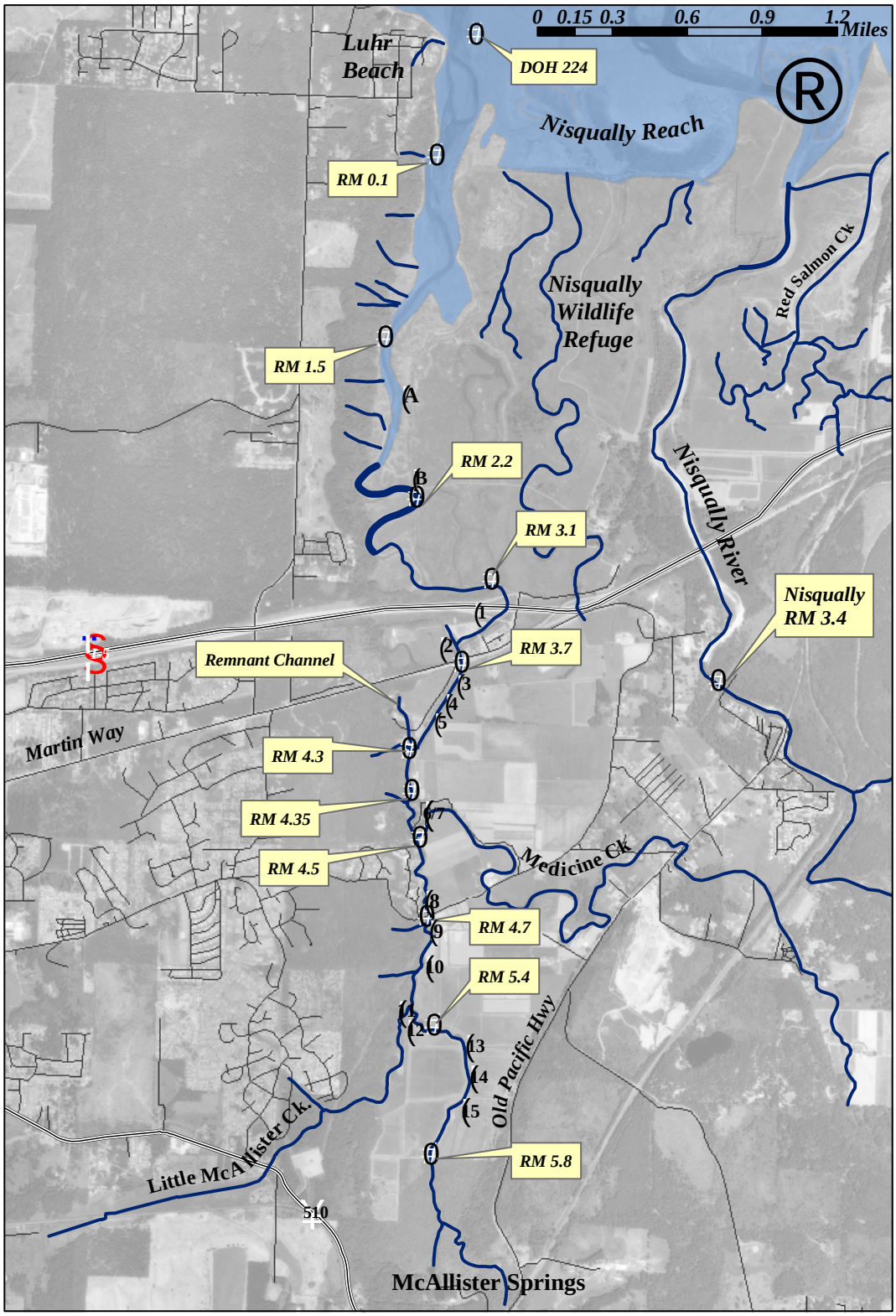

Figure 4: McAllister Creek sampling sites and tide gates

The remnant channel enters McAllister Creek mainstem just downstream of RM 4.3. A small privately owned trout rearing operation, Nisqually Trout Farm # 1, is located at the end of the remnant channel. The trout farm receives water input from a small spring that flows off of the west bluff. The facility is divided into upper and lower ponds. Discharge from the facility flows through a tide gate (not numbered) and into the remnant channel. During TMDL sampling, the trout farm was under Ecology's threshold size requirements for a General NPDES Fish Hatchery permit, so it was not a permitted facility.

At RM 2.4, after leaving the artificial channel, the creek flows through the U.S. Fish and Wildlife Nisqually National Wildlife Refuge to the mouth near Luhr Beach. The east bank is diked all the way to the mouth. Tides have a major influence on the creek in this reach. The stream opens into a broad estuarine lagoon which becomes a network of braided distributaries and mud flats at low tide (Thurston County WWM, 1993). Two tide gates discharge to the creek in this reach, draining water from the Nisqually Wildlife Refuge.

In McAllister Creek, a complete flow reversal occurs two times a day during the flood tide. This has the effect of pushing creek water back upstream, causing considerable mixing throughout the length of the creek. Tidal dynamics require the use of drainage ditches linked to tide gates and extensive diking in order for lands east of the creek to be drained for agricultural use (Whiley and Walter, 1996). The location of the major tide gates is included in Figure 4.

The city of Olympia records water levels at the McAllister Springs weir, where flows averaged 16.7 cfs in the mid-1980s. During peak water-demand periods, Olympia withdraws as much as 70% of the springs' flow (Thurston County WWM, 1993).

USGS maintained a continuous recording gauging station near McAllister Springs from 1951 to 1964 (Thurston County WWM, 1993), with flow averaging 24 cfs, and an intermittent gage at Steilacoom Road from 1941 to 1949, where flow ranged from 48 to 132 cfs.

What Needs to be Done?

Implementation strategy (summary of actions that need to be done)

This implementation plan is unique because many of the action items identified in the June 2005 TMDL submittal report have already been implemented. The following items are still needed to meet water quality standards in this watershed. The parentheses behind each item are the focus areas that the action will affect.

Fecal Coliform

On-site sewage systems

The Tacoma-Pierce County Health Department will investigate any suspected failures that are brought to their attention. A sanitary survey may be needed if reductions are not met with those action items listed in Table 2. (Ohop/Lynch Creeks)

Thurston County will continue to investigate failing sewage systems in the area of Luhr Beach and any other failures brought to their attention. They will also provide financial assistance to homeowners through loans and grants to repair failing on-site sewage systems. Funding has been secured and will be available throughout 2011. (Nisqually Reach, McAllister Creek)

Thurston County will also conduct on-site sewage workshops and educational campaigns in the areas of concern near The Meadows subdivision. (McAllister Creek)

The Tacoma-Pierce County Health Department is developing a project to provide grant and loan assistance to qualifying low income residents and loan assistance to other qualifying residents to assist in the repair of failing on-site sewage systems. This project will be designed to complement the existing low interest loans available through Pierce County Department of Community Services Housing Programs. (Ohop Creek, Lynch Creek, Red Salmon Creek)

The Tacoma-Pierce County Health Department is also developing an on-site sewage system management plan as required by Chapter 246-272A-0015 WAC. The plan will provide the basis to identify the location and type of on-site sewage systems in Pierce County; encourage, track and enforce maintenance requirements; identify measures to reduce or eliminate potential health risks from on-site sewage systems in water quality-sensitive areas; and, determine the means to fund and implement the plan. An additional component of the plan will be the identification of marine recovery areas, or areas where marine water quality is impaired, as required by House Bill 1458. The plan is expected to be completed by July 2007. (Ohop Creek, Lynch Creek, Red Salmon Creek)

Pet waste

The WSDOT has responsibility for pet waste that reaches McAllister Creek from their property near Exit 114 on I-5 by way of the dike. Residents of a nearby recreational vehicle park walk animals on the dike, and there was evidence of pet feces noted during the study. A pet waste station should be placed there, or access for pet walkers on the dike should be eliminated. (McAllister Creek)

Agricultural practices

The Nisqually Tribe has worked on agricultural problems in Red Salmon Creek. The farm animals should be totally removed from the area by 2007. Since these animals had direct access to the creek and drainage area, fecal coliform counts should be reduced. (Red Salmon Creek)

The Nisqually Tribe and the Pierce Conservation District have been working on a very large restoration project in the Ohop Creek area. Although the primary focus of this project is salmon recovery, many of the actions will also improve water quality. The project will be completed in phases and will continue as funding and participation of landowners allow. Some of the water quality improvements will include buffers and fencing of livestock, removal of drainage tiles allowing filtering of runoff (unclear), and filtering of runoff through streamside plantings. (Ohop Creek)

The Thurston Conservation District will work with landowners in the Nisqually Basin to implement best management practices and develop conservation plans. They will also continue the shellfish pledge project, an incentive-based program aimed at helping people change their behaviors that have a negative impact on water quality. They will also promote and/or administer financial assistance for implementing livestock exclusion fencing and plantings. (McAllister Creek)

The Pierce Conservation District will promote and/or administer financial assistance for implementing livestock exclusion fencing and plantings. They will also assist in the development and implementation of farms plans and water quality BMPs. (Ohop Creek, Lynch Creek)

Stormwater

The town of Eatonville will work on their stormwater issues. They will complete a stormwater plan and investigate illicit discharges. They will begin design work for a bio-filtration system to treat discharges to Lynch Creek in 2007 with plans to construct in 2008, if funding can be obtained. They will also work on investigating low impact development techniques for stormwater management. (Lynch Creek)

Pierce County will monitor two locations on Lynch Creek and Ohop Creek quarterly as part of their monitoring program. (Lynch Creek, Ohop Creek)

Thurston County will implement some of the BMPs listed in the Washington State stormwater manual on ditches that are publicly owned to help in the reduction of the fecal coliform reaching the waterways. (McAllister Creek)

Thurston County will perform monthly monitoring on McAllister Creek near the 1-5 bridge.

WSDOT, Pierce County, and Thurston County are covered by stormwater municipal NPDES permits. Stormwater discharges within the permitted area are subject to permit requirements. (All Focus Areas)

WSDOT will perform maintenance on tide gates one through six every other year. (McAllister Creek)

Ecology is working on the stormwater municipal NPDES Phase I and II permits, including a permit for the WSDOT. The Phase I and II permits were issued on January 17, 2007 and will be effective on February 16, 2007. The permit for WSDOT still remains under development. (All Focus Areas)

Other

A recommendation was suggested in the TMDL that was unable to be assigned to a stakeholder for implementation. This was placement of a portable toilet at creek access points during the fishing season (Steilacoom and Martin Way). Bacteria counts were elevated in this area where stream bank fishing occurred. We will continue, through adaptive management, to try to find a stakeholder that can manage this recommendation.

Dissolved oxygen

While low dissolved oxygen levels in McAllister Creek are largely a natural condition, high nutrient levels may exacerbate the already low dissolved oxygen levels. There were, however, no prescriptions for correction, only suggestions to investigate the natural condition further, and incorporate BMPs that are also handled under the fecal coliform prescriptions.

Thurston County is currently conducting a bacteria and nitrogen study for Henderson Inlet. Results from that study will be available mid 2007. Thurston County will consider if any of the findings from that study are applicable to portions of the Nisqually TMDL regarding anthropogenic sources of nitrogen. (McAllister Creek)

General

An adaptive management strategy will be used if the general approach to improve water quality does not achieve the desired results. Please see the *Adaptive Management* section of this document for more information. (All)

Pollution sources and organizational actions, goals, and schedules

This section of the WQIP outlines the entities involved in implementation, the activities that need to be carried out, and the schedule for implementing those activities. Table 2 provides a summary of this implementation plan's components.

Table 2. Nisqually TMDL Implementation Actions

Action	Schedule	Focus Areas				
		Nisqually Reach	McAllister Creek	Ohop Creek	Red Salmon	Lynch Creek
Town of Eatonville						
Perform monitoring on the town's stormwater discharge, where the town has jurisdiction to further determine sources of fecal coliform contamination	Ongoing, beginning October 2006					✓
Finalize and adopt the town's stormwater management plan	January 2007					✓
Investigate bacterial sources impacting the town's stormwater drainage system that discharges to Lynch Creek. Identify activities impacting surface discharges to the drainage system.	February 2007					✓
Design a bio-filtration system to treat discharges to Lynch Creek	2007					✓
Construct a bio-filtration system to treat discharges to Lynch Creek	2008					✓
Distribute educational materials on pet waste	Ongoing					✓
Investigate low impact development (LID) techniques for stormwater management	Ongoing					✓
Natural Resources Conservation Service (NRCS)						
Work with the Pierce and Thurston Conservation districts to administer the 2002 Farm Bill	Ongoing	✓	✓	✓	✓	✓

Action	Schedule	Focus Areas				
		Nisqually Reach	McAllister Creek	Ohop Creek	Red Salmon	Lynch Creek
Nisqually Reach Shellfish Protection District citizen advisory group						
Oversee implementation items in the Henderson Inlet and Nisqually Reach Shellfish Protection Districts' implementation work plan, specifically the on-site sewage system and stormwater recommendations	Ongoing	✓	✓			
Nisqually Tribe						
Work with the Pierce Conservation District on the Ohop restoration project. Work with landowners along the banks of the Ohop to restrict animal access to the creek	Ongoing			✓		
Removal of animals on the Braget farm to eliminate access to Wash Creek	2007	✓			✓	
Perform and coordinate monitoring in the Nisqually River Basin	As needed	✓	✓	✓	✓	
Coordinate monitoring activities in the Nisqually River Basin	Ongoing	✓	✓	✓	✓	✓
Nisqually River Council						
Organize and facilitate an annual adaptive management meeting beginning in 2008 to discuss progress and identify alternatives if needed	2008 and annually thereafter	✓	✓	✓	✓	✓
Pierce Conservation District						
Promote and/or administer financial assistance programs for implementing riparian livestock exclusion fencing and plantings	Ongoing			✓		✓
Work with the Nisqually Tribe on the Ohop Creek Restoration Project	Ongoing			✓		
Assist in the development and implementation of farm plans and water quality BMPs	Ongoing			✓	✓	✓

Action	Schedule	Focus Areas				
		Nisqually Reach	McAllister Creek	Ohop Creek	Red Salmon	Lynch Creek
Pierce County						
Voluntarily provide educational materials to the town of Eatonville regarding pet waste management	2006					✓
Continue monitoring on Ohop and Lynch creeks to further determine sources of fecal coliform contamination	Ongoing			✓		✓
Continue implementation of BMPs through the requirements of the NPDES Stormwater permit	Ongoing			✓	✓	✓
Investigate bacterial sources impacting the county's stormwater drainage system that drains to Lynch and Ohop Creeks	Ongoing			✓		✓
Enforce Critical Areas Ordinance and other Pierce County Land Use regulations (Planning and Land Services)	Ongoing			✓	✓	✓
Refer landowners to the Pierce Conservation District for technical assistance where agricultural or livestock impacts contribute direct flows or sheet flows to the county stormwater drainage system	Ongoing			✓	✓	✓
Complete the Nisqually Basin plan, and identify projects which may have an impact on water quality	2008			✓	✓	✓
Puget Sound Water Quality Action Team						
Provide technical and financial assistance to control pollution from on-site sewage systems, farm animal wastes and stormwater runoff	Ongoing		✓	✓	✓	✓
Administer grant funds for public involvement and education projects	Ongoing		✓	✓	✓	✓

Action	Schedule	Focus Areas				
		Nisqually Reach	McAllister Creek	Ohop Creek	Red Salmon	Lynch Creek
Tacoma/Pierce County Health Department						
Provide educational materials in areas where failing on-site systems have been identified	Ongoing			✓	✓	✓
Respond to referrals from citizens/local governments where there is evidence of suspected on-site sewage failures	Ongoing			✓	✓	✓
Develop a project to provide grant and loan assistance to qualifying low income residents and loan assistance to other qualifying residents to assist in the repair of failing on-site sewage systems	July 2007			✓	✓	✓
Develop on-site sewage system management plan as required by Chapter 246-272A-0015 WAC. The plan will provide the basis to identify the location and type of on-site sewage systems in Pierce County	2007			✓	✓	✓
Thurston Conservation District						
Animal access to ditches and waterways that drain tide gates 9, 13, 12, 4, and 5 has been restricted and fencing is done. Planting was completed in 2006. This will restrict animal access in both the creek and the ditch	2006		✓			
Work with landowners in the Nisqually Basin to implement BMPs and develop conservation plans	Ongoing		✓			
Promote and/or administer financial assistance programs for implementing riparian livestock exclusion fencing and plantings as well as other practices addressing water quality issues	Ongoing		✓			

Action	Schedule	Focus Areas				
		Nisqually Reach	McAllister Creek	Ohop Creek	Red Salmon	Lynch Creek
Continue the shellfish pledge project, an incentive-based program aimed at helping people change their behaviors that have a negative impact on water quality	Ongoing	✓	✓			
Respond to referrals from the County and State	Ongoing	✓	✓			
Thurston County						
Conduct a on-site sewage workshop in the area near the Meadows subdivision	2007		✓			
Use information from Woodland and Tanglewilde nitrate study to determine the portions that are also applicable in the Nisqually Basin	After December 2007		✓			
Continue to investigate possible on-site sewage system failures in Luhr Beach and areas along Nisqually Reach identified by Washington State Department of Health (WDOH). Work with owners to repair on-site sewage failures	Ongoing	✓				
Implement BMPs that are practicable on publicly owned ditches to reduce overland flow to the marine waters that may contain pollutants including fecal coliform	Ongoing	✓				
Provide financial assistance to homeowners through loans and grants for repairing failing on-site sewage systems	Now through 2011	✓	✓			
Thurston County is conducting a "Woodland Creek Pollutant Load Reduction Project" in response to recommendations in the Henderson Inlet Watershed TMDL Report. Thurston County will consider if any of the findings from that study are applicable to portions of the Nisqually TMDL area as it relates to nitrate loading to ground water	Conditional upon results	✓				

Action	Schedule	Focus Areas				
		Nisqually Reach	McAllister Creek	Ohop Creek	Red Salmon	Lynch Creek
Conduct monthly monitoring on McAllister Creek near I-5 bridge	Ongoing		✓			
Washington Department of Ecology						
When requested, assist in the review of QAPP plans for non-Ecology water quality monitoring efforts	Ongoing	✓	✓	✓	✓	✓
Enforce the Water Pollution Control Act (Ch. 90.48 RCW) requirements	Ongoing	✓	✓	✓	✓	✓
Perform inspections of construction stormwater sites and other permitted facilities	Ongoing	✓	✓	✓	✓	✓
Respond to non-dairy agriculture complaints	Ongoing	✓	✓	✓	✓	✓
Conduct TMDL effectiveness monitoring	2012	✓	✓	✓	✓	✓
Washington Department of Health						
Monitor marine water quality in Nisqually Reach	Ongoing 2/year	✓				
Washington Department of Transportation						
Discharges of stormwater conveyances owned or managed by WSDOT must meet Washington State water quality standards	Ongoing		✓			
Install a pet waste station on the dike at McAllister Creek or close access to the dike	Feb-08		✓			
Maintain tidegates 1-6 every other year per WSDOT maintenance program	2008 and every other year thereafter		✓			
All Participants						
Participate in annual adaptive management meetings	March 2008 and annually thereafter	✓	✓	✓	✓	✓

Adaptive management

Adaptive management is a process where the stakeholder group meets each year to analyze and discuss implementation activities. The group will look to see which best management practices (BMPs) are supporting water quality standards and which BMPs are not. It is at this time that we "adapt" our original implementation schedule to ensure that our plan continues to work.

The implementation plan assumes that the activities outlined will achieve water quality improvement. If water quality targets are not being met, then adaptive management is required. If monitoring results indicate the pollution levels are increasing, or not moving towards the pollution reduction goals, further analysis will be needed to determine additional actions to reach the goals. If water quality standards are achieved, but wasteload and load allocations are not, the TMDL will be considered satisfied.

The Nisqually River Council will facilitate the adaptive management meetings, which will be held annually beginning in 2008. The purpose of these meetings will be to review all actions that have been put into place, and make sure local entities are moving forward. The group will review all data collected and inform participants of actions needed for the next year. The stakeholders will also introduce new representatives of other participating agencies as needed.

TMDL reductions should be achieved by 2015. Partners will work together to monitor progress towards these goals, evaluate successes, obstacles, and changing needs, and make adjustments to the cleanup strategy as needed. It is ultimately Ecology's responsibility to assure that cleanup is being actively pursued and water standards are achieved.

See the *Implementation Monitoring* section in this report.

Funding Opportunities

The following is a list of funding sources commonly available at the writing of this document. These represent potential sources for grants and other financial incentives. However, there are other sources of funds through federal programs, Indian Tribes, and conservation groups that will or may provide assistance with the implementation of this plan. While these are generally stable sources of funding, funding sources change over time. New initiates, political interest, and legislation may create funding sources not available at this time. As new or additional sources become available, they will be pursued to accomplish the water quality goals in the Nisqually River Basin.

Centennial Clean Water Fund/Clean Water Act Section 319 Nonpoint Source Fund/Washington State Water Pollution Control Revolving Loan Fund. These three funding sources are managed by Ecology through one combined application program. Funds are available to public entities and some not-for-profit organizations (Section 319 only) as grants or low-interest loans. Grants require a 25 percent local match. Grants may be used for education/outreach, technical assistance, specific water quality projects, or as seed money to establish various kinds of water quality related programs or program components. Grants may not be used for capital improvements to private property without an easement being given but riparian fencing, riparian re-vegetation, and alternative stock water projects can be eligible for funding consideration.

Low-interest loans are available to public entities for all the uses listed above. They have also been used as "pass-through money" to provide low-interest loans to homeowners for on-site sewage system repair or agricultural best management practice implementation. Loan money can also be used for a wide range of improvements to private property.

Conservation Reserve Enhancement Program (CREP). This federal program provides incentives to restore and improve salmon and steelhead habitat on private land. This is a voluntary program to establish forested buffers along streams where streamside habitat is a significant limiting factor for salmonids. In addition to providing habitat, the buffers improve water quality and increase stream stability. Land enrolled in CREP is removed from production and grazing under 10-15 year contracts. In return, landowners receive annual rental, incentive, maintenance and cost share payments. The annual payments can equal twice the weighted average soil rental rate (incentive is 110 percent in areas designated by the Growth Management Act). The Pierce County Conservation District administers this program in conjunction with the U.S. Department of Agriculture, Natural Resource Conservation Service.

Emergency Watershed Protection. The U.S Department of Agriculture, Natural Resource Conservation Service may purchase easements on floodplain lands, and the right to conduct restoration activities, in exchange for limited future use by the landowner.

Environmental Quality Incentives Program. This federally funded program is administered by the Pierce County Conservation District in conjunction with the U.S. Department of Agriculture, Natural Resource Conservation Service. It provides technical assistance, cost share

payments, and incentive payments to assist crop and livestock producers with environmental and conservation improvements on the farm. This funding source provides 75 percent cost-share but allows 90 percent if a producer is a limited resource or beginning farmer or rancher. Program funding is divided up between livestock-related practices (60 percent) and crop land needs (40 percent). Contracts are for one to ten years.

Forestry Riparian Easement Program. This voluntary program, administered through the Washington State Department of Natural Resources Small Forest Landowner Office, acknowledges the importance of small landowners and their contribution to protection of wildlife habitat. The intent of the program is to help small forest landowners keep their land in forestry. The Forestry Riparian Easement Program partially compensates landowners for not cutting or removing qualifying timber under a 50-year easement. The landowner still owns the property and retains full access, but has "leased" the trees and their associated riparian function to the state.

Riparian Open Space Program. This is a voluntary program administered by the Washington State Department of Natural Resources (DNR) to acquire (through purchase or donation) an interest in lands within unconfined channel migration zones (CMZs). The DNR may acquire the fee interest of the CMZ land or a permanent conservation easement over such lands.

Rural Housing Repair and Rehabilitation Program. This program is administered by the U. S. Department of Agriculture and provides loans to low-income rural residents who own and occupy a dwelling in need of repairs. Funds are available for repairs to improve or modernize a home or to remove health and safety hazards. One percent loans are given for up to 20 years.

Salmon Recovery Funding. In 1999, the Washington State Legislature created the Salmon Recovery Funding Board (SRFB), composed of five citizens appointed by the Governor and five state agency directors. The board provides grant funds to protect or restore salmon habitat by funding habitat protection and restoration projects. It also supports related programs and activities that produce sustainable and measurable benefits for fish and their habitat. SRFB works closely with local watershed groups known as lead entities. It has helped finance over 500 projects to date. To be considered for funding assistance, the grant programs require that the proposed project be operated and maintained in perpetuity for the purposes for which funding is sought. All projects require lead entity approval and must be a high priority in the lead entity strategy. Grants are awarded by the board based on a public, competitive process that weighs the merits of proposed projects against established program criteria.

Measuring Progress toward Goals

Performance measures and targets

At the annual adaptive management meetings, Ecology and partners of this implementation plan will review any available data. If the current strategy fails to meet water quality standards for fecal coliform, Ecology and partners will develop additional control and source identification procedures.

Please refer to *Appendix A* of this document for long-term tracking of implementation projects.

Effectiveness monitoring plan

Effectiveness monitoring determines if the interim targets and water quality standards have been met after the water quality implementation plan is finished (i.e. the in-stream water quality monitoring). It is usually conducted by Ecology's Environmental Assessment Program. Effectiveness monitoring should begin when the advisory committee believes that the BMPs put into place are sufficient for TMDL reductions to have been achieved. This is estimated to occur near 2012. The choice of how monitoring options will take place will be determined based on resource availability and timing.

Entities with enforcement authority will be responsible for following up on any enforcement actions. Stormwater permit holders will be responsible for meeting the requirements of their permits. Those conducting restoration projects or installing BMPs will be responsible for monitoring plant survival rates and maintenance of improvements, structures and fencing.

Implementation monitoring

In the Nisqually River Basin, there are a few entities with funded sampling programs. These include:

- Thurston County with monthly sampling on McAllister Creek near I-5.
- The WDOH conducts monitoring twice a year on marine water quality in the Nisqually Reach.
- Pierce County Water Program will monitor several spots on Lynch Creek and Ohop Creek.
- Other monitoring is needed and the Nisqually Tribe will submit a Centennial/319 grant application in 2006 for implementation in 2007. Funding will need to be acquired before the monitoring program can begin. They will also coordinate monitoring efforts in the basin.

Reasonable Assurances

When establishing a TMDL, reductions of a particular pollutant are allocated among the pollutant sources (both point and nonpoint sources) in the water body. For the *Nisqually River Basin Fecal Coliform Bacteria and Dissolved Oxygen TMDL*, both point and nonpoint sources exist. TMDLs (and related Action Plans) must show "reasonable assurance" that these sources will be reduced to their allocated amount. Education, outreach, technical and financial assistance, permit administration, and enforcement will all be used to ensure that the goals of this water cleanup plan are met.

Ecology believes that the following activities are already supporting this TMDL and add to the assurance that fecal coliform and dissolved oxygen in the Nisqually River basin will meet conditions provided by state water quality standards. This assumes that the activities described below are continued and maintained.

The goal of the Nisqually River water quality improvement plan for fecal coliform is for the waters of the basin to meet the state's water quality standards. There is considerable interest and local involvement in resolving the water quality problems in the Nisqually River Basin. Numerous organizations and agencies are already engaged in stream restoration and source correction actions that will help resolve the fecal coliform problem. The following rationale helps provide reasonable assurance that the Nisqually River Basin nonpoint source TMDL goals will be met by 2015.

While Ecology is authorized under Chapter 90.48 RCW to impose strict requirements or issue enforcement actions to achieve compliance with state water quality standards, it is the goal of all participants in the Nisqually River Watershed TMDL process to achieve clean water through voluntary control actions. Ecology will consider and issue notices of noncompliance in accordance with the Regulatory Reform Act in situations where the cause of noncompliance with load allocations can be established.

Current implementation efforts (what is currently completed or underway)

Many of the stakeholders are already implementing bacteria reduction activities.
The following recommendations were originally identified as primary issues for cleanup of bacteria in the Nisqually River Basin Fecal Coliform Bacteria and Dissolved Oxygen Total Maximum Daily Load Study. Implementation activities currently underway are listed below.

On-site sewage systems

Study Recommendations

Several areas along Nisqually Reach are known potential sources of bacteria from on-site sewage systems including Luhr Beach, the commercial area near Interstate 5, and several residential areas. Other areas of interest in the watershed include the Ohop/Lynch Creek area, Ohop Lake and possibly the Red Salmon Creek Drainage.

Begin regular monitoring of Sequalitchew Creek for fecal coliform bacteria. Given the proximity of the Sequalitchew Creek mouth to the Nisqually Flats, high bacteria levels in the creek could significantly influence water quality in the shellfish beds.

Actions

One failing on-site sewage system near Luhr Beach has been repaired and another is under enforcement action to be repaired. Monitoring in the area has shown improved water quality. The area near Luhr Beach was reclassified for shellfish harvest from Restricted to Approved. This proposed change in classification is the result of repairs of on-site sewage systems and improvements in farm animal management practices.

While not originally located in the study area, the area south of Mill Bight was also reclassified from approved and unclassified to prohibited. The classification changed because high levels of fecal coliform bacteria were recorded coming from shoreline drainages and because several failing on-site sewage systems were subsequently identified along the shoreline. The pollution conditions in these areas do not meet the National Shellfish Sanitation Program water quality standards. This suggests that although we are making progress in the study area, there are still areas of concern located directly out of the study area. Thurston County is conducting surveys and dye testing in this area.

The Tacoma-Pierce County Health Department will investigate any suspected failures that are brought to their attention. A sanitary survey may be needed if reductions are not met using those action items listed in Table 2.

After researching conditions in Sequalitchew Creek with the Fort Lewis Military Reservation, it was determined that most of the flow has been redirected. The discharge has been rerouted to Tatsolo Point which is out of this study area. Therefore, the regular monitoring recommendation will not be pursued. Ecology will, however, stay involved with any new developments in the water quality of this creek.

Agricultural practices

Study Recommendations

The TMDL identified agricultural sources of pollution in the lower reaches of McAllister Creek, Red Salmon Creek and Ohop Creek. Inadequate maintenance of some tide gates along

McAllister Creek results in back flooding and may exacerbate the pollution contribution from these sources.

Actions

The Thurston Conservation District did extensive work in the McAllister Creek area. The Centennial Grant G0200337, which included fencing and plantings to keep livestock away from the creek, was completed summer of 2006. Sampling between 2001 and 2005 showed fecal coliform counts to be much lower than before the project. Actual counts were lower by the end of the project in 2006. More sampling is needed to determine if this project was successful.

The Nisqually Tribe has worked on agriculture-related problems in Red Salmon Creek. The animals should be totally removed from the Braget Farm area by 2007. Since these animals had direct access to the creek and drainage area, fecal coliform counts should decrease.

The Nisqually Tribe and the Pierce Conservation District are working on a very large restoration project in the Ohop Creek area. Although the primary focus of this project is salmon recovery, many of its actions will improve water quality. The project will be completed in phases and will continue as funding and participation of landowners allow. Some of the water quality improvements will include buffers and fencing of livestock, removal of drainage tiles allowing filtering of runoff, and filtering of runoff from plantings.

WSDOT will maintain the operation of tidegates number 1-6 every other year per their maintenance plan. This includes ensuring that the gates open and close properly.

Stormwater

Study Recommendations

The TMDL study identified several areas where stormwater is a consideration:

- City of Eatonville, and possibly Pierce County outfalls to Lynch Creek and outfalls to Ohop Creek and Ohop Lake
- The West Bank of McAllister Creek
- Interstate 5 outfall to McAllister Creek

Actions

The city of Eatonville is in the process of improving its stormwater contributions. See previous section. (pg 14)

Pierce County is monitoring two locations on Lynch Creek.

The West Bank of McAllister Creek has been addressed with some stormwater improvement completed by the Thurston County. (An increase in storage capacity of Mallard Pond that serves the Meadows subdivision has been installed.)

The WSDOT improved the discharge to McAllister Creek by building bioswales and placing compost on the highway shoulders. The installation was completed in May of 2006.

General

As discussed previously, if the actions in this document do not achieve the needed reductions to achieve water quality we will use adaptive management to come up with more implementation activities.

Ecology will consider and issue notices of noncompliance in accordance with the Regulatory Reform Act in situations where the cause or contribution of cause of noncompliance with load allocations can be established.

Public Involvement

A presentation of the draft Water Quality Implementation Plan was presented to the Nisqually River Council on February 16, 2007. At the meeting the comment period was discussed. The comment period ran from March 1, 2007 to March 31, 2007.

The following display ad was placed in the Olympian and the Nisqually Valley News on March 2, 2007, and the Eatonville Dispatch on March 7, 2007.

Comments requested on the Nisqually River Basin Detailed Implementation Plan (TMDL)

A 2005 study conducted by the Department of Ecology (Ecology), in cooperation with Thurston County and the Thurston Conservation District, found water quality problems in parts of the Nisqually watershed.

There are too much fecal coliform bacteria in McAllister, Red Salmon, Ohop, and Lynch creeks. In addition, nitrate levels are higher than normal in underground water (ground water) in the lower watershed, and dissolved oxygen levels in McAllister Creek are below healthy levels for aquatic life.

The study identified some potential sources of pollution including on-site septic systems, livestock and pet waste, stormwater runoff, and fertilizers applied to residential and agricultural lands.

For the past year Ecology and other partners have been working on a detailed plan to cleanup unhealthy waters in the Nisqually River Basin. Your comments are encouraged during the public comment period.

Beginning in 2008, Ecology will meet with local partners annually to discuss if implementation is progressing. Recommendations in the plan that are not achieving clean water will be reconsidered.

For more information, please contact Cindy James at 360/407-6556, or by e-mail at cjam461@ecy.wa.gov .

Public comment period
March 1 – 31, 2007

The Plan is available for review online at

http://www.ecy.wa.gov/biblio/0710016.html

In person at:

Lacey Timberline Library, 500 College St. SE:

Olympia Timberline Library, 313 8th Ave. SE:

Eatonville Library, 207 Center St. W.

Please send comments by March 31, 2007 to Cindy James, Department of Ecology, PO Box 47775, Olympia , WA 98504-7775, or email cjam461@ecy.wa.gov

References

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Appendices

Appendix A. Tables of organizations' progress

Nisqually TMDL Implementation Monitoring Results

Year	Monitoring Reports Reviewed	
	Goal	Result
2008		
2009		
2010		
2011		
2012		
2013		
2014		
2015		

Adaptive Management Meetings

Year	Meetings Held	
	Goal	Result
2008		
2009		
2010		
2011		
2012		
2013		
2014		
2015		

Appendix B. Letters of concurrence

Tacoma | Pierce County
Health Department
Healthier. Safer. Smarter.
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Governed by a local Board of Health

RECEIVED
APR 06 2007
Washington State
Department of Ecology

April 4, 2007

Dave Peeler, Manager
Water Quality Program
Department of Ecology
PO Box 47600
Olympia, WA 98504-7600

Dear Mr. Peeler:

This letter is to support the Nisqually TMDL Detailed Implementation Plan. This plan contains a wide-range of actions that should significantly reduce fecal coliform pollution in the Nisqually River Watershed. Such efforts will improve water quality and help protect public health in the watershed.

The Tacoma-Pierce County Health Department (TPCHD) has been identified as the lead for several actions in the Plan. The TPCHD will work to implement these actions provided that funding is available.

If you have any questions, please call Ray Hanowell, Environmental Health Specialist II, at (253) 798-2845.

Sincerely,

Steve Marek, R.S.
Public Health Manager
Environmental Health Program

3629 South D Street
Tacoma WA 98418-6813
Printed on 100% recycled paper

Federico Cruz-Uribe, MD, MPH, Director of Health

253 798-6500
800 992-2456
TDD: 253 798-6050

Pierce County
Public Works and Utilities

Brian J. Ziegler, P.E.
Director
Brian.Ziegler@co.pierce.wa.us

Environmental Services
9850 64th Street West
University Place, Washington 98467-1078
(253) 798-4050 Fax (253) 798-4637

April 16, 2007
WP54187

Ms. Cindy James
Department of Ecology
PO Box 47600
Olympia, WA 98504-7600

RE: Nisqually Water Cleanup Plan

Dear Ms. James:

Pierce County commends you on your work developing the Detailed Implementation Plan for the Nisqually River basin. We know how difficult it is to gather a group of diverse individuals with strong opinions and reach consensus on actions needed to protect water quality.

Pierce County agrees to participate in the actions set forth in the Plan as will be included in our NPDES Stormwater permit.

Congratulations on completing this plan

Sincerely,

Heather Kibbey
Water Quality and NPDES Coordination

HK:tr

cc: Dan Wrye, Water Programs
Roy Huberd, Water Programs
Randy Brake, Water Programs
File

Nisqually River Council

12501 Yelm Highway • Olympia WA 98513 • (360) 407-1686

Council Membership

Pierce County

Thurston County

Lewis County

Cities of Yelm, Eatonville & Roy

Tacoma Power

UW Pack Experimental Forest

WA Dept. of Natural Resources

WA Dept. of Fish & Wildlife

WA Dept. of Ecology

WA Parks & Recreation Commission

WA Conservation Commission

WA Secretary of State

Nisqually Indian Tribe

US Army, Fort Lewis

Nisqually National Wildlife Refuge

Gifford Pinchot National Forest

Mount Rainier National Park

Nisqually River Citizens Advisory Committee

April 16, 2007

Cindy James
South Puget Sound TMDL Coordinator
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

Dear Cindy,

Thank you for your dedication to the TMDL planning process for the Nisqually Watershed. The Nisqually River Council is pleased to play a role in its implementation. We are committed to supporting the Department of Ecology's efforts - through the promotion of its goals and strategies, and by hosting the annual review process called for in the implementation plan.

The River Council, as well as many of its members, has been active in the creation of the plan. It has been an excellent example of the progress that can be made through collaborative partnerships.

We look forward to our role in the successful achievement of a well conceived and executed plan for high water quality throughout the Nisqually.

Sincerely,

Steve Pruitt, Chair
The Nisqually River Council

Thurston
Conservation District
Local solutions to local problems

Conservation Planning • Habitat Restoration • Bio-engineering • Soils Analysis • Conservation Education • South Sound GREEN • Nutrient Management

March 12, 2007

Department of Ecology-Headquarters
Attn: Cindy James
South Puget Sound TMDL Coordinator

RE: Nisqually Water Quality Improvement Plan

Dear Ms. James:

The board and staff of the Thurston Conservation District support the efforts to improve water quality throughout Thurston County. Water quality protection and improvement is a high priority for the District and is part of our 5-year work plan as well as our long range goals.

We have participated in the collaborative effort to develop the Nisqually TMDL Water Quality Improvement Plan and fully support the plan that has been developed. We are committed to continuing our mission, which is "*To conserve, sustain, and protect our natural resources for the people of Thurston County through: rural and urban partnerships, fostering volunteerism, cooperation, education, leadership, and technical and financial assistance.*" It should be noted that much of our work is dependent on grants we receive from the Conservation Commission and DOE Clean Water Fund programs. Therefore our ability to provide those services on a continual basis is dependent on having such grants. We applied for Clean Water Funds in October 2006 for FY 2008 to concentrate efforts in the Nisqually/Henderson watershed, and it appears that we will receive that funding.

Conservation districts depend on individual responsibility and voluntary action to protect and concern natural resources. We are no a regulatory agency. Therefore we cannot and do not formulate regulations, nor do we enforce them. Our role is to offer landowners/occupier with information, technical assistance and resources necessary to practice good stewardship. It is our expectation that the agencies with the authority and responsibility for enforcement of laws and regulations will utilize their ability to do so.

If you have any questions or need additional information, please don't hesitate to contact me at kwhalen@thurstoncd.com or 360-754-3588, ext 114.

Sincerely,

Kathleen S. Whalen
District Administrator

921 Lakeridge Way SW Suite 101 • Olympia, WA 98502-6004 • Fax (360) 236-0941 • Phone (360) 754-3588
• website: www.thurstoncd.com • Email tcd@thurstoncd.com

THURSTON COUNTY
WASHINGTON
SINCE 1852

BOARD OF COUNTY COMMISSIONERS

Date: January 11, 2007

Ms. Cindy James
Department of Ecology
PO Box 47600
Olympia, WA 98504-7600

Re: Letter of Concurrence for the Nisqually Water Quality Implementation Plan

Dear Ms. James:

Thurston County has been a participant with agencies, tribes, organizations, property owners, and counties in the Nisqually River watershed in developing a Water Quality Implementation Plan. During this process certain actions have been identified for each of the participating organizations to implement that will improve water quality.

Thurston County has already implemented many of the actions identified in the plan that have helped improve water quality. We will continue those actions and proceed with others as our local priorities and resources allow.

Thank you for the important work that is necessary to improve the quality of Thurston County's waters.

Sincerely,

Chairman

Vice-Chairman

Commissioner

Building #1, Room 269, 2000 Lakeridge Drive SW, Olympia, Washington 98502-6045 (360) 786-5440
BoCC_07/Draft Ecology letter 1.10.07 T.D.D. (360) 754-2933

Appendix C. Response to comments

Comments were only received from the Washington State Department of Transportation.

Comment 1:

*RE: dissolved oxygen; text; page 7**:***

"The TMDL suggested that lower dissolved oxygen DO levels are somewhat of natural condition on McAllister Creek"

The TMDL study actually says: Low dissolved oxygen levels found in McAllister Creek were determined to be largely due to natural conditions, from a combination of low dissolved oxygen in the groundwater, wetland influence, and physical conditions that impede re-aeration of water." It was not possible to quantify the anthropogenic contribution to low dissolved oxygen compared to natural background conditions. High nutrient levels in the creek may contribute to excessive plant growth and thus lower dissolved oxygen levels. Recommendations are made for control of nutrients to the creek and investigation of high nitrate+nitrite nitrogen levels in groundwater. (Page vii) ....; and .... "High groundwater levels of nitrogen are the biggest source of nitrogen loading to the creek". (Page 61).

It seems like it would be more accurate to say something along the lines of, "low dissolved oxygen (DO) appears to occur naturally in McAllister Creek; this could be exacerbated by microbial oxygen demand as a result of elevated groundwater nitrate+nitrite levels". Suggest talking with Debby Sargeant, who wrote the TMDL study, to sort out the language.

***Response*:**

Comment noted: while the suggested changes may be appropriate, there is no opportunity to change the TMDL submittal. It was already approved by the Environmental Protection Agency (EPA) in 2005. This effort focuses on the Implementation Plan.

Comment 2:

Re: Nisqually Reach (Focus Area); paragraph 3, page 10

Fort Lewis wastewater treatment plant discharge is mentioned here, but nowhere else in the report. If shellfish protection is an issue in this TMDL, it would seem appropriate to include an assessment of the permit discharge limits and any available data regarding actual rather than just theoretical discharges from this plant; e.g. discharge monitoring reports (DMRs), to get some sense of the bacteria load this may be exerting on the receiving water.

Response:

Although the Fort Lewis wastewater treatment plant is mentioned in the TMDL, it was not included in the WQIP because the plant was ruled out as a potential contributor to bacteria levels in the Nisqually delta region.

Comment 3

Re: Table on page 25 of Draft WQ Implementation Plan; WSDOT responsibilities:

It is not clear exactly what this means. Highways themselves do not generate bacteria; rather they are conveyances. Most potential bacteria discharges to the highway system are outside of WSDOT's control, so installing source-controls is by and large not feasible. However, the requirement in the table is for controls to "filter water"; which is a treatment rather than a source-control, so it appears to be redundant with the third requirement in the table, which includes a requirement to, "Apply best management practices ...." This is addressed immediately below.

Response:

This item was added to show current work WSDOT has done to improve freeway runoff reaching McAllister Creek. Due to the lack of direct participation by WSDOT to develop this WQIP the information provided in the plan may not have been specific. Due to the lack of specificity this action item has been removed from the table.

Comment 4:

Re: Table on page 25 of Draft WQ Implementation Plan; WSDOT responsibilities:

Third requirement to "Apply best management practices ... including programmatic measures .... must meet a 90th percentile"

Apply BMPs:

TMDL-related BMP requirements ought to be tempered by the fact that Ecology has no approved or designated stormwater BMPs for bacteria treatment or removal. With the potential exception of rest areas (e.g., failing septic systems and pet exercise areas), the state highway system does not itself generate bacteria, but rather is a potential conveyance for sources which are beyond its control. In order to have a clear understanding regarding expectations and compliance pathways for these TMDL-related permit requirements, Ecology should provide WSDOT a list of Ecology-approved stormwater bacteria treatment BMPs that WSDOT is expected to deploy in these situations.

WSDOT is conducting research on hydraulic properties of vegetated roadside shoulder fill and natural soil and subsoil that should lead to ability to model infiltration under a variety of conditions. Conceptually, a 50% decrease in runoff volume should result in a 50% decrease in pollutant load, even if concentration doesn't change at all; although results indicate that concentration of particulate pollutants are decreased significantly. As long as net load to receiving water is decreased, and TMDL analysis is based on loading instead of concentration alone, infiltration BMPs ought to be considered viable treatment options; but this would require approval by Ecology.

. . . Programmatic Measures:

With regard to programmatic measures, WDOT believes that if it is in compliance with its Stormwater Management Plan, it should be in compliance with TMDLs, and TMDL language should reflect that.

. . . Must meet a 90th percentile:

The 90th percentile portion of the sentence appears to be cut off. The target value indicated in the TMDL study is a 90th percentile of 100 cfu/100 mL. While useful for assessment, modeling, and prioritization, 90th percentile is not mathematically equivalent to part 2 of the state water quality standard for fecal coliform bacteria. WSDOT maintains that the legal standard is still that in WAC 173-201a; i.e., "not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding ...." Additionally, there is more than one way to calculate 90th percentile; and these can yield different results depending on the data; so the method used or to be used for calculating 90th percentile must always be stated.

There are problems with percent decrease indicated to meet the target. While not noted explicitly in this 2006 TMDL draft, there are problems with the technical study data used to calculate the basis for percent reduction both at the I-5 outfall and elsewhere. (sampling between 2003-2003). Data sample size is too small to be representative (11 samples in just over a year), and sample events do not appear to be correlated to storm events. For I-5 discharge, sample size = 11, but three of the events were paired samples, so sample-event n = 8; wet season sample event n = 7. Additional samples were obtained prior to the 2005 (2002-3 data) TMDL study , but only five samples were collected from the I-5 culvert. The EPA National Monitoring Program and statistical power analysis both suggest a minimum sample set of 20 – 25 samples per year for two years (n = 40 to 50) in order to reasonably characterize a stream before implementing BMPs.

Other Historic data are ten to fifteen years old, and it is not clear what degree of QA has been applied to them.

Tribal data from June 1992 - November 1995	*(12 - 15 years old)*
Tribal data from June 1995 - April 1997	*(10 - 12 years old)*

Loading from the I-5 discharge to the creek cannot be determined, since culvert flow was not measured; an estimate was assigned. Receiving water loading is also highly uncertain. Stream flows were estimated by a third party, and were measured by Ecology at a single point (RM 4.5) on only eight days, only one of which coincided with receiving water sample events; two of the eight flow-measuring events occurred after the sampling period. Flows could only be measured at low tide because of tidal interference at other times. Flows are acknowledged to "vary a great deal from season to season".

Even in other cases when accurate instantaneous flow data are available concomitant with samples, estimating loading for anything much broader than that instant is highly likely to have a large amount of error. An EPA NMP workshop (1999) demonstrated that for TSS data obtained daily, and using several different modeling methods; if the data were broken up into groups representing the seven days of the week (e.g. data collected on Monday, Tuesday, etc.), loading estimates for the year could vary over an order of magnitude. Other studies have shown that protocols single storm event samples produce highly inaccurate estimates for entire storm loads.

The 2005 study author has indicated that the numeric load list (Table 13) should not be considered to be very accurate, and is only really appropriate to prioritize where the greatest efforts should be exerted first, in order to maximize benefit to the watershed with limited resources. According this prioritization of the tributaries, the I-5 culvert discharge is a fraction of a percent of overall loading. This should be considered in assessing where and on what timetable efforts should be expended in the watershed.

***Response**:*

Many of these comments apply directly to the development of the TMDL. The 90th percentile is an approved tool used by Ecology. In response to this comment the table has been changed to read: "Discharges of stormwater from conveyances owned or managed by WSDOT must meet Washington State water quality standards."

Comment 5:

Re: Attribution of bacteria sources

The TMDL study says:

"McAllister Creek RM 3.7 to 3.1
Increases in bacteria levels were seen in this reach. Located in this reach is a large commercial development including a recreational vehicle (RV) park, stormwater discharge from Interstate-5(I-5), and tide gates 1 and 2. Tide gate 1 drains the RV park area and often has high bacteria concentrations, but there is very little water in the ditch behind this tide gate and it is often stagnant". Yet the TMDL DIP doesn't mention the commercial development or RV park as potential sources of bacteria. As is common in many TMDLs, sampling is done at or near bridges, because it is convenient; but elevated FC below a bridge, compared to another site upstream, does not mean the bridge is responsible for the increased stream pollutant load. Absent sampling immediately above

and below the bridge, there is no way to factor out other sources upstream from the bridge and downstream from the next sampling point upstream.

Response:

Thurston County has inspected the RV park and they have an operational certificate that requires inspection of the system and pumping of the tank, if needed, every three years. The tank was pumped and the system inspected in September 2004. It will be due for inspection in fall of 2007. Runoff from stormwater was the other contributing factor. Other sources upstream have also been looked at such as agricultural practices and tide gate maintenance. It was determined that pet waste is a large contributing factor. RV residents walk their pets along the dike and many do not pick up wastes deposited there. Therefore, pet waste is the focus.

Concluding Comments:

At least two TMDL submittal reports[1] state, "EPA guidance recommends that NPDES-regulated municipal (and small construction) stormwater discharge effluent limits be expressed as best management practices (BMPs) or similar requirements, rather than as numeric effluent limits". Given the limitations on data quantity and quality, and the inherent high degree of uncertainty in stormwater pollutant levels at any given point in time, WSDOT agrees with the recommendation pointed out by these two TMDLs; that numeric effluent limits are inappropriate. As noted earlier, WDOT believes that if it is in compliance with its stormwater management plan, it should be in compliance with TMDLs, and TMDL language should reflect that. Also as noted above, WSDOT and Ecology need to work together to establish approved BMPs for bacteria treatment and/or removal.

Response:

Ecology agrees and looks forward to working with WSDOT to establish approved BMPs for bacteria treatment and removal.

Appendix D. Load allocations

Ohop Creek bacteria reductions and targets

Site	Critical season	# of sample events in period	Geometric mean	90th percentile	FC reduction needed to meet standards	Limiting criterion	Target value fc/100 mL
Lynch Creek RM 6.2T	Wet	8	27	260	13%	90th percentile	200
Ohop Creek RM 6.0	Wet	16	22	264	24%	90th percentile	200
Ohop ditch at RM 2.2D	Dry	5	113	452	56%	90th percentile	200
Ohop Creek RM 0.1	Dry	4	102	383	48%	90th percentile	200

Red Salmon Creek fecal coliform bacteria reduction targets

Site	# of samples	Geometric mean #fc/100mL	90th percentile #fc/100mL	FC reduction needed to meet target limits	Limiting criterion	Target 90th percentile #fc/100mL
Red Salmon RM 1.44	6	28	97	51%	90th percentile	48
Wash Creek RM 1.42T	6	130	285	83%	90th percentile	48
Red Salmon RM 1.40	15	25	131	37%	90th percentile	43
Unnamed Trib RM 1.30T	15	57	116	14%	90th percentile	43

Fecal coliform bacteria target geometric mean, 90th percentile, and percent bacteria reduction for McAllister Creek

McAllister Creek Site	Target geometric mean fecal coliform (# fc/100 mL)	Target 90th percentile fecal coliform (# fc/100 mL)	Bacteria reduction needed
RM 4.3	34	84	32%
RM 3.7	27	55	Based on RM 4.3 meeting targets
RM 0.1	14	43	34% *

Based on DOH and Ecology TMDL sampling from July 2002 - March 2004 (n=28)

McAllister Creek tributaries estimated fecal coliform loading, current geometric mean and 90th percentile fecal coliform, and percent reduction need to meet fecal coliform targets

Site	FC loading based on 90th percentile values (billions per day)	Current FC geometric mean (fc/100 mL)	Current 90th percentile FC (fc/100 mL)	Percent reduction in FC needed to meet water quality standard
Little McAllister Creek	38.2	48	378	74%
Tide gate 13	32.8	22	168	40%
Tide gate 9	12.5	54	325	69%

Site	FC loading based on 90th percentile values (billions per day)	Current FC geometric mean (fc/100 mL)	Current 90th percentile FC (fc/100 mL)	Percent reduction in FC needed to meet water quality standard
Tide gate 4	7.8	36	520	81%
Tide gate 15	7.3	17	134	0%
Tide gate 5	6.4	38	545	78%
Tide gate 12	6.4	42	172	42%
Tide gate 10	4.5	20	137	27%
Tributary at RM 4.3 (LB)	3.1	51	254	61%
Culvert at TG 11	3.1	24	251	60%
Medicine Creek at mouth	3.1	59	208	52%
Tide gate 14	2.2	16	175	43%
Tide gate 2	2.1	14	51	0%
Tributary at RM 4.34 (LB)	1.2	8	99	0%
Tide gate 8	1.2	75	1615	94%
Tributary at RM 4.42 (LB)	1.2			0%
Tide gate A	**.59**	**12**	**48**	**10%**
Tributary at RM 4.41 (LB)	.48	12	39	0%
I-5 Stormwater Pipe	.41	29	212	53%
Tide gate 1	.41	84	1652	94%
Tide gate B	**.41**	**8**	**33**	**0%**
Tide gate 3	.38	22	110	9%
Tributary at RM 4.6 (LB)	.13	26	175	43%

Bold = Indicates site must meet marine bacteria standard

Appendix E. Glossary and acronyms

303(d) list: Section 303(d) of the federal Clean Water Act requires Washington State periodically to prepare a list of all surface waters in the state for which beneficial uses of the water – such as for drinking, recreation, aquatic habitat, and industrial use – are impaired by pollutants. These are water quality limited estuaries, lakes, and streams that fall short of state surface water quality standards, and are not expected to improve within the next two years.

Best management practices (BMPs): Physical, structural, and/or operational practices that, when used singularly or in combination, prevent or reduce pollutant discharges.

Clean Water Act (CWA): Federal Act passed in 1972 that contains provisions to restore and maintain the quality of the nation's waters. Section 303(d) of the CWA establishes the TMDL program.

Designated uses: Those uses specified in Chapter 173-201A WAC (Water Quality Standards for Surface Waters of the State of Washington) for each water body or segment, regardless of whether or not the uses are currently attained.

Existing uses: Those uses actually attained in fresh and marine waters on or after November 28, 1975, whether or not they are designated uses. Introduced species that are not native to Washington, and put-and-take fisheries comprised of nonself-replicating introduced native species, do not need to receive full support as an existing use.

Extraordinary primary contact: Waters providing extraordinary protection against waterborne disease or that serve as tributaries to extraordinary quality shellfish harvesting areas.

Fecal coliform (FC): That portion of the coliform group of bacteria which is present in intestinal tracts and feces of warm-blooded animals as detected by the product of acid or gas from lactose in a suitable culture medium within twenty-four hours at 44.5 plus or minus 0.2 degrees Celsius. FC are "indicator" organisms that suggest the possible presence of disease-causing organisms. Concentrations are measured in colony forming units per 100 milliliters of water (cfu/100mL).

Geometric mean: A mathematical expression of the central tendency (an average) of multiple sample values. A geometric mean, unlike an arithmetic mean, tends to dampen the effect of very high or low values, which might bias the mean if a straight average (arithmetic mean) were calculated. This is helpful when analyzing bacteria concentrations, because levels may vary anywhere from ten to 10,000 fold over a given period. The calculation is performed by either: 1) taking the nth root of a product of n factors, or 2) taking the antilogarithm of the arithmetic mean of the logarithms of the individual values.

Load allocation (LA): The portion of a receiving water's loading capacity attributed to one or more of its existing or future sources of nonpoint pollution or to natural background sources.

Loading capacity: The greatest amount of a substance that a water body can receive and still meet water quality standards.

Margin of safety (MOS): Required component of TMDLs that accounts for uncertainty about the relationship between pollutant loads and quality of the receiving water body.

National Pollutant Discharge Elimination System (NPDES): National program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements under the Clean Water Act. The NPDES program regulates discharges from wastewater treatment plants, large factories, and other facilities that use, process, and discharge water back into lakes, streams, rivers, bays, and oceans.

Nonpoint source: Pollution that enters any waters of the state from any dispersed land-based or water-based activities, including but not limited to atmospheric deposition, surface water runoff from agricultural lands, urban areas, or forest lands, subsurface or underground sources, or discharges from boats or marine vessels not otherwise regulated under the National Pollutant Discharge Elimination System Program. Generally, any unconfined and diffuse source of contamination. Legally, any source of water pollution that does not meet the legal definition of "point source" in section 502(14) of the Clean Water Act.

Pathogen: Disease-causing microorganisms such as bacteria, protozoa, viruses.

Phase I Stormwater Permit: The first phase of stormwater regulation required under the federal Clean Water Act. The permit is issued to medium and large municipal separate storm sewer systems (MS4s) and construction sites disturbing five or more acres.

Phase II Stormwater Permit: The second phase of stormwater regulation required under the federal Clean Water Act. The permit is issued to smaller municipal separate storm sewer systems (MS4s) and construction sites disturbing one acre or more.

Point Source: Sources of pollution that discharge at a specific (discrete?) location from pipes, outfalls, and conveyance channels to a surface water. Examples of point source discharges include municipal wastewater treatment plants, municipal stormwater systems, industrial waste treatment facilities, and construction sites that clear more than 5 acres of land. (Are Phase II sites not considered point sources?)

Pollution: Such contamination, or other alteration of the physical, chemical, or biological properties, of any waters of the state, including change in temperature, taste, color, turbidity, or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive, or other substance into any waters of the state as will or is likely to create a nuisance or render such waters harmful, detrimental, or injurious to the public health, safety, or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, fish, or other aquatic life.

Primary contact recreation: Activities where a person would have direct contact with water to the point of complete submergence including, but not limited to, skin diving, swimming, and water skiing.

Stormwater: The portion of precipitation that does not naturally percolate into the ground or evaporate but instead runs off roads, pavement, and roofs during rainfall or snow melt. Stormwater can also come from hard or saturated grass surfaces such as lawns, pastures, playfields, and from gravel roads and parking lots.

Surface waters of the state: Lakes, rivers, ponds, streams, inland waters, saltwaters (marine waters?), wetlands and all other surface waters and water courses within the jurisdiction of the state of Washington.

Total maximum daily load (TMDL): A distribution (amount, concentration?) of a substance in a water body designed to protect it from exceeding water quality standards. A TMDL is equal to the sum of all of the following: 1) individual wasteload allocations (WLAs) for point sources, 2) the load allocations (LAs) for nonpoint sources, 3) the contribution of natural sources, and 4) a Margin of Safety to allow for uncertainty in the wasteload determination. A reserve for future growth is also generally provided.

Wasteload allocation (WLA): The portion of a receiving water's loading capacity allocated to existing or future point sources of pollution. WLAs constitute one type of water quality-based effluent limitation.

Watershed: A drainage area or basin in which all land and water areas drain or flow toward a central collector such as a stream, river, or lake at a lower elevation.