Walla Walla Watershed
PCBs, Chlorinated Pesticides, Fecal Coliform, Temperature, pH & Dissolved Oxygen
Total Maximum Daily Load

Water Quality Implementation Plan

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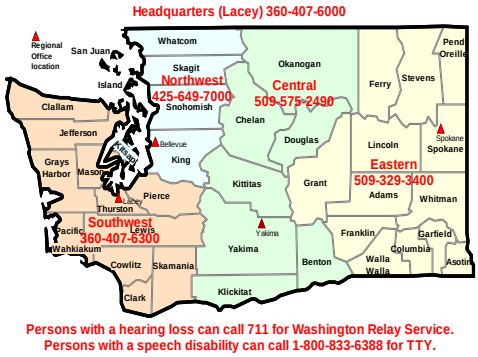

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Water Quality Implementation Plan

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Under the Clean Water Act, each state is required to have its own water quality standards designed to protect beneficial 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. The Clean Water Act requires that a water quality improvement report or Total Maximum Daily Load (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.

Why is a TMDL project being done in this watershed?
Ecology began a TMDL in this watershed because the Walla Walla River and several tributaries did not meet water quality standards. Several streams were on the 303(d) list in 1996 and 2004 for not meeting temperature, pH, dissolved oxygen, PCBs, chlorinated pesticides and fecal coliform standards.

Why does this matter?
The pollutants this plan targets impact everyone. Chlorinated pesticides and PCBs can make fish unhealthy to eat and can build up in our bodies and lead to health problems. Bacteria can make us sick. Temperature, pH and dissolved oxygen can create a difficult or impossible environment for fish to live in, which can reduce recreational fishing opportunities and further harm endangered or threatened fish.

Watershed description
The Walla Walla River is located in the southeast corner of Washington State. The river extends 61 miles from the headwaters in Oregon to its confluence with the Columbia River in Washington (**Figure ES-1**). Two-thirds of the Walla Walla drainage basin lies within Washington.

Elevation controls the climate in the Walla Walla basin. Air temperatures and the amount of precipitation vary from west to east with the rise in elevation toward the Blue Mountains. The western lowlands are warm and semiarid (less than 10 inches of annual precipitation), while higher elevations in the Blue Mountains are cool and relatively wet (up to 60 inches of annual precipitation) (HDR/EES Inc., 2005). Most of the precipitation falls as snow in the winter months, causing a significant accumulation of snowpack in the mountains. Spring thaw, compounded with rain showers, is the source of flooding for the basin. Significant flood events occurred in 1933, 1964, and 1996.

The Walla Walla basin contains bull trout and steelhead, both of which are listed as threatened species under the Endangered Species Act (USFWS, 2005).

Forest-based land uses are present in the upper watersheds, but commercial agriculture is the dominant land use in the basin. Some small farms can be found in the vicinity of urban areas.

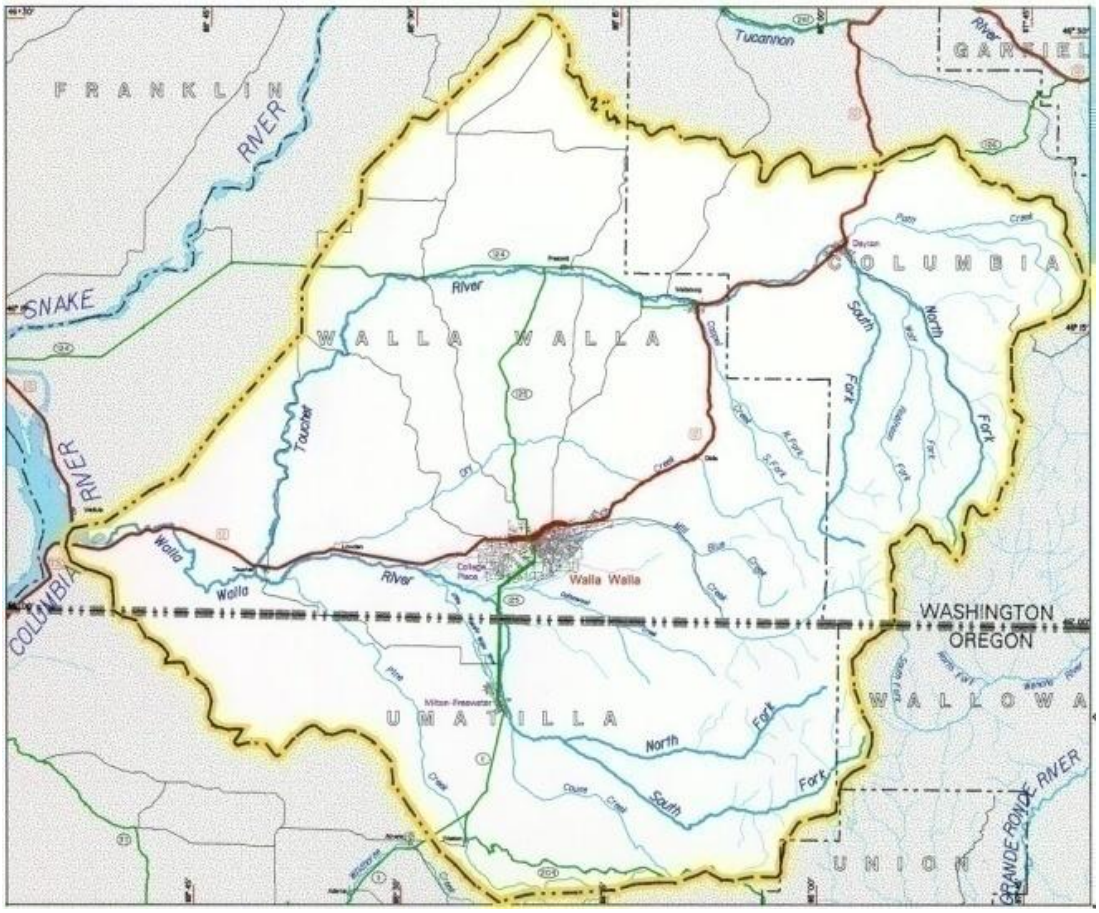

Figure ES-1. The Walla Walla River watershed (U.S. Army Corps of Engineers, 1997).

What will be done?

The Walla Walla Watershed Planning Unit's Water Quality Subcommittee prioritized areas in the watershed for work to begin (Figure ES-2). Stream reaches that do not meet several water quality standards and have severe problems (such as highly erodible land) are *priority restoration zones*. Stream reaches that only have one water quality problem are *secondary restoration zones*. Some reaches are *primary protection zones* because they are in relatively good condition and should be protected. The stretch of Mill Creek from east of the city of Walla Walla to its confluence with the Walla Walla River is a secondary restoration reach because the restoration challenges are so complex and unique that the solutions will probably be unlike any others in the watershed. Work is also important in upland areas. Much of the work in upland areas will center on reducing erosion and nutrients through changes in farm management.

Best management practices (BMPs) watershed residents can take to improve water quality are included in Appendix B of this plan. The Water Quality Subcommittee recommended several practices for urban and rural areas. Some of the actions include correct application of lawn fertilizers; composting; planting trees and shrubs along streams; and limiting pet and livestock access to streams.

The cities of Dayton, College Place, and Walla Walla have permits to release treated wastewater from their wastewater treatment facilities. Some changes to the cities' permits may be necessary. The cities will have ten years to complete the new permit requirements.

The city of Walla Walla and Walla Walla County are required to have municipal stormwater permits. Also, construction sites one acre or greater and industrial sites that discharge stormwater must have stormwater permits. This plan also includes recommendations to reduce fecal coliform bacteria in stormwater throughout the watershed.

Who will help?

Over fourteen organizations committed to help improve water quality in the Walla Walla watershed. Table 8 of this plan includes actions these groups will use, such as educating the public; restoring native plants along streams; following a stormwater management plan; identifying stormwater discharges to streams; obtaining conservation easements; and installing off-site water systems and fencing.

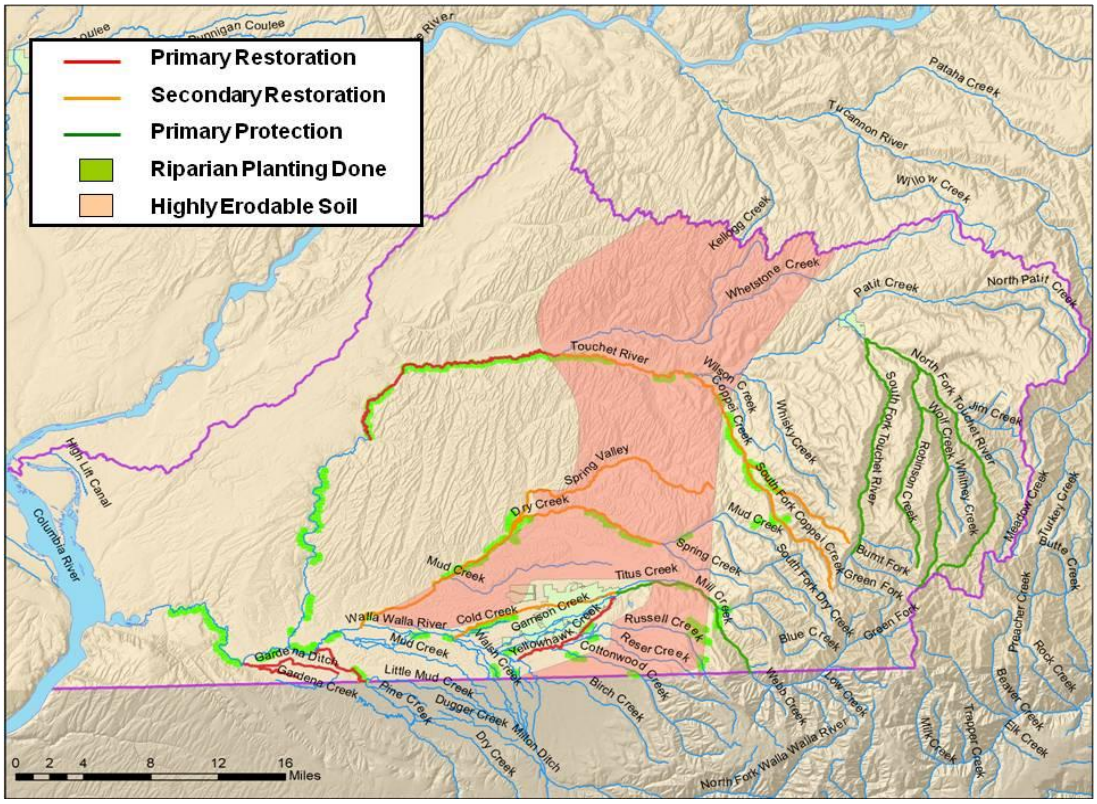

Figure ES- 2. Priority areas for improving or protecting water quality.

Measuring progress

Each year, Ecology will track the organizations' progress toward completing the actions they agreed to take. Ecology will then review the information in a meeting with the Water Quality Subcommittee and residents each year in January or February.

Water quality monitoring is expected to be performed by Ecology five years after completion of this plan. The results will be compared to the targets to identify if water quality goals have been reached. If watershed streams do not meet the targets, adaptive management will be applied.

Reasonable assurance
This plan provides over 20 examples of actions and commitments organizations have already completed to improve water quality and fish habitat. For example, since 2001 Ecology has invested over seven million dollars to improve water resources in the Walla Walla watershed. Nearly 20 other organizations have made similar commitments.

Funding
Landowners in the watershed are using their own money to install BMPs or convert to minimum tillage practices, etc. However, a wide variety of funding sources exist for projects that improve water quality in the watershed. The Natural Resources Conservation Service (NRCS), Washington State Conservation Commission, Salmon Recovery Funding Board, Bonneville Power Foundation, and Ecology have funding programs for a variety of projects aimed at reducing pollution from sources that are not easily identified. This plan includes several other sources of funding that are available to cities to help improve infrastructure and wastewater treatment plants.

Public involvement
The Water Quality Subcommittee helped develop this plan. Ecology held meetings to begin working on this plan in September 2007 and continued periodically through September 2008. A total of six meetings were held. Ecology sent meeting announcements and notes to a mailing list of approximately seventy people. Ecology also maintains a website on the TMDL at http://www.ecy.wa.gov/programs/wq/tmdl/wallawalla/index.html.

Next steps
Once the comment period for this plan is complete, Ecology will respond to the comments and make all necessary changes. Ecology will then send the plan to the Environmental Protection Agency.

Implementing this plan will be the focus for the months and years to come. Ecology will hold annual meetings to track organizations' progress on completing the activities listed in this plan and toward meeting the water quality standards.

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 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 the data 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 water. This list divides water bodies into one of 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 its being implemented
- 4b. – Has a pollution control plan in place that should solve the problem
- 4c. – Impaired by a non-pollutant such as low water flow, dams, culverts

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

TMDL process overview

The Clean Water Act requires that a total maximum daily load (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. 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 Environmental Protection Agency (EPA) approves the TMDL, 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 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 any 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.

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

What part of the process are we in?

EPA approved all four TMDLs for the Walla Walla watershed:

- Chlorinated Pesticides and PCBs TMDL (approved May 9, 2006)
- Fecal Coliform (approved January 24, 2007)
- Temperature (approved August 9, 2007)
- Dissolved Oxygen and pH (approved August 9, 2007)

This document is the Water Quality Implementation Plan (WQIP) for all the TMDLs in the watershed. It was developed in 2008. This plan describes and prioritizes specific actions planned to improve water quality. Ecology will continue to work with the Water Quality Subcommittee and other residents to implement the WQIP.

Why is Ecology conducting a TMDL in this watershed?

Overview

Ecology conducted TMDLs in this watershed because the Walla Walla River and several tributaries were on Washington State's list of impaired waters [the 303(d) list] in 1996 and 2004 for not meeting temperature, pH, dissolved oxygen, PCBs, chlorinated pesticides, and fecal coliform standards (Table 1). The watershed contains important bull trout and salmon populations, so there is further potential for habitat restoration. The federal Clean Water Act of 1972 requires the state to develop a cleanup plan (a TMDL) and to implement activities in the plan to bring these water bodies back into compliance with standards.

Table 1. Walla Walla watershed water bodies on the 2004 303(d) list for temperature, fecal coliform, pH, dissolved oxygen, chlorinated pesticides and PCBs.

Water Body	Parameter	Medium	Township, Range, Section	2004 Listing ID
Blue Creek	Temperature	Water	07N, 37E, 26	24240
Caldwell Creek	Temperature	Water	06N, 36E, 37	24242
Cold Creek	Temperature	Water	07N, 35E, 32	24244
Coppei Creek	Temperature	Water	09N, 37E, 36	24245
Coppei Creek, N.F.	Temperature	Water	08N, 38E, 08 08N, 38E, 07	24247 24246
Coppei Creek, S.F.	Temperature	Water	08N, 38E, 20 08N, 38E, 33	24248 23674
Cottonwood Creek	Temperature	Water	06N,36E, 11 06N, 36E, 05	23676 23675
Doan Creek	Temperature	Water	07N, 35E, 38	23677
Dry Creek	Fecal coliform	water	7N, 34E, 29	41636
	Dissolved Oxygen	Water	07N, 34E, 29	41337
Dry Creek, N.F	Temperature	Water	07N, 38E, 08	23679
Dry Creek, S.F.	Temperature	Water	07N, 38E, 17	23678
East Little Walla Walla River	Temperature	Water	06N, 35E, 38 06N, 35E, 11	23680 23682
Garrison Creek	Fecal coliform	water	6N, 35E, 39 6N, 35E, 03	12381 12382
	Temperature	Water	06N, 35E, 39 06N, 35E, 03	14176 14177
	Dissolved Oxygen	Water	06N, 35E, 03	41338
	4,4'-DDT	Water	06N, 35E, 3	14386
	4,4'-DDE	Water	06N, 35E, 3	40969
	4,4'-DDD	Water	06, 35E, 3	40968
	Hexachloro-benzene	Water	06N, 35E, 3	14389
Jim Creek	Temperature	Water	09N, 40E, 30	23685
Lewis Creek	Temperature	Water	08N, 40E, 09	23686
Mill Creek	Fecal coliform	Water	7N, 36E, 19	41638

Water Body	Parameter	Medium	Township, Range, Section	2004 Listing ID
Mill Creek (continued)	Fecal coliform (continued)	Water	7N, 36E, 20 7N, 36E, 21 7N, 35E, 38 7N, 36E, 23	41641 41645 41710 16783 (category 2)
	Temperature	Water	07N, 36E, 23 07N, 37E, 37 07N, 36E, 21 07N, 36E,37 07N, 35E, 23 07N, 36E, 19 06N, 37E, 02 07N, 35E, 38 07N, 36E, 22	23690 23764 23688 23689 23765 23766 23768 23761 23762
	pH	Water	07N, 36E, 23 07N, 36E, 19 07N, 35E, 24	11119 41164 41329
	Dissolved Oxygen	Water	07N, 36E, 23 07N, 35E, 38	41441 41469
Mud Creek	Fecal coliform	water	7N, 34E, 31	41646
Pine Creek	Temperature	Water	06N, 33E, 01 06N, 34E, 07	23769 23770
Robinson Creek	Temperature	Water	08N, 39E, 15 09N, 39E, 35	23772 23771
Russell Creek	Fecal coliform	water	6N, 36E, 37	41671
	Temperature	Water	06N, 36E, 37	23773
Touchet River	Fecal coliform	Water	9N, 37E, 08 7N, 33E, 33 9N, 36E, 05 9N, 36E, 03 7N, 33E, 27	16784 16787 41245 41246 41652
	Temperature	Water	07N, 33E, 33 09N, 34E, 02 09N, 38E, 05 07N, 33E, 27 09N, 37E, 08 09N, 38E, 04 10N, 39E, 30	11098 23777 23778 23775 23776 40510 11105 (category 2)
	pH	Water Water	07N, 33E, 33 07N, 33E, 27 07N, 33E, 02 08N, 33E, 02 09N, 34E, 32 09N, 34E, 02 09N, 36E, 05 09N, 37E, 07 09N, 37E, 11 09N, 38E, 07 09N, 38E, 04 10N, 38E, 35	11096 41177 41178 41179 41180 41181 41183 41185 41186 41187 41188 41189
	Dissolved Oxygen	Water	07N, 33E, 33 07N, 33E, 27	11099 41352
Touchet River, N.F. (E.F.)	Temperature	Water	09N, 39E, 04	23779

Water Body	Parameter	Medium	Township, Range, Section	2004 Listing ID
Touchet River, N.F. (E.F.) (continued)	Temperature (continued)	Water	08N, 40E, 28 09N, 40E, 30	23780 23781
	Dissolved Oxygen	Water	10N, 39E, 32	41444
Touchet River, S.F.	Temperature	Water	07N, 39E, 06 10N, 39E, 32	23782 23783
Walla Walla River	Fecal coliform	Water	7N, 32E, 35 7N, 35E, 31 6N, 35E, 05 6N, 33E, 03	16789 41666 41668 41713
	Temperature	Water	07N, 32E, 35 07N, 34E, 34 06N, 35E, 04 06N, 35E, 39 06N, 33E, 03 06N, 35E, 13	6589 23785 23784 23786 23788 23787
	pH	Water	07N, 32E, 21	41191
	Dissolved Oxygen	Water	07N, 32E, 35 06N, 35E, 11	11113 41374
	4,4'-DDT	Tissue	07N, 31E, 25	40970
	4,4'-DDE	Tissue	07N, 31E, 25 07N, 32E, 35	8806 14178
	Chlordane	Tissue	07N, 31E, 25	8804
	Dieldrin	Tissue	07N, 31E, 25	8805
	Heptachlor epoxide	Tissue	07N, 31E, 25	8808
	Hexachloro-benzene	Tissue	07N, 31E, 26	8809
	Total PCBs	Tissue	07N, 31E, 26	8810
West Little Walla Walla River	Temperature	Water	06N, 35E, 09 06N, 35E, 05	23789 23790
Whiskey Creek	Temperature	Water	09N, 38E, 07	23792
Wolf Creek (Fork)	Temperature	Water	09N, 39E, 36	23794
Yellowhawk Creek	Fecal coliform	water	6N, 36E, 37	41649
	Temperature	Water	07N, 36E, 23 06N, 35E, 38	23797 23798

Ecology sampled the water quality of the watershed streams in 2002 and 2003. To analyze whether water quality standards were being met, Ecology scientists reviewed the data and developed water quality models. In December 2004 Ecology staff began meeting with local residents and organizations to review technical information and develop general strategies to improve water quality. The chlorinated pesticide and PCB TMDL was the first water quality improvement report submitted to and approved by EPA on May 9, 2006. On June 12, 2006 the advisory group merged into the Walla Walla Watershed Planning Unit's Water Quality Subcommittee. Ecology continued working with the Water Quality Subcommittee to develop the remaining three TMDLs: fecal coliform bacteria (approved Jan. 24, 2007), temperature (approved Aug. 9, 2007), and pH and dissolved oxygen (approved Aug. 9, 2007). Approximately thirteen meetings were held to develop all four TMDLs. More information on the history of the Walla Walla watershed TMDLs can be found on the Internet at: http://www.ecy.wa.gov/programs/wq/tmdl/wallawalla/index.html.

The following bullets contain information on how the pollutants impact beneficial uses and water quality and internet links for all the TMDLs:

- Chlorinated Pesticides and PCBs (http://www.ecy.wa.gov/biblio/0510079.html)
  Chlorinated pesticides are considered probable human carcinogens by the EPA and have a range of possible negative human health effects including nervous, digestive, immune and reproductive system effects.

  PCBs (polychlorinated biphenyls) were widely used as coolants, lubricants, and as insulators in electrical transformers. PCBs can cause stomach, liver and kidney damage, skin irritation, and thyroid gland injuries, and are suspected to be probable human carcinogens.

  Both chlorinated pesticides and PCBs can build up in fish tissue and reach levels much higher than in water. They then can accumulate further in humans through consuming fish. Chlorinated pesticides and PCBs were banned in the 1970s and 1980s due to environmental concerns.

- Fecal Coliform Bacteria (http://www.ecy.wa.gov/biblio/0610074.html)
  These bacteria are found in the intestinal tracts of humans and other warm-blooded animals. When fecal coliform bacteria are found, they indicate that pathogens, or disease-causing bacteria, may be present. When fecal coliform are found in water above the state standard, it means that fecal wastes are entering waterways and creating a greater potential for infection from pathogens when people come in contact with the water.

- Temperature (http://www.ecy.wa.gov/biblio/0710030.html)
  Temperature controls the rate of many chemical reactions, and affects the amount of dissolved oxygen in water, as well as aquatic organisms' metabolic function and life cycles.

- pH and Dissolved Oxygen (http://www.ecy.wa.gov/biblio/0703010.html)
  pH levels beyond the neutral range (6.5 to 8.5) increase the solubility of some contaminants such as nutrients and heavy metals, which can become toxic for humans and aquatic organisms. High pH levels can impair aquatic organisms' ability to maintain their body fluids.

  Dissolved oxygen is important for aquatic organisms to breathe. In addition, aquatic life's growth rates, swimming ability, susceptibility to disease, and the ability to endure other environmental stressors and pollutants are all affected by oxygen levels.

In summary, these pollutants impact everyone. Chlorinated pesticides and PCBs can make fish unhealthy to eat and can build up in our bodies and lead to health problems. Bacteria can make us sick. Temperature, pH and dissolved oxygen can create a difficult or impossible environment for fish to live in, which can reduce recreational fishing opportunities and further harm endangered or threatened fish.

Watershed Description

The Walla Walla River is located in the southeast corner of Washington State (Figure 1). The river extends 61 river miles (RM) from the headwaters of its north fork in Oregon to its confluence with the Columbia River in Washington. The drainage basin covers approximately 1,760 square miles and flows through four counties: Umatilla and Wallowa counties in Oregon, and Columbia and Walla Walla counties in Washington. Two-thirds of the Walla Walla drainage basin lies within Washington.

The Walla Walla River headwaters are in Oregon and the last 40 miles are in Washington. In Washington, the river has a low gradient with a wide floodplain. Agriculture is the dominant land use along the Walla Walla River. Major tributaries to the Walla Walla River include the Touchet River, Mill Creek, Dry Creek, and Pine Creek.

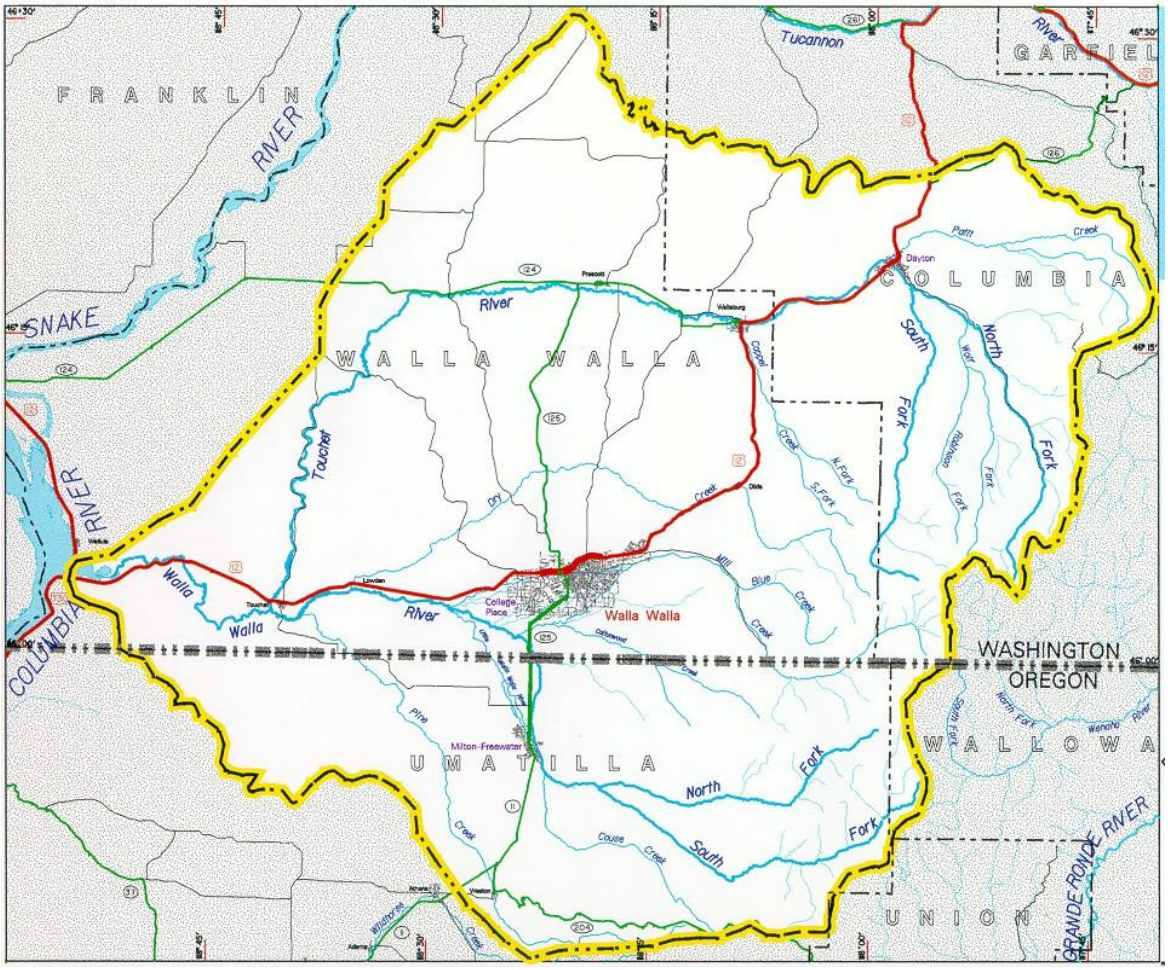

Figure 1. The Walla Walla River watershed (U.S. Army Corps of Engineers, 1997).

The four primary forks of the Touchet River (South Fork Touchet, North Fork Touchet, Wolf Fork, and Robinson Fork) originate deep in the Blue Mountains at an elevation of 6,074 feet. The four forks are mainly forested with only small farms in the valleys. The forks converge just

above the city of Dayton to form the mainstem Touchet River. The Touchet River flows through the cities of Dayton, Waitsburg, and Prescott, reaching its confluence with the Walla Walla River by the town of Touchet at an elevation of 420 feet. Land use in the Touchet basin, from Dayton to the confluence of the Walla Walla River, is predominantly agricultural with both irrigated and non-irrigated crops.

Dry Creek is located in a 239-square-mile basin with elevations from 460 feet at the confluence with the Walla Walla River near Lowden (RM 27.2) to 4,600 feet in the Blue Mountains. Dry Creek's watershed is mainly used for dryland wheat agriculture, with only sparse forests in the headwaters.

Mill Creek headwaters are located in the Blue Mountains where 22,000 acres are preserved as a drinking water source for the city of Walla Walla. The 100 square mile drainage flows through Oregon, where a portion of the streamflow is diverted for the city of Walla Walla water supply, and then continues to the Washington border and downstream through the city of Walla Walla. Below the city of Walla Walla, Mill Creek flows through agricultural areas to the confluence with the Walla Walla River (RM 33.6). Mill Creek enters the Walla Walla River downstream of the city, near the historical Whitman Mission.

The city of Walla Walla and the Army Corps of Engineers built a control structure in the 1940s to stop catastrophic flooding during the spring months. Currently, a portion of Mill Creek's flow is diverted at RM 10.5 into Garrison Creek, Yellowhawk Creek, and to Bennington Lake. Mill Creek's remaining flow passes through the city of Walla Walla. Mill Creek is armored with energy dissipater weirs and a concrete channel through the city of Walla Walla. Portions of the creek that are not entirely concrete have revetments to stabilize the banks and a rubble bottom. In the areas with energy dissipaters, the channel is as wide as 520 feet.

During the summer months, May through October, the majority of Mill Creek flow is diverted at RM 10.5 to Yellowhawk and Garrison creeks which enter the Walla Walla River just upstream of the Mill Creek confluence. Garrison Creek winds through dense residential areas in the cities of Walla Walla and College Place before reaching agricultural areas and joining the Walla Walla River (RM 36.2). Yellowhawk Creek flows through fewer residential areas. It is joined by Russell and Cottonwood creeks from hills to the east before joining the Walla Walla River (RM 38.2).

Although most of the city of Walla Walla's drinking water comes from a 36-square-mile managed and protected portion of upper Mill Creek, additional supplies are taken from ground water in a deep basalt aquifer. Water from a relatively dynamic, shallower gravel aquifer is used by residents in the Walla Walla basin as well, but mainly for irrigation.

Springs supply baseflows to surface waters year-round. Winter storms can cause severe flooding from heavy rainfall and rapid snowmelt. Snowmelt and runoff in the spring increase river discharge volumes. Rivers and streams in the basin experience greatly reduced flows in the summer from a combination of reduced supply and diversion for irrigation. For example, the Walla Walla River has often gone dry at the Oregon-Washington border, and Mill Creek usually has little to no flow between points of irrigation withdrawals and returns. Conditions improved

recently in the mainstem Walla Walla River as a result of farmers diverting less water in response to bull trout Endangered Species Act listings. Flows near the state line now range from 4 - 15 cubic feet per second (cfs) in the summer.

The Walla Walla basin contains federally-designated critical habitat for bull trout and steelhead trout, both of which are listed as threatened species protected under the Endangered Species Act (ESA) (USFWS, 2005). Mendel et al. surveyed the fish populations within the Walla Walla basin, finding the highest abundances of salmonid species in Mill Creek and the North and Wolf Forks of the Touchet River. Native salmonid species identified were mountain whitefish (*Prosopium williamsoni*), bull trout (*Salvelinus confluentues*), and rainbow/steelhead trout (*Oncorhynchus mykiss*). Most spawning habitat was found in the upper reaches, while the lower reaches of the Touchet and Walla Walla rivers are mainly used for fish migration with little rearing capability. In 2002 WDFW, USFS, and ODFW staff counted 161 Bull Trout redds in Mill Creek, 29 redds in the North Fork Touchet River, and 92 redds in the Wolf Fork Touchet River (Mendel et al., 2004). Chinook salmon were originally native to this basin. In recent years the Confederated Tribe of the Umatilla Indian Reservation (CTUIR) began working to reintroduce the salmon to some basin streams.

Elevation exerts significant control over the climate in the Walla Walla basin. Temperature and precipitation gradients exist from west to east with the rise in elevation toward the Blue Mountains. Local climate varies from warm and semiarid in the western lowlands, to cool and relatively wet at higher elevations in the Blue Mountains (HDR/EES Inc., 2005). Temperatures in the basin can easily reach 37.8 °C (100 °F) in the summer and below freezing in the winter. The lower portions of the basin receive less than 10 inches of annual precipitation, while the upper sections, in the Blue Mountains, can receive up to 60 inches of annual precipitation. Most of the precipitation falls as snow in the winter months, causing a significant accumulation of snowpack in the mountains. Spring thaw, compounded with rain showers, is the source of flooding for the basin. Significant flood events occurred in 1933, 1964, and 1996.

The Walla Walla basin consists primarily of rolling hills interspersed with valleys, and is underlain by loess (windblown silt) formations up to 250 feet thick, except to the west where the soils are sandy. The valley floors are underlain by floodplain alluvium. Beneath the floodplain alluvium are clay units up to 500 feet thick. Most benches within the valleys and terraces on the valley sides are composed of sand and silt of the Touchet Beds deposited by catastrophic floods from glacial Lake Missoula's floods. The Columbia River basalts lie below newer sediment deposits, but are exposed at the surface in some locations.

There are two major aquifers in the area: the basalts are the deep confined aquifer and the gravels are the shallow unconfined aquifer. In general, streams are in hydraulic continuity with the shallow gravel aquifer (Newcomb, 1965, and Carson and Pogue, 1996). In the Walla Walla Valley, the clays serve to slow water movement between the shallow aquifer and the deep basalt aquifer (Newcomb, 1965, and Carson and Pogue, 1996). Folds and faults in the basalt can work as natural dams, creating impediments to groundwater flow, large differences in groundwater pressure, and fluctuations in water levels (HDR/EES Inc., 2005).

Much of the land area in the upper Touchet River and upper Mill Creek watersheds is covered with forest. The United States Forest Service (USFS) manages federally-owned forest land. Forest land in the watershed that is not owned and managed by the USFS is subject to the state forest practices rules.

Forest-based land uses are present in the upper watersheds, but commercial agriculture is the dominant land use in the basin. Some small farms can be found in the vicinity of urban areas. Starting as early as the 1920s, the principal form of land use was production of small grains (such as wheat and barley), forage crops (like alfalfa), and row crops (Mapes, 1969). Currently, wheat, pasture, vegetables, alfalfa seed, and hay are the largest percentage of the irrigated crops. Pasture makes up roughly a quarter of irrigated lands on the Washington side of the Walla Walla basin. Other crops include onions, peas, grapes, apples, asparagus, and barley.

Roughly 12 percent of the total acreage of the Walla Walla basin in Washington State is enrolled in the Conservation Reserve Program (CRP). Just less than one percent is under the Conservation Reserve Enhancement Program or CREP (Walla Walla Watershed Planning Unit and Walla Walla Basin Watershed Council, 2004). About 91 percent of land on the Washington side of the Walla Walla basin is privately owned. Approximately six percent and two percent are owned by federal and state entities respectively (Hashim and Stalmaster, 2004).

Much natural habitat is highly altered due to historical grazing, prescribed burning, wildfires, and agriculture. Riparian vegetation is limited in most areas throughout the basin, but considerable riparian enhancement has occurred through efforts by the local community.

Most people in the Walla Walla basin live in urban areas. The Washington State Office of Financial Management's most recent census results show there were about 56,700 people living in Walla Walla County in 2004. The major cities are Walla Walla and College Place, with a combined population of less than 40,000. The cities of Waitsburg, Dayton, College Place, and Walla Walla are the principal urban population centers. Smaller towns of Prescott, Touchet, and Milton-Freewater (Oregon) support surrounding agriculture.

The cities of Walla Walla, College Place, and Dayton have wastewater treatment plants that discharge to surface water. These are regulated by National Pollutant Discharge Elimination System (NPDES) permits. Walla Walla County, College Place, and Walla Walla qualify for stormwater permits.

What Will be Done?

Overview – Piecing it all together

The Walla Walla watershed is blessed in having a number of organizations that are already implementing projects that will benefit water quality. These groups and actions will be identified later in the report, but there is still a lot more work to be done. Time and resources are limited, and not all the groups listed have water quality improvement as their first priority. Implementation is further complicated by the fact that there are four separate TMDLs, each with their own set of recommendations. So, there is a need for a plan that summarizes the results of the TMDLs and focuses work where it is most needed. This plan attempts to do that.

The strategies included in this plan will reduce chlorinated pesticides, fecal coliform bacteria, water temperature, and nutrients (to increase dissolved oxygen and decrease pH levels). This plan recommends and prioritizes actions for both point sources and nonpoint sources.

State standards are anticipated to be met in 10 years from the completion of this plan for all water quality parameters except temperature, which is expected to be achieved in 50 years or less. Table 2 lists timeframes for meeting interim targets and water quality standards.

Table 2. Timelines for meeting interim targets and water quality standards.

TMDL			Years after the WQIP								
			3	5	6	10	15	20	30	40	50
Chlorinated Pesticides & PCBs	E. Little Walla Walla & Yellowhawk Creeks	TSS (mg/L)		30		15	5*				
		Turbidity (NTU)		15		8	3*				
	Mainstem & other Tributaries	TSS (mg/L)		50		30	5*	2 to 1*			
		Turbidity (NTU)		24		15	3*	1 to < 1*			
Fecal Coliform Bacteria (% decrease in colonies)			29		59	99					
Temperature (% increase in shade)						10		20	35	55	73
pH & DO (nutrient seasonal average µg/L)	Mill & Yellowhawk creeks	Headwater & tributary streams	30% lower than 2003 levels		60% lower than 2003 levels	DIN = 76 SRP = 47					
		Ground water				DIN = 387 SRP = 85					
	Touchet River	Headwater & tributary streams				DIN = 55 organic N = 39 SRP = 25 organic P = 18					
		Ground water				DIN = 205 SRP = 50					
	Walla Walla River & other tributaries					DIN = 200 SRP = 40					

DIN = dissolved inorganic nitrogen (nitrogen that is available for uptake by organisms for growth)
SRP = soluble reactive phosphorus (also called phosphate, which is available for uptake by organisms for growth)
* Goals to protect the public and tribal members who consume large quantities of fish.

Summary of implementation actions

Nonpoint Sources

TMDLs must assign pollutant loads to nonpoint sources in the watershed. Nonpoint sources are assigned load allocations (LAs) which will be met by local and state organizations using a variety of approaches. Table 3 contains all the load allocations in the four TMDLs.

Table 3. Load allocations assigned by the Walla Walla TMDLs

Location		Chlorinated Pesticide & PCB TMDL				Fecal Coliform TMDL	Temperature TMDL	pH & Dissolved Oxygen TMDL
		Jan. – June				June – Oct.	July – Aug.	May – Oct.
		Total Suspended Solids (lbs/day)			PCBs (gm/day)	Target Reduction (%)	Increase in Shade (%)	(µg/L)
		50 mg/L	30 mg/L	15 mg/L				
Coppei Creek						44	*System Potential Mature Riparian vegetation (Defined as the vegetation which can grow and reproduce on a site given climate, elevation, soil properties, plant biology, and hydrologic processes.)	Natural background concentrations of dissolved inorganic nitrogen and soluble reactive phosphorus (see Table 2 of this document)
Cottonwood Creek						36		
Dry Creek		19,440	11,664			45		
East Little Walla Walla River			15,000					
Gardena Creek		2,160	1,296					
Garrison Creek		4,320	2,592		0.0017	81		
Mill Creek	@ mouth	47,790	28,674		0.023	62		
	@ Roosevelt					76		
	@ 9th Street					94		
Mud Creek		1,620	972			60		
Patit Creek						80		
Pine Creek		16,470	9,882			21		
Russell Creek						68		
Touchet River	@ mouth	202,500	121,500					
	@ Hart Rd.					86		
	@ Highway 125					72		
	@ Pettyjohn Road					46		
	@ Lamar Road					16		
	@ Cummins Road					81		
	@ Highway 12					78		
Walla Walla River	@ Peppers Bridge (Oregon Stateline)	120,000	69,000					
	@ Cummins Road	450,000	270,000			32		
	@ Highway 125					6		
	@ Last Chance Road					35		
	@ Detour Road					33		
	@ Touchet-Gardena Road					60		
West Little Walla Walla		1,566	940			46		
Yellowhawk Creek			15,000	7,600	0.010	42		

* Specific increases in shade required for the Walla Walla tributaries and mainstem can be found in the temperature TMDL (http://www.ecy.wa.gov/biblio/0710030.html).

Prioritization
Prioritization serves as guidance for managers on where to focus implementation. It is not meant as a regulatory tool. The prioritization and the watershed subcommittee that helped develop it have no regulatory power to require groups or landowners to make any management changes. However, Ecology staff will use the plan to focus their technical assistance, and may use the plan to help identify areas where further investigation and possible enforcement is warranted.

1) Riparian Areas:
To show managers the areas of greatest water quality concern, Ecology mapped the results of the TMDL studies. Once the map was developed, Ecology worked closely with the Watershed Planning Unit's Water Quality Subcommittee (Subcommittee) to identify priority water quality protection and restoration areas (Figure 2). Those riparian reaches requiring load reductions for several pollution parameters and those that have particularly severe problems (such as highly erodible land) are classed as *priority restoration zones*. Those reaches requiring reductions of only one pollution parameter or that have less severe problems are classed as *secondary restoration zones*. Some TMDLs identified reaches that were in relatively good condition and worthy of protection. These areas we classed as *primary protection zones* because it is important to prevent deterioration here if load reduction efforts elsewhere are to succeed.

The only exception to the prioritization strategy is the stretch of Mill Creek from roughly just east of the city of Walla Walla to its confluence with the Walla Walla River. This area was identified in several TMDLs as being a pollution problem and in poor condition. But, the Subcommittee chose to classify it as a secondary restoration reach because the restoration challenges are so complex and unique that the solutions will probably be unlike any others in the watershed. Restoration will require a concentrated effort from a wide variety of stakeholders, and the Mill Creek workgroup is actively working on solutions to many of these problems. So, although Ecology and the Subcommittee are not recommending any immediate TMDL implementation work there, it will be important to track the progress of work by such watershed groups. If present restoration efforts are unsuccessful, the Subcommittee may choose to re-prioritize this reach and redirect TMDL implementation efforts there.

2) Upland Areas:
The TMDL analysis showed that pollution reduction work was equally important in upland areas. Much of the work in upland areas will center on reducing erosion and nutrient inputs through changes in farm management. By using a soil map of the watershed we were able to identify a broad area of highly erodible soils, shown as a shaded area on the prioritization map (Figure 2). This area should be the focus of future upland technical assistance and education/outreach work.

Best Management Practices (BMPs)
Knowing where to work is only half the picture. Managers also need to know what actions to take. Appendix B contains tables of best management practices recommended by the Subcommittee. Urban and rural areas have different pollution sources and so need different BMPs. Therefore, there is a table for urban BMPs and a table for rural BMPs. Appendix B lists the factors related to the water quality impairments and the BMPs that can be applied in the prioritized zones as well as other areas in the watershed. Because the conditions at each site will

vary, the Subcommittee did not prescribe what BMPs should be used for each reach. Local managers should select the appropriate BMPs for each site.

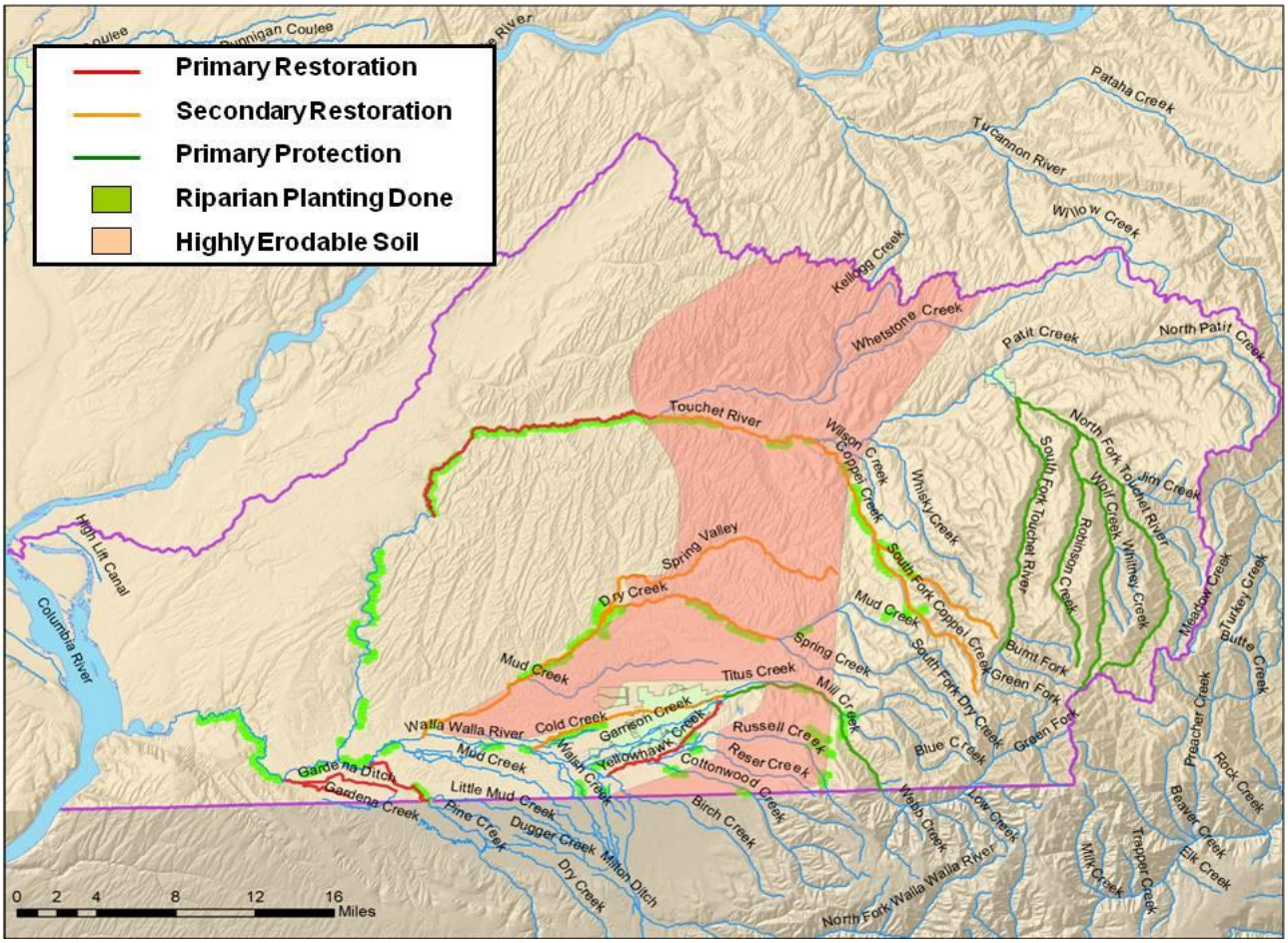

Figure 2. Priority water quality protection and restoration areas in the watershed.

Coordination

The long-term success of TMDL implementation will depend a lot on how well work is coordinated with what other groups are doing across the basin. There is considerable overlap with the implementation areas identified in some other planning processes. The Snake River Salmon Recovery process is one example. Figure 3 is a map and Table 4 is a list of watershed streams the Snake River Salmon Recovery Board considers as priorities for protection and restoration for salmon, steelhead, and bull trout (Snake River Salmon Recovery Board, 2006).

This situation presents us with two choices: concentrate TMDL implementation in areas *not* covered by other plans, or implement activities in areas already identified in other plans. The former choice assumes that other groups will achieve their objectives and that all implementation priorities identified in the TMDLs are addressed. The latter choice concentrates resources in a few key areas, improving implementation speed and efficacy in those areas. The Subcommittee recommends managers implement activities in areas already identified by other plans. They reasoned that if other groups were already working in certain areas the issues must be serious.

Therefore, it is important to achieve improvements in these areas as soon as possible. They also pointed out that because other groups do not have water quality concerns as a top priority, TMDL issues may not always be adequately addressed without strong collaboration and coordination. So, it made most sense to work in areas where there was already overlap with other groups' work.

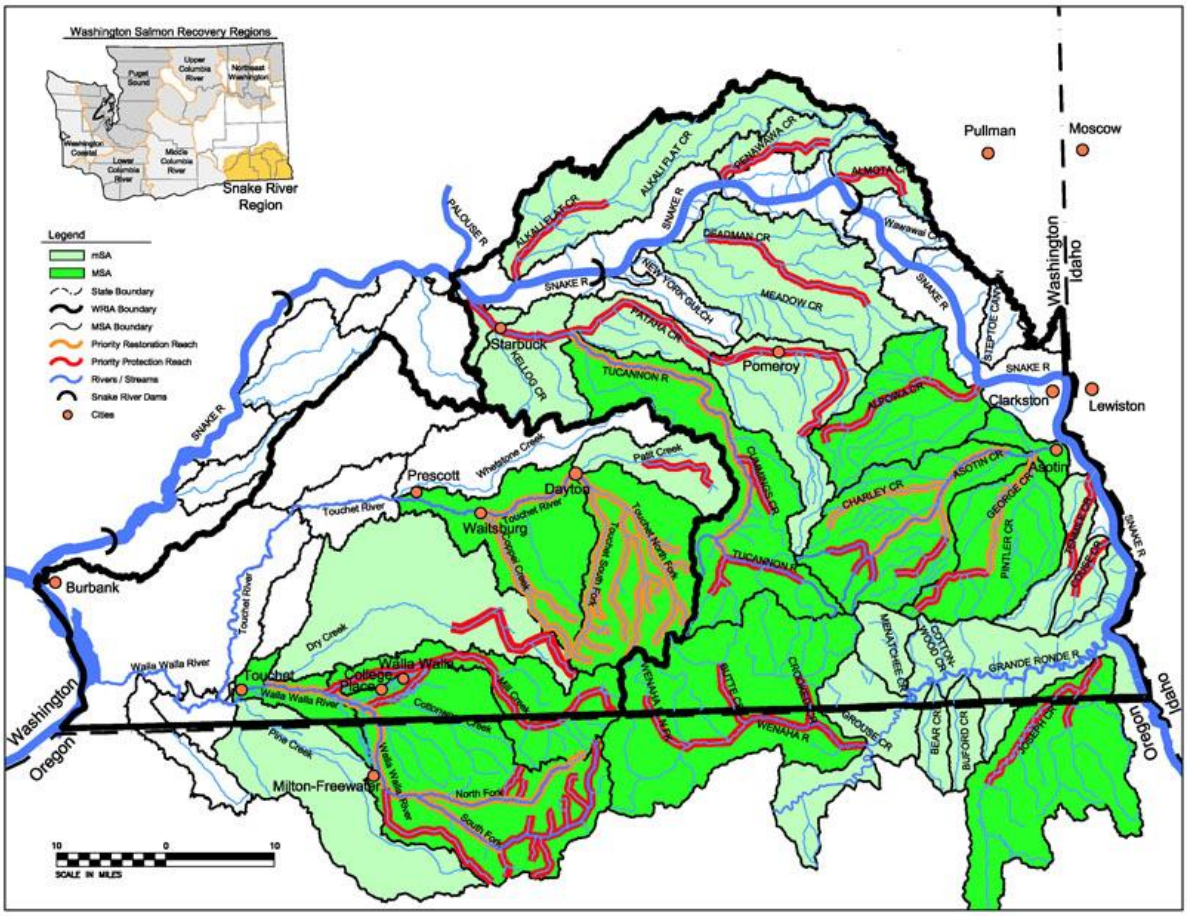

Figure 3. Snake River Salmon Recovery priority streams for the Snake River Region (Snake River Salmon Recovery Board, 2006)

What has been done so far?

The TMDLs are based on data collected from 2002 through 2003. Upon request of the Subcommittee, Ecology funded studies to collect additional data in 2007 in support of the chlorinated pesticides and PCB TMDL. But, essentially the TMDLs are snapshots of the state of the watershed about 5 years ago. Much implementation has been done since then, and many parts of the watershed are improved. Figure 4 is a map showing where restoration projects are installed based on information received from the Walla Walla County Conservation District. Managers should use this information to install new projects in those areas that remain unaddressed. However, some post project assessment might show follow-up work is necessary in areas previously worked in.

Table 4. Priority Protection and Restoration Areas within the Walla Walla watershed (excerpted from Table 6-1 of the Snake River Salmon Recovery Board, 2006)

Stream and Reach	Subbasin	Priority (Restoration and/or Protection)
Walla Walla River (Dry Creek to Mill Creek)	Walla Walla River	protection
Walla Walla River (Mill Creek to E. Little Walla Walla)	Walla Walla River	restoration and protection
Walla Walla R. (E. Little Walla Walla to Tumalum Bridge)	Walla Walla River	restoration and protection
Walla Walla River (Tumalum Bridge to Nursery Bridge)	Walla Walla River	restoration and protection
Walla Walla River (Nursery Bridge to Little Walla Walla diversion)	Walla Walla River	restoration and protection
Walla Walla River (Little Walla Walla diversion to forks)	Walla Walla River	restoration and protection
South Fork Walla Walla River (mouth to Elbow Creek)	Walla Walla River	restoration and protection
N. Fork Walla Walla River (Canyon Creek)	Walla Walla River	restoration and protection
Upper Dry Creek	Walla Walla River	protection
Coppei Creek Drainage	Walla Walla River	restoration and protection
Touchet River (Coppei Creek to forks)	Walla Walla River	restoration and protection
S. Fork Touchet River main-stem	Walla Walla River	restoration and protection
S. Fork Touchet River Tributaries	Walla Walla River	restoration and protection
N. Fork Touchet River Tributaries (except Wolf Fork)	Walla Walla River	restoration and protection
N. Fork Touchet River main-stem	Walla Walla River	restoration and protection
Wolf Fork (mouth to Coates Creek)	Walla Walla River	restoration and protection
Upper So. Fork Walla Walla River (Elbow to access limit)	Walla Walla River	protection
Skiphorton Creek & Reser Creek Drainages	Walla Walla River	protection
Lower South Fork Walla Walla River Tributaries	Walla Walla River	protection
N. Fork Walla Walla River (Little Meadows Creek to Big Meadows Creek)	Walla Walla River	protection access limit
Patit Creek Drainage	Walla Walla River	protection
Mill Creek Drainage above Bennington Dam & below Gose Street	Walla Walla River	protection
Yellowhawk River mainstem	Walla Walla River	protection
"Headwater" Geographic Area	Walla Walla River	protection
N. Fork Touchet River above EDT reaches	Walla Walla River	protection
Burnt & Green forks, Touchet River above EDT Reaches	Walla Walla River	protection
Wolf Fork, Touchet River above EDT reaches	Walla Walla River	protection
Mill Creek above EDT reaches	Walla Walla River	protection
S. Fork Walla Walla River above EDT reaches	Walla Walla River	protection
N. Fork Walla Walla River above EDT reaches	Walla Walla River	protection

Education

Increasing watershed residents' awareness of how they impact water quality and what can be done to lessen their impact is necessary to achieve cleaner water in the basin. Education efforts, using science-based information, should focus on changing behaviors that degrade water quality. Targeted education strategies should address barriers to preferred behaviors, highlight benefits of good water quality, and measure changes in behavior. Education programs based on community-based marketing achieve these goals. Since everyone has the ability to impact water quality within the watershed, educational programs should include all sectors of the public and be targeted at a wide variety of land uses.

The Subcommittee recommends several approaches to education:

- Workshops should be offered about water quality standards and the targets in the TMDLs. Agencies should work together to hold workshops so that a variety of information related to managing water can be learned at one place and time. Such workshops could also draw in more people. Presentations about water quality could also be given at various wintertime meetings put on by groups such as the Grandmothers' Round Table, Kiwanis, Wheat Growers, local cattlemen association, etc.
- Inform farmers about the benefits of direct seeding. Potential educational tools include creating forums for growers to interact with credible direct seeders, advertising economic comparisons between direct seeding and conventional farming practices, and publicizing stories of failures and successes.
- Use the Water and Environmental Center at Walla Walla Community College to disperse information and hold workshops about protecting water quality. The Subcommittee also believes the Water and Environmental Center would be a good organization to maintain a web-based geographic information system (GIS) map of watershed streams with a database that includes data on water quality, where direct seeding is taking place, etc. The Subcommittee acknowledges that grant funding and coordination with Walla Walla County's GIS efforts would be needed.
- Include water quality classes in agriculture and other curriculums at the local colleges, as well as vocational-agriculture classes in the watershed's high schools.
- Provide information to city residents and developers about decreasing stormwater and the pollutants it carries.
- Place signs and other educational materials at parks. For example, provide baggies and trash cans at the new pet park, along with information about pet waste contributing bacteria to area streams.

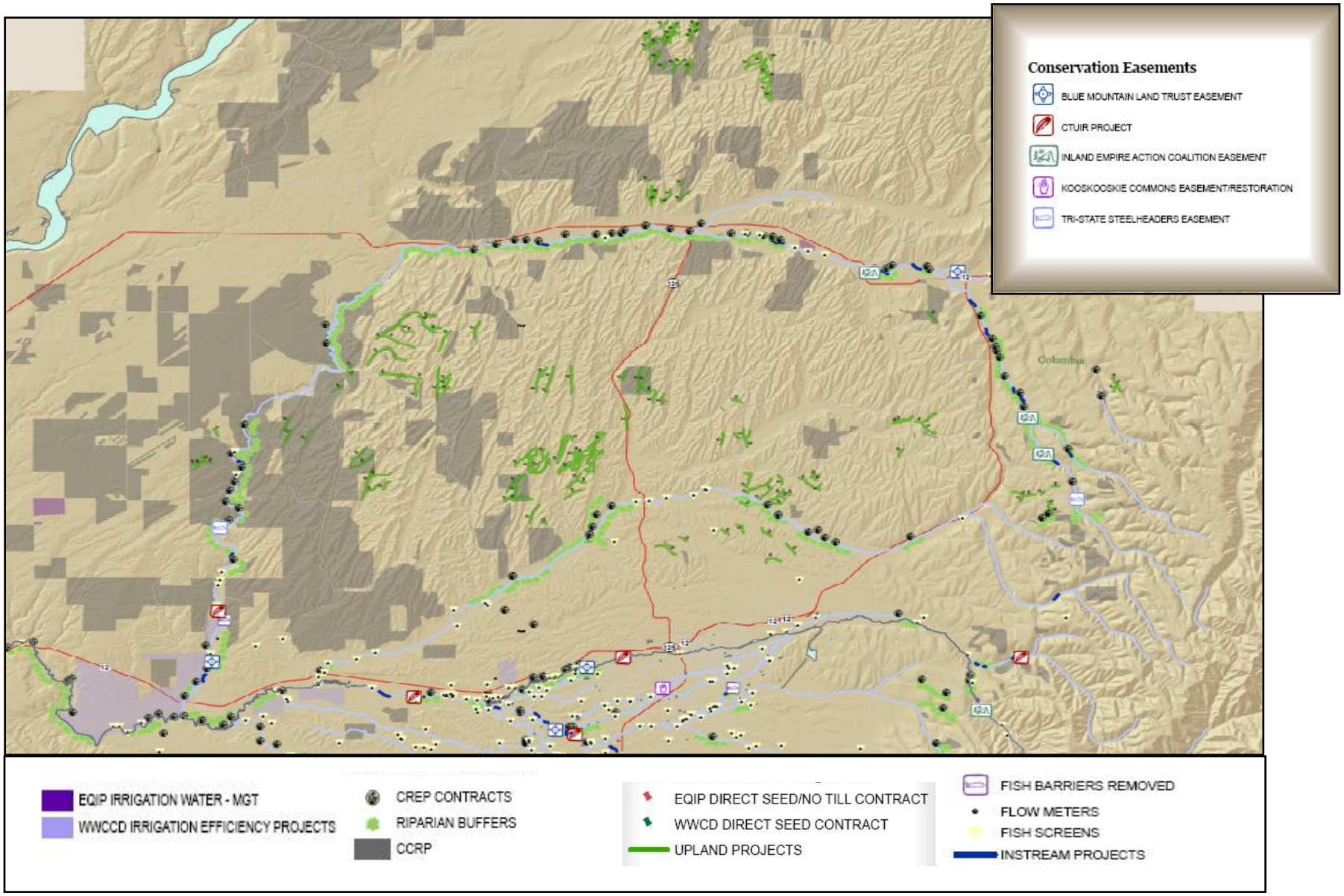

Figure 4. Work completed in the watershed that helps improve water quality (photo courtesy the Walla Walla County Conservation District)

Implementation issues not addressed in the TMDLs
There are three issues important to the environmental health of the watershed which were not addressed in the TMDLs:

1) Invasive Species:
Invasive plant species are a serious problem in the Walla Walla basin. Not only are they important economically as agricultural pests, but they also threaten riparian ecosystems. Appendix C contains a list of the noxious weeds in Walla Walla County. Desert false indigo (*Amorpha fruticosa*) is one of the most serious threats to disturbed riparian areas in the Walla Walla basin. This plant has been found spreading at a rapid rate up the Touchet River, and recently Ecology staff located a few specimens along Yellowhawk Creek. Invasive species were not addressed in any of the TMDLs because they don't appear to have a direct impact on any of the parameters of concern. But, the watershed's success in maintaining healthy riparian ecosystems will depend, in large part, on how well residents manage the weed problem in the watershed. Managers should begin a coordinated, long-term, multi-species control program across the watershed and investigate the possibility of introducing a biological control for the false indigo problem in particular.

2) Climate Change:
The temperature TMDL included some information on climate change and indicated that water quantity and water quality of Pacific Northwest streams will likely be impacted. At this stage no one knows for certain how this will manifest itself in the Walla Walla region. But climatic changes are likely and will probably affect plant growth in the region and the success of restoration projects. The most important change for TMDL implementation will likely be hotter and drier summers. This may mean that the temperature reductions achieved from the maximum system potential shade recommendations in the temperature TMDL will be less than currently expected. But all the TMDLs would potentially be affected as snow melt could occur earlier and summer flows might be even lower than they are currently.

On a site-specific level, restoration projects might be affected as well. Because the future is uncertain, the best approach is to plant species appropriate to site conditions, monitor closely, and employ adaptive management as the climate changes. Appendix D contains a map and a corresponding table Ecology developed for the temperature TMDL. The map shows the recommended plant types and species for various river reaches in the watershed. These recommendations are based upon likely historical occurrence, general site conditions, and species tolerances. Ecology strongly encourages managers to follow this guidance when installing riparian plantings, and perhaps select those species to plant within each category which are most drought and heat tolerant. This should improve the chances of long-term plant survivability, even in the face of future climate changes.

In addition, several groups are working to improve flows and restore natural hydrological function to the watershed, which will hopefully alleviate the problem. This is one more reason to pursue close coordination between TMDL implementation and the other planning processes.

3) Pharmaceuticals:
The chlorinated pesticide and PCB TMDL applies to chemicals the Environmental Protection Agency banned in the 1970s and 1980s. Recently, research found that trace amounts of legal drugs people use every day (aspirin, hormones, antibiotics) are showing up in ground and surface water because wastewater treatment plants and septic systems are not designed to treat this waste.

The best way to dispose of household medications is to take any unused portions to a pharmaceutical collection program or household hazardous waste collection event. If a collection program does not exist, residents should encourage their health care provider, local governments and law enforcement to develop one. People choosing to store medications while waiting for a collection event should minimize the risk of accidental poisoning, overdose or diversion (illegal use by someone other than the intended person) by storing medications out of reach of children or in a locked cabinet.

Dispose of any unused medicine in the trash by following these steps:

- Remove or mark over all labels that identify the medicine and provide personal information and instructions for refilling a prescription.
- Modify the medicine so it is unattractive to children and thieves by grinding them up or mixing them with coffee grounds or kitty litter.
- Put the medicine in a second container or small plastic bag and hide them in your trash.

People should never burn medicines because the smoke can contain dioxins and other air pollutants.

Point Sources

TMDLs must allocate pollutant loads to point sources in the watershed. Point sources receive wasteload allocations that Ecology uses to develop limits in a city's National Pollutant Discharge Elimination System (NPDES) or stormwater permit.

Municipal wastewater:
In the Walla Walla watershed, the point sources are the wastewater treatment plants for the cities of Dayton, College Place, and Walla Walla. Although the city of Waitsburg's wastewater treatment plant discharges to a wetland, the wetland is adjacent to the Touchet River. Since the wetland is closely connected to the river, the city of Waitsburg has an NPDES permit.

Ecology also issues state waste discharge permits. These permits apply to municipal wastewater treatment plants, industrial and commercial facilities that apply waste water onto the ground. State waste discharge permits do not receive wasteload allocations in TMDLs.

Table 5 provides a list of the NPDES and state waste discharge permits in the Walla Walla watershed. The wasteload allocations in the four Walla Walla TMDLs will be incorporated into the cities' future NPDES permits. Table 6 provides a list of the wasteload allocations assigned to

the wastewater treatment plants. Wastewater treatment plants receiving allocations will have ten years from the completion of this plan to meet water quality standards.

Table 5. Permits in the Walla Walla watershed

Entity	Discharge to	Type of Permit	Permit Number	Permit Expiration Date
City of Dayton	Touchet River	NPDES	WA0020729	April 27, 2010
City of College Place	Garrison Creek	NPDES	WA0020656	June 29, 2010
City of Walla Walla	Mill Creek	NPDES	WA0024627	June 29, 2010
City of Waitsburg	wetlands adjacent to the Touchet River	NPDES	WA0045551	March 23, 2010
Walla Walla Water District #2 (Touchet)	ground	State Waste Permit	ST 8040	April 1, 2008 *(In process of reissuing)*
City of Walla Walla	varies	Phase II Stormwater	WAR04-6508	Feb. 15, 2012
Walla Walla County	varies	Phase II Stormwater	WAR04-6509	Feb. 15, 2012
Washington State Dept. of Transportation	varies	Phase II Stormwater	To be issued Nov. 2008	Nov. 2013

Stormwater:
Stormwater runoff from urban areas, as well as construction and industrial sites, contains pollutants that impact receiving waters and may require permits from Ecology. Stormwater is the leading contributor to water quality pollution in our urban waterways. Stormwater is also Washington's fastest growing water quality problem.

Currently, the city of Walla Walla and Walla Walla County have municipal stormwater permits. Special Condition S5 of the Eastern Washington Phase II Municipal Stormwater Permit requires cities, towns, and counties that are regulated by the permit to develop stormwater management programs. The required elements of a stormwater management program are:

1) Stormwater public education and outreach.
2) Public involvement and participation in the development of the stormwater management program.
3) Illicit discharge detection and elimination, which includes mapping the storm sewer system.
4) Construction site stormwater runoff control.
5) Post-construction stormwater management for new development and redevelopment.
6) Pollution prevention and good housekeeping for municipal operations.

These entities are also required to develop ordinances or other regulatory measures that prohibit illicit discharges, regulate construction activities, and implement post-construction protections to reduce stormwater impacts. Additional information on the Phase II Municipal Stormwater Permits can be found at: http://www.ecy.wa.gov/programs/wq/stormwater/municipal/index.html.

Table 6. Wasteload allocations assigned by the Walla Walla TMDLs

City	Parameter	Wasteload allocation	TMDL Critical period
Dayton Wastewater Treatment Plant	Chlorinated Pesticides & PCBs	Did not include in the study.	January - June
	Fecal Coliform	Current permit limits	June - October
	Temperature	21.8 °C	July - August
	pH & Dissolved Oxygen	• 0.28 lb/day for dissolved inorganic nitrogen (sum of nitrate, nitrite, and ammonia). • 0.20 lb/day for organic nitrogen. • 0.13 lb/day for soluble reactive phosphorus. • 0.09 lb/day for organic phosphorus.	May - October
College Place Wastewater Treatment Plant	Chlorinated Pesticides & PCBs	• PCBs: 0.0011 gm/day • TSS: current permit limits	January - June
	Fecal Coliform	2005 permit limits	June - October
	Temperature	Current permit limits	July - August
	pH & Dissolved Oxygen	Remove effluent from receiving waters	May - October
Walla Walla Wastewater Treatment Plant	Chlorinated Pesticides & PCBs	• PCBs: 0.0062 gm/day • TSS: current permit limits	January - June
	Fecal Coliform	Current permit limits (does not discharge during this time)	June - October
	Temperature	does not discharge during this time & is in compliance	July - August
	pH & Dissolved Oxygen	does not discharge during this time & is in compliance	May - October
Waitsburg Wastewater Treatment Plant	Chlorinated Pesticides & PCBs	Did not include in the study.	January - June
	Fecal Coliform	n/a – discharges to wetland	June - October
	Temperature	n/a – discharges to wetland	July - August
	pH & Dissolved Oxygen	Requires further investigation to determine if the treatment plant's wetland is a source of nutrients. If so, prevent ground water continuity between the wetland and the Touchet River.	May - October

Any construction site one acre in size or greater is required to obtain a construction stormwater permit. Specifically, Ecology's construction stormwater general permit is required if:

1. The construction project disturbs one or more acres of land through clearing, grading, excavating, or stockpiling of fill material. This includes the cumulative acreage of the entire project, whether it is a single or multiphase project.

2. There is any possibility that stormwater could run off the site during construction and into surface waters or conveyance systems leading to surface waters of the state. If the topography and location of the site is such that there is no possibility that rainfall or snowmelt could leave the site or enter a waterway, permit coverage is not required.

Additional information on the construction stormwater general permits can be found at: http://www.ecy.wa.gov/programs/wq/stormwater/construction/.

Also, industrial sites are required to have a permit if they discharge stormwater from their industrial areas into surface water or a storm drain system that later discharges into surface water. An industrial stormwater general permit is also required for industrial facilities that have certain Standard Industrial Classification (SIC) codes. Some industries may be required to seek permit coverage for areas of their industrial site that have a potential or are causing an impact to receiving waters. See http://www.ecy.wa.gov/biblio/9938.html or http://www.ecy.wa.gov/programs/wq/stormwater/industrial/index.html for more information about industrial stormwater permits.

Ecology recommends that all entities and facilities that are required, or that nearly qualify for inclusion in a permit, apply for coverage under the relevant municipal, construction, or industrial permit.

While collecting water quality data for the four TMDLs developed for the Walla Walla watershed, Ecology did not specifically sample stormwater. Therefore, wasteload allocations were not assigned by any of the TMDLs. However, the fecal coliform TMDL did recommend reductions in fecal coliform levels from stormwater at various locations in the watershed. Table 7 provides target reductions for stormwater listed in the fecal coliform bacteria TMDL.

Table 7. Target reductions for fecal coliform bacteria in stormwater

Stream segment	Target reduction (%)
Mill Creek at 9th Street	94
Mill Creek at mouth	62
Yellowhawk Creek	42
Garrison Creek	81
Touchet River @ Highway 125	72
Touchet River @ Highway 12	78
Walla Walla River @ Highway 125	6
Walla Walla River @ Detour Rd.	33
Walla Walla River @ Cummins Rd.	32

Communities or entities with stormwater systems are responsible for reducing fecal coliform, sediment, and nutrients in their system to prevent them from being discharged into surface water. Pollution from stormwater in urban areas is considered capable of occurring at any time. Therefore, the following recommendations to reduce the impact of stormwater apply year-round and should be incorporated into their next permits:

- Monitor stormwater outfalls for sediment (total suspended solids and turbidity), nutrients (nitrogen and phosphorus) and fecal coliform loading. Periodic monitoring for

chlorinated pesticides and PCBs is encouraged to determine if and how much stormwater contributes these pollutants to area creeks.

- Identify and apply corrective measures to control pollutants from stormwater systems to ensure that effluent from their systems do not increase pollutant concentrations in creeks and rivers. The *Stormwater Management Manual for Eastern Washington* (Washington State Dept. of Ecology, 2004) identifies strategies to decrease or eliminate the amount of stormwater or runoff directly entering area streams and rivers.
- Consider adopting ordinances and regulatory mechanisms to control stormwater from municipal, construction and industrial activities. Local governments are encouraged to work with developers and others to ensure compliance with the construction stormwater permit.
- Evaluate stormwater collection systems to identify pollution sources.
- Use BMPs on highways and roads near cities, towns, and all surface water crossings in the watershed.
- Apply infiltration or retention stormwater BMPs that allow water to infiltrate into the ground, rather than directing stormwater over cement or asphalt heated by the sun before entering streams. While temperature is not included in stormwater permits issued by Ecology at this time, these BMPs could help lower temperatures of stormwater before entering streams. Residents are encouraged to water lawns and landscaping at a rate that allows infiltration rather than cause water to run off into streets.

Pollution sources and organizational actions, goals, and schedules

Many local interests in the Walla Walla basin are involved with TMDL planning and implementation. As discussed previously, many others are involved in a variety of other planning and implementation processes. There is an excellent opportunity to dovetail the actions in this WQIP with these other related efforts. Coordinating efforts should help to achieve water quality improvements more efficiently and effectively. Ecology will continue to work closely with these basin interests to improve water quality in the Walla Walla watershed.

Actions recommended are intended to be specific enough to clearly identify the actions and results, yet general enough to permit some flexibility in carrying them out. It is recognized that some actions will require further investigation prior to full implementation. Additionally, some actions can be carried out only if funding is provided, and funding decisions will be made over a period of months or years following plan adoption. Table 8 lists the entities that identified implementation actions to meet the targets in the four Walla Walla TMDLs. The information listed in the table may change as personnel and available funding are better defined over time. Once an organization agrees to implement actions identified in the plan, it is expected these commitments will be honored, recognizing funding limitations.

Consistent with the Forests and Fish agreement, implementation of the load allocations established in this TMDL for private and state forestlands will be accomplished via implementation of the revised forest practices regulations. The effectiveness of the Forests and

Fish rules will be measured through the adaptive management process and monitoring of streams in the watershed. If shade is not moving on a path toward the TMDL load allocation by 2009, Ecology will suggest changes to the Forest Practices Board.

Table 8. Organizations' Activities to Improve Water Quality

Organization	Pollution Source	Action	Performance Measures		Parameter
			Where	When	
Columbia Conservation District, NRCS, and FSA	upland	install riparian buffers	CREP eligible reaches	landowner driven	temperature, bacteria, dissolved oxygen, nutrients, turbidity
		direct seeding	site specific	landowner and referral driven	sediment, nutrients
	livestock	fencing	CREP eligible reaches	referral and funding driven	bacteria, dissolved oxygen, temperature, nutrients
		off-site water	site specific	referral and funding driven	
Kooskooskie Commons	lawns and small acreages	education and restoration by Walla Walla Backyard Stream Team	Yellowhawk Creek	on-going	bacteria, dissolved oxygen, temperature, nutrients
		Yellowhawk streamkeepers-Urban Backyard Riparian Restoration	Garrison Creek in Fort Walla Walla Park	on-going	
		education and outreach on stream restoration	60-house development on Yellowhawk Creek	on-going	
Priority Projects Group*	land conversion	3 – 5 acre wetland restoration	North Fork Reser Ck	2010	temperature, dissolved oxygen
		3 – 5 acres upland steppe restoration	Walla Walla basin	2010 - 2011	
Tri-State Steelheaders	bank erosion, lack of riparian buffer	woody bank armor, riparian planting and conservation easement	Walla Walla River	2006 - 2008	bacteria, dissolved oxygen, temperature, nutrients, turbidity
		large woody debris and riparian planting	Touchet River	2007 - 2008	

Organization	Pollution Source	Action	Performance Measures		Parameter
			Where	When	
Tri-State Steelheaders (continued)	agriculture and land development	conservation easement	North Fork Coppei Creek	2005 - 2008	bacteria, dissolved oxygen, temperature, nutrients, turbidity
		conservation easement	Mill Creek	2007 - 2008	
	bank erosion, livestock	riparian planting, pasture fence setback	Russell Creek	2007 - 2008	
		pasture fence setback, riparian planting	Yellowhawk Creek, Caldwell Creek	2009	
		riparian planting, livestock setback/exclusion	Walla Walla River	2010 – 2011	
	agriculture	restore 3-acre wetland with a 14 acre native plant buffer	Reser Creek drainage	2008 – 2012	
U.S. Army Corps of Engineers – Walla Walla	stormwater	riparian planting	Nursery St. Bridge in Oregon	possibly 2009 - 2010	temperature
	channelization	feasibility study	Walla Walla Basin	ongoing	flow
City of Walla Walla	Stormwater	place no dumping placards	1000 storm drains discharging to streams	2008-2009	bacteria, dissolved oxygen, temperature, nutrients, turbidity
		Sweep streets	arterials	every week	
			Residential streets	every 2 months	
		maintain BMPs required by stormwater permit	city wide	yearly	
	urban/rural	composting for residents	city wide	yearly	bacteria, dissolved oxygen, nutrients
		collect household hazardous waste	city wide	yearly	toxic chemicals
	all/varies	Publish 4 articles, bill inserts, or TV spots about water quality	city wide (10,000 customers)	yearly	bacteria, dissolved oxygen, temperature, nutrients, turbidity

Organization	Pollution Source	Action	Performance Measures		Parameter
			Where	When	
Walla Walla Community College's Water and Environmental Center	varies	education on rural and upland BMPs	workshops within the entire watershed	annually	bacteria, dissolved oxygen, temperature, nutrients, turbidity
Walla Walla Community College	channelization	remove cement-lined pond and install a buffer	Titus Creek	2008 - 2009	bacteria, temperature, dissolved oxygen, nutrients, turbidity
Walla Walla County Conservation District, NRCS, and FSA	livestock	install 810 acres riparian buffers	Touchet and Walla Walla rivers; Dry, Doan, and Cottonwood creeks	2008 - 2012	bacteria, temperature, dissolved oxygen, nutrients, turbidity
Walla Walla County Conservation District	urban areas	install 9 to 15 urban buffers	urban streams	fall 2007 – spring 2010	temperature, dissolved oxygen, nutrients, sediment, turbidity
	irrigation canals	6 miles of piping	Touchet River basin - Eastside Irrigation District	2008 – 2009	
		piping (undetermined amount)	Old Lowden	2009-2010	
			Bergevin-Williams	2009-2010	
			Gardena	2010-2011	
			Lowden	2010-2011	
	channelization	creek restoration, including meander reconstruction	Doan Creek east of Last Chance Road	2010	

Organization	Pollution Source	Action	Performance Measures		Parameter
			Where	When	
Walla Walla County Public Works Department	road construction	develop stormwater management plan; use BMPs	on-site	during construction	turbidity, total suspended solids
	bridge construction projects	develop stormwater management plan, use of BMPs, riparian restoration at bridge, comply with federal and state regulations		during construction	
	rock crushing	develop stormwater management plan; use BMPs; comply with DNR requirements		during operations	turbidity, total suspended solids
	county facilities	develop stormwater management plan; use BMPs		on-going	
	new county roads for housing developments	develop stormwater management plan; use BMPs		during construction	
	new county roads for industrial and commercial development	develop stormwater management plan; use BMPs during construction		during construction	
	direct discharge of stormwater into streams	evaluate on case-by-case basis		when needed	turbidity, total suspended solids, temperature, nutrients, bacteria
	herbicide applications near waterways	use aquatic herbicides per regulations		during application	toxic chemicals
	de-icing applications	use non-toxic solutions		during application	

Organization	Pollution Source	Action	Performance Measures		Parameter
			Where	When	
WA State Dept. of Ecology	All sources	award grants and loans for implementation activities	basin wide	annual competitive cycle	turbidity, total suspended solids, temperature, nutrients, bacteria
		provide technical assistance		when needed	
		provide education and outreach		when needed	
		monitor water quality		as funding allows	
		inspect DMRs and facilities		as required by permit	
		follow up on complaints, referrals and enforcement		as received	
WA State Dept. of Transportation	highway construction	increase infiltration	Highway 12 plus an additional 5 acres	2008 – 2011	dissolved oxygen, nutrients, pH, turbidity

* Priority Projects Group consists of: Walla Walla County Conservation District, Tri-State Steelheaders, Washington State Department of Fish and Wildlife, Confederated Tribes of the Umatilla Indian Reservation, and Blue Mountain Land Trust

County and City Governments
Local regulatory programs involving land use planning and permitting are expected to help reduce water temperatures in the Walla Walla watershed. Shorelines of streams with mean annual flows greater than 20 cubic feet per second (cfs) are protected under the Shoreline Management Act. (Larger rivers greater than 200 cfs east of the Cascade crest are defined as shorelines of statewide significance.) Counties and cities develop and manage plans for streams protected by the Shoreline Management Act. In addition, land management practices next to streams may be limited by cities or counties if there are local critical areas ordinances. These ordinances are established by cities and counties and typically prescribe buffer widths for streams or wetlands. County and city governments are tasked with protecting these buffer requirements while permitting activities. City and county governments must periodically update their Shoreline Management Plans and critical areas ordinances. Local governments in the Walla Walla watershed agreed to consider the *Snake River Salmon Recovery Plan* when updating their plans and ordinances. Steps should be taken by local governments to encourage a proactive approach to protect water quality.

City of Dayton
Once the city of Dayton's NPDES permit is reissued, they will have a ten-year compliance schedule to remove discharge or use a treatment that will result in nutrient loads that meet the TMDL targets during the May-October critical period. As part of this effort, it will be important to coordinate with other planning groups and governmental entities so the impacts of this effluent diversion are widely understood. Diversion of Dayton's effluent from the Touchet River will require significant improvements and modifications to their existing wastewater treatment plant. Dayton will need some form of federal and/or state financial assistance in the form of grants and/or low interest loans in order to comply with the TMDL targets. If they choose to utilize some or all of its effluent for water reuse, then Dayton will likely be required to perform a water right impairment analysis and construct improvements to produce the class of reclaimed water required for its reuse.

City of Waitsburg
The city of Waitsburg should work to identify and reduce or eliminate sources of nutrients to the Touchet River within its city limits.

City of Walla Walla
The city of Walla Walla (City) already has a stormwater utility in place and was recently issued an NPDES stormwater permit. The City and Walla Walla County combined funding to hire a consultant to develop a plan to comply with the new permit. The City already completed mapping the stormwater system using GPS and GIS technology, and currently practices many stormwater BMPs. For example, arterials are cleaned weekly and residential streets are swept every two months. Catch basins are also cleaned of debris every year. Debris and street sweeping residue are decanted at the Public Works decant facility that is shared with the Washington State Department of Transportation. CH2M HILL OMI, the wastewater treatment plant operator, is installing "no dumping drains to stream" signs at 1,000 storm drains. In addition, proper stormwater practices for developments are reviewed and enforced by the planning and engineering departments.

The City has an active stream restoration program and has restored streams in City parks using grant money. Walla Walla has been named Tree City USA 12 years in a row by the National Arbor Day Foundation. Each fall, the City collects approximately 1,500 cubic yards of leaves from streets and transports them to the compost facility located at the Sudbury Landfill. Compost is then sold to projects that reduce stormwater runoff and protect the environment. The Sudbury Landfill cells are lined to protect ground water. In addition, the landfill has a facility where people can take household hazardous materials.

CH2M HILL OMI operates the City Wastewater Treatment Plant. It is the oldest reclaimed water plant in the northwest and it is the largest Class A reclaimed water facility in Washington. The facility provides reclaimed water to two irrigation districts, leaving water in Mill Creek for fish and flow. The plant also has an active industrial pretreatment program protecting water quality. The plant is the only one of its size in Washington, east of the Cascades, to frequently receive the Department of Ecology's perfect compliance award, which is awarded to facilities that meet their permit limits all year long.

The City's Water Department has an active water conservation program and aquifer storage and recovery (ASR) program. The program injects surplus winter water treated at the water plant into the deep basalt aquifer where it is stored for use later in the year. Hydraulic modeling has shown that five percent of the water is lost to local streams and springs because the City has restored artesian pressure in the deep aquifer, improving water quantity in streams and benefiting water quality.

The City has many other programs and hired a sustainability coordinator in 2008. Public education about City programs is distributed monthly through newsletters with utility bills to 10,000 people, and on television through the City's local government access channel (cable channel 17). Information for the newsletters and television spots ranges from water quality to recycling and water conservation.

Columbia Conservation District

Conservation Districts have authority under Chapter 89.08 of the Revised Code of Washington (RCW) to develop farm plans that protect water quality. Conservation Districts also provide information, education, and technical assistance to residents on a voluntary basis. In 1988 Ecology signed a Memorandum of Agreement (MOA) with conservation districts. This MOA establishes a process for conservation districts to address and resolve agriculture-related water quality complaints received by Ecology.

The Columbia Conservation District (District) offers a variety of technical and financial assistance programs to private landowners to address water quality and quantity issues within the Touchet River subbasin. The District also worked cooperatively with Washington State University and the Washington Department of Fish and Wildlife to monitor and collect temperature data in the Touchet River Subbasin. The District is an active participant in the promotion and installation of the United States Department of Agriculture Farm Service Agency's Conservation Reserve Enhancement Program (CREP) which enhances riparian buffers. Currently there are 56 contracts in effect, encompassing 1007 acres and 50 stream miles. The

District provided technical and cost-share assistance funding in the past, and continues to pursue grant funding for future programmatic needs. The District is also involved in:

- Irrigation efficiency projects.
- Irrigation diversion screens and metering.
- Upland sediment reduction projects.
- Livestock best management practice (BMP) projects to improve water quality.

Confederated Tribes of the Umatilla Indian Reservation

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) is made up of the Umatilla, Cayuse, and Walla Walla Tribes. The CTUIR has co-management responsibilities in the Walla Walla River basin. Some CTUIR lands are located on the Rainwater Wildlife Area in the upper South Fork Touchet watershed.

The CTUIR expressed interest the Walla Walla watershed TMDLs and is concerned with salmon and steelhead production in the Walla Walla River basin. In 1995, the CTUIR wrote a Salmon Policy that includes a number of actions to improve water quality and enhance steelhead production (CTUIR, 1995). Some actions included in the plan include protecting floodplains and returning beaver to area rivers. CTUIR is involved with a number of habitat, hatchery, harvest, and hydrologic restoration actions to enhance and restore native salmonid habitat in the basin. The goal is to increase fish production in the watershed. These efforts often help improve water quality. For more information, visit: www.umatilla.nsn.us.

Natural Resources Conservation Service (NRCS)

The United States Department of Agriculture (USDA) NRCS offers technical and financial assistance to eligible farmers and ranchers to address soil, water, and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. The Environmental Quality Improvement Program (EQIP) seeks the input of a local work group to help NRCS establish priority conservation practices for funding. For more information on the funding available through NRCS and other USDA programs, please see the *Funding* section in this report.

Oregon Department of Environmental Quality (ODEQ)

ODEQ is responsible for completing TMDLs and submitting them to EPA. ODEQ published the *Walla Walla Subbasin Stream Temperature Total Maximum Daily Load and Water Quality Management Plan* in August 2005 (ODEQ, 2005). EPA approved this TMDL on September 29, 2005. TMDLs have not been developed for other water quality parameters in the Walla Walla watershed in Oregon. After EPA approves ODEQ's TMDLs, designated agencies are responsible for developing plans detailing how they will implement them.

Implementation work underway in Oregon has the potential to positively affect water quality in the Washington portion of the river. BMPs recommended to reduce temperature problems include increasing riparian vegetation, decreasing bank and upland erosion, and decreasing channel width-to-depth ratios. The agricultural portion of the plan calls for reduced riparian disturbance, including improved livestock management. These BMPs are expected to help reduce fecal coliform, pesticide, suspended solids and nutrient loads coming into Washington,

which may be needed in order to achieve compliance with Washington standards. For more information, please visit: http://www.deq.state.or.us/wq/TMDLs/wallawalla.htm#wwb.

Umatilla National Forest
This TMDL does not address the Umatilla National Forest in Washington State. However, ODEQ did address the Umatilla National Forest for the Walla Walla Subbasin in Oregon, and the Forest Service participated in and contributed to the development of the temperature TMDL and Water Quality Management Plan. In general, documentation of water quality conditions and management practices have been successful in demonstrating commitment to improving water quality on USFS land. Any actions the Forest Service takes to maintain or enhance riparian areas and control erosion will help provide cleaner water downstream.

Region 6 of the USFS and Ecology signed a memorandum of agreement for meeting responsibilities under federal and state water quality laws. This document recognizes the Forest Service as the designated management agency for meeting Clean Water Act requirements on national forest lands. Forest Service and Ecology staff meet annually to review progress on the MOA.

Forest Plan standards, guidelines and amendments, including the aquatic conservation strategy contained in Pacfish (a Forest Service land management plan for improving salmonid habitat), are the foundation for water quality protection and management on the Umatilla National Forest. Project design, BMPs, monitoring activities, restoration programs, and collaboration are the mechanisms for achieving water quality protection. Long-term monitoring programs have been successful in identifying impaired water quality. Over the last ten years significant progress has been made in addressing water quality problems through a variety of means, including changes in management practices, riparian protection, BMPs, and watershed/aquatic restoration.

The Umatilla National Forest Land and Resource Management Plan (USDA Forest Service, 1990) is being revised to account for resource and social changes as well as include new scientific information. For more information visit: www.fs.fed.us/r6/uma/blue_mtn_planrevision/index.shtml.

Walla Walla County Conservation District
As stated under the Columbia Conservation District, the Walla Walla County Conservation District provides information, education, and technical assistance to residents on a voluntary basis. The MOA with the conservation districts allows Ecology to refer landowners to the Walla Walla County Conservation District for technical assistance to resolve complaints..

The Walla Walla County Conservation District has been active in installing riparian buffers along watershed streams. The District also provides technical and financial assistance for:

- Irrigation efficiency projects.
- Fish passage barrier removal.
- Fish screen design and installation.
- Metering of pumps for surface and shallow groundwater withdrawals.
- Sediment reduction.

- Livestock influenced water quality improvement projects.
- Stream restoration projects.

In addition, the District participates in educational programs. The District also applied for and received a grant to expand their riparian buffer program to urban areas in the watershed.

Walla Walla Watershed Planning Unit
The watershed planning process offers a tool to allow local guidance in identifying, prioritizing and developing solutions to water resource management issues. The Planning Unit has been active since the year 2000. In May 2005, the final Walla Walla Watershed Plan was adopted. The Planning Unit received grants for various activities listed in their plan, and they anticipate additional grants will be received in the future for other activities in the plan.

The Walla Walla Watershed Planning Unit works with other local planning and advocacy groups, such as the Walla Walla Basin Watershed Council and Walla Walla Watershed Alliance, to address a variety of water resource issues. These groups coordinate to varying degrees on the following planning processes:

- Bi-State Habitat Conservation Plan (HCP)
- Walla Walla Subbasin Plan
- Comprehensive Irrigation District Management Plan (CIDMP)
- Walla Walla Basin Water Management Initiative (WMI)
- Snake River Salmon Recovery Plan

All of these plans include strategies to improve water quantity, water quality, or fish habitat that could be used to meet the TMDL load allocations.

The Walla Walla Watershed Planning Unit developed a sediment model to assess the positive impact of alternative agricultural BMPs implemented in the basin. The model was used to analyze the erosion and sediment characteristics of the basin as impacted by historical and current (or projected) agricultural practices. Both the planning unit and Ecology have access to this model, and it could be further developed to conduct a basin-wide modeling study or to focus on specific drainage areas within the basin. In addition, the model could be used to help evaluate the stream loading associated with other water quality parameters individually or as affected by sediments.

Conventional approaches to water management in the Walla Walla Basin can make it difficult to implement strategies that effectively address water problems. In response, the Walla Walla Basin Water Management Initiative (WMI) was started, in cooperation with Ecology, to seek flexible solutions to lingering water management issues. As of October, 2008 the Basin, led by the Planning Unit, was pursuing the formation of a local "Walla Walla Watershed Management Partnership" (Partnership). The Partnership would implement the WMI by providing strategic coordination and unified vision of watershed management for both water quantity and quality. In addition to current Planning Unit programs, the Partnership would administer a program, available to water right holders in the Walla Walla Basin, that would allow flexibility in the use of water in return for increased instream flows.

Washington State Department of Ecology (Ecology)
EPA delegated authority to Ecology, under the federal Clean Water Act, to establish water quality standards, administer the NPDES wastewater permitting program, and enforce water quality regulations under Chapter 90.48 of the Revised Code of Washington (RCW). While Ecology is authorized under Chapter 90.48 RCW to initiate enforcement actions if voluntary compliance with state water quality standards is unsuccessful, it is the goal of all participants in the Walla Walla River TMDL process to achieve clean water through voluntary control actions.

Ecology responds to complaints, conducts inspections, and issues NPDES and State Waste Discharge permits as part of its responsibilities under state and federal laws and regulations. The agency's Environmental Assistance Program conducts effectiveness monitoring to determine if water quality is improving.

Ecology recently completed a stormwater management manual for eastern Washington. It is designed to guide local authorities on how to meet new stormwater discharge regulations. Ecology issued the revised municipal general stormwater discharge permit on January 17, 2007. The city of Walla Walla and Walla Walla County currently have this permit. As these permits are implemented, they will help regulate stormwater-related water quality problems.

In cooperation with conservation districts and other local organizations, Ecology will pursue implementation of BMPs for agricultural and other land uses. Ecology has a Memorandum of Agreement (MOA) with conservation districts, signed in 1988, that allows Ecology to refer agriculture-related water quality complaints to the conservation districts for resolution of the problems. When Ecology refers a complaint to a conservation district, the conservation district will meet with the owner/operator of the property where the violation occurred, provide technical assistance, and notify Ecology of the progress to resolve the water quality violation. However, Ecology will investigate and seek resolution of all complaints that appear to need immediate action. While Ecology maintains enforcement responsibility for complaints, this MOA expedites and streamlines correction of agricultural water quality violations.

Ecology also provides technical and financial assistance to people interested in installing BMPs. Ecology has a competitive grant and loan process for local governments and non-profit organizations. Grant money can be used to plan and install BMPs, and loans can be used to purchase direct seed equipment or improve wastewater treatment facilities.

Washington State Department of Fish and Wildlife (WDFW)
WDFW is actively involved with habitat improvement, hatchery production, technical assistance, and assessments in the watershed. Habitat improvement activities include dam removal and passage projects; identifying areas in need of fish screens and installing them; developing a native plant nursery; and assisting with Habitat Conservation Plans. WDFW's hatchery production activities include releasing trout and steelhead, evaluating hatchery fish success, and performing habitat surveys. WDFW provides technical assistance on habitat improvement projects, beginning with project identification and design through the permit process. When issuing permits for habitat projects, WDFW should make sure the projects will not impact water quality. WDFW also gives technical assistance to regional planning efforts. WDFW has an extensive assessment role in the watershed, including spawning surveys; monitoring species

distribution; measuring stream flows; conducting instream flow studies; and monitoring stream temperature. WDFW staff also work to obtain funding for habitat improvement projects, and offer financial assistance to landowners for similar projects. As WDFW acquires new land in the watershed, BMPs necessary for healthy riparian corridors should be applied and maintained.

Washington State Department of Natural Resources (DNR)
DNR has primary administrative and enforcement responsibilities for Washington Administrative Code (WAC) 222 and the Forest Practices Act (Ch. 76.09 RCW), which includes implementation of the 1999 "Forests and Fish Report." The Washington State legislature adopted the Forests and Fish Report (ESHB 2091) to protect salmonid species listed under the federal Endangered Species Act as well as other aquatic species and clean water, while keeping the timber industry economically viable. This report can be found online at: http://www.dnr.wa.gov/forestpractices/rules/forestsandfish.pdf.

Forest Practices rules apply to non-federal forest lands in the state of Washington. The rules address forest roads, unstable slopes, riparian shading and timber harvest, use of forest chemicals, and effectiveness monitoring. The rules meet the Forests and Fish Report requirements to provide for fully functional forested riparian areas. Fully functioning riparian areas include good stream bank stability, woody debris input and availability, sediment filtering, nutrient input from leaves of riparian plants, and stream shading.

DNR is also responsible for oversight of activities on forest roads. Forest practices rules also apply to standards for new road construction and upgrading existing roads. Roads must provide for control of road-related sediments, provide streambank stability protection, provide adequate fish passage, and meet current best management practices.

Load allocations are included in this TMDL for non-federal forest lands in accordance with Section M-2 of the *Forests and Fish Report*. DNR is encouraged to condition forest practices to prohibit any further reduction of stream shade and not waive or modify any shade requirements for timber harvesting activities on state and private lands.

Washington State University Extension
WSU Cooperative Extension offers educational opportunities on a wide range of topics about water quality. Many of the educational materials offered by WSU Extension are located on the internet at www.wawater.wsu.edu. Meetings and satellite conferences with specific topics related to water quality are also held periodically. Anyone interested in participating in these events should contact the local WSU Extension office to be notified when they are offered. WSU Extension has an ongoing commitment to develop educational publications on emerging issues. Notices about these publications and funding opportunities are also posted on the above web site. WSU Extension staff members are willing to help inform watershed residents about this TMDL implementation plan and BMPs that may be voluntarily applied to improve water quality.

Washington Water Trust (WWT)
WWT is a private, nonprofit organization whose mission is to restore instream flows to benefit water quality, fisheries, agriculture and recreation in Washington's rivers and streams. WWT

works cooperatively with landowners, tribes, agencies, municipalities, and local organizations to restore stream flows via purchases, leases, and donations of water rights. As of 2008, WWT completed over a dozen creative projects in the Walla Walla Basin, including a unique partnership with WallaWalla County and the Department of Ecology to administer the Walla Walla water exchange, which supports mitigation of new exempt wells under the 2007 instream flow rule. For more information visit: http://www.thewatertrust.org.

Walla Walla Watershed Alliance
Created in 2001, the Walla Walla Watershed Alliance is a broad-based, bi-state, non-profit organization whose goal is to improve the watershed's environmental, economic and cultural health for future generations. The Alliance promotes innovative restoration strategies and cooperation among various interests. For more information about the Alliance, visit http://www.wwwalliance.org/.

Adaptive management

After the completion of this *water quality implementation plan* (WQIP), the TMDL targets or water quality standards should be achieved in ten years for the chlorinated pesticides and PCBs, fecal coliform bacteria, and pH and dissolved oxygen TMDLs, and 50 years for the temperature TMDL. If data indicates water quality standards are achieved and the load and wasteload allocations are not, the TMDL will be considered fulfilled.

This report identified interim targets described in terms of percent load reductions and increase in shade. Partners will work together to monitor progress towards these goals, and evaluate successes, obstacles, and changing needs. The Water Quality Subcommittee and Ecology will use adaptive management when water monitoring data shows that the TMDL targets are not being met or implementation activities are not producing the desired result. Adjustments will be made to the cleanup strategy as needed. It is ultimately Ecology's responsibility to ensure that cleanup is being actively pursued and water standards are achieved.

Adaptive management will be applied using the following steps:

Step 1. The activities are put into practice.

Step 2. Programs and BMPs are evaluated for adequacy of design and installation. Effectiveness of the activities (or WQIP) is evaluated by assessing new monitoring data and comparing it to the TMDL targets.

Step 3. If the goals and objectives are achieved, the implementation efforts (or WQIP) are adequate as designed, installed, and maintained. Project success and accomplishments should be publicized and reported to continue project implementation and increase public support.

If the goals and objectives are not being met, then BMPs (or the WQIP) could be modified or new actions identified. The new or modified actions are then applied as in Step 1.

Measuring Progress toward Goals

A monitoring program for evaluating progress is an important component of any implementation plan. Monitoring is needed to keep track of what activities have been done, measure the success or failure of actions, and evaluate if water quality standards are achieved. Monitoring should continue after water quality standards are obtained to ensure implementation measures are effective and standards continue to be met.

A quality assurance project plan (QAPP) should be prepared for whatever water quality monitoring is conducted. The QAPP should follow Ecology guidelines (Lombard and Kirchmer, 2004), paying particular attention to consistency in sampling and analytical methods.

Performance measures and targets

The actions listed in Table 8 to improve water quality need to be tracked to determine:

- What activities were performed and where.
- Whether the actions worked and could be applied elsewhere.
- What practices should be considered for adaptive management, if necessary.
- If resources or some other factor are preventing some actions from occurring.
- Whether this implementation plan is adequate to meet water quality standards.

Ecology's TMDL Implementation Team will collect updates from each organization in Table 8 on an annual basis. A table specific to each organization in Appendix A will be used to track their activities. Ecology will review the current status of the implementation activities in a meeting with the Water Quality Subcommittee each year in January or February.

Effectiveness monitoring

Effectiveness monitoring results are used to determine if the interim targets and/or water quality standards are being achieved. Ecology usually performs this monitoring five years after this plan is finished. The ability for Ecology to conduct this monitoring depends upon the availability of resources. However, volunteers and local groups can also conduct monitoring to measure progress of this TMDL.

Data from effectiveness monitoring will be compared to interim targets identified in Table 2 to identify if water quality goals have been reached. If watershed streams do not meet the interim targets, adaptive management will be applied and future effectiveness monitoring will need to be scheduled.

Effectiveness monitoring plans should take into account the following recommendations:

- Chlorinated pesticides and PCBs should be analyzed periodically in resident mainstem fish species and the water column from Mill and Garrison creeks. Sample size for fish should be appropriate for making a statistical comparison with criteria used to assess compliance with human health standards. WDOH should be consulted on the sampling design.
- Monitoring should focus on critical conditions, but sampling during all seasons is recommended. The same sites used to collect the data for the TMDLs should be used.
- Water sampling and analysis should use low-level detection techniques. Total suspended solids (TSS) and turbidity samples should be collected in conjunction with the pesticide sampling. In order to obtain representative and comparable data, depth integrating sampling procedures should be used, and streamflow should be measured.

Other monitoring

Routine water monitoring, monitoring to determine if BMPs are effective at reducing pollution, and monitoring to search for pollution sources fall under this category.

Routine monitoring is when organizations collect water samples on a set schedule to find out the current pollutant concentrations. An example would be monitoring required as part of a permit. Monitoring nutrients during the growing season (May through October) is recommended in surface and ground water to see trends in concentrations over time.

BMP monitoring should be performed to evaluate how successful they are, as well as to make sure they remain in good condition (streambank stabilization work hasn't washed out; fencing is intact and keeping out animals; etc.). Most BMPs will need to be in place for several years before their impact on water quality will be evident in data from water monitoring. Therefore, groups and landowners who complete restoration projects or install BMPs are responsible for monitoring plant survival rates and maintenance of improvements, structures and fencing.

Identifying pollutant sources is important to implementing the TMDL, because without knowing what the problem is people cannot work on solutions. Monitoring may be required to identify sources of chlorinated pesticides, PCBs, fecal coliform, and nutrients. Identifying sources will likely require sampling sites not used during the TMDL studies. Additional sampling is recommended for PCBs in Yellowhawk, Mill, and Garrison creeks, and toxaphene sources in the Pine Creek drainage.

If there is not an apparent cause for the chlorinated pesticide, PCB, bacteria, and nutrient levels (e.g., everyone is implementing required BMPs and all potential sources have been addressed, but targets are not being met), then more studies may be required. Ecology or other entities may conduct these additional studies to identify the sources entering the river system.

Applying microbial source tracking (MST) methods to identify bacteria sources should only be performed if fecal coliform levels remain high and BMPs are in place to reduce the impact from

potential sources. The first approach to identifying sources of bacteria should be to collect fecal coliform water quality samples because:

1) The results would be comparable to the data used for this TMDL.
2) The cost of analyzing samples for fecal coliform is less expensive than MST methods.
3) MST methods can not be repeated with accuracy.
4) MST methods cannot determine how much of the bacteria are from a particular species, only that the species may or may not have been a source.
5) Currently, the EPA, the United States Geologic Survey and Ecology do not support or conduct monitoring using MST methods.

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 Walla Walla Watershed TMDLs, both point and nonpoint sources exist. TMDLs 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. Organizations and their commitments under permits, laws, rules, and programs to reduce stream temperatures in the watershed are also expected to result in improved water quality.

Ecology believes that the following bulleted activities already support this TMDL and add to the assurance that chlorinated pesticides, fecal coliform bacteria, temperature, pH and dissolved oxygen in the Walla Walla Watershed will meet conditions provided by Washington State water quality standards. This assumes that the activities described below are continued and maintained.

The goal of this water quality improvement plan (WQIP) is for the waters of the basin to meet the state's water quality standards. There is considerable interest and local involvement toward resolving the water quality problems in the Walla Walla watershed. Numerous organizations and agencies are already engaged in stream restoration and source correction actions that will help resolve the water quality problems addressed by the TMDLs. The following rationale helps provide reasonable assurance that the Walla Walla watershed nonpoint source TMDLs' goals will be met in ten or fifty years following completion of this WQIP.

- The city of Walla Walla installed permanent curb markers at stormdrains that warn residents to avoid dumping liquids and solids into them. The signs also contain a phone number people can call to report illegal dumping (CH2M HILL OMI, 2008).

- The Walla Walla County Conservation District is actively working on a Creating Urban Riparian Buffers (CURB) project. The project has funding from Ecology and others to install native riparian vegetation along creeks in the cities of Walla Walla and College Place (Walla Walla County Conservation District, 2007).

- In 2008, the Walla Walla County Conservation District began working with the Eastside and Westside Irrigation Districts to install over nine miles of pipe. The pipe will replace the open and unlined ditches currently used for irrigation water (Walla Walla County Conservation District, 2008a).

- The Walla Walla County Conservation District continues to host mini-sessions, which are workshops held in sub-watersheds to provide landowners with information about available technical and financial assistance to begin new management practices that protect water quality (Walla Walla County Conservation District, 2008b).

- Walla Walla Community College opened the Water and Environmental Center. The Center is part of the College, but also houses agencies and organizations involved in regional water management and conservation. The vision of the Water and

Environmental Center is that it will be a central location for water science and technology in the watershed (Walla Walla County Watershed Planning Dept., 2007a).

- The Snake River Salmon Recovery Funding Board continues to fund projects that restore and protect salmon, steelhead, and bull trout habitat. In 2007, the Board distributed $2,250,000 between the Walla Walla, Lower Snake, Tucannon and Asotin watersheds. Projects in the Walla Walla watershed include several conservation easements, restoration or enhancement projects, and an assessment of the Touchet River (Walla Walla County Watershed Planning Dept., 2007b).

- The Blue Mountain Land Trust created a stewardship booklet to educate new rural landowners in the Walla Walla valley about restoring and maintaining natural resources on their property. The booklet became available to landowners in June 2008 (Walla Walla County Watershed Planning Dept., 2008).

- In 2008, the Walla Walla Community College and twenty-four vineyards in the watershed received Salmon-Safe certification.

- Ecology will work with the city of Dayton to develop a compliance schedule in their NPDES permit to meet the requirements of this TMDL.

- From 1998 through 2001, the city of College Place restored approximately a third of a mile of Garrison Creek (HDR/EES, 2005). The city planted native vegetation in a buffer about 150 feet wide on both sides of the creek.

- In the Columbia County portion of the watershed, the Columbia Conservation District, Farm Service Agency (FSA) and NRCS have 56 Conservation Reserve Enhancement Projects (CREP) contracts totaling 1007 acres along 50 stream miles.

- The Columbia Conservation District secured funding to pipe open irrigation ditches for the East End Irrigation District and West End Irrigation District. These projects reduced the diversion rate and prevented approximately a 90 percent loss of irrigation to water to the ground. Some of the saved water was placed in a trust to increase instream flows.

- Columbia Conservation District (CCD) partners with other entities to monitor water quality. CCD purchased temperature monitoring devices that local WDFW staff used to assess the Touchet River and its tributaries. CCD also contracts with U.S. Forest Service staff at the Pomeroy Ranger District to maintain, collect and analyze water from samplers located at four sites within the Touchet River subbasin. In 1999, CCD contracted with Washington State University's Center for Environmental Education to assess various 303(d) listings for the Touchet River and develop a report.

- Following the Columbia Complex Fire, the Columbia Conservation District provided cost-share assistance to 38 cooperators for installing 436,338 feet of livestock control fencing, 188,315 trees and 3,115 acres of aerial and ground grass seeding.

- The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) received $400,000 in funding from Ecology under the new Columbia River Management Initiative. CTUIR, in partnership with the United States Army Corps of Engineers, will use the money to help fund a feasibility study researching methods to enhance flows in the Walla Walla watershed with water from the Columbia River. CTUIR is also working on stream restoration activities. For example, 300 trees were planted along five miles of the South Fork Touchet River. In an effort led by the Walla Walla County Conservation District, CTUIR staff helped remove a fish passage barrier from the Walla Walla River at Gose Street (CTUIR, 2006).

- As part of implementing the Snake River Salmon Recovery Plan, local governments in the Walla Walla watershed committed to restore and/or protect 30 acres of road right-of-way per year for the next 15 years. In addition, the counties agreed to restore perennial grass to road ditches and cut slopes.

- Tri-State Steelheaders planted countless trees and shrubs along streams to improve fish habitat. The group of volunteers also removed illegally dumped concrete and other debris. The group also teaches conservation to hundreds of local students in elementary and high school, and conducted the course in Spanish at a Walla Walla County farm-labor camp (Washington State Dept. of Ecology, 2002).

- Upland BMPs are being applied in the watershed. Dryland farmers are transitioning from traditional farming techniques, which involve intense soil tillage, to a more sustainable practice of direct seeding or minimum tillage practices. By limiting tillage trips through the field, the soil not only maintains its structure, but the relatively undisturbed crop residue from the previous crop shields the soil from wind and rain erosion. Other BMPs, such as grassed waterways, divided slope farming, and strip cropping are being installed as further measures to keep the soil in place. These BMPs, coupled with direct seeding, become an effective system which results in a dramatic reduction in total runoff.

- The Washington State Department of Fish and Wildlife worked to improve fish habitat and monitor water quality. WDFW helped remove two dams and funded two Landowner Incentive Program grants along McEvoy and Yellowhawk creeks to improve stream flow and riparian vegetation. Stream flow is measured during low flow every two weeks, and numerous temperature probes are also deployed in the summer. WDFW also provides technical assistance and permitting for stream restoration projects.

- The city of Walla Walla and the Walla Walla Basin Watershed Council are working on a shallow and deep aquifer recharge program. The program's goal is to supplement natural recharge of the shallow aquifer, and potentially increase the groundwater flow return to the Walla Walla River (Walla Walla Basin Watershed Council Web site, 2007).

- The Walla Walla Backyard Stream Team is a group of citizens volunteering time to promote stream and riparian restoration in urban areas. One of the Team's projects is called the Pledge Project, which gathers pledges from residents to perform actions that protect surface and ground water. The Pledge Project aims to change the way people maintain their lawns; care for their septic systems; reduce toxics; dispose of animal

waste; reduce stormwater; and protect streamside vegetation. The Team's second major effort is to coordinate the restoration of 1,000 feet of riparian vegetation in Fort Walla Walla Park along Garrison Creek (Walla Walla Watershed Planning Website, 2006).

- In Walla Walla County, approximately 181 stream miles of riparian buffer were installed through the Conservation Reserve Enhancement Program (CREP). The Walla Walla County Conservation District through Washington State, the Farm Service Agency (FSA) and Natural Resources Conservation Service **(**NRCS) provided funding and assistance for this project (NACD, 2004).

- The Walla Walla Water Management Initiative is an Ecology pilot project designed to identify innovative solutions to water management in the watershed.

- Working with the Walla Walla Watershed Planning Unit, Ecology developed an instream flow rule that protects flows for fish and supplies the water needed for current demand and growth.

- The Walla Walla Watershed Planning Unit passes some of their grant funding to other entities to perform activities identified in the Watershed Plan. The Planning Unit paid for a signage project to increase residents' awareness of watershed boundaries. Planning Unit funds also paid for some riparian planting on the Touchet River as well as Cottonwood, Yellowhawk, and Russell creeks. In addition, the Planning Unit provided money to create an informational booklet to increase the use of BMPs among rural residential landowners and interpretive signs and materials related to a restoration project on Titus Creek.

- Since 2003, the Washington Water Trust (WWT) has obtained an estimated eight cubic feet per second of water rights in the Walla Walla basin. Included in this estimate is the purchase of a water right on the Touchet River, one lease on Mill Creek, and two leases on Cold Creek. For more information visit the WWT Web site at www.thewatertrust.org.

- In 2000, a unique settlement agreement was reached between the three largest irrigation districts (Walla Walla River, Hudson's Bay Improvement and Gardena Farms) and the USFWS. This agreement (and its extension signed in 2001) ordered increased instream flows to be maintained in the Walla Walla River. These efforts are intended to improve temperature conditions and increase habitat connectivity. They may help reduce sediment loads, in turn reducing levels of toxins in the water column, though this is yet to be determined. A bi-state habitat conservation plan (HCP) is being developed as a follow-up on activity to the settlement agreement, and includes other parties such as the city of Walla Walla.

- The executive committee of the irrigation districts, in collaboration with CTUIR and various other stakeholders, completed a manual (Comprehensive Irrigation District Management Plan) that sets up a voluntary and incentive-based process for improving irrigation district operations in response to the Endangered Species Act and the Clean Water Act. Specifically, the manual describes an innovative and assertive approach to water quality problem assessment, monitoring, outreach, BMP implementation, and

adaptive management. Many of the activities outlined in this manual may have potential beneficial impacts on the sediment load and toxin problem in the Walla Walla River.

- Since 2001, Ecology has provided over seven million dollars in the Walla Walla watershed to fund watershed planning efforts, water conservation, and water quality protection activities. For example, in February 2008 Ecology granted the Port of Walla Walla over $300,000 to help keep stormwater from entering the city of Walla Walla's sewer system.

These examples of implementation activities provide evidence of the funding commitments made by several agencies and organizations over the past 10 or more years to improve water quality and fish habitat. The Bonneville Power Administration, Salmon Recovery Funding Board, United States Army Corps of Engineers, and the Confederated Tribes of the Umatilla Indian Reservation are just a few of the entities that dedicate funds to restore healthy habitat and good water quality for native salmonids. Financial assistance from these and other groups are likely to continue and are discussed further under the *Funding Opportunities* section.

Whenever applicable BMPs are not being used and Ecology has reason to believe that individual sites or facilities are causing pollution in violation of RCW 90.48.080, Ecology may pursue orders, directives, permits, or enforcement actions to gain compliance with the state's water quality standards. Ecology will enforce water quality regulations under Chapter 90.48 RCW in pursuit of the objectives of this TMDL. Ecology will consider and issue notices of noncompliance, in accordance with the Regulatory Reform Act, in situations where the cause or contribution of the cause of noncompliance with load allocations can be established. While Ecology has the authority to carry out these actions, it is the goal of all participants in the Walla Walla Watershed TMDL process (including Ecology) to achieve clean water through voluntary control actions. 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.

Funding Opportunities

A wide variety of potential funding sources exist for the water quality improvement projects in the Walla Walla basin. There is also the potential for collaborating with other planning processes to maximize efficiency. Implementation activities are varied, and funding sources appropriate for some projects may not be suitable for others.

Public sources of funding are administered by federal and state government programs. Private sources of funding normally come from private foundations. Foundations provide funding to nonprofit organizations with tax-exempt status. Forming partnerships with government agencies, nonprofit organizations, and private businesses can effectively maximize funding opportunities.

The U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), and USDA Farm Service Agency (FSA) administer federal non-regulatory programs such as the:

- Conservation Reserve Program (CRP).
- Conservation Reserve Enhancement Program (CREP).
- Continuous Conservation Reserve Program (CCRP).
- Environmental Quality Incentives Program (EQIP).
- Wildlife Habitat Incentives Program (WHIP).
- Grassland Reserve Program (GRP).
- Wetlands Reserve Program (WRP).
- Conservation Security Program (CSP).

The NRCS programs provide technical, educational, and financial assistance to eligible farmers and ranchers. The programs aid landowners in addressing natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. The USDA FSA administers CREP and CRP, both of which the NRCS has technical responsibility over. These are both voluntary cost share programs designed to restore and enhance habitat and increase bank stability along waterways on private lands. These programs offer payments for annual rental, signing, cost share, practice, and maintenance. In exchange, landowners must remove land from production and grazing under 10-15 year contracts. For more information about these programs, visit NRCS' Web site at: www.wa.nrcs.usda.gov/programs/index.html.

Potential funding sources available through Ecology's Water Quality and Shorelands programs include:

- Centennial Clean Water Fund grants
- Section 319 grants under the federal Clean Water Act
- State Revolving Fund (SRF) loans
- Direct Implementation Funds
- Terry Husseman Account (Coastal Protection Funds)

Financial assistance for wastewater and stormwater projects is available through the following organizations:

- Department of Community, Trade and Economic Development
- Public Works Board

- United States Department of Agriculture Rural Development
- Washington State Department of Health

These organizations provide funding for the Public Works Trust Fund, Community Development Block Grants, and Drinking Water State Revolving Fund. Ecology provides loans to cities for upgrades or improvements to their wastewater treatment plants and stormwater projects. Ecology gives grants to communities for wastewater treatment plant upgrades when they can show an economic burden to rate payers.

The Walla Walla County and Columbia Conservation Districts provide cost-share programs to irrigators and ranchers. Implementing BMPs on private property usually requires that individual landowners make an investment in the practice. Conservation Districts can apply for Washington State Conservation Commission and Ecology grants to provide funding for these cost-share programs.

The Confederated Tribes of the Umatilla Indian Reservation's involvement in the subbasin provides additional opportunities for funding. These include, but are not limited to cost-matching from non-federal rate payer Bonneville Power Administration, EPA tribal gap, and Bureau of Indian Affairs money. These resources may be available to assist in on-the-ground research. CTUIR is ready to develop and implement habitat restoration projects that may ultimately result in temperature reductions.

Other funding sources available to some groups in the Walla Walla watershed are the Salmon Recovery Funding Board, the Bonneville Power Administration, and the Bonneville Power Foundation.

Landowners are using their own money to install BMPs, convert to minimum tillage practices, etc. Landowners can contribute 25 percent of project costs in a cost-share program to 100 percent of the cost to purchase direct seed equipment. In either case, funding agencies should continue to help ease the economic burden landowners face when making changes to improve water quality.

Summary of Public Involvement Methods

Public involvement is vital in any TMDL. TMDLs are successful only when the watershed landowners and residents are involved because they are the closest to and most knowledgeable of the watershed resources. The Walla Walla Basin has a host of local, state, federal and tribal agencies, and non-governmental organizations involved in water resource protection. Many private landowners in the area are intimately involved with these efforts.

The Walla Walla Water Quality Subcommittee helped develop this Water Quality Implementation Plan. Ecology held meetings to begin working on this plan in September 2007 and continued periodically through September 2008. A total of six meetings were held. Ecology sent meeting announcements and past meeting notes to a mailing list of approximately seventy people. Ecology also maintains a website on the TMDL at http://www.ecy.wa.gov/programs/wq/tmdl/wallawalla/index.html.

A 30-day public comment period for this report was held from November 5 through December 5, 2008. A news release was sent to all local media in the Walla Walla watershed. Advertisements about the comment period were placed in the following publications:

- Walla Walla Union-Bulletin
- Dayton Chronicle
- The Times

No comments were received during the 30-day public comment period, as indicated in Appendix E (Response to Comments).

Next Steps

Ecology sent the plan to the Environmental Protection Agency in January 2009. Ecology staff are working with organizations and landowners to implement this plan. Annual meetings will be scheduled early each year to provide the public with the progress toward improving water quality.

If you would like more information on what you can do to help, please contact the Eastern Regional Office at (509) 329-3400 and ask to speak to someone in the Water Quality Program about the Walla Walla TMDL.

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Appendices

Appendix A. Tables of Organizations' Progress

The tables on the following pages will be used to track each organization's activities listed in **Table 8**. The following organizations have agreed to track progress of their activities:

Columbia Conservation District, NRCS & FSA
Kooskooskie Commons
Priority Projects Group
Tri-State Steelheaders
U.S. Army Corps of Engineers – Walla Walla
City of Walla Walla
Walla Walla Community College's Water & Environmental Center
Walla Walla Community College
Walla Walla County Conservation District, NRCS & FSA
Walla Walla County Conservation District
Walla Walla County Public Works Department
Washington State Dept. of Ecology
Washington State Dept. of Transportation

Columbia Conservation District, NRCS, & FSA										
Action	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Install riparian buffers										
Apply direct seeding										
Install fencing										
Develop off-site water systems										

Kooskooskie Commons										
Action	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Walla Walla Backyard Stream Team										
Yellowhawk Streamkeepers- Urban Backyard Riparian Restoration										
Restoration Education & Outreach										

Priority Projects Group*										
Action	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
3 – 5 acre wetland restoration										
3 – 5 acres upland steppe restoration										

*Priority Projects Group consists of: Walla Walla County Conservation District, Tri-State Steelheaders, Washington State Department of Fish and Wildlife, Confederated Tribes of the Umatilla Indian Reservation, and Blue Mountain Land Trust

Tri-State Steelheaders										
Action	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Walla Walla River woody bank armor, riparian planting & conservation easement										
Touchet River large woody debris & riparian planting										
NF Coppei Creek conservation easement										
Mill Creek conservation easement										
Russell Creek riparian planting, pasture fence setback										
Yellowhawk & Caldwell creek pasture fence setback, riparian planting										
Walla Walla River riparian planting, livestock setback/exclusion										
Reser Creek basin restoration 3-acre wetland with a 14 acre native plant buffer										

U.S. Army Corps of Engineers - Walla Walla										
Action	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Nursery St. Bridge riparian planting										
Walla Walla basin feasibility study										

City of Walla Walla										
Action	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Install 1,000 placards at storm drains										
Sweep arterials every week and residential streets every 2 months										
Maintain BMPs required by stormwater permit										
Yearly composting collection city wide										
Yearly household hazardous waste collection										
Publish 4 articles, bill inserts and/or TV spots about water quality										

Walla Walla Community College's Water & Environmental Center										
Action	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Education and outreach workshops										

Walla Walla Community College										
Action	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Titus Creek restoration										

Walla Walla County Conservation District, NRCS & FSA										
Action	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Install 810 acres of riparian buffers										

Walla Walla County Conservation District										
Action	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Install 9 to 15 urban buffers										
Install 6 miles of piping in Eastside Irrigation District										
Install piping in irrigation canals at Old Lowden										
Install piping for Bergevin-Williams irrigation canals										
Install piping in Gardena Irrigation District										
Install piping in Lowden irrigation canals										
Restore Doan Creek east of Last Chance Road										

Walla Walla County Public Works Department										
Action	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Develop stormwater management plan & use BMPs during road construction										
Use stormwater BMPs & riparian restoration at bridge construction sites										
Develop stormwater management plan & use BMPs during rock crushing activities										
Develop stormwater management plan & use BMPs at county facilities										
Develop stormwater management plan & use BMPs during road construction of housing developments										
Develop stormwater management plan & use BMPs during road construction for industrial & commercial buildings										
Evaluate direct discharge of stormwater into streams										
Apply herbicides per regulations										
Use non-toxic de-icing solutions										

Washington State Department of Ecology										
Action	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Award grants and Loans										
Provide technical assistance										
Provide education & outreach										
Monitor water quality										
Inspect facilities										
Follow up on complaints, referrals & enforcement										

Washington State Department of Transportation										
Action	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Increase infiltration along Highway 12 plus additional 5 acres										

Appendix B. Best Management Practices for Nonpoint Sources of Pollution

Table B1 is for rural best management practices (BMPs)
Table B2 is for urban BMPs

Note: The following BMPs should not be considered a comprehensive list. For additional information or to identify the most appropriate BMP for your land, contact your local conservation district, NRCS office, or Ecology TMDL Implementation Team member.

Table B1. Rural BMPs

Factors related to impairment	General Action to Improve Water Quality	Specific BMP
Stream banks	Plant, protect and maintain riparian vegetation (Increase amount of mature riparian shade)	Plant native trees and shrubs along rivers and creeks
		Add large woody debris
	Restore natural hydrology	Restore floodplain connectivity
		Re-establish historic stream channel meanders
		Re-introduce beavers
		Reduce channelization, especially Mill Creek
Livestock, large pets, including small acreage farms	Control when, where and how long animals have access to surface water	Fence riparian areas to create a buffer and keep animals out of the water
		Install off-stream watering troughs away from the riparian area
		Establish water gaps
		Rotate pastures
		Place salt in the upland areas to draw cattle away from the riparian area
	Protect riparian vegetation from grazing damage.	Develop and follow a riparian grazing management plan that will protect riparian plants.
		Rotate pastures
	Manure management	Construct covered concrete building to store manure during winter
		Spread manure at agronomic rates on agricultural fields
		Compost the manure
Roads	Reduce impacts from roads, especially those located close to surface water	Maintain appropriate cut and fill slopes that will not slough; decrease slopes

Factors related to impairment	General Action to Improve Water Quality	Specific BMP
		Plant road ditches with grasses
		Mow ditches rather than spraying them
		Decommission or relocate roads next to surface water where possible
		Enforce road closures during erosive time periods
		Vegetated buffers adjacent to cut slopes
Dryland agriculture	Reduce soil loss from fields (erosion)	Use direct seed methods, especially in Walla Walla County and specifically in the Touchet River drainage
		Install grassed waterways
		Education & research of BMP
	Apply fertilizers at the correct rate (Prevent excess pesticide/fertilizer usage)	Make sure applicators are working as designed/promote nutrient management
		Promote GPS based systems and other precision agriculture techniques
	Prevent runoff into streams	Filter strips
		Field borders
		Buffer strips
		Promote strip cropping/divided slope
		Install sediment dams/level terraces
Irrigated agriculture	Protect or enhance surface & ground water flows	Increase efficiency of irrigation system
		Shallow aquifer recharge
		Pipe or line canals
		Enroll in seasonal, annual or permanent trust water program
		Conversion of high water demand crops to low water demand crops
		Apply water scheduling program
Irrigated agriculture (continued)	Reduce erosion (Prevent runoff)	Use minimum till methods
		Use direct seed methods

Factors related to impairment	General Action to Improve Water Quality	Specific BMP
		Install buffer strips, field borders, filter strips
	Apply fertilizers at the correct rate (Prevent excess pesticide/fertilizer usage)	Promote GPS based systems and other precision agriculture techniques
Septic systems	Maintain septic systems	Pump your septic tank every 3 to 5 years
		Develop a reminder system for septic tank owners
	Detect failing septic tanks	Dye test septic systems near urban creeks
Yard maintenance	Lawn care	Apply fertilizers & insecticides/herbicides only as needed
		Mulch or compost lawn clippings
		Efficient irrigation systems; use low flow systems
		Xeriscaping; minimize green scaping/size of lawn
	Properly dispose of pet waste	Throw away in trash
Education/Research	Develop informational material/conduct workshops about all listed BMPs above	On proper application of fertilizers, herbicides & insecticides
		Direct seed
		Livestock & manure management

Table B2. Urban BMPs

Factors related to impairment	General Action to Improve Water Quality	Specific BMP
Stormwater	Allow stormwater to infiltrate	Install swales, catch/filtration basins
		Install more dry wells
		Maintain dry wells
		Permeable parking lots, roads & sidewalks
	Prevent run-off	Use timers when watering lawns
		Minimize over-watering
		Water only what the ground can absorb at the time
		Avoid watering sidewalks and other pavement
		Wash car in a car wash
		Sweep sidewalks & driveways instead of hosing them off
		Install swales, catch/filtration basins
Yard maintenance	Lawn care	Apply fertilizers & insecticides/herbicides only as needed
		Mulch or compost lawn clippings
		Efficient irrigation systems; use low flow systems
		Xeriscaping; minimize green scaping/size of lawn
	Properly dispose of pet waste	Throw away in trash
Water conservation	Reduce or minimize residential water use	Low flow shower heads & toilets
		Compost rather than using a garbage disposal unit
Construction	Reduce erosion at construction sites	Apply appropriate stormwater BMPs
Education & research		Fines for watering paved surfaces
		Collection for pharmaceuticals rather than flushing & throwing away medications

Appendix C. Noxious Weed List for Walla Walla County

Class A Weeds: Non-native species whose distribution in Washington is still limited. Preventing new infestations and eradicating existing infestations are the highest priority. **Eradication of all Class A plants is required by law.**

Common Name	Scientific Name
buffalobur	*Solanum rostratum*
common crupina	*Crupina vulgaris*
^cordgrass, common	*Spartina anglica*
cordgrass, dense flower	*Spartina densiflora*
cordgrass, salt meadow	*Spartina patens*
dyers woad	*Isatis tinctoria*
eggleaf spurge	*Euphorbia oblongata*
floating primrose-willow	*Ludwigia peploides*
garlic mustard	*Alliaria petiolata*
giant hogweed	*Heracleum mantegazzianum*
goatsrue	*Galega officinalis*
*hawkweed, European	*Hieracium sabaudum*
hawkweed, yellow devil	*Hieracium floribundum*
hydrilla	*Hydrilla verticillata*
johnsongrass	*Sorghum halepense*
knapweed, bighead	*Centaurea macrocephala*
knapweed, Vochin	*Centaurea nigrescens*
kudzu	*Pueraria montana* var. *lobata*
meadow clary	*Salvia pratensis*
purple starthistle	*Centaurea calcitrapa*
reed sweetgrass	*Glyceria maxima*
*ricefield bulrush	*Schoenoplectus mucronatus*
sage, clary	*Salvia sclarea*
sage, Mediterranean	*Salvia aethiopis*
silverleaf nightshade	*Solanum elaeagnifolium*
Spanish broom	*Spartium junceum*
hawkweed:	
spurge flax	*Thymelaea passerina*
Syrian bean-caper	*Zygophyllum fabago*
Texas blueweed	*Helianthus ciliaris*
thistle, Italian	*Carduus pycnocephalus*
thistle, milk	*Silybum marianum*
thistle, slenderflower	*Carduus tenuiflorus*
*variable-leaf milfoil	*Myriophyllum heterophyllum*
velvetleaf	*Abutilon theophrasti*
wild four o'clock	*Mirabilis nyctaginea*

^ Change in Noxious Weed Class / * New Addition 2008

Class B Weeds: Non-native species presently limited to portions of the State. Species are **designated** for control in regions where they are not yet widespread. Preventing new infestations in these areas is a high priority. In regions where a Class B species is already abundant, control is decided at the local level, with containment as the primary goal.

\+ are CLASS B designated in Walla Walla County.

Common Name	Scientific Name
+Austrian fieldcress	*Rorippa austriaca*
+blackgrass	*Alopecurus myosuroides*
+blueweed	*Echium vulgare*
Brazilian elodea	*Egeria densa*
bugloss, annual	*Anchusa arvensis*
+bugloss, common	*Anchusa officinalis*
^butterfly bush	*Buddleja davidii*
+camelthorn	*Alhagi maurorum*
+common catsear	*Hypochaeris radicata*
+common fennel	*Foeniculum vulgare*
^common reed (nonnative genotypes)	*Phragmites australis*
+cordgrass, smooth	*Spartina alterniflora*
+Dalmatian toadflax	*Linaria dalmatica* ssp. *dalmatica*
Eurasian watermilfoil	*Myriophyllum spicatum*
+fanwort	*Cabomba caroliniana*
+gorse	*Ulex europaeus*
grass-leaved arrowhead	*Sagittaria graminea*
+hawkweed oxtongue	*Picris hieracioides*
+hawkweed, mouseear	*Hieracium pilosella*
+hawkweed, orange	*Hieracium aurantiacum*
+hawkweed, polar	*Hieracium atratum*
hawkweed, queen-devil	*Hieracium glomeratum*
+hawkweed, smooth	*Hieracium laevigatum*
+hawkweed, yellow	*Hieracium caespitosum*
+herb-Robert	*Geranium robertianum*
hoary alyssum	*Berteroa incana*
houndstongue	*Cynoglossum officinale*
+indigobush See Exclusion area	*Amorpha fruticosa*

^ Change in Noxious Weed Class
* New addition to the 2008 Noxious Weed List

Class B Weeds continued

+knapweed, black	*Centaurea nigra*
+knapweed, brown	*Centaurea jacea*
knapweed, diffuse	*Centaurea diffusa*
+knapweed, meadow	*Centaurea jacea x nigra*
+knapweed, Russian	*Acroptilon repens*
+knapweed, spotted	*Centaurea stoebe*
knotweed, Bohemian	*Polygonum bohemicum*
knotweed, giant	*Polygonum sachalinense*
knotweed, Himalayan	*Polygonum polystachyum*
knotweed, Japanese	*Polygonum cuspidatum*
kochia	*Kochia scoparia*
^lawnweed	*Soliva sessilis*
+lepyrodiclis	*Lepyrodiclis holosteoides*
longspine sandbur	*Cenchrus longispinus*
loosestrife, garden	*Lysimachia vulgaris*
loosestrife, purple	*Lythrum salicaria*
loosestrife, wand	*Lythrum virgatum*
+oxeye daisy	*Leucanthemum vulgare*
+parrotfeather	*Myriophyllum aquaticum*
+perennial pepperweed	*Lepidium latifolium*
+perennial sowthistle	*Sonchus arvensis* ssp. *arvensis*
+policeman's helmet	*Impatiens glandulifera*
^poison hemlock	*Conium maculatum*
puncturevine	*Tribulus terrestris*
rush skeletonweed	*Chondrilla juncea*
saltcedar	*Tamarix ramosissima*
+Scotch broom	*Cytisus scoparius*
+spurge laurel	*Daphne laureola*
+spurge, leafy	*Euphorbia esula*
spurge, myrtle	*Euphorbia myrsinites*
+sulfur cinquefoil	*Potentilla recta*
+swainsonpea	*Sphaerophysa salsula*
+tansy ragwort	*Senecio jacobaea*
+thistle, musk	*Carduus nutans*
+thistle, plumeless	*Carduus acanthoides*
thistle, Scotch	*Onopordum acanthium*
+water primrose	*Ludwigia hexapetala*
white bryony	*Bryonia alba*
wild carrot	*Daucus carota*
+wild chervil	*Anthriscus sylvestris*
+yellow floating heart	*Nymphoides peltata*
+yellow nutsedge	*Cyperus esculentus*
yellow starthistle	*Centaurea solstitialis*

^ Change in Noxious Weed Class
* New addition to the 2008 Noxious Weed List

Class C Weeds: Noxious weeds which are already widespread in Washington or are of special interest to the state's agricultural industry. The Class C status allows counties to enforce control if locally desired. Other counties may choose to provide education or technical consultation.

Common Name	Scientific Name
absinth wormwood	*Artemisia absinthium*
babysbreath	*Gypsophila paniculata*
black henbane	*Hyoscyamus niger*
cereal rye	*Secale cereale*
common groundsel	*Senecio vulgaris*
common St. Johnswort	*Hypericum perforatum*
common tansy	*Tanacetum vulgare*
curly-leaf pondweed	*Potamogeton crispus*
English ivy: four cultivars only	*Hedera helix* 'Baltica', 'Pittsburgh', and 'Star' *H. hibernica* 'Hibernica'
field bindweed	*Convolvulus arvensis*
fragrant water lily	*Nymphaea odorata*
hairy whitetop	*Cardaria pubescens*
hairy willow-herb	*Epilobium hirsutum*
*hawkweed, common	*Hieracium lachenalii*
hawkweeds, nonnative and invasive species not listed elsewhere	*Hieracium* spp.
hoary cress	*Cardaria draba*
jointed goatgrass	*Aegilops cylindrica*
old man's beard	*Clematis vitalba*
poison-hemlock	*Conium maculatum*
reed canarygrass	*Phalaris arundinacea*
scentless mayweed	*Matricaria perforata*
smoothseed alfalfa dodder	*Cuscata approximata*
spikeweed	*Hemizonia pungens*
spiny cocklebur	*Xanthium spinosum*
thistle, bull	*Cirsium vulgare*
thistle, Canada	*Cirsium arvense*
white cockle	*Silene latifolia* ssp. *alba*
yellow archangel	*Lamiastrum galeobdolon*
yellow flag iris	*Iris pseudacorus*
yellow toadflax	*Linaria vulgaris*

* New addition to the 2008 Noxious Weed List

Weed list courtesy of http://wallawalla.wsu.edu/weeds/WW%20Noxious%20Weed%20List%202008.pdf.

Appendix D. Potential Riparian Vegetation Zones

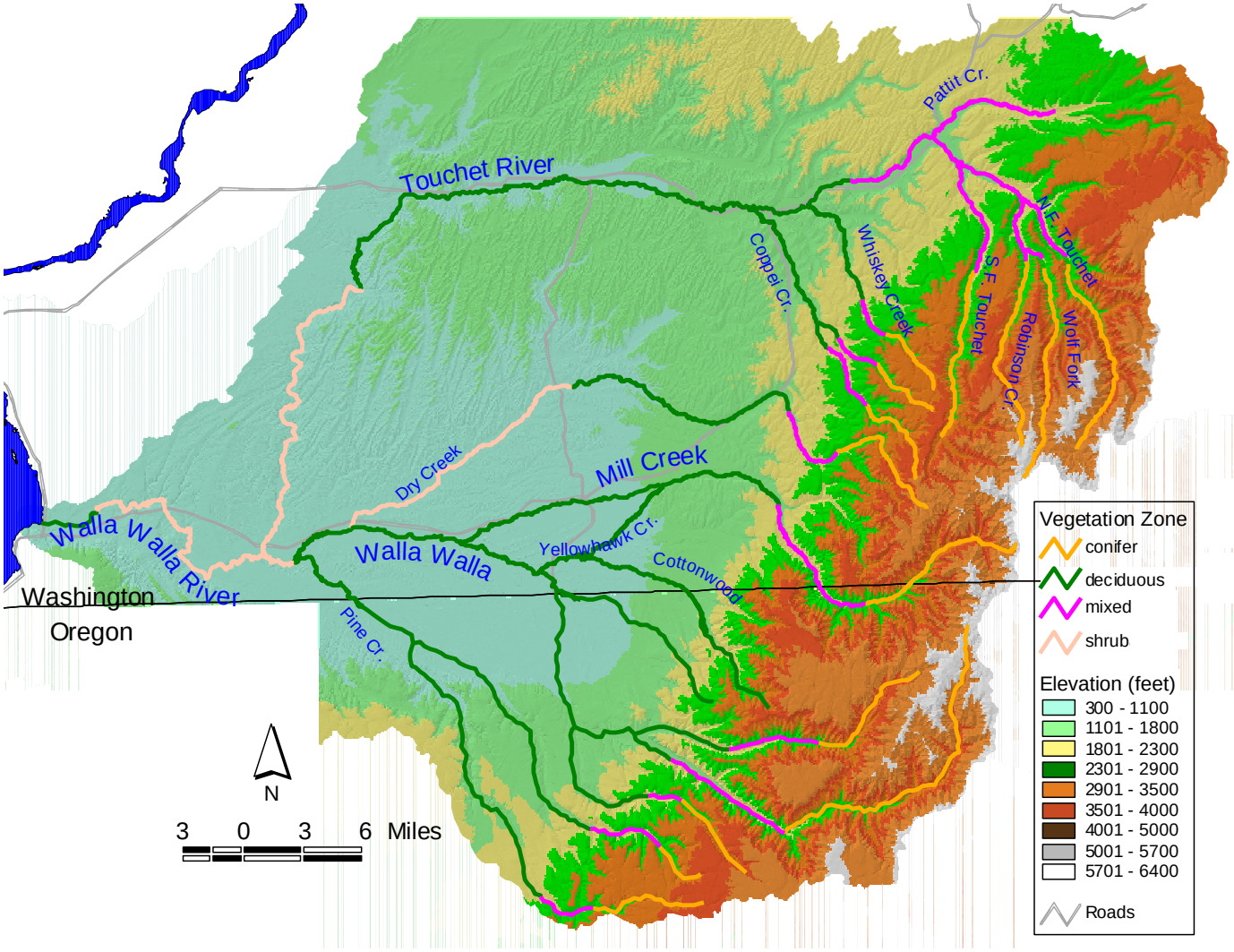

Figure D-1. Map of potential vegetation zones in the Walla Walla watershed study area (Baldwin & Stohr, 2007). Refer to Table D-1 and Table D-2 for color coding and description of zones.

Table D-1. Potential vegetation composition, height, and density for the Walla Walla River (Baldwin & Stohr, 2007). The description columns below are color coded in relation to Figure D-1 of potential vegetation zones.

River Mile (km)	Riparian Zone Name	Height Dominant Plants	Percent stream length with trees	Percent stream length with shrubs	Average Tree Canopy Height (m)	Average Willow-Shrub Height (m)	Canopy Density (%)	Longitudinal Distance-weighted Average Height (m)
Walla Walla Mouth to 7.8 (Zangar Junction)	Lower Deciduous Zone	Black Cottonwood, Large Willows, Red Osier Dogwood, Mixed Shrubs	100%	N/A	N/A	N/A	80	approximately 22 (or Cottonwood Gallery-28)
7.8 to 11.8 (Nine Mile Bridge)	Indefinite Lower Shrub-Deciduous Zone	Black Cottonwood, Large Willows, Red Osier Dogwood, Mixed Shrubs	25%	75%	14.6	4.3	80	6.9
			50%	50%	14.6	4.3	80	9.4
11.8 to 19.8 (~2.5 miles downstream from Touchet confluence)	Indefinite Shrub-Deciduous Zone	Black Cottonwood, Large Willows, Red Osier Dogwood, Mixed Shrubs	5%	95%	14.6	4.3	80	4.8
			25%	75%	14.6	4.3	80	6.9
19.8 to 23.0 (Confluence with Pine Creek)	Indefinite Upper Shrub-Deciduous Zone	Black Cottonwood, Large Willows, Red Osier Dogwood, Mixed Shrubs	25%	75%	14.6	4.3	80	6.9
			50%	50%	14.6	4.3	80	9.4
Walla Walla 23.0 to 52.2 (South Fork in Oregon 2.8 miles upstream of North fork Confluence)	Deciduous Zone	Mixed Willow, Mixed Alder, interspersed Black Cottonwood	100%	0%	22.0 m	N/A	80	approximately 22 (or Cottonwood Gallery-28)
Walla Walla 52.2 to 59.0 (Oregon BLM trailhead)	Deciduous-Conifer Zone	**Deciduous**- Quaking Aspen, Mixed Willow, Mixed Alder, Black Cottonwood, Red Osier Dogwood **Conifer** - Mixed Firs, Ponderosa Pine, Engelmann Spruce	100%	0%	dominant classes are 22.0, 25.0 and 28.0 meter	N/A	80	approximately 25
59.0 to Model Upper Boundary	Conifer Zone	Mixed Firs, Ponderosa Pine, Engelmann Spruce	100%	0%	dominant classes are 22.0, 25 and 25 meter	N/A	80	approximately 24

Grey area - low range

Blue area- high range

Table D-2. Potential vegetation composition, height, and density for tributaries to the Walla Walla River (Baldwin & Stohr, 2007). The description columns below are color coded in relation to Figure D-1 of potential vegetation zones.

River Mile (km)	Riparian Zone Name	Height Dominant Plants	Percent stream length with trees	Percent stream length with shrubs	Average Tree Canopy Height (m)	Average Willow-Shrub Height (m)	Canopy Density (%)	Longitudinal Distance-weighted Average Height (m)
Touchet R. mouth to Luckenbill bridge	Indefinite Upper Shrub-Deciduous Zone	Black Cottonwood, Large Willows, Red Osier Dogwood, Mixed Shrubs	25%	75%	14.6	4.3	80	6.9
			50%	50%	14.6	4.3	80	9.4
Touchet River at Luckenbill Road to Lewis and Clark State Park upstream of Waitsburg	Deciduous Zone	Mixed Willow, Mixed Alder, interspersed Black Cottonwood	100%	0%	22.0 m	N/A	80	approximately 22 (or Cottonwood Gallery-28)
Touchet River at Lewis and Clark State Park upstream to and above Wolf Fork	Deciduous-Conifer Zone	**Deciduous**- Quaking Aspen, Mixed Willow, Mixed Alder, Black Cottonwood, Red Osier Dogwood **Conifer** - Mixed Firs, Ponderosa Pine, Engelmann Spruce	100%	0%	dominant classes are 22.0, 25 and 28 meter	N/A	80	approximately 25
Yellowhawk mouth to upstream confluence with Mill Creek	Deciduous Zone	Mixed Willow, Mixed Alder, interspersed Black Cottonwood	100%	0%	22.0 m	N/A	80	approximately 22 (or Cottonwood Gallery-28)
Mill Creek Confluence with Yellowhawk Creek to RM? Site (blue creek?)	Deciduous Zone	Mixed Willow, Mixed Alder, interspersed Black Cottonwood	100%	0%	22.0 m	N/A	80	approximately 22 (or Cottonwood Gallery-28)
Mill Creek at Blue Creek to x miles above the drinking water diversion	Deciduous-Conifer Zone	**Deciduous**- Quaking Aspen, Mixed Willow, Mixed Alder, Black Cottonwood, Red Osier Dogwood **Conifer** - Mixed Firs, Ponderosa Pine, Engelmann Spruce	100%	0%	dominant classes are 22.0, 25 and 28 meter	N/A	80	approximately 25
Mill Creek x miles above the drinking water diversion And Touchet River upper Forks	Conifer Zone	Mixed Firs, Ponderosa Pine, Engelmann Spruce	100%	0%	dominant classes are 22.0, 25 and 25 meter	N/A	80	approximately 24
			Grey area - low range					
			Blue area- high range					

Appendix E. Response to Comments

No comments were received during the 30-day public comment period.

Appendix F. 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.

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 S. *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 degrees C and 45 degrees 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 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 waters' 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): (i) 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 (ii) designed or used for collecting or conveying stormwater; (iii) which is not a combined sewer; and (iv) 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): 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 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 5 acres of land.

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, 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 waterbody 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. WLA 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.