Willapa River
Fecal Coliform Bacteria
Total Maximum Daily Load

Water Quality Implementation Plan

August 2008

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Water Quality Implementation Plan

Developed by the
Willapa Water Quality Workgroup

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Executive Summary

This *Water Quality Improvement Plan* builds upon studies and corrective actions that started before 1996 in the Willapa River watershed. Local work has been very effective in lowering bacteria levels. However, more work is needed in certain areas of the watershed to meet water quality objectives.

This plan describes additional work that is scheduled in order to meet established beneficial uses of the river and estuary.

The additional steps in this plan will help Ecology and local stakeholders focus efforts on priority pollution sources. The general approach for TMDL implementation will be to:

- Provide technical assistance and help each implementing partner find financing to make needed changes that will help improve water quality.

- Support the work of Health Department programs to help homeowners properly maintain their on-site septic systems, including local programs for education/outreach, financial assistance, or enforcement.

- Foster continued coordination among the farm service agencies, natural resource agencies, and agricultural landowners so that technical and financial assistance can continue to help expand implementation of best management practices (BMPs) for improving farm goals, including water quality protection.

- Develop a coordinated monitoring program to track implementation activities and programs that are called for in the Water Quality Implementation Plan.

- Assure that new data are available, over the foreseeable future, to show where water quality improvements occurred and where limited cleanup resources should be focused next.

The approach is designed to complete and implement a realistic plan, monitor for success, and continuously adapt or refocus implementation where monitoring shows that changes are needed. Implementation will be determined by available funding and the ability of the implementing parties to incorporate and prioritize the plan activities into their current programs and budgets. Financial assistance is available for implementing controls.

Overall, the desired project outcomes are:

- Provide an ongoing understanding of current water quality conditions.
- Increase public awareness of the pollution reductions needed and why.
- Keep partners in the cleanup process informed of progress so they can prioritize resources and actions to help fix the highest priority problems.

While government programs can help, the actions of individual landowners primarily determine water quality.

The federal Clean Water Act requires restoration of impaired water bodies to clean water standards using a water cleanup plan known as a total maximum daily load, or TMDL process. This process starts with a study and analysis of pollution levels and sources. Then it requires that actions be taken to restore healthy water quality, based on that analysis.

The preliminary plan for meeting bacteria cleanup goals in the Willapa River watershed was completed by a local workgroup and approved by the U.S. Environmental Protection Agency in August 2007. This plan continues a phased approach that will be managed by the local workgroup and Ecology.

This report:

- Reviews the cleanup goals set in the preliminary plan.
- Reviews cleanup actions implemented recently.
- Describes in more detail who is involved; what they expect to continue doing; how the work will be funded; and when it is scheduled to happen.
- Proposes a monitoring strategy to evaluate the effectiveness of improvement measures and provide ongoing feedback about new priorities as the previous ones are fixed.

Like the earlier plan, this report also helps meet a required part of the federal Clean Water Act. It addresses fifteen locations in the watershed that the Clean Water Act section 303(d) list identifies as sites which require bacteria reduction.

In 1998, fecal coliform bacteria concentrations at these sites were high enough to indicate a potential health risk to recreational users. Various swimming holes in the river are used by children and families in the summertime. Several rope swings and fishing lures hanging from tree branches along the river mark favorite recreation spots. There is one commercial retreat center and a private group campground on the upper river shoreline.

The tributaries and the mainstem Willapa River drain to an estuary and Willapa Bay. The bay supports tribal, commercial, and private shellfish harvest. Elevated bacteria concentrations indicate a potential health risk to people who eat the shellfish and can result in restrictions on shellfish harvest.

The Washington State Department of Health (DOH) classifies areas for commercial harvest of shellfish. In Willapa Bay, DOH established a “sanitary line” separating the approved area from the prohibited area. A buffer area separates the shellfish harvest “sanitary line” from a point upstream at river mile 1.8 where the state marine water quality standards apply. Shellfish occur in the buffer area and upstream of where the marine water quality standards begin. DOH set the sanitary line at a calculated safe distance downstream of the Raymond and South Bend wastewater treatment plants. The buffer area protects people from eating contaminated shellfish due to an upset, bypass, or loss of disinfection at either of these facilities.

Harvest restrictions have not been needed in the mouth of the Willapa River for many years. However, the state marine water quality standard for shellfish protection is exceeded about one sample event each year at Johnson Slough near the river mouth.

In the TMDL, National Pollutant Discharge Elimination System (NPDES) permit limits for all of the facilities in the lower Willapa River are protective of water quality standards and meet the intent of the TMDL. As a result, the cleanup actions focus entirely on nonpoint sources of pollution.

Nonpoint source reductions are needed at 15 places in the watershed. The reduction goals vary from 17 percent (SR-6 at Menlo) to 81 percent (Swiss Picnic campground).

The final standard for achievement of the TMDL is to have the water in the river meet water quality standards consistently. When standards are achieved, the TMDL will also be met. In order to reach that goal, the plan encourages watershed residents to consider the following actions:

- Prevent domestic animals from having direct access to streams. Livestock are the primary problem, but pets also contribute.

- Maintain vegetation along streams. During normal rain conditions, it helps filter water flowing over the surface before it reaches streams. Under normal and flood conditions, vegetation reduces bank erosion.

- Apply manure to fields at rates and times that allow for plants to use the nutrients rather than have the nutrients carried by rain water or flood events into streams.

- Store manure in a manner that protects it from being carried into streams by rain water or flood events.

- Pump and inspect septic systems regularly. Perform needed repairs in a timely manner.

The next phase is to address the obvious problems in the areas of primary concern. Additional water quality monitoring will help identify or rule out pollutions sources. Sampling will especially focus on sources of bacteria to four stormwater drains in Raymond and South Bend. Additional outreach, technical assistance and corrective measures will be conducted throughout the watershed as priority areas are found. Additional livestock management sites will receive technical assistance on installing best management practices.

More widespread sampling is planned over time, as funding is identified, to track progress towards achievement of water quality standards. Ongoing monitoring is essential to determine what the most up-to-date conditions are and to help local organizations focus limited resources on fixing remaining priority areas. Ongoing monitoring will also help suggest if, how, and where the plan should be adapted.

Partners will need to continue to be creative in finding ways to fund the work. For instance, the county and cities created a plan to share the work and costs of stormwater sampling. The conservation district utilized state water quality financial assistance to help landowners pay for installation of some best management practices recommended in this TMDL. More of that state and federal funding continues to be available. Additional federal funding is available, especially from the Conservation Reserve Enhancement Program (CREP). The county identified prospective state and federal grant funds, and a state loan program is also available for fixing failing septic systems.

The public will continue to receive project updates so they can understand if and how the project affects them. Citizen participation will be essential for the plan to be effective. Communication methods will be tailored to the audience and the location in the watershed. Keeping all of the stakeholders properly informed may require site-specific messages.

General outreach may involve newspaper stories or announcements. If information needs to be targeted to specific groups or neighborhoods, special presentations and/or direct mailings may be used. All of these outreach methods have been useful in this project so far.

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 criteria, to accomplish 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 analyzes 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 the data are used to develop the 303(d) list. The 303(d) list is used as part of a Water Quality Assessment.

The Water Quality Assessment is a list that tells a more complete story about the condition of Washington's water. This list divides water bodies into five categories:

Category 1 – Meets standards for parameter(s) for which it has been 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 program in place that should solve the problem.
- 4c. – Is impaired by a non-pollutant such as low water flow, dams, and culverts.

Category 5 – Polluted waters that require a TMDL – the 303d list.

TMDL process overview

The Clean Water Act requires a total maximum daily load (TMDL) to be developed for each of the water bodies on the 303(d) list (EPA, 2001). The TMDL identifies pollution problems in the watershed and then specifies how much pollution needs to be reduced or eliminated to achieve clean water. Then 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 has been 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 how much of a given pollutant can be discharged to the water body and still meet standards. This amount is called the loading capacity of the water body. Then, that pollutant load is distributed among all the various sources in the watershed which contribute to the pollution.

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 any lack of knowledge about the causes of the water quality problem or the loading capacity of the water body. 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.

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 determines 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 either a load allocation or a wasteload allocation, as defined above. 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

What Part of the Process Are We In?

This project phase will develop a Water Quality Implementation Plan (WQIP). It will focus on developing and implementing more detailed cleanup strategies, compared to the more general recommendations of previous plans.

Water quality protection activities have been happening for a long time in the Willapa watershed. So, this plan is meant to fine-tune and help advance the 2007 TMDL water quality improvement report.

The 2007 report predicted that water quality standards for fecal coliform bacteria could be met by 2012, given the pace of improvements already measured. With the ongoing monitoring that this plan describes, a pathway is in place to adapt the plan on an as-needed basis.

A continuous review of progress and refinement of cleanup action priorities will keep the plan alive.

Why is Ecology Conducting a TMDL in This Watershed?

Overview

Ecology conducted a TMDL study in this watershed because the federal Clean Water Act requires that impaired water bodies be restored to meet water quality standards through a total maximum daily load, or TMDL process. Ecology's Southwest Regional Office prioritized the watersheds needing TMDLs in southwest Washington. This TMDL stems from the 1996 priority-setting process conducted with people who live in the Willapa area (Ecology, 1997).

Previous studies summarized the relative amounts of fecal coliform bacteria coming from the tributaries, river, and five facilities in the cities (two treatment plants and three seafood processors). Discharges from the facilities are already regulated by federal discharge permits. Permit limits were determined to be adequate to meet the needs of this TMDL. Consequently this project focuses just on the nonpoint sources. Tables 1 and 2 identify the affected waterbody segments. Table 3 names the facilities with permit limits already meeting the TMDL.

Table 1. Study area water bodies on the 2004 303(d) list for fecal coliform bacteria

Waterbody Name	Listing ID	Township	Range	Section
Willapa River	10013	14N	9W	24
	6688	14N	9W	21
	9998	14N	9W	24
	10000	14N	8W	19
	10001	4N	8W	27
	10002	13N	8W	52

Waterbody Name	Listing ID	Township	Range	Section
Willapa River	10003	13N	8W	14
	10004	13N	8W	48
	10006	12N	7W	4
	10007	12N	7W	3
Unnamed Creek (Central St drain @ Coast Seafoods)	9995	14N	9W	28
Riverdale Creek	9989	14N	9W	24
Wilson Creek	10009	14N	8W	27
Falls Creek	9983	12N	7W	11
Fern Creek	9984	12N	7W	3

Table 2. Impaired but unlisted water bodies discovered during the TMDL study

Waterbody Name	Location		
Fork Creek	Township 12 N	Range 7 W	Section 6
Raymond Stormwater outfall at Delaware Rd.	Long.DD 123.76	Lat.DD 46.67	
South Bend Stormwater outfall at South Bend Packers	Long.DD 123.79	Lat.DD 46.66	

Table 3. Permitted point sources of bacteria

Facility Name	NPDES ID	Permit Flow (mgd)	Permit FC Bacteria (cfu/100ml)	Max. FC Reported 1998-2002 (cfu/100ml)
City of Raymond WWTP	WA000023329	1.500	200	502
City of South Bend WWTP	WA0037591	0.375	200	532
South Bend Packers	WA0040941	0.010	200	1,600
East Point Seafood	WA0001104	0.320	200	2,200
Coast Seafood	WA0002186	0.099	200	44,000

The TMDL study found that as long as the permit limits are met, the facilities do not need any additional bacteria controls.

What has already been done?

Local jurisdictions, the Pacific Conservation District (PCD), the U.S. Natural Resource Conservation Service (NRCS), landowners, and citizens groups have worked to protect and restore these areas for many years.

For example, local natural resource planning groups produced *Watershed Analysis* (Weyerhaeuser, 1994) and *Salmon Recovery Strategies* (Willapa Bay Water Resources Coordinating Council, 2006), that have led to installation of best management practices (BMPs), education and outreach, riparian restoration, and water quality monitoring.

Many land improvements helped prevent livestock manure and bacteria runoff to surface water. For example, a large tideland pasture located at Potter Slough, in the lower river, typically supported up to 300 cows until 2005 (personal communication, Pacific Conservation District Board, 2006). The land was sold for wetland conversion to restore it to natural river functions and the cattle were removed.

Actions of the Pacific County Department of Community Development (DCD) helped guide a variety of water quality improvement actions, such as making low-interest loans available for septic system repair. Some actions, such as the conversion of Ecklund Park residences in the city of Raymond to sanitary sewers in 1997, reduced bacteria loads in the lower Willapa River. This helped allow the state DOH Shellfish Protection Program to justify expanding the commercial shellfish harvest area closer to the river mouth. These bacteria reduction activities, implemented largely by landowners and the city, resulted in the upgrade of about 150 acres of shellfish growing area in 1998.

The Washington State Dairy Nutrient Management Program (DNMP) legislation was enacted and implemented in April 1998. All dairies in the Willapa watershed now implement nutrient management plans that significantly reduce bacteria discharges to water. Major federal and state financial assistance programs helped landowners improve their farm operations, economics and land conditions while helping to improve water quality. A Centennial Clean Water grant was awarded to the PCD in 2003 for farm management planning services and to help finance landowner projects that directly support this TMDL implementation.

Before this plan began, livestock exclusion (fencing) and riparian planting were applied to approximately 9300 feet of shoreline on three land parcels in important river segments of this TMDL project area. The PCD also implements the federal Conservation Reserve Enhancement Program (CREP). Two Willapa Valley landowners have participated in this program since 1998. Landowners install fencing and riparian plantings on their shorelines and place that area in an easement in exchange for a multi-year lease payment. Those two agreements protect more than 6,000 feet of shoreline and provide a buffer of approximately ten acres of land. Since the cattle can no longer directly access the river, alternative livestock watering equipment is included in those agreements. These practices frequently allow or encourage more efficient and cost-effective grazing management opportunities. Producers found that different grazing rotations help promote a more healthy plant cover, improve forage quantity and quality, and stabilize the soils better than an uncontrolled animal access situation. Riparian planting further reduces soil

loss from erosion and river washout. Similar financial and conservation returns have been demonstrated with the use of the federal Environmental Quality Incentive Program (EQIP) implemented in the Willapa basin by the Natural Resource Conservation Service.

EQIP provided grants to help dairy farmers with the initial costs of implementing the Dairy Nutrient Management Act requirements. Grants paid for capital improvements like manure containment and dry-stacking that allows nutrients to be captured and used instead of wasted in runoff to surface water. Carefully timed and controlled rates of livestock nutrient applications have improved forage quality and quantity, improved land /soil health, and reduced the need for commercial fertilizer purchases.

EQIP Program participants were initially very skeptical about the potential value of the activities brought by the DNMP, but many have effectively applied the program on their farms for financial and ecological profit. While the water quality benefits from the increased investments in farm planning and improvements cannot be directly summed up, monitoring shows that water quality has improved since 1998. However, more financial and technical support for the agriculture sector, as well as other implementing parties, would be especially helpful.

Watershed Description

The Willapa River is located in southwest Washington State, in Water Resource Inventory Area (WRIA) 24, also known as the Willapa watershed, in Pacific County, Washington. The figure below shows Willapa River watershed.

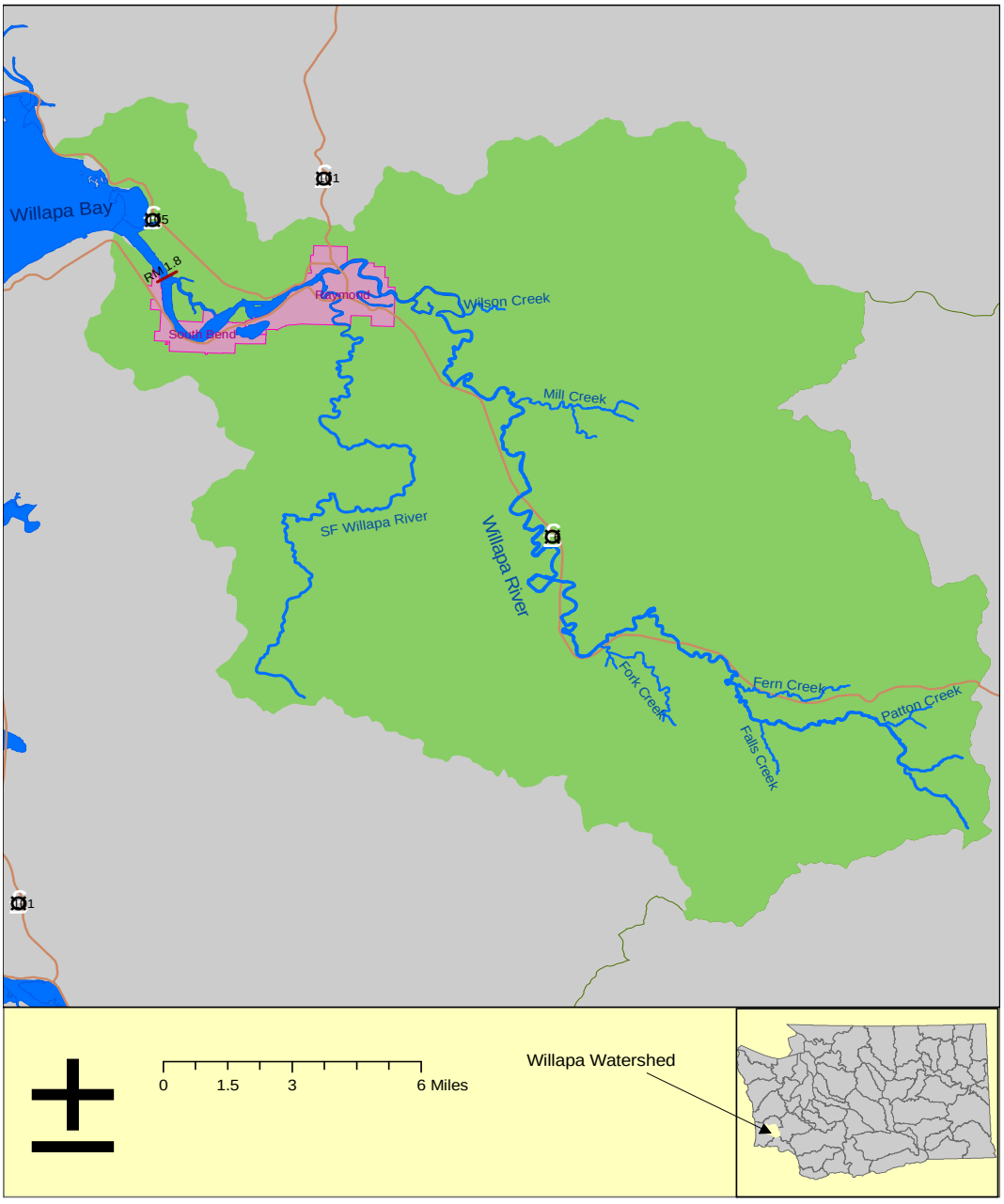

Figure 1. Map of the Willapa Watershed.

The lower river reach extends from the mouth to a short distance downstream of Mill Creek. This is the reach where there are tidal effects. The upper river reach is upstream of this location.

What Will Be Done?

Implementation strategy (summary of actions)

The TMDL approach develops and implements a realistic plan, monitors for success, and continuously adapts or refocuses implementation where monitoring shows that changes are needed.

Overall, the desired project outcomes are to:

- Provide an ongoing understanding of current water quality conditions.
- Increase public awareness about what pollution reductions are needed and why.
- Keep partners in the cleanup process informed of progress so they can prioritize resources and actions to help fix the highest priority problems.

The general approach for TMDL implementation will be to:

- Provide technical assistance and help each implementing partner find financing to make needed changes that will help improve water quality.

- Support the work of Health Department programs which help homeowners maintain their on-site septic systems properly, including local programs for education/outreach, financial assistance, or enforcement.

- Foster continued coordination among the conservation district, natural resource agencies, and agricultural landowners so that technical and financial assistance will continue to expand actions which improve water quality protection.

- Develop a coordinated monitoring program to track the implementation of activities and programs that will be called for in the water quality implementation plan.

- Assure that sampling data are kept current to show where water quality improvements have occurred and where limited cleanup resources should be focused next.

While government programs can help, the actions of individual landowners primarily determine water quality.

This plan continues a phased approach that will be managed by the local workgroup and Ecology. Appendix A identifies many specific actions and a timeline planned for their completion.

The next phase is to address the obvious problems in the areas of primary concern. Actions focus on four primary sources of bacteria pollution in the watershed.

Stormwater runoff
Additional water quality monitoring will help identify or rule out specific pollution sources. Sampling will especially focus on sources of bacteria to four stormwater drains in Raymond and South Bend. Additional outreach, technical assistance and corrective measures will be conducted throughout the watershed as priority areas are found.

The city of South Bend also will continue to oversee replacement of residential side sewers to ensure that sanitary wastes from homes are conveyed directly to the treatment plant and remain separate from stormwater, where it could otherwise drain to the river or the environment.

Livestock waste
Livestock management sites will be the focus of technical assistance on installing more best management practices. The conservation district and other local partners identified some land parcels that are believed to be high-risk sources of pollution that need correction. Practical solutions could be livestock exclusion fencing and planting of riparian areas that will block runoff of pollutants from surface water.

Failing on-site septic systems
The Pacific County Department of Community Development (DCD) plans to revisit hot-spots found during their preliminary on-site septic system survey and source identification work in 2007. TMDL workgroup partners are working to arrange financial assistance options to help owners fix or replace broken septic systems.

Sanitary waste from boats in the harbor
Boat waste is believed to be a very minor source of fecal coliform bacteria contamination compared to others evaluated in the studies. The partners initiated the opportunity to address it separate from the TMDL. The city of Raymond, Pacific County, and Port of Willapa Harbor have found funding that they plan to use to install a sanitary pump-out station at the Port.

More widespread sampling is planned to measure the effects of these activities. As funding allows, extra sampling will help determine how widespread the cleanup effects are and where water quality standards are being met. Ongoing monitoring is also essential to help local organizations focus limited resources on fixing remaining priority areas. Ongoing monitoring will also help suggest if and where the plan should be adapted.

Monitoring data will be compared to the state water quality standards to determine success of the TMDL. However, numeric load allocations and associated percent-reduction goals were determined in the previous cleanup plan. Those load allocations (LAs - for nonpoint source locations) and wasteload allocations (WLAs - for the permitted facilities which are already in compliance with the TMDL) are shown in Tables 4 and 5.

Project Communication and Outreach

The public will continue to receive project updates so they can understand if and how the project affects them. Citizen participation will be essential for the plan to be effective. The update information can be available in several forms, depending on what will reach the most people, and

may include options such as local meetings, articles in local newspapers and notices on the county website.

Table 4. Target reductions necessary to achieve water quality standards at the various 303(d) listed and other impaired locations in the Willapa River and its tributaries (2006).

Station	Mainstem RM	Tributary RM	Location	303(d) listing	Mean Annual Flow, cfs	90th percentile conc. cfu/100		Annual 90th percentile FC load, cfu/day		Annual Target reductions, %
						observed	criterion	Observed,	Capacity	
FALLS	37.5	0.3	Falls Creek	9983		156	200			None
WRSW	37.1		Swiss Picnic Rd	10007	88	1048	200	2.3E+12	4.3E+11	81
FERN	36.2	0.4	Fern Creek	9984	63	664	200	1.0E+12	3.1E+11	70
WRLE	33.2		Lebam Rd	10006	205	624	200	3.1E+12	1.0E+12	68
FORK	30.5	0.25	Fork Creek	Not listed	105	338	200	8.7E+11	5.1E+11	41
WROX	25.2		At Oxbow Rd	10004		171	200			None
WRMN	21.4		Mainstem at SR-6,	10003	496	241	200	2.9E+12	2.4E+12	17
WRC1	17.5		Camp One Rd	10002	639	323	200	5.0E+12	3.1E+12	38
WRWI	13.7		Willapa Road	10001	797	367	200	7.2E+12	3.9E+12	46
WILSON	12	1.45	Wilson Creek	10009		157	200			None
WRHY	7.7		Highway 101 bridge	10000		179	200			None
WRRA	6.4		Near Port in Raymond	9998		93	200			None
RAYSW-3	7.2	0.4	Riverdale Creek	9989	11.5	895	200	2.5E+11	5.6E+10	78**
SBSW-2	3.1	0.0	Central Street drain at Coast Seafood	9995	11.5	Max = 330	200	9.3E+10	5.6E+10	39
WRSB3*	1.5		below Potter Slough	6688	---	85	43	---	9.2E+14	49
WRJS*	0.4		Near Johnson Slough	10013	---	75	43	---	9.4E+14	43

* Seaward station where marine criteria apply; loading capacity based on TetraTech (2004a) and Fox (2005)

** Without the "outlier," the target reduction would be 30%

Table 5. Wasteload allocations for city wastewater treatment plants

Facility	Effluent limit, cfu/100 mL: Monthly average	Daily Max. Flow, mgd: Daily Max	Bacteria load*, based on daily: Maximum limit cfu/day	
South Bend Packers	200	400	0.025	3.79E+08
East Point Seafoods	200	400	0.325	4.92E+09
Coast Seafoods	200	400	0.175	2.65E+09

- Loads will vary with changes in flow. However, the concentration-based water quality standard will be met when the concentration-based effluent limit is met. These limits were not changed by the TMDL.

Pollution sources and organizational actions, goals, and schedules

Appendix A is a list of the pollution categories, a list and timeline of implementation actions planned, and funding expectations. These activities are also described in an earlier section called "What Will Be Done".

Adaptive management

Water quality improvements will be kept going by evaluating sampling data and land-use information, taking action, evaluating results of those actions, and then using what is learned to fine-tune the next steps. This process is called adaptive management.

The assessment tools that may be used in adaptive management include continued monitoring, increased priority on wet weather assessments, and site-specific bacteria source tracking. On-site septic system surveys are another type of monitoring that will be used to identify sources in strategic locations.

The involved organizations will work together to manage the cleanup. Water quality improvement actions have evolved in the Willapa River system, with considerable progress, for many years. The percent-reduction goals shown in Table 4 are just that -- goals. The final standard for achievement of the TMDL is for the river to be in compliance with water quality standards so that its designated uses can be maintained.

The adaptive management approach will monitor for success, and continuously adapt or refocus implementation where monitoring shows that changes are needed. In order to assess progress effectively, activity implementation will be tracked periodically and water quality will be routinely monitored. Periodic performance reviews by the local workgroup and Ecology will occur at least annually. The ongoing performance reviews will help show if any changes to the load or wasteload allocations are required or appropriate. If monitoring shows that water quality standards cannot be met then the TMDL load allocations may be revised.

If the water quality standards are still not being met after all identified cleanup strategies to address human-related sources are fully implemented, then the exceedance may be due to natural conditions. At that stage, a useful monitoring technique may include microbial source tracking (Herrera Environmental Consultants, 2005).

If violations are shown to be due to natural sources, the natural pollutant concentration would become the standard, and no human-caused pollution could exceed that natural condition. If the natural-condition situation applies to the Willapa River, it would be applied according to the terms of the anti-degradation requirements in the state water quality regulations at WAC 173-201A-310(3).

The goal is to reach the TMDL reductions by 2012. 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. However, it is ultimately Ecology's responsibility to assure that the water quality standards are achieved.

Funding Opportunities

Partners will need to continue to be creative in finding ways to fund the work. For instance, the county and cities created a plan to share the work and costs of stormwater sampling. The conservation district utilized state water quality financial assistance to help landowners pay for installation of best management practices recommended in this Willapa TMDL. More state and federal funding was offered and continues to be available. Additional federal funding is available, especially from the Conservation Reserve Enhancement Program (CREP). The county identified prospective state and federal grant funds, and a state loan program is also available for fixing failing septic systems.

Partners can refer to the website (http://www.ecy.wa.gov/programs/wq/tmdl/TMDLFunding.html) for a list and descriptions of funding sources available for water cleanup work.

Appendix B identifies the funding sources that are expected to support the specific implementation actions over the life of the implementation of this plan. Specific funding programs expected to support the work right away are identified in Appendix A.

Measuring Progress toward Goals

What is the schedule for achieving water quality standards?

The demonstrated pace of reducing bacteria concentrations in the Willapa River system in the past nine years suggests that the water quality standard could be consistently achieved by 2012. Local groups are on track to find and fix failing septic systems, livestock waste problems, and reduce bacteria pollution to stormwater.

Performance measures and targets

Appendix A identifies many specific actions and the timeline planned for their completion.

In order to assess progress effectively, the local workgroup and Ecology will review activity implementation and cleanup progress at least annually and water quality monitoring will continue. The ongoing performance reviews will help show if any changes to the cleanup strategy are needed. Typically, the highest priority or most polluted sites are looked at first. A periodic review of the work and the water quality effects will allow for ongoing adjustments to the cleanup priorities and actions.

Effectiveness monitoring plan

The river was monitored at several locations and compared to state water quality standards. However, most tributaries were monitored only at their mouth. Therefore, the technical analysis for those creeks provides evaluation of water quality and pollution loads only at the creek mouths. That scale of analysis and source area prioritization is a common outcome of the technical study and initial cleanup phase of a TMDL project. At this stage of a "normal" TMDL project, many questions remain unanswered about specific sources and source areas. Identification and follow-up sampling of additional distinct sources is commonly addressed during the next phase of the TMDL, when this water quality implementation plan is performed.

In some cases, conclusions from the analysis cannot be easily explained by observed land use patterns. Other questions will arise during the course of the cleanup. Sampling, investigation, and evaluation will still be required. This might include water quality sampling, microbial source tracking, land use surveys, creek walks, dye testing, or upstream/downstream sampling for on-site septic system effects or other methods chosen by local groups. Monitoring will likely occur through a combined effort involving the county and state, and could include volunteers like civic or student groups if local partners want to arrange that.

Generally, monitoring should focus on the most polluted areas where source identification and cleanup work is occurring or needed. Over time, and as funding is available, all stations in the 2006 sampling plan should be monitored again (Onwumere, G., Ecology 2006). Monitoring is essential to document improvements, to verify that the TMDL load allocations have been achieved, or to indicate where the cleanup plan implementation might be adapted if necessary.

Knowledge of the project requirements at this time suggests several sampling priorities. Some of these priorities are already underway or planned by the project partners. For example, the cities of South Bend and Raymond and DCD personnel negotiated an approach to share the work and expenses of stormwater sampling. A specific sampling plan for the work will be completed before monitoring starts again in fall of 2008. Ecology will help guide development of a stormwater sampling plan by the partners (Lombard, S. and C. Kirchmer, Ecology 2004).

Ecology will consider sampling several places as part of the monthly "Ambient Monitoring Program", subject to future funding priorities. Sampling stations are presently located at Johnson Slough (river mile 0.5), near the Port of Willapa Harbor docks in Raymond (river mile 6.4), and at Willapa Road (Camp One). That routine monitoring follows an established sampling plan.

The DOH Office of Shellfish and Water Protection Program added a sample site seaward of the WRJS (river mouth) site location that will help document compliance with the marine water quality standard.

The stations identified as 303d-listed or otherwise impaired (see Table 4), which have been assigned bacteria load reduction goals, should continue to be sampled as funding allows, in order to assess the effectiveness of, or the need to adapt water quality improvement strategies. Ideally, more frequent sampling should be conducted in highest priority areas for cleanup action, to help with better accuracy in pollution source identification, and to measure effectiveness of local actions.

Compliance verification monitoring will be conducted when water quality standards are believed to be achieved. The local workgroup and Ecology agreed to meet routinely (i.e., at least annually) to review progress of project implementation and water quality results. These discussions will help determine if and how implementation could be changed to achieve the project goals.

Reasonable Assurances

Reasonable Assurance

When establishing a TMDL, reductions of a particular pollutant are allocated among the pollutant sources (both point and nonpoint sources) in the water body. The Willapa Fecal Coliform Bacteria TMDL has identified both point and nonpoint sources. TMDLs (and related Action Plans) must show "reasonable assurance" that these sources will be managed or reduced to their allocated amount. Education, outreach, technical and financial assistance, and permit administration are several of the actions which will be employed to ensure that the goals of this water clean up plan are met.

The technical analysis for this TMDL determined that, for the permitted facilities, the target wasteloads are equivalent to the facilities' current discharge permit limits and no further reductions are required of them in this TMDL. A sensitivity analysis showed that the point source discharges have little impact on the bacteria level in the lower river, so reducing their bacteria discharges below the permit limits will not contribute to compliance (Tetra Tech, 2004). Still, Ecology's traditional oversight of the facilities' NPDES permitted discharges provides assurance that the limits will continue to be met.

Consequently, reasonable assurance of success depends more on the ongoing success of nonpoint source pollution controls.

Ecology believes that many local activities already support this TMDL and add to the assurance that bacteria in the Willapa watershed will meet state water quality standards. This assumes that the adaptive management activities described earlier will continue and are maintained.

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 Willapa bacteria TMDL process to achieve clean water through voluntary control actions. However, Ecology will consider and may 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.

Summary of Public Involvement Methods and Public Comment Received During this Document Review

The Willapa Water Quality workgroup reconvened in January 2008 following EPA approval of the initial cleanup plan.
Workgroup members included:

- Pacific County Faith Eldred, Bryan Harrison
- City of Raymond Mayor Bob Jungar
- City of South Bend Mayor Karl Heinicke, Steve Russell
- Pacific Conservation District Mike Johnson
- Washington State Department of Health Bill Cleland
- Washington Department of Ecology Dave Rountry

They met monthly through June 2008 to identify additional steps that will advance their water quality work. The group adopted a schedule and public outreach goals strategy, and set about to find ways that the partners could share the cleanup work and expenses in a fair and equitable way.

Pacific County Department of Community Development provided a mailing list of residents in the geographic priority areas of the project. A project update fact sheet was mailed to approximately 260 target addresses in late May 2008. Contact information was provided for two local workgroup members and an Ecology representative who could help answer questions about the TMDL project. None of the workgroup members were contacted with questions or comments.

A 30 day public comment period for the Water Quality Implementation Plan occurred from June 16 to July 16, 2008. A display advertisement was published in the Willapa Harbor Herald newspaper on June 11, 2008 to announce the comment process. The draft report was posted for review on Ecology's internet website. The workgroup also provided paper draft reports for review at the Pacific County Office of Community Development, and at the Raymond and South Bend public libraries. The display ad encouraged interested reviewers to locate copies at those locations.

Just one public comment was received. The commenter, Mr. Gary Johnson of the Puget Sound Anglers - Fidalgo Chapter, asked for clarification about the relationship of industrial port facilities to the TMDL. Ongoing improvements at the Port facilities are expected to result in better protection of Willapa river water quality, but the Port facilities have not caused any concerns related to fecal coliform bacteria pollution being addressed by this TMDL. Mr. Johnson also offered that the local Anglers club is very interested in working with others to implement the TMDL, to protect and preserve water quality for the benefit of local fisheries as well as the community. The local workgroup will follow-up with Mr. Johnson about his offer to help.

The U.S.EPA also contacted us during the comment period to acknowledge they received the draft implementation plan, and that they had no comments. Typically the EPA does not see it as their role to officially approve the local implementation strategies of these plans.

The local workgroup agreed as part of their project charter to remain intact. They will continue to review progress on implementing this plan so they may recommend if and how the plan should be adapted to be most effective.

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Appendices

Appendix A. Willapa Bacteria TMDL Action Plan Summary

Management Roles, Planned Actions, Schedule

Source	Partner	Action	Schedule	Potential Funding
Livestock	Pacific CD	Revegetate shoreline of 180 acres where knotweed was removed.	Spring-Summer 2008	CREP
		Install 7500 ft. of new fencing for livestock exclusion.	2008-2009	State Conservation Commission Livestock Program
		Re-install 2 miles of livestock and dairy fencing destroyed by December 2007 flood.	2008-2009	Federal Emergency Conservation Program
		Reinstall livestock fencing destroyed by December 2007 flood.	2008-2009	Federal/State 319 Non-point Program Detailed Implementation Fund
		Provide technical assistance and grant funding to land owners when available, in problem areas identified by the TMDL. CD considers the TMDL hot-spots as priority areas for helping landowners implement BMPs.	Ongoing	CREP Other Federal and State Funds as available
	Ecology	Data interpretation and Technical assistance to help find or verify priority hot-spots. Compliance assistance to motivate landowner participation when necessary.	Ongoing	Various Also provide technical assistance to help the CD find and apply for funding.

Source	Partner	Action	Schedule	Funding
Septic Systems	County DCD	Continue county-wide Operations and Maintenance Program.	Ongoing	DCD Local Govt. Assistance Grant Oyster Reserve Grant U.S.D.A Rural Development Grant
		Prioritize areas for on-site sanitary surveys.	Late 2007 through 2008	DCD Local Govt. Assistance Grant
		Continue to explore funding sources and assist homeowners in securing funds for repairs.	Ongoing	Oyster Reserve Grant U.S.D.A Rural Development Grant Washington State Water Pollution Control Revolving Fund
		Conduct on-site sanitary surveys in high priority areas.	Spring 2009 Lebam Fall 2009 Tokeland	DCD Local Govt. Assistance Grant Oyster Reserve Grant U.S.D.A Rural Development Grant

Source	Partner	Action	Schedule	Funding
Storm Water	South Bend	Fix broken sewer connection that may have been leaking into Central St. storm drain.	**Completed** February 2008	City budget
		Continue upgrading side sewers.	Ongoing as time permits	Homeowners expense
		Conduct rainy-season sampling for source i.d. in Central St. drain and at Reed St. outfall at S Bend packers.	Five times during one year period starting late 2008	Cost-share by the cities and county
	Raymond	Conduct rainy-season sampling for source i.d. in Riverdale Cr. and at Delaware Street outfall.	Five times during one year period starting late 2008	Cost-share by the cities and county
	Pacific Co. Dept. of Community Development	Provide bacteriological lab analysis of stormwater samples submitted by Cities of Raymond and South Bend.	Rainy season sampling planned for approximately one year beginning in late Fall/Winter 2008.	Cost-share by the cities and county Local government assistance grant
	Ecology	Lead the completion of Quality Assurance Sampling Plan for stormwater sampling. Provide Technical assistance on field protocols, help with data interpretation.	Late Fall 2008 for plan completion, technical assistance ongoing During and after sampling	Program budget
General Non-Point Sources	Pacific Co. City of Raymond Port Of Willapa Harbor	Install Sanitary Pump-Out Station for boats at Port of Willapa Harbor.	2009	State Parks and Recreation Commission ($150 K grant)

Appendix B. Additional Possible Sources of Funding

Potential TMDL Funding Sources

Multiple sources of financial assistance for water cleanup activities are available through Ecology's grant and loan programs, local conservation districts, and other sources. The following table shows some of the potential sources of water cleanup funding.

Possible Funding Sources to Support TMDL Implementation

Sponsoring Entity	Funding Source	Uses to be Made of Funds
Department of Ecology, WQP	Centennial Clean Water Fund, Section 319, and Washington State Water Pollution Control Revolving Fund http://www.ecy.wa.gov/programs/wq/funding/	Facilities and water pollution control-related activities; implementation, design, acquisition, construction, and improvement of water pollution control. Priorities include: implementing water cleanup plans, keeping pollution out of streams and aquifers, modernizing aging wastewater treatment facilities, reclaiming and reusing waste water.
County Conservation District	Federal Conservation Reserve Enhancement Program http://www.snohomishcd.org/crep.htm	Conservation easements; cost-share for implementing agricultural/riparian best management practices (BMPs).
Natural Resources Conservation Service	Environmental Quality Incentive Program http://www.nrcs.usda.gov/programs/eqip/	Voluntary conservation program for farmers and ranchers that promotes agricultural production and environmental quality as compatible national goals; includes cost-share funds for farm BMPs.
Department of Ecology, SEA	Coastal Zone Protection Fund	Some funding is available through a program that taps into penalty monies collected by the WQP.
Office of Interagency Committee, Salmon Recovery Board	Salmon Recovery Funding Board http://www.iac.wa.gov/srfb/grants.asp	Provides grants for habitat restoration, land acquisition, and habitat assessment.
Natural Resources Conservation Service	Emergency Watershed Protection http://www.nrcs.usda.gov/programs/ewp/index.html	NRCS purchases land vulnerable to flooding to ease flooding impacts.

Sponsoring Entity	Funding Source	Uses to be Made of Funds
Natural Resources Conservation Service	Wetland Reserve Program http://www.wa.nrcs.usda.gov/programs/wrp/wrp.html	Landowners may receive incentives to enhance wetlands in exchange for retiring marginal agricultural land.

Appendix C. Glossary

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 designated 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 don't meet 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.

Char: Char (genus *Salvelinus*) are distinguished from trout and salmon by the absence of teeth in the roof of the mouth, presence of light-colored spots on a dark background, absence of spots on the dorsal fin, small scales, and differences in the structure of their skeleton. (Trout and salmon have dark spots on a lighter background.)

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.

Effective Shade: The fraction of incoming solar shortwave radiation that is blocked from reaching the surface of a stream or other defined area.

Enterococci: A subgroup of the fecal streptococci that includes *Streptococcus faecalis, S. faecium, S. gallinarum,* and *S. avium*. The enterococci are differentiated from other streptococci by their ability to grow in 6.5% sodium chloride, at pH 9.6, and at 10^{o} C and 45^{o} C.

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 24 hours at 44.5 plus or minus 0.2^{o} C. 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.

Municipal Separate Storm Sewer Systems (MS4): A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains): (1) owned or operated by a state, city, town, borough, county, parish, district, association, or other public body having jurisdiction over disposal of wastes, storm water, or other wastes; and (2) designed or used for collecting or conveying stormwater; (3) which is not a combined sewer; and (4) which is not part of a Publicly Owned Treatment Works (POTW) as defined in the Code of Federal Regulations at 40 CFR 122.2.

National Pollutant Discharge Elimination System (NPDES): Federal 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 NPDES 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 of 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 over one acre.

Point Source: Sources of pollution that discharge at a specific 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 five acres of land.

Pollution: Such contamination, or other alteration of the physical, chemical, or biological properties, of any waters of the state. This includes change in temperature, taste, color, turbidity, or odor of the waters. It also includes discharge of any liquid, gaseous, solid, radioactive, or other substance into any waters of the state. This definition assumes that these changes will, or are likely to, create a nuisance or render such waters harmful, detrimental, or injurious to (1) public health, safety, or welfare; or (2) domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses; or (3) 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.

Salmonid: Any fish that belong to the family *Salmonidae*. Basically, any species of salmon, trout, or char. www.fws.gov/le/ImpExp/FactSheetSalmonids.htm

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 soil, gravel roads and parking lots.

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

Total Maximum Daily Load (TMDL): A distribution 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 constitutes 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.