# South Fork Palouse River Watershed
# Fecal Coliform Bacteria
# Total Maximum Daily Load

## Water Quality Implementation Plan

DEPARTMENT OF ECOLOGY
State of Washington

December 2011
Publication No. 11-10-074

## Publication and Contact Information

This report is available on the Department of Ecology's website at
www.ecy.wa.gov/biblio/1110074.html

For more information contact:

Washington State Department of Ecology
Water Quality Program
Eastern Regional Office - Spokane
4601 N Monroe Street
Spokane, WA 99205
Phone: 509-329-3436

Washington State Department of Ecology - www.ecy.wa.gov/

| | | |
|---|---|---|
| o | Headquarters, Olympia | 360-407-6000 |
| o | Northwest Regional Office, Bellevue | 425-649-7000 |
| o | Southwest Regional Office, Olympia | 360-407-6300 |
| o | Central Regional Office, Yakima | 509-575-2490 |
| o | Eastern Regional Office, Spokane | 509-329-3400 |

Cover photo: South Fork Palouse River

*To ask about the availability of this document in a format for the visually impaired, call the Water Quality Program at 360-407-6404. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.*

# South Fork Palouse River Watershed
# Fecal Coliform Bacteria
# Total Maximum Daily Load

---

# Water Quality Implementation Plan

*By*

Elaine Snouwaert
Water Quality Program
Eastern Regional Office
Washington State Department of Ecology
Spokane, Washington 99205

*This page is intentionally left blank*

# Table of Contents

Page

List of Figures and Tables ..... iv

Acknowledgements ..... vi

Executive Summary ..... vii

What is a Total Maximum Daily Load (TMDL) ..... 1
- Federal Clean Water Act requirements ..... 1
- TMDL process overview ..... 1
- Elements the Clean Water Act requires in a TMDL ..... 2
- What part of the process are we in? ..... 2

Why Ecology Conducted a TMDL in this Watershed ..... 3
- Overview ..... 3
- Why this matters ..... 4

Watershed Description ..... 5

What Will Be Done ..... 7
- Implementation strategy ..... 7
- Prioritizing implementation ..... 15
- Activities to address pollution sources ..... 19
- Organizations' implementation actions, goals and schedules ..... 21
- Adaptive management ..... 32

Funding Opportunities ..... 35

Measuring Progress toward Goals ..... 39
- Performance measures and targets ..... 39
- Effectiveness monitoring plan ..... 40

Summary of Public Involvement Methods ..... 41

References ..... 43

Appendices ..... 45
- Appendix A. Glossary and acronyms ..... A-47
- Appendix B. Response to comments ..... B-51

# List of Figures and Tables

Page

## Figures


Figure 1. South Fork Palouse River Watershed. ....4

Figure 2. Photos of land use in the SF Palouse River watershed....7

Figure 3. Map of all 2006-2007 South Fork Palouse River Watershed TMDL sampling sites.....9

Figure 4. Map of the 2006-2007 TMDL study sampling sites within the Pullman city limits.....11

Figure 5. Watershed stream reaches prioritized for implementation based on bacteria loads and concentrations. ....17

Figure 6. Pullman stream reaches prioritized for implementation based on bacteria loads and concentrations. ....18

Figure 7. Signs of a failing septic system ....19

Figure 8. Example of a stormwater outfall that had consistent high bacteria concentrations .....20

Figure 9. Underside of bridges over Spring Flat Creek in Colfax, WA.. ....23

Figure 10. Feedback loop for determining need for adaptive management. Dates are estimates and may change depending on resources and implementation status. ....33


## Tables


Table 1. Waterbody segments with Clean Water Act 303(d) listings for not meeting fecal coliform bacteria standards in the South Fork Palouse River watershed. ....3

Table 2. Land use in the SF Palouse River watershed....7

Table 3. Description of the 2006-2007 TMDL study sampling sites in the South Fork Palouse River watershed outside of Pullman. ....8

Table 4. Description of the 2006-2007 TMDL study sampling sites within the Pullman city limits. ....10

Table 5. Load allocations expressed as target percent reductions and loading capacity for sites on the SF Palouse River and its tributaries. ....12

Table 6. Load allocations expressed as target percent reductions and loading capacity for tributaries to the SF Palouse River. ....13

Table 7. Municipal wastewater treatment plant (WWTP) wasteload allocations. ....14

Table 8. Wasteload allocations expressed as target percent reductions needed to meet water quality standards for selected stormwater outfalls. ....14

Table 9. Summary and schedule of actions for Ecology. ....22

Table 10. Summary and schedule for Albion. ....22

Table 11. Summary and schedule for Colfax.....24
Table 12. Summary and schedule of actions for Pullman. .....26
Table 13. Summary and schedule for Palouse CD. .....27
Table 14. Summary and schedule for WSDOT implementation actions. .....29
Table 15. Summary and schedule for WSU implementation actions. .....31
Table 16. Summary and schedule for Whitman County Health Department implementation actions. .....32
Table 17. Potential funding sources for implementation projects .....36

# Acknowledgements

The author of this implementation plan would like to thank the following people and organizations for their contributions to this document:

- The South Fork Palouse River Water Quality Advisory Group who assisted in the development of this plan.
- The organizations listed in this plan which will be implementing activities to reduce pollution.
- Scott Tarbutton of the Environmental Assessment Program for creating several figures included in the final document.
- Mike Kuttel, Helen Bresler, Donna Ward, Beth Herrera, Diane Dent, Kelsey Highfill, and Ann Kahler of the Water Quality Program for their review and formatting of this document.

# Executive Summary

## Introduction

Streams in the South Fork Palouse River (SFPR) Watershed are impaired by excess fecal coliform bacteria. Fecal coliform bacteria come from the intestines of warm-blooded animals, including humans. When levels are high in the stream, it can be a sign that sewage or manure may be entering the stream. Too much bacteria in the water indicates there is an increased risk that people could become ill from the bacteria or other pathogens associated with fecal matter.

The Department of Ecology (Ecology) completed a study on the bacteria problems in 2006-2007 and outlined a strategy for reducing the bacteria in the streams (Carroll & Snouwaert, 2009). This water quality implementation plan expands on the recommendations in the 2009 report and lays out the roles and responsibilities for addressing fecal coliform bacteria in the watershed.

## What is a total maximum daily load (TMDL)?

The federal Clean Water Act (CWA) requires that a total maximum daily load (TMDL) be developed for each of the water bodies on the 303(d) list. The 303(d) list, which the CWA requires states to prepare, contains water bodies that do not meet state water quality standards. The TMDL study identifies pollution problems in the watershed, and then the TMDL specifies how much pollution needs to be reduced or eliminated to achieve clean water.

## Watershed description

The SFPR watershed drains 295 square miles from its headwaters in Idaho to its confluence with the mainstem Palouse River (also known as the North Fork Palouse River) at Colfax, Washington. Major tributaries to the SFPR include Paradise Creek, Missouri Flat Creek, Four Mile Creek, and Spring Flat Creek. Other smaller tributaries of interest within the study area include Sunshine; Airport Road; Dry Fork; Parvin; Rose; and Staley Creeks.

Land use within the study area is dominated by dryland agriculture and interspersed with several clusters of urban population. The majority of the population is concentrated in the cities of Pullman and Moscow, with a greater concentration on and around university campuses in both cities. Smaller communities include the towns of Colfax at the mouth of the SFPR, and Albion, located along the SFPR between Pullman and Colfax. Major crops include spring and winter wheat, barley, peas, and lentils. These crops are produced without irrigation, thus the term "dryland agriculture" (RPU, Inc., 2002).

## What will be done?

This implementation plan prioritizes areas of the watershed in need of the greatest bacteria reductions. It describes activities the various agencies and organizations will carry out to reduce bacteria in the waterways. Efforts will primarily address fecal coliform from animals (livestock and wildlife), from failing or improperly constructed or maintained on-site septic systems, and from stormwater (including pet waste).

## Measuring progress

Ecology will ensure requirements to implement the TMDL are incorporated into permits for entities discharging to streams. Ecology will also follow up with the entities listed in this document to determine if progress is being made towards completing the activities and getting to

clean water. Individual organizations are also expected to track their progress on completing their commitments.

Based on the plan outlined, it is expected that the South Fork Palouse River and its tributaries will meet fecal coliform bacteria water quality standards by 2020.

# What is a Total Maximum Daily Load (TMDL)

## Federal Clean Water Act requirements

The Clean Water Act (CWA) established a process to identify and clean polluted waters. It requires each state to have its own water quality standards designed to protect, restore, and preserve water quality. Water quality standards consist of two parts: 1) designated uses that must be protected (such as recreation or drinking water supply); and 2) criteria that must be met to achieve those uses.

### The Water Quality Assessment and the 303(d) List

Every two years, states are required to prepare a list of water bodies that do not meet water quality standards. This list is called the CWA 303(d) list. In Washington State, this list is part of the Water Quality Assessment (WQA) process.

To develop the WQA, the Washington State Department of Ecology (Ecology) compiles its own water quality data along with data from local, state, and federal governments, tribes, industries, and citizen monitoring groups. All data in the WQA are reviewed to ensure they were collected using appropriate scientific methods before they are used to develop the assessment. Waters that do not meet standards are labeled as Category 5 in the WQA and these waters make up the state's 303(d) list.

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

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

The CWA 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.

## TMDL process overview

Ecology uses the 303(d) list to prioritize and initiate TMDL studies across the state. The study investigates how widespread the problem is, seeks to identify sources, and determines which stream reaches are most in need of actions to correct the problems. Ecology, with the assistance of local governments, tribes, agencies, and the community, develops a strategy to control and reduce pollution sources and a monitoring plan to assess effectiveness of the water quality improvement activities. Together, the study and implementation strategy comprise the *water quality improvement report* (WQIR).

Once the U.S. Environmental Protection Agency (EPA) approves the WQIR, a *water quality implementation plan* (WQIP) should be developed within one year. The WQIP identifies

specific tasks, responsible parties, and timelines for reducing or eliminating pollution sources and achieving clean water.

## Elements the Clean Water Act requires 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 (WLA). 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 (LA). In this TMDL, point sources receiving wasteload allocations include the municipal wastewater treatment plants (Pullman and Albion) and stormwater under Phase II stormwater permit. The city of Pullman, Washington State University (WSU), and the Washington State Department of Transportation (WSDOT) received stormwater wasteload allocations. All nonpoint load allocations were established geographically based on the reductions needed at each TMDL study sampling location.

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's 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?

The TMDL to address bacteria impairments in the South Fork Palouse River watershed was completed in October 2009 and approved by EPA on January 14, 2010. This implementation plan expands on the implementation strategy in the approved TMDL. This document outlines the steps various entities will take to ensure bacteria levels in the South Fork Palouse River and its tributaries decrease and come into compliance with Washington's Water Quality Standards for fecal coliform bacteria.

# Why Ecology Conducted a TMDL in this Watershed

## Overview

Ecology initiated a w*ater quality improvement project* (or TMDL) in this watershed (Figure 1) because historical data show that the South Fork Palouse River and its tributaries are impaired by elevated levels of fecal coliform (FC) bacteria and do not meet "primary contact recreation" beneficial use standards. The South Fork Palouse River, Paradise Creek, Missouri Flat Creek, and Dry Fork Creek were included on Washington State's 303(d) list of impaired water bodies, in 2008, for FC bacteria impairments (Table 1). Elevated bacteria levels have a long history in the watershed. The South Fork Palouse River and Paradise Creek were listed on Washington's first comprehensive 303(d) list published in 1996. Several of these streams were also listed as impaired by elevated bacteria levels in 1998 and 2004.

FC bacteria are used as indicators of fecal contamination and the presence of other disease-causing (pathogenic) organisms. High FC bacteria numbers in waterways may indicate an increased risk of infection from pathogens associated with fecal waste.

**Table 1. Waterbody segments with Clean Water Act 303(d) listings for not meeting fecal coliform bacteria standards in the South Fork Palouse River watershed.**

| Water body | Township | Range | Section | 303(d) Listing ID | TMDL station |
|---|---|---|---|---|---|
| South Fork Palouse River | 15N | 45E | 06 | 6707 | 34SFPR22.0 |
| | 15N | 44E | 26 | 6708 | 34SFPR19.2 |
| | 15N | 44E | 25 | 6709 | 34SFPR21.5 |
| | 14N | 45E | 06 | 6710 | 34SFPR22.8 |
| | 14N | 45E | 05 | 6711 | 34SFPR23.6 |
| | 14N | 45E | 08 | 6712 | 34SFPR24.3 |
| | 15N | 44E | 36 | 10448 | 34SFPR21.5 |
| | 15N | 44E | 15 | 10450 | 34SFPR15.8 |
| | 15N | 44E | 10 | 10452 | 34SFPR11.5 |
| Paradise Creek | 14N | 45E | 04 | 10439 | 34Air00.0 |
| | 14N | 46E | 05 | 10441 | 34Para06.6 |
| | 14N | 45E | 01 | 10442 | 34Para03.8 |
| | 14N | 45E | 03 | 10443 | 34Para01.1 |
| | 14N | 45E | 05 | 10444 | 34Para00.1 |
| Missouri Flat Creek | 14N | 45E | 05 | 6713 | 34Miss00.1 |
| Dry Fork Creek | 14N | 45E | 05 | 46406 | 34Dry00.1 |

The South Fork Palouse River flows into the Palouse River at Colfax, WA. The Palouse River and several of its tributaries are also impaired by high levels of bacteria. These impairments were addressed in separate TMDL reports (Tarbutton et. al., 2010; Snouwaert, 2006; Snouwaert & Ahmed, 2005).

In addition to the bacteria impairments, there are also water quality impairments for temperature, dissolved oxygen, and pH in the South Fork Palouse River watershed. These impairments are being addressed in a separate TMDL report.

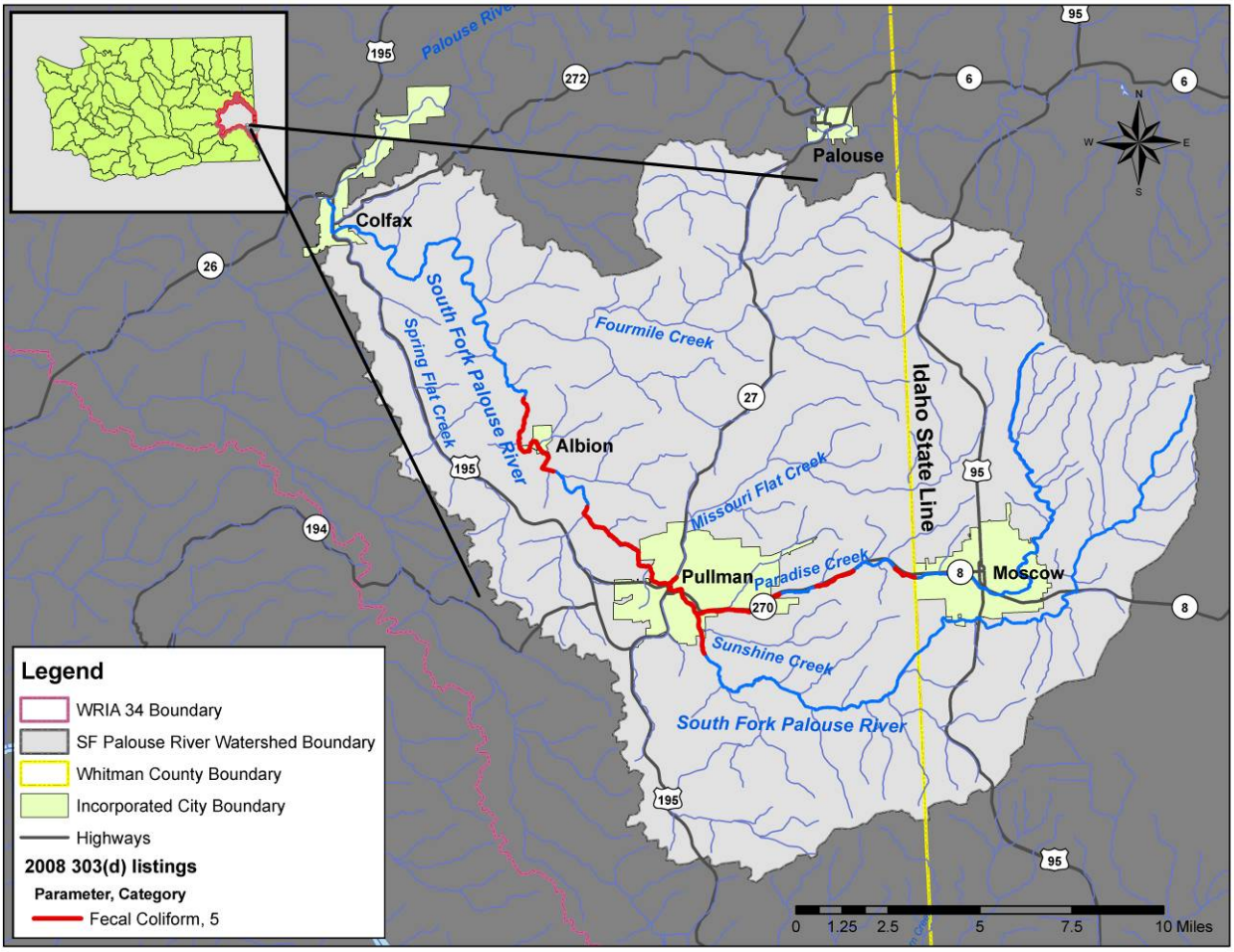


**Figure 1. South Fork Palouse River Watershed.**

# Why this matters

The water quality of streams in the South Fork Palouse River watershed must be improved to ensure these streams are safer for the activities for which people use the water. There is always some risk associated with recreation in natural waterways. However, at current bacteria levels these streams pose a greater risk to anyone playing or working in the water than if the streams met the approved recreational use water quality standard. Achieving the reductions needed to bring these streams into compliance with the fecal coliform water quality standards depends on the participation of a broad range of entities. This implementation plan describes how various organizations will strive to achieve bacteria water quality standards. Healthy streams are important to communities and their economies because they provide recreational and aesthetic values.

# Watershed Description

The South Fork Palouse River (SFPR) drains 295 square miles from its headwaters in Idaho to its confluence with the mainstem Palouse River (also known as the North Fork Palouse River) at Colfax, Washington. The mainstem then drains into the Snake River at the convergence of Whitman, Franklin, Columbia, and Walla Walla Counties.

The SFPR sub-watershed is located in Whitman County of eastern Washington and Latah County of north Idaho, within the larger Palouse River watershed. This area of rolling hills is known as The Palouse. The portion of the Palouse watershed within Washington is designated as Water Resource Inventory Area (WRIA) 34.

Major tributaries to the SFPR include Paradise Creek, Missouri Flat Creek, Four Mile Creek, and Spring Flat Creek. Other smaller tributaries of interest within the study area include Sunshine; Airport Road; Dry Fork; Parvin; Rose; and Staley Creeks.

Paradise Creek drains about 35 square miles from its headwaters at Moscow Mountain in Idaho to its confluence with the SFPR near the eastern Pullman city limits. The creek serves as the receiving waters for the Moscow Wastewater Treatment Plant (WWTP), located approximately 0.5 miles east of the state line. During low-flow periods (June to October), the WWTP discharge can account for up to 87% of the flow in Paradise Creek at the state line (Hallock, 1993).

Missouri Flat Creek originates north of Moscow in Idaho and flows west across the state border where it bends south, travels through Pullman along Highway 27/Grand Avenue, and converges with the SFPR near downtown Pullman. The 27-square-mile drainage area is influenced primarily by nonpoint dry-land agricultural runoff. However, the stretch of the creek within the Pullman city limits receives residential and commercial runoff from 26 separate storm drains.

Land use within the study area (Figure 2 and Table 2) is dominated by dryland agriculture and interspersed with several clusters of urban population. The majority of the population is concentrated in the cities of Pullman and Moscow, with a greater concentration on and around university campuses in both cities. Smaller communities include the towns of Colfax, at the mouth of the SFPR, and Albion, located along the SFPR between Pullman and Colfax. Major crops include spring and winter wheat, barley, peas, and lentils. These crops are produced without irrigation, thus the term “dryland agriculture” (RPU, Inc., 2002).

Annual precipitation in this watershed can range from 15-25 inches of rain per year. Summer daily maximum air temperatures can range from mid-80ºF to mid-90ºF (around 29ºC to 35ºC) and occasionally exceed 100ºF (37.8ºC).

*This page is intentionally left blank*

# What Will Be Done

## Implementation strategy

During the TMDL study, Ecology collected bacteria and streamflow data from 64 sites in the watershed, twice per month for a full year (May 2006 – May 2007). The TMDL sampling sites are described in Tables 3 and 4 and shown in Figures 3 and 4. The results were partitioned into either a dry season or wet season group based on streamflows for the analysis. The dry season was July through mid-December 2006, and the wet season included the time periods of May through June 2006 and mid-December 2006 through April 2007.

Bacteria load reduction targets, based on the reductions needed to meet water quality standards were developed for the dry and wet seasons. Targets were expressed as percent reduction from current concentration levels and are set geographically, based on the reduction needed at each TMDL study sampling site. The load allocations needed for nonpoint sources are in Tables 5 and 6.

**Figure 2. Photos of land use in the SF Palouse River watershed (dryland agriculture and city/university).**

**Table 2. Land use in the SF Palouse River watershed (RPU, Inc., 2002).**

| Land use | Acres | Percent of watershed |
|---|---|---|
| Cropland | 154,764 | 82% |
| Urban use (including roadways) | 15,100 | 8% |
| Forestland | 11,324 | 6% |
| Rangeland | 3,774 | 2% |
| Riparian/wetland | 3,774 | 2% |
| Total | 188,736 | |

**Table 3. Description of the 2006-2007 TMDL study sampling sites in the South Fork Palouse River watershed outside of Pullman.**

| Station ID (RM included) | Station Description | Longitude | Latitude |
|---|---|---|---|
| 34ALBPOTW | City of Albion wastewater outfall into SFPR | -117.25961 | 46.78749 |
| 34B080 | SFPR at the Albion bridge (aka 34SFPR15.8) | -117.25153 | 46.78978 |
| 34C100 | Paradise Ck at the state line (aka 34Para06.6) | -117.04305 | 46.73250 |
| 34DRY02.2 | Dry Fork Ck at Pullman city limits near furniture store | -117.20120 | 46.70895 |
| 34FOUR00.3 | Near mouth of Fourmile Ck on Shawnee-Parvin Rd | -117.27569 | 46.83006 |
| 34FOUR03.3 | Fourmile Ck above Rose Creek confluence (McIntosh Rd) | -117.22321 | 46.83092 |
| 34HADL00.1 | Mouth of Hatley Ck at Hayward Rd | -117.19247 | 46.73930 |
| 34MISS01.7 | Missouri Flat Ck at Kitzmiller Rd | -117.16909 | 46.75448 |
| 34MISS03.9 | Missouri Flat Ck on Whelan Rd upstream of Pullman | -117.13532 | 46.77125 |
| 34MISS07.5 | Missouri Flat Ck at O'Donnell Rd downstream of state line | -117.07338 | 46.76516 |
| 34MOSCPOTW | City of Moscow wastewater outfall into Paradise Ck | -117.03460 | 46.73170 |
| 34PARA03.8 | Paradise Ck below Sunshine Rd on road to gravel company | -117.09636 | 46.72927 |
| 34PARA06.6 | Paradise Ck at the state line on driveway to Wilbur-Ellis Inc. | -117.05017 | 46.73445 |
| 34PARA08.1 | Paradise Ck above Moscow POTW at Perimeter Rd | -117.02465 | 46.73196 |
| 34PARV00.1 | Mouth of Parvin Ck above Parvin Rd bridge | -117.28019 | 46.84773 |
| 34ROSE00.1 | Mouth of Rose Ck at McIntosh Rd | -117.22072 | 46.83051 |
| 34SFPR01.2 | SFPR just above flood control structure in Colfax | -117.36206 | 46.87727 |
| 34SFPR05.4 | SFPR just above grain silo that burned in 2006 fire | -117.31285 | 46.86555 |
| 34SFPR09.2 | SFPR at the Parvin Rd bridge | -117.28453 | 46.84775 |
| 34SFPR11.5 | SFPR at the Shawnee Rd bridge | -117.27486 | 46.82743 |
| 34SFPR19.2 | SFPR at the Armstrong Rd bridge | -117.22528 | 46.76009 |
| 34SFPR21.5 | SFPR at end of Hayward Rd | -117.19770 | 46.74113 |
| 34SFPR26.6 | SFPR above Staley Creek | -117.14943 | 46.69038 |
| 34SFPR31.3 | SFPR near Sand Rd | -117.07448 | 46.68164 |
| 34SFPR33.8 | SFPR at WA-Idaho state line | -117.04166 | 46.70054 |
| 34SPRI00.5 | Spring Flat Creek just above the Colfax city limits | -117.35654 | 46.87284 |
| 34STAL00.1 | Mouth of Staley Creek | -117.14946 | 46.68998 |
| 34STAL03.9 | Staley Creek at river mile 3.9 | -117.16286 | 46.66045 |
| 34SUN00.0 | Mouth of Sunshine Creek (outfall to SFPR) | -117.16391 | 46.71438 |
| 34UNKPARA(06.3) | Unknown drainage to Paradise Ck at Airport Rd east | -117.05377 | 46.73833 |
| 34UNKPARA(07.5) | Unknown drainage to Paradise Ck below Moscow POTW | -117.03484 | 46.73161 |
| 34UNKSFPR(17.3) | Unknown drainage to SFPR at Pat Old Rd | -117.23861 | 46.77714 |

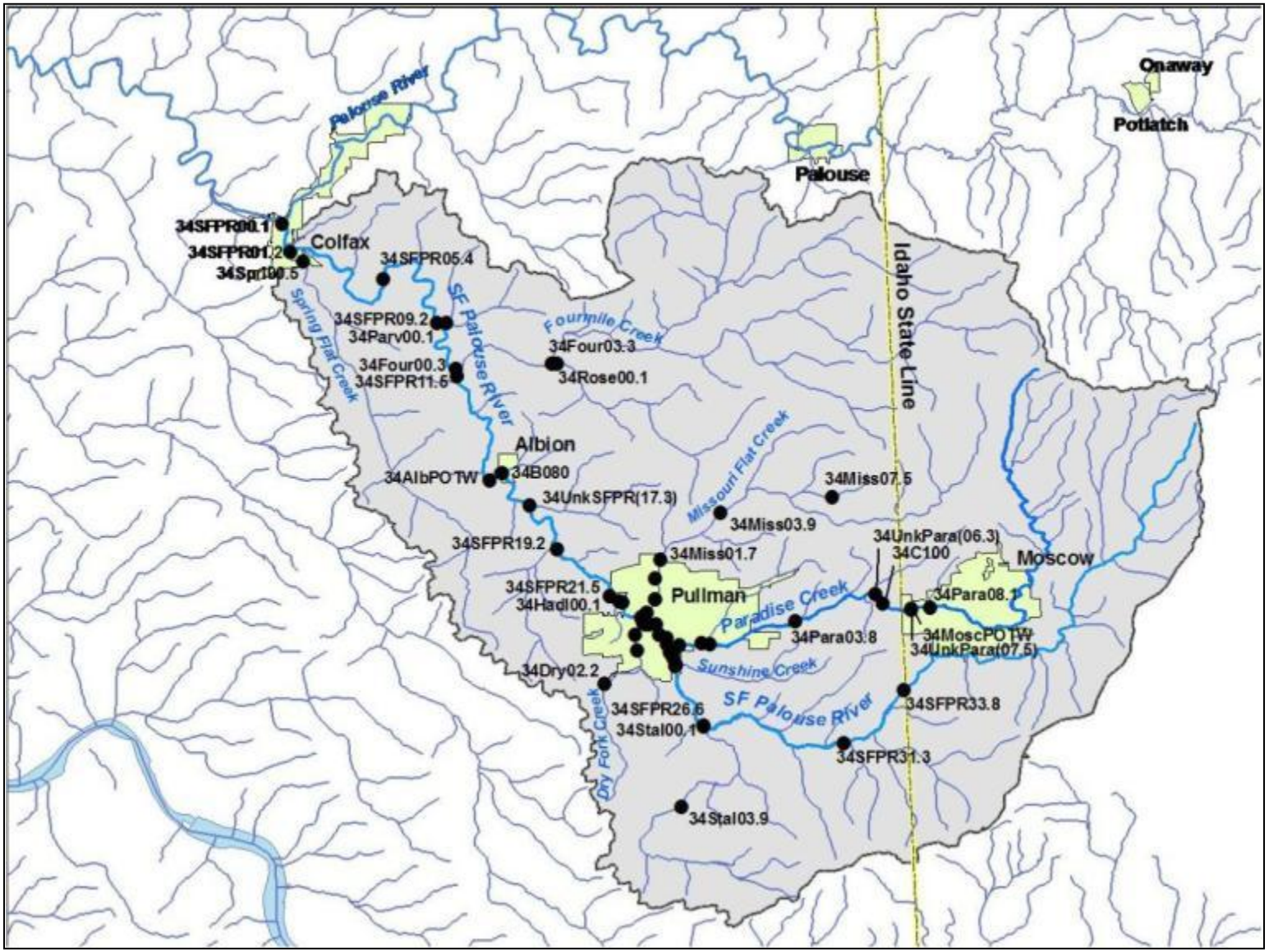


**Figure 3. Map of all 2006-2007 South Fork Palouse River Watershed TMDL sampling sites. (See Figure 4 for enlargement of sites within Pullman).**

**Table 4. Description of the 2006-2007 TMDL study sampling sites within the Pullman city limits.**

| Station ID (RM included) | Station Description | Longitude | Latitude |
|---|---|---|---|
| 34AIR00.0 | Mouth of Airport Rd Creek | -117.14772 | 46.72167 |
| 34B110 | SFPR at State St bridge in Pullman (aka 34SFPR22.8) | -117.18100 | 46.73266 |
| 34B130 | SFPR at Bishop Blvd bridge in Pullman (aka 34SFPR24.3) | -117.16461 | 46.71861 |
| 34C060 | Mouth of Paradise Ck (aka 34Para00.1) | -117.16305 | 46.72055 |
| 34DRY00.4 | Dry Fork Ck near Grand Ave at Texaco Station. | -117.18477 | 46.72644 |
| 34DRY00.9 | Dry Fork Ck near Grand Ave across from Post Office | -117.18391 | 46.72022 |
| 34DRY02.2 | Dry Fork Ck at Pullman city limits near furniture store | -117.20120 | 46.70895 |
| 34HADL00.1 | Mouth of Hatley Ck at Hayward Rd | -117.19247 | 46.73930 |
| 34M070 | Mouth of Dry Fork Ck (aka 34Dry00.1) | -117.17858 | 46.73058 |
| 34MISS00.8 | Missouri Flat Ck just upstream of Jack in the Box on Grand Ave | -117.17250 | 46.73971 |
| 34MISS01.7 | Missouri Flat Ck at Kitzmiller Rd | -117.16909 | 46.75448 |
| 34MISSSD120 | Storm drain #120 outfall into Missouri Flat Ck | -117.17243 | 46.73977 |
| 34MISSSD200 | Storm drain #200 outfall into Missouri Flat Ck | -117.17778 | 46.73434 |
| 34MISSSD210 | Storm drain #210 outfall into Missouri Flat Ck | -117.17811 | 46.73419 |
| 34MISSSD60 | Storm drain #60 outfall into Missouri Flat Ck | -117.17238 | 46.74752 |
| 34N070 | Missouri Flat Ck at State St bridge in Pullman (aka 34Miss00.1) | -117.17953 | 46.73303 |
| 34PARA01.1 | Paradise Ck above confluence of Airport Road Ck | -117.14410 | 46.72147 |
| 34PARAWSU3 | WSU storm drain #3 outfall to Paradise Ck | -117.16091 | 46.72166 |
| 34PULLPOTW | City of Pullman wastewater outfall into SFPR | -117.19072 | 46.73893 |
| 34SFPR-SD120 | Storm drain #120 outfall into SF Palouse River under Kamiaken | -117.17962 | 46.73044 |
| 34SFPR-SD140 | Storm drain #140 outfall into SFPR below pedestrian walk | -117.17880 | 46.73000 |
| 34SFPR-SD170 | Storm drain #170 outfall into SFPR behind Taco Time | -117.17628 | 46.73010 |
| 34SFPR-SD180 | Storm drain #180 outfall into SFPR across from SD170 | -117.17617 | 46.73024 |
| 34SFPR-SD260 | Storm drain #260 outfall into SFPR below South St bridge | -117.17183 | 46.72597 |
| 34SFPR-SD290 | Storm drain #290 outfall into SFPR end of Pro Mall Blvd | -117.16768 | 46.72231 |
| 34SFPR-SD320 | Storm drain #320 outfall into SFPR below Bishop Blvd bridge | -117.16609 | 46.71918 |
| 34SFPR-SD360 | Storm drain #360 outfall into SFPR east of Klemgard | -117.16492 | 46.71597 |
| 34SFPR-WSU1 | WSU storm drain #1 outfall to SFPR on Benewah St | -117.16814 | 46.72467 |
| 34SFPR-WSU2 | WSU storm drain #2 outfall to SFPR on Riverview Rd | -117.17323 | 46.73006 |
| 34SFPR21.5 | SFPR at end of Hayward Rd (just below Pullman city limits) | -117.19770 | 46.74113 |
| 34SFPR22.0 | SFPR just above Pullman POTW outfall | -117.19081 | 46.73884 |
| 34SFPR22.9 | SFPR at the Kamiaken Rd bridge | -117.17962 | 46.73056 |
| 34SFPR23.6 | SFPR at the South St bridge | -117.17128 | 46.72558 |
| 34SFPR24.7 | SFPR off Bishop Blvd next to cinema | -117.16327 | 46.71303 |
| 34SUN00.0 | Mouth of Sunshine Creek (outfall to SFPR) | -117.16391 | 46.71438 |

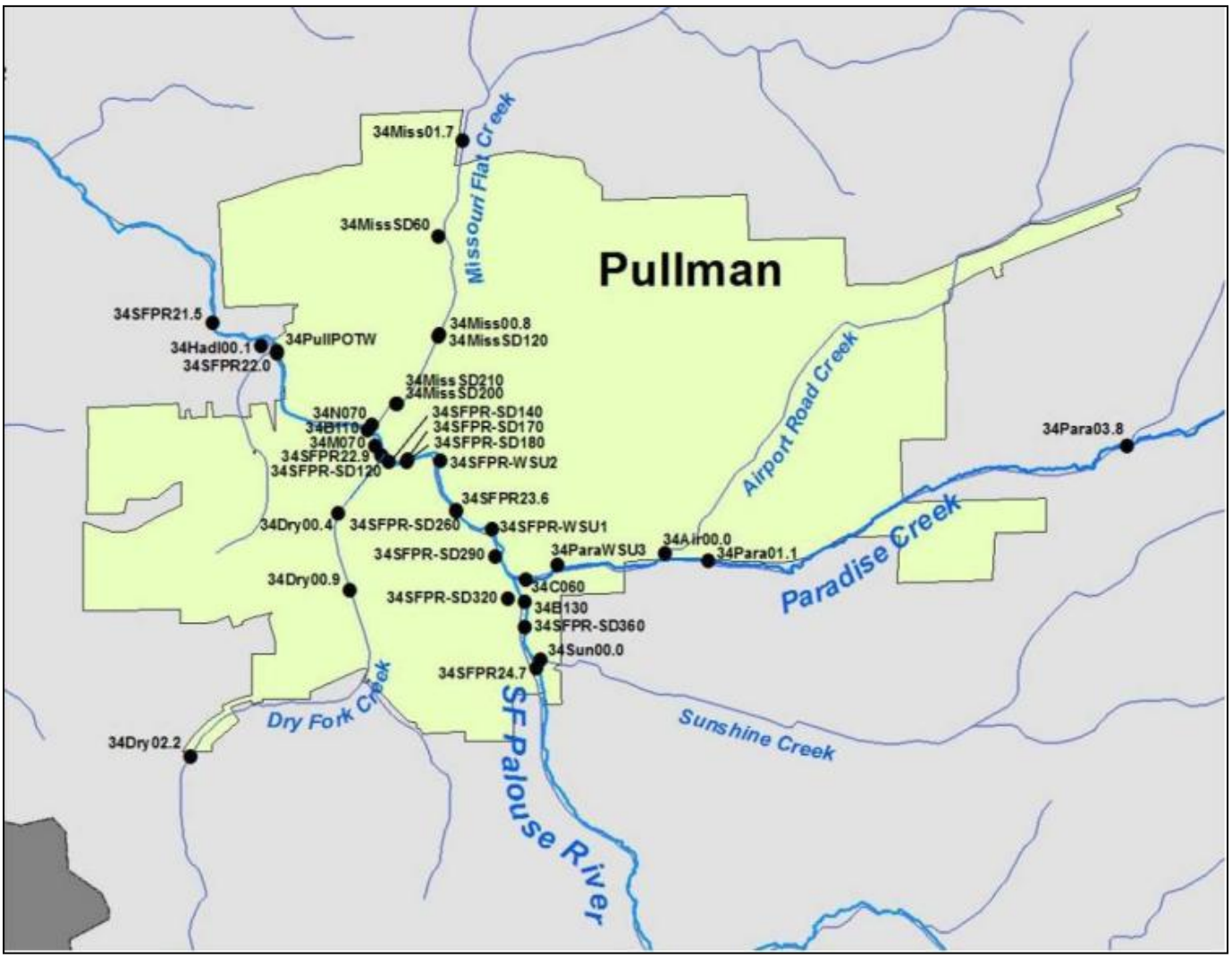


**Figure 4. Map of the 2006-2007 TMDL study sampling sites within the Pullman city limits.**

**Table 5. Load allocations expressed as target percent reductions and loading capacity for sites on the SF Palouse River and its tributaries.**

| Station ID | Dry season target % reduction | Wet season target % reduction | Loading capacity (cfu/day) based on average seasonal flow | |
|---|---|---|---|---|
| | | | Dry season | Wet season |
| South Fork Palouse River and tributary mouths | | | | |
| 34SFPR33.8 | 86% | 41%[1] | 4.3E+09 | 1.4E+11 |
| 34SFPR31.3 | 0% | 0%[2] | 2.7E+09 | 1.6E+11 |
| 34SFPR26.6 | 0% | 61% | 5.5E+09 | 1.7E+11 |
| 34Stal00.1 | 80% | 87% | 8.6E+08 | 1.6E+10 |
| 34Sun00.0 | 0% | 6% | 3.8E+06 | 3.2E+09 |
| 34SFPR24.7 | 0% | 70% | 8.5E+09 | 1.9E+11 |
| 34SFPR24.3 | 40% | 53% | 7.6E+09 | 1.9E+11 |
| 34Para00.1 | 59% | 37% | 1.7E+10 | 1.1E+11 |
| 34SFPR23.6 | 83% | 55% | 2.9E+10 | 3.2E+11 |
| 34SFPR22.9 | 84% | 58% | 2.9E+10 | 3.2E+11 |
| 34Dry00.0 | 89% | 91% | 9.5E+08 | 1.6E+10 |
| 34SFPR22.8 | 86% | 39% | 3.0E+10 | 3.4E+11 |
| 34Miss00.1 | 81% | 62% | 2.7E+09 | 7.2E+10 |
| 34SFPR22.0 | 68% | 40% | 3.1E+10 | 4.2E+11 |
| 34HADL00.0 | NC | 50% | NC | 1.8E+09 |
| 34SFPR21.5 | 49% | 63% | 5.6E+10 | 4.5E+11 |
| 34SFPR19.2 | 56% | 54% | 5.6E+10 | 4.5E+11 |
| 34UnkSFPR(17.3) | 0% | 0% | 1.5E+08 | 5.5E+09 |
| 34SFPR15.8 | 33% | 35% | 5.7E+10 | 4.6E+11 |
| 34SFPR11.5 | 48% | 64% | 5.9E+10 | 4.7E+11 |
| 34Four00.3 | 43% | 4% | 6.1E+09 | 1.3E+11 |
| 34Parv00.1 | 0% | 0% | 6.3E+07 | 4.2E+09 |
| 34SFPR09.2 | 0% | 55% | 6.9E+10 | 6.5E+11 |
| 34SFPR05.4 | 0%[2] | 0%[2] | 7.1E+10 | 6.6E+11 |
| 34SFPR01.2 | 0% | 0% | 7.4E+10 | 6.7E+11 |
| 34Spri00.5 | 0% | 66% | 7.0E+08 | 2.0E+10 |
| 34SFPR00.1 | 96% | 83% | 7.6E+10 | 6.9E+11 |

Shaded cells are estimates due to insufficient # of samples.

[1]using the Idaho DEQ TMDL % reduction for wet season

[2]site had too many seasonal high counts

[3]reduction was needed in 2006 dry season to meet permit limit

NC – not calculated due to no measureable flow during season

**Table 6. Load allocations expressed as target percent reductions and loading capacity for tributaries to the SF Palouse River.**

| Station ID | Dry season target % reduction | Wet season target % reduction | Loading capacity (cfu/day) based on average seasonal flow | |
|---|---|---|---|---|
| | | | Dry season | Wet season |
| Staley Creek | | | | |
| 34Stal03.9 | 14% | 64% | 1.7E+08 | 8.4E+09 |
| 34Stal00.1 | 80% | 87% | 8.6E+08 | 1.6E+10 |
| Paradise Creek | | | | |
| 34Para06.6 | 91% | 85% | 1.4E+10 | 9.3E+10 |
| 34UnkPara(06.3) | NC | 0%[1] | NC | 6.2E+09 |
| 34Para03.8 | 84% | 39% | 1.5E+10 | 9.9E+10 |
| 34Air00.0 | 93% | 84% | 4.4E+08 | 9.6E+09 |
| 34Para01.1 | 74% | 38% | 1.6E+10 | 1.0E+11 |
| 34Para00.1 | 59% | 37% | 1.7E+10 | 1.1E+11 |
| Dry Fork Creek | | | | |
| 34Dry02.2 | 99% | 67% | 1.1E+08 | 8.3E+09 |
| 34Dry00.9 | 14% | 7% | 4.9E+08 | 1.3E+10 |
| 34Dry00.4 | 79% | 75% | 7.6E+08 | 1.4E+10 |
| 34Dry00.0 | 89% | 91% | 9.5E+08 | 1.6E+10 |
| Missouri Flat Creek | | | | |
| 34Miss07.5 | 0% | 56% | 2.1E+06 | 3.6E+10 |
| 34Miss03.9 | 0% | 0% | 8.7E+08 | 6.1E+10 |
| 34Miss01.7 | 94% | 60% | 9.7E+08 | 6.6E+10 |
| 34Miss00.8 | 80% | 38% | 1.5E+09 | 7.1E+10 |
| 34Miss00.1 | 81% | 62% | 2.7E+09 | 7.2E+10 |
| Fourmile Creek | | | | |
| 34Rose00.1 | 0% | 0% | 3.9E+08 | 1.8E+10 |
| 34Four03.3 | 91% | 66% | 4.7E+09 | 1.0E+11 |
| 34Four00.3 | 43% | 4% | 6.1E+09 | 1.3E+11 |

Shaded cells are estimates due to insufficient # of samples.

[1] site had too many seasonal high counts

NC – not calculated due to no measureable flow during season

Entities that discharge to the streams in the watershed must be assigned wasteload allocations (limits) on the amount of fecal coliform bacteria they can discharge to the stream. In this watershed, the Pullman and Albion wastewater treatment plants (WWTP), stormwater from Pullman, Washington State University's (WSU) campus, and Washington State Department of Transportation's highways and facilities required wasteload allocations. The municipal WWTP limits are shown in Table 7, and the stormwater wasteload allocations are shown in Table 8.

**Table 7. Municipal wastewater treatment plant (WWTP) wasteload allocations.**

| WWTP | NPDES Permit Limit |
|---|---|
| City of Pullman | Year-round: 100 cfu/100 mL weekly average |
| City of Albion | January to May: 200 cfu/100 mL monthly and weekly average<br>June to December: 100 cfu/100 mL monthly and weekly average |

There are approximately 90 outfalls draining stormwater from the city of Pullman and WSU's campus. Ecology sampled bacteria and flow from 14 of these outfalls. Some outfalls discharge year round, which could indicate groundwater or natural overland drainage is entering the storm sewers. Based on the data collected, Ecology assigned wasteload allocations for the stormwater outfalls for the dry season, wet season, and storm events (Table 8). For the majority of outfalls, too little data was collected during storm events to assign a wasteload allocation. For these outfalls, estimates based on a single storm are provided in Table 8. A combined wasteload allocation for all outfalls during a storm event is also provided.

**Table 8. Wasteload allocations expressed as target percent reductions needed to meet water quality standards for selected stormwater outfalls.**

| Stormwater outfall | Dry season target % reduction | Wet Season target % reduction | Storm event target % reduction |
|---|---|---|---|
| South Fork Palouse River stormwater outfalls | | | |
| 34SFPR-SD360 | 0% | 0% | 91% |
| 34SFPR-SD320 | 0% | 0% | 87% |
| 34SFPRWSU1 | 91% | 72% | 96% |
| 34SFPR-SD260 | 91% | 23% | 97% |
| 34SFPRWSU2 | 63% | 61% | 94% |
| 34SFPR-SD180 | 33% | 84% | 97% |
| 34SFPR-SD170 | NC | 29% | 72% |
| 34SFPR-SD140 | NC | NC | 97% |
| 34SFPR-SD120 | 72% | 99% | 94% |
| Paradise Creek stormwater outfalls | | | |
| 34ParaWSU3 | 0% | 0% | 0% |
| Missouri Flat Creek stormwater outfalls | | | |
| 34MissSD60 | 95% | 0% | 97% |
| 34MissSD120 | 92% | 92% | 93% |
| 34MissSD200 | NC | NC | 94% |
| 34MissSD210 | 95% | 83% | 94% |
| City of Pullman and WSU stormwater outfalls | | | |
| Combined outfalls | ---- | ---- | 78% |

Shaded cells are estimates due to insufficient # of samples.
NC – not calculated due to no measureable flow during season

Achieving the reductions needed to bring these streams into compliance with the fecal coliform water quality standards depends on the participation of a broad range of entities. Implementation activities will generally involve agencies and organizations responsible for addressing stormwater and nonpoint pollution sources. To effectively reduce nonpoint source pollution, these organizations will need to work with private landowners to implement best management practices (BMPs) designed to address the pollution issues.

Fecal coliform bacteria primarily enter waterways from the following sources:

- Livestock with direct access to streams or with poor manure management.
- Failing or improperly constructed septic systems.

- Stormwater (including pet waste).
- Wildlife.

The most effective means of addressing these sources is prevention. If these sources are managed and maintained properly, bacteria can be prevented from entering waterways both directly and through runoff. Healthy riparian areas are a key component to ensure runoff is filtered prior to it reaching the streams; therefore, degraded riparian areas throughout the watershed will need to be restored to healthy functioning conditions. In several portions of the watershed, a relationship between total suspended solids (mainly sediment) and bacteria was found, indicating that methods to reduce erosion could also reduce bacteria levels.

# Prioritizing implementation

The South Fork Palouse River (SFPR) Water Quality Advisory Group met regularly from June 2008 to June 2009 to review the findings of the TMDL study and plan actions to address pollution sources. These actions were included in the implementation strategy that is in the TMDL (Carroll, et. al., 2009). This strategy prioritized sources and areas where initial efforts should begin. Since children have been observed playing in sections of the South Fork Palouse Watershed, the first priority should be to address any areas used for recreational purposes or that have public access. In addition, areas with the highest loads of bacteria should also be a priority. As sources are located and corrected it will improve downstream water quality, and the elimination of these sources may make smaller sources more apparent.

To ensure the SFPR and its tributaries attain the fecal coliform bacteria standards, all unnatural sources of bacteria need to be corrected. Therefore, even if the TMDL did not find significant bacteria loading or concentration in a specific reach, if a source is found it should be a priority for implementation. Even natural sources, such as increased wildlife presence near a stream due to human activities, need to be corrected to reduce these sources to a natural loading level. However, since there are not the necessary resources to address all stream reaches and sources simultaneously, the following stream reaches are prioritized based on size of load and concentration, to assist organizations in prioritizing their actions. This prioritization is also illustrated in Figures 5 and 6. It should be noted that this representation only shows prioritization for stream reaches between sample sites or just upstream of sites that need reductions. There may be significant sources and impairment upstream of the furthest upstream sampled site that need to be addressed. Since not all reaches were sampled they cannot be accurately represented on the maps.

## Dry season

1. Unexplained load within Colfax.
2. Unexplained load between RM 22.8 and RM 21.5.
3. Point source load from Pullman Wastewater Treatment Plant (meet permit limit).
4. Unexplained nonpoint load between RM 9.2 and RM 5.4.
5. Unexplained load between RM 24.3 and RM 23.6.
6. Unexplained load above RM 33.8 (Idaho).
7. Unexplained load to Paradise Creek above the state line.
8. Point source load from storm drain WSU1.

9. Unexplained load between RM 22.9 and RM 22.8.
10. Point source load (storm drain 120) and other load from Missouri Flat Creek.
11. Unexplained load from Dry Fork Creek.

## Wet season

1. Unexplained load within Colfax.
2. Unexplained load above RM 33.8 (Idaho).
3. Unexplained nonpoint load between RM 26.6 and RM 24.7.
4. Unexplained load to Paradise Creek above state line and RM 1.1.
5. Unexplained load from Dry Fork Creek.
6. Point and nonpoint loads from Missouri Flat Creek.
7. Unexplained nonpoint load between RM 15.8 and RM 11.5.
8. Nonpoint load from Staley Creek.
9. Unexplained load between RM 24.3 and RM 23.6.
10. Nonpoint load from Fourmile Creek.
11. Nonpoint load from Spring Flat Creek (upstream of Colfax).

## Storm events

1. Unexplained load in Dry Fork Creek between RM 0.4 and the city limit (RM 2.2), with emphasis on the ten stormwater outfalls discharging to the culvert between RM 0.4 and RM 0.9.
2. Unexplained load in Missouri Flat Creek between the mouth and the city limit (RM 1.7) including the 17 stormwater outfalls that discharge to reaches that were not sampled by this TMDL study.
3. Storm drain 120 (34MissSD120) that discharges to Missouri Flat Creek (next to Jack-in-the-Box).
4. Unexplained load in Dry Fork Creek between the mouth and RM 0.4 (at the Texaco station on Grand Ave), with emphasis on the 16 stormwater outfalls discharging to the culvert between the mouth and RM 0.4.
5. Storm drain WSU1 (34SFPRWSU1) that discharges to the SF Palouse River (near Benewah Street).
6. Storm drain 60 (34MissSD60) that discharges to Missouri Flat Creek (at the end of Larry Street).

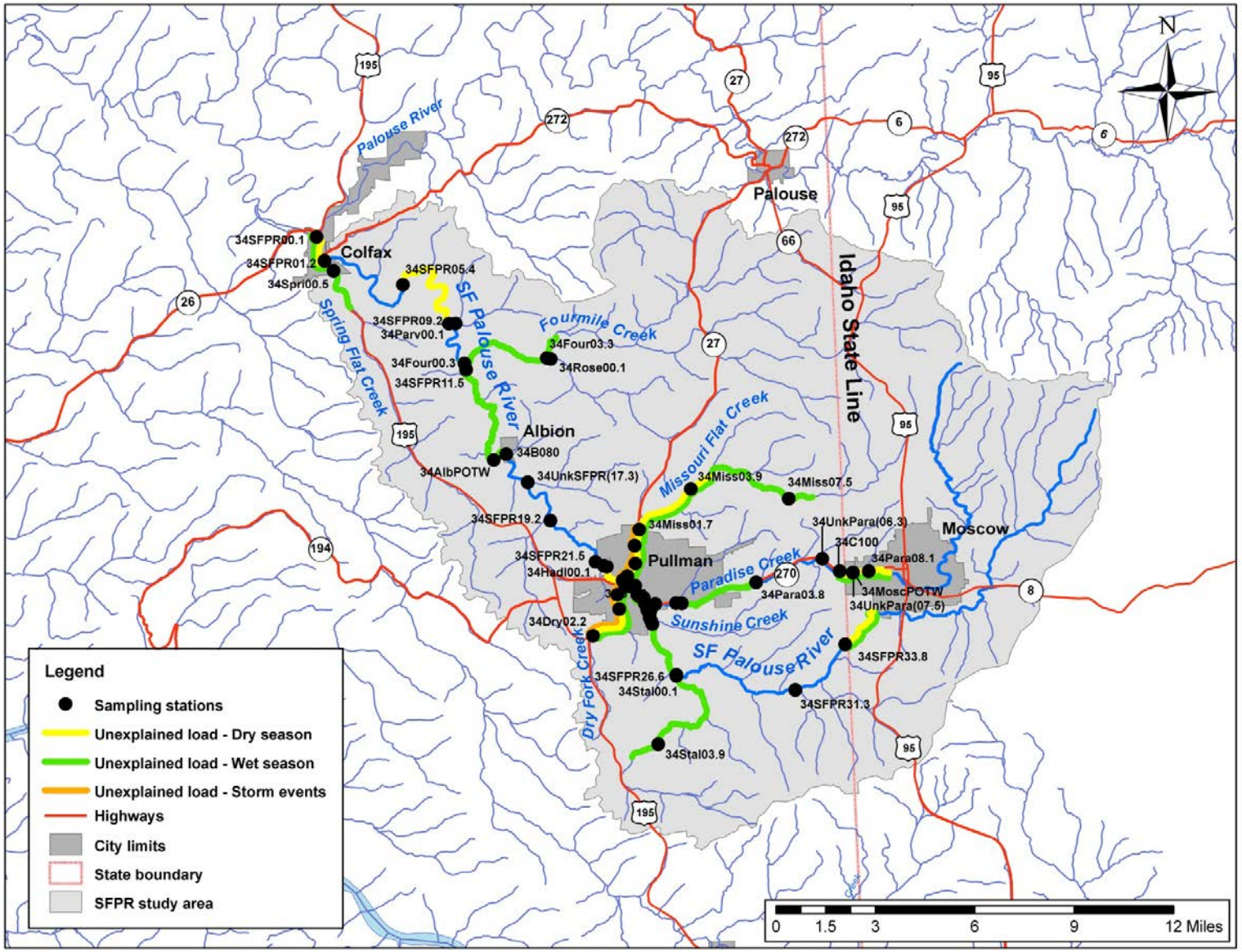


**Figure 5. Watershed stream reaches prioritized for implementation based on bacteria loads and concentrations**.
*Note: Reaches upstream of the uppermost sampling site on each stream may have unknown impairments and sources that would have a high prioritization for implementation if they had been sampled during the study.*

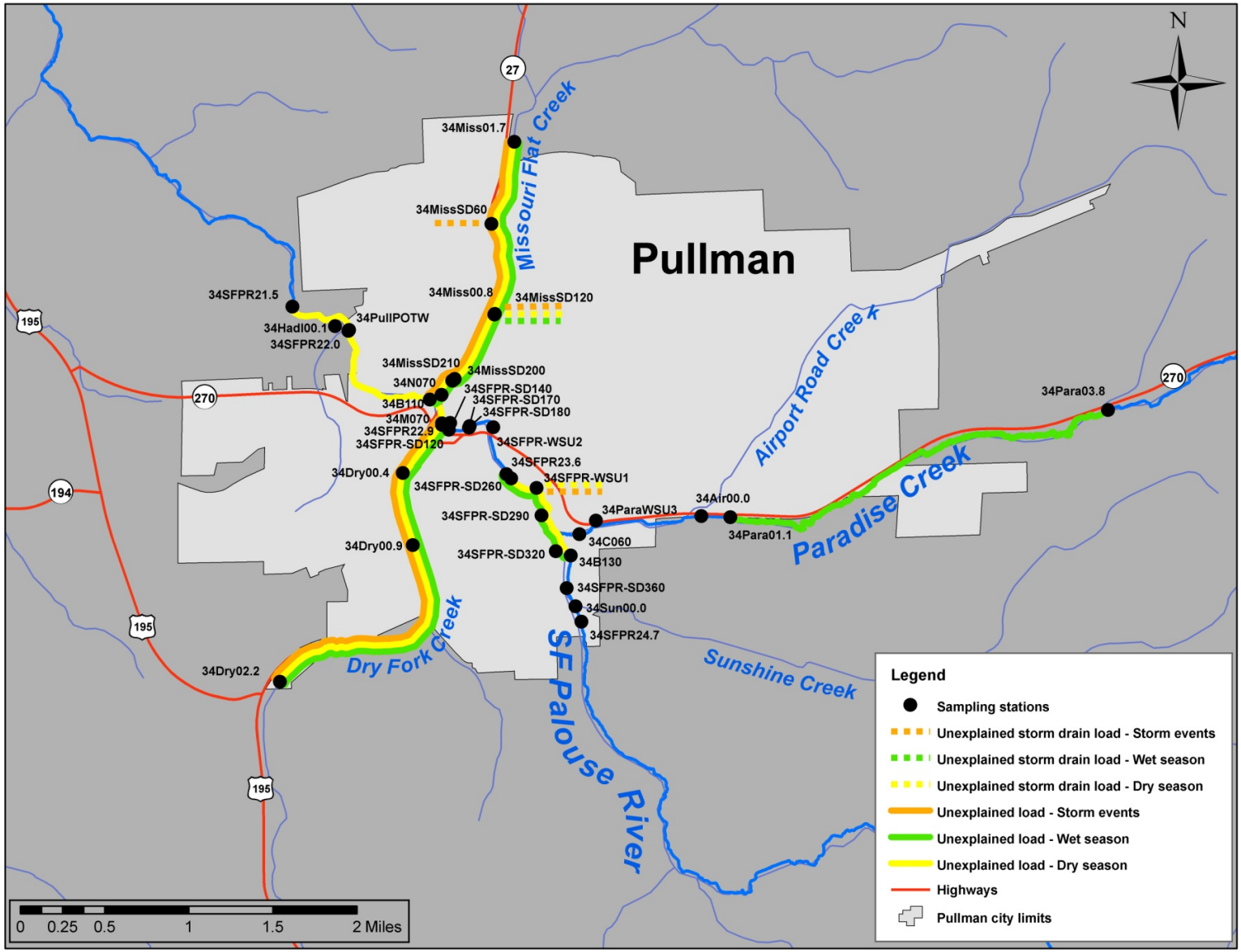


**Figure 6**. **Pullman stream reaches prioritized for implementation based on bacteria loads and concentrations.**
*Note: Reaches upstream of the uppermost sampling site on each stream may have unknown impairments and sources that would have a high prioritization for implementation if they had been sampled during the study*.

# Activities to address pollution sources

## Fecal coliform from animals (livestock and wildlife)

When livestock or wildlife congregates along streams, they deposit fecal matter, trample vegetation, and break up the soil. When the vegetation is removed and the soil is loosened, it increases erosion and removes any filtering effect for the deposited fecal matter. To address these issues, riparian fencing and off-stream watering should be installed in areas with livestock to ensure the stream corridor is protected. In areas without livestock, riparian vegetation should be planted, enhanced, or maintained to discourage wildlife congregation and filter polluted runoff.

## Fecal coliform from failing or improperly constructed or maintained on-site septic systems

Improperly maintained septic systems can fail and lead to pollutants entering waterways (Figure 7). Untreated or partially treated sewage can accumulate on the ground's surface and flow into streams. Improperly treated sewage can also leach pollutants into the ground water, which can travel to nearby streams.

To combat failing septic systems, homeowners should be educated about the proper maintenance and inspection of septic systems. This education should include the negative effects of garbage disposals, and what should and should not be disposed of through in-home drains to septic systems.

Sub-reaches of the streams with consistent year-round loading should be further investigated for failing or improperly constructed septic systems. If failing or straight pipe (direct discharge without treatment to a ditch or stream) septic systems are found, they will need to be repaired or replaced by the property owners under proper permitting regulations.

**Figure 7. Signs of a failing septic system**

## Fecal coliform from stormwater (including pet waste)

All stormwater conveyance systems in the watershed should be assessed to determine where stormwater may be delivering pollutants to streams and apply BMPs to the drainage (Figure 8). Some entities are required to carry out specific activities under stormwater permits; however, all entities must ensure their stormwater is not a source of pollution to waters of the state. Because the TMDL study showed bacteria loading was correlated with total suspended solids (mainly sediment) in some areas, efforts to control sediment runoff and delivery should also be implemented.

**Figure 8. Example of a stormwater outfall that had consistent high bacteria concentrations (SFPRWSU1)**

Many BMPs exist to reduce runoff that can transport bacteria and sediment to streams via stormwater. The Eastern Washington Stormwater Permit and the associated Stormwater Management Manual (Ecology, 2004) contain many practices and procedures to address stormwater pollution. The main ways to reduce bacteria and sediment transport to streams via stormwater include:

- Infiltration.
- Pollution prevention/source control.
- Improved operations and maintenance.

Since stormwater is primarily a transporter of bacteria to surface waters, approaches that infiltrate stormwater also decrease pollutant delivery. Examples of BMPs for stormwater reduction include water dispersion into vegetated areas; infiltration via trenches; bioretention or rain gardens; soil amendments for lawn and landscaped areas; permeable paving; and other methods described in the Low Impact Development (LID) Manual for the Puget Sound Basin (Hinman, 2005). Infiltration is a passive means of treatment that uses existing soil or amended soils and substrate to collect and treat stormwater.

However, due to the soil conditions in the South Fork Palouse River watershed, the success rate of infiltration is limited compared to other locations. The Washington Stormwater Center (WSC), a non-profit organization serving as a central resource for information on stormwater

research, technologies, and management practices, is working to create an eastern Washington branch on the WSU Pullman campus. This branch location would research and test stormwater management practices, addressing the challenges specific to eastern Washington locations and conditions.

Controlling the source and preventing bacteria and sediment from entering stormwater or municipal separate storm sewer systems (MS4s) can reduce its transport to streams. Both public education and illicit discharge and detection (IDDE) programs can reduce the amount of pollutants entering stormwater and MS4s.

Bacteria and sediment inputs to an MS4 can be reduced by assessing and adjusting the frequency of storm system maintenance and by optimizing the scheduling of street sweeping and catch basin cleanout to limit sediment and debris buildup (the language adapted from Lawrence, Roberts, & Johnston, draft 2011).

An important source of bacteria in stormwater can be pet waste that is left on the ground. Towns should have pet waste ordinances in place to require citizens to pick up and properly dispose of pet waste. Educating the town residents regarding this practice is an important step cities can take to reduce bacteria in stormwater.

# Organizations' implementation actions, goals and schedules

Following are descriptions of activities to be carried out by different entities in the watershed. Entities are listed alphabetically after Ecology.

**Washington State Department of Ecology (Ecology)**

Ecology will oversee and track the implementation of this plan to ensure implementation is on schedule and pollution sources are being addressed. Implementation progress and water quality data will be reviewed by Ecology's TMDL coordinator. If the streams are not on track to meet water quality targets, the coordinator will apply adaptive management (see section later in this document).

As the agency that regulates wastewater treatment plants, MS4s, and Washington State Department of Transportation's stormwater from state highways and facilities, Ecology will ensure requirements to implement the TMDL are incorporated into the respective NPDES permits.

Ecology will provide funding, through its competitive water quality grant and loan funding cycle, to projects that address the goals of this plan and rank high enough to receive funding. Additional points are awarded during the application evaluation for projects implementing TMDLs. The Ecology TMDL lead will provide feedback on grant applications, prior to their submission, to help applicants refine their scope of work to develop the best project that has the highest likelihood of being funded.

Where necessary, Ecology will initiate or seek partnerships to investigate potential sources in reaches that need further study. A list of areas that should be considered for further study to isolate or better define bacteria sources can be found in the water quality improvement report under "Recommendations" (Carroll & Snouwaert, 2009).

Ecology will refer nonpoint sources of pollution to the appropriate entity, such as a conservation district, to receive technical and financial assistance to correct the pollution problem. If necessary, Ecology will use its authority under Revised Code of Washington (RCW) 90.48 to enforce water quality regulations.

A summary of Ecology's actions is in Table 9.

**Table 9. Summary and schedule of actions for Ecology.**

| Action | Timeline |
|---|---|
| Track implementation status and water quality progress | On-going with yearly updates |
| Regulate point source discharges through NPDES permits | On-going |
| Provide funding for implementation activities | On-going to competitive grant/loan applicants |
| Investigate (with other organizations) reaches for potential sources | On-going as necessary |
| Refer water quality problems for technical and financial assistance | On-going as necessary |
| Enforce RCW 90.48 | As necessary |

### City of Albion (Albion)

In the TMDL, Ecology determined the Albion (Albion) wastewater treatment plant fecal coliform bacteria effluent limits of 200 cfu/100 mL monthly and weekly averages were protective of water quality during months with higher in-stream flow. Currently, Albion only discharges during high flow months from January to May. However, if the WWTP needs to discharge from June to December, the effluent must meet a fecal coliform concentration of 100 cfu/100 mL as monthly and weekly averages. Ecology will update Albion's NPDES permit to reflect these seasonal requirements.

Albion will also include educational materials about water quality stewardship and programs that may be of interest to its citizens in their utility bills. Materials may include reminders about picking up pet waste or managing animals near streams. Educational inserts may be provided by the Palouse Conservation District, Ecology, and others.

A summary for the city of Albion's actions is in Table 10.

**Table 10. Summary and schedule for Albion.**

| Action | Timeline |
|---|---|
| Operation of WWTP to meet permit limits (including updated permit limits)for fecal coliform | On-going |
| Distribute educational information in utility bills | On-going as opportunities arise |

### City of Colfax (Colfax)

During the summer of 2009, Colfax collaborated with Ecology to investigate the source of the excessively high bacteria loading in the last mile and a half of the South Fork Palouse River (inside the city limits). The results of this investigation revealed that pigeons roosting under bridges in Spring Flat Creek may be a large portion of the bacteria source. Several city stormwater outfalls were also found to have elevated bacterial concentrations.

Colfax will install best management practices to discourage pigeon roosting under the bridges that fall within the city's jurisdiction. Four bridges will be the primary focus of this effort: Cooper Street, Thorn Street, Wawawai Street, and Poplar Street. The pigeons nest on the side

ledges in between the cross beams (Figure 9). In July 2010, it was estimated that 75-100 pigeons reside under these bridges. Signs of pigeon droppings are very apparent.

**Figure 9. Underside of bridges over Spring Flat Creek in Colfax, WA.** *Note pigeon droppings on side of wall.*

In addition, Colfax personnel found several pigeon nests in a storm sewer manhole (running under Rosauer's Grocery Store) upstream of one of the outfalls with high bacteria counts. The outfall pipe and sewer are large enough to easily allow pigeons to enter and nest. Colfax will investigate options to prevent bird entry into the pipe while still allowing a free flowing discharge of stormwater. An option they are considering is a flexible flap over the end of the pipe that would be pushed out with water flow.

Colfax will investigate three stormwater outfalls that were found to have high bacteria concentrations during the 2009 study. Possible methods to determine the source of bacteria in these outfalls include dye or smoke testing or a video camera survey of the storm sewer and its connections. This investigation will be completed by October 29, 2011.

A draft stormwater ordinance is currently being developed for Colfax. The ordinance will govern requirements for the flow, treatment and discharge of stormwater from post-construction development. Colfax will also consider developing an Illicit Discharge and Connection Stormwater Ordinance to prohibit non-stormwater discharges and connections to the storm sewer. Ecology's guidance for developing these regulations can be found at www.ecy.wa.gov/biblio/0810061.html.

Colfax will also remind the town residents about the existing pet waste ordinance and the responsibilities of pet owners to properly dispose of their pet's waste. Colfax may do this through educational flyers in utility bills or other methods.

Actions for Colfax are summarized in Table 11.

**Table 11. Summary and schedule for Colfax.**

| Action | Timeline |
|---|---|
| Implement BMPs for pigeons under city bridges | Complete by September 2011 |
| Investigate three suspicious stormwater outfalls | Complete by October 29, 2011 |
| Address pigeons nesting in stormwater manhole under Rosauer's parking lot | Complete by June 2012 |
| Complete stormwater ordinances | Adopted by July 2012 |
| Remind citizens about existing pet waste ordinance | Complete by April 2012; yearly thereafter |

### City of Moscow, Idaho

The city of Moscow (Moscow) will be covered under EPA's Municipal Stormwater NPDES permit, which is expected to be issued in 2011. The permit will require Moscow to reduce pollutants to the maximum extent practicable by developing and implementing a stormwater management program (SWMP). Its SWMP will be required to include the following measures:

- Public education and outreach.
- Public involvement and participation.
- Illicit discharge detection and elimination (IDDE).
- Construction site stormwater runoff control.
- Post-construction stormwater management.
- Pollution prevention and good housekeeping for municipal operations.

The TMDL study indicated there is unexplained loading to Paradise Creek upstream of the Washington-Idaho state line site. Since Moscow is required to develop and update a comprehensive storm sewer system map as part of its IDDE efforts, Ecology recommends Moscow focus early efforts on locating potential stormwater outfalls in this reach of Paradise Creek. Outfalls found between TMDL sites 34Para08.1 and 34Para06.6 should be investigated to determine if any are potential sources of fecal coliform bacteria. Likewise, the bacteria loading from above 34Para08.1 should be evaluated to determine if is from stormwater or other sources.

Ecology recommends Moscow include jurisdictional boundary monitoring stations for any water quality monitoring conducted to determine the loading that originates outside of Moscow city limits. For example, monitoring stations at Moscow city limits could help determine the portion of bacteria loading originating in Latah County upstream of the city limits.

Moscow WWTP should remain in compliance with its NPDES bacteria permit limits to ensure its discharge does not contribute to downstream water quality standards violations.

### City of Pullman (Pullman)

Pullman's stormwater is regulated under the Eastern Washington Phase II Municipal Stormwater NPDES and State Waste Discharge General Permit (here after referred to as the Municipal Stormwater Permit). The permit requires the implementation of the following stormwater management elements:

- Public education and outreach.
- Public involvement and participation.
- Illicit discharge detection and elimination (IDDE).
- Construction site stormwater runoff control.

- Post-construction stormwater management.
- Pollution prevention and good housekeeping for municipal operations.
- Requirements based on approved Total Maximum Daily Loads (TMDLs).
- Evaluations of program compliance.

As a result of the TMDL study findings, and in conjunction with the Municipal Stormwater Permit, Pullman will conduct activities to locate and reduce potential sources of bacteria to its municipal separate storm sewer system (MS4).

Pullman staff will perform maintenance on 95% of all public catch basins annually. The remainder of the public stormwater system will be cleaned on a regular schedule as part of Pullman's operation and maintenance plan. Pullman intends to purchase a vactor truck for stormwater maintenance in 2011, and hire additional staff in 2012 to facilitate this maintenance schedule. Equipment purchase and new staff will be dependent on funding.

Pullman staff will inventory and inspect the MS4. Global positioning system (GPS) coordinates and information gathered during inventory and inspection will be entered into an asset management software program.

As part of its IDDE Program, Pullman will investigate potential sources of fecal coliform bacteria in drainage basins contributing the highest bacteria loadings and concentrations. The first priority of this investigation will be the storm shed that drains into Missouri Flat Creek through storm outfall 34MissSD120 (near the Jack-in-the-Box restaurant). This work will take place in 2011 and 2012.

The second priority will be an investigation of all storm sewers draining to the corrugated metal pipe (CMP) culvert-enclosed portion of Dry Fork Creek between Crestview Street (near 34Dry00.9) and Center Street (near 34Dry00.4). In subsequent years, IDDE efforts will move to address other outfalls in need of bacteria reductions and outfalls not sampled but discharging to stream segments in need of bacteria reductions. Pullman and Ecology will work collaboratively to determine focus areas for additional IDDE efforts based on the TMDL study loading analysis and more recent monitoring. Pullman and Ecology will consider the prioritization listed under the *Prioritizing Implementation* section earlier in this document.

Sampling will be conducted under a quality assurance project plan (QAPP). If illicit discharges or connections are found, they will be recorded and addressed.

In the summer of 2010, Pullman began to develop a Pet Waste Management Program. The Pet Waste Management Program will include education and outreach to pet owners, and the research and implementation of actions to help prevent pet waste from reaching storm drains and streams.

Pullman Planning and Public Works Departments incorporated the TMDL considerations into their State Environmental Protection Act (SEPA) review and permitting procedures. All land use actions requiring SEPA or city permits will be evaluated for their potential to result in increased fecal coliform reaching streams through increased runoff to streams or the MS4.

Pullman is scheduled to update its Shoreline Master Program in 2014. This update will include considerations for protecting water quality based on the findings of the bacteria and future TMDL studies.

Pullman's wastewater treatment plant (WWTP) treats wastewater and discharges under a NPDES permit. Pullman will operate the WWTP to ensure it continues to meet its fecal coliform

bacteria limits as stated in the NPDES permit. Under the Municipal Stormwater Permit, the WWTP must ensure, through good housekeeping practices and best management practices, pollutants related to biosolids are not running off the site to the river. During transportation and handling of the biosolids, the catch basin near the holding area is sealed with a double layer of plastic, forcing any runoff into an adjacent catch basin that is routed back to the headworks for treatment. This catch basin is scheduled to be eliminated by the end of 2011. During future upgrades of the WWTP, Pullman will evaluate the plant's storm drain system.

Actions Pullman will take are summarized in Table 12.

**Table 12. Summary and schedule of actions for Pullman.**

| Action | Timeline |
|---|---|
| Clean public catch basins | Annually |
| Inventory and inspect MS4 | Ongoing; initial inventory complete by 2012 |
| IDDE emphasis in 34MissSD120 storm-shed | Beginning in 2010 and ongoing until sources found and addressed |
| IDDE emphasis in Dry Fork Creek storm-shed | Beginning in 2013 and ongoing until sources found and addressed |
| IDDE emphasis in other drainage basins | Following earlier priorities |
| Develop and implement Pet Waste Management Program | Beginning in 2010 and ongoing |
| Consider TMDL and bacteria sources to streams during SEPA and permitting procedures | Ongoing |
| Operation of WWTP to meet permit limits for fecal coliform | Ongoing |
| Good housekeeping and best management practices during biosolids transportation and handling | Ongoing |

### Environmental Protection Agency (EPA)

The EPA issues NPDES permits for discharges to the Idaho portions of the South Fork Palouse and Paradise Creek. The Moscow WWTP permit contains limits designed to meet Washington's water quality standards. EPA should continue to ensure new issues of Moscow's permit contribute to Paradise Creek meeting Washington's water quality standards at the state line.

Idaho's South Fork Palouse River TMDL included *E. coli* wasteload allocations for two mobile home parks in Idaho (IDEQ, 2007). EPA will develop NPDES permits to regulate these point sources. *E. coli* reductions should also reduce fecal coliform levels, improving the water quality as it enters Washington.

In 2008, EPA determined the MS4 in Moscow needed coverage under a Phase II Municipal Stormwater permit. This designation resulted, in part, from the data collected as part of Washington's bacteria TMDL study. When the permit is issued, it will require actions to reduce pollutant delivery via stormwater.

### Idaho Department of Environmental Quality (IDEQ)

The United States Environmental Protection Agency (EPA) approved IDEQ's TMDLs for bacteria on both Paradise Creek and the South Fork Palouse River. EPA approved the Paradise Creek TMDL in February 1998. The data collected during the Washington TMDL study should be compared to the load allocations established in the Paradise Creek TMDL to determine if the creek is meeting required reductions at the Washington-Idaho state line. If the water quality is not in compliance with the TMDL, adaptive management should be applied.

EPA approved the Idaho South Fork Palouse River TMDL in October 2007. This TMDL called for a 41 percent year-round reduction in *E. coli*. The relationship between *E. coli* and fecal coliform bacteria in this watershed is very comparable; therefore, Idaho's TMDL will likely result in a similar reduction in fecal coliform bacteria. According to Ecology's study, an 86 percent reduction in fecal coliform bacteria is needed during the dry season to meet Washington's water quality standards at the border. IDEQ and Ecology will need to work together to ensure Washington's standards are met at the border.

### Palouse Conservation District (CD)

The Palouse CD applied for and was awarded a Centennial Clean Water Fund grant for the South Fork Palouse River: TMDL Implementation project. This project will inform and educate the community about the bacteria problems in the watershed and the steps citizens can take to help address the problem. This project will also plan and implement BMPs, such as re-vegetation and fencing, to address bacteria sources. Additionally, Palouse CD will monitor water quality in an attempt to further identify sources and measure the effectiveness of installed BMPs. The Palouse CD commits to the activities and schedule, in Table 13, to help implement this TMDL.

**Table 13. Summary and schedule for Palouse CD.**

| Action | Timeline |
|---|---|
| Develop outreach brochure regarding implementation opportunities | Yearly (mail to riparian landowners each year 2010-2014) |
| Present display and materials at Inland NW Green Fair and WSU Wellbeing Fair | Yearly 2010-2014 |
| Coordinate a volunteer riparian planting event | Yearly 2010-2014 |
| Present a display at the Whitman County Fair and Pullman Lentil Festival | Yearly 2010-2014 |
| Write articles for Palouse CD newsletter | Ongoing |
| Conduct conservation planning with 10 landowners | Complete by 2012 |
| Install 1000 feet livestock exclusion fencing and establish 3 off-stream watering facilities | Complete by 2013 |
| Monitoring according to an approved plan | Through 2014 |

### Residents and landowners

The bacteria contributions in the rural parts of the South Fork Palouse River watershed are primarily from nonpoint sources of pollution. Nonpoint source pollution results from the actions of all people living in a watershed; therefore, everyday activities by citizens can have a significant impact on local water quality.

In some rural areas in the watershed, there is a correlation between bacteria and total suspended solids. Agricultural landowners may be able to help reduce bacteria entering the streams by implementing agricultural practices that reduce runoff and erosion.

In addition, actions by residents and landowners within urban areas can contribute bacteria to stormwater. Actions watershed residents can take to lessen their impact include:

- Properly disposing of and managing animal waste.
- Restoring their riparian areas.
- Repairing failing or regularly pumping septic systems.
- Educating others about the impacts of their everyday actions on water quality.

Many of the agencies and organizations mentioned in this plan can provide technical or financial assistance to landowners and residents for these activities.

**Washington State Department of Transportation (WSDOT)**

Ecology did not directly measure WSDOT stormwater outfalls during the TMDL study; however, some of the outfalls along Pullman streets that are highways may have shared jurisdictional responsibility. The responsibility for these outfalls will be determined by Pullman and WSDOT, collaboratively. Along highways in rural portions of the watershed, it is reasonable to assume WSDOT stormwater may be a conveyance of fecal coliform in areas where adjacent land uses are recognized sources.

WSDOT will implement the following, which include some pollution-prevention measures that address fecal coliform bacteria concentrations, for state road and highway runoff according to its SWMPP and Municipal Stormwater NPDES Permit in all applicable Phase I and II coverage area.

- Discharge inventory/IDDE (source identification and control).
- Implementation of the Highway Runoff Manual (stormwater BMP design manual equivalent to Ecology's Stormwater Management Manual).
- Baseline fecal coliform stormwater grab sampling of highways (at selected sites statewide per the Permit requirements).
- Stormwater BMP retrofit program.
- Highway maintenance program.

WSDOT will inventory highway discharge locations within the South Fork Palouse River FC Bacteria TMDL boundary. The inventory will include the identification of illicit bacteria and excessive sediment discharges to WSDOT's conveyance system. Prioritization of inventory efforts should be:

- Highway 195 crossings and discharge locations to the South Fork Palouse River and Spring Flat Creek and the ditches leading up to discharge locations.
- Highway 270 discharge locations to Paradise Creek and the ditches leading up to discharge locations.
- Highway 27 discharge locations to Missouri Flat, Dry Fork, and Four Mile creeks and the ditches leading up to discharge locations.

WSDOT will implement source identification for fecal coliform within the South Fork Palouse River TMDL boundary. If discharges transporting bacteria to the streams are found, WSDOT will apply best management practices from its SWMPP or perform remediation to correct the situation. If source identification reveals this area has significant WSDOT-related contributions, WSDOT's fecal coliform programmatic approach (currently under development) may be applied where these highways discharge to a water body within the TMDL boundary.

During the summer of 2009, Ecology conducted a supplemental study to determine the source of the extremely high load entering the South Fork Palouse River in the last 1.5 mile reach within Colfax. The study revealed pigeons roosting under the bridges are likely a significant contributor to the loading. After additional investigation during the summer of 2010, it appears

the WSDOT Highway (Hwy) 195 bridge, while the largest, does not provide good roosting areas for pigeons. There is a large ledge along the side of the stream channel, but most indications suggest the pigeons roost under Colfax bridges. As Colfax addresses pigeons under their bridges, the birds may seek new nesting areas. As part of regular maintenance, WSDOT will inspect the underside of the bridge to ensure pigeon nests are not being built under this bridge or that pigeon feces are not accumulating on this ledge. If inspections reveal pigeons are utilizing or soiling the bridge structure or stream under the bridge, WSDOT will take efforts to prevent pigeon usage.

WSDOT actions are summarized in Table 14. Compliance with the action items identified presumes compliance with WSDOT's waste load allocation; however, in the event new data or other actionable information should later reveal WSDOT is a significant source or contributor, it would be appropriate to assign WSDOT new/additional actions via the adaptive management process. For monitoring and source identification purposes, outfalls above the water quality standards will be considered significant contributors and will be prioritized, based on highest concentrations, for additional investigation and source identification or additional actions.

**Table 14. Summary and schedule for WSDOT implementation actions.**

| Action | Timeline |
|---|---|
| Implement WSDOT's SWMPP and Municipal Stormwater NPDES Permit in all Phase I and II areas | On-going |
| Inventory highway discharge locations within the South Fork Palouse River FC Bacteria TMDL boundary | Complete by March 2014 |
| Implement source identification for fecal coliform within the South Fork Palouse River TMDL boundary | Complete by March 2014 |
| Apply best management practices from SWMPP or perform remediation to correct bacteria discharges | As needed |
| Apply fecal coliform programmatic approach within TMDL boundary | If determined necessary |
| Inspect underside of Highway 195 bridge in Colfax for pigeon nests and feces | With annual bridge inspection |

### Washington State University (WSU)

WSU is regulated as a secondary permittee under the Eastern Washington Phase II Municipal Stormwater NPDES and State Waste Discharge General Permit (here after referred to as the Municipal Stormwater Permit). The permit requires the implementation of the following stormwater management elements.

- Public education and outreach.
- Public involvement and participation.
- Illicit discharge detection and elimination (IDDE).
- Construction site stormwater runoff control.
- Post-construction stormwater management.
- Pollution prevention and good housekeeping for municipal operations.
- Requirements based on approved total maximum daily loads (TMDLs).
- Evaluations of program compliance.

As a result of the TMDL study findings, WSU will focus its stormwater permit implementation and other efforts on specific activities to locate potential sources of bacteria to its MS4 and correct them.

During 2011-2012, the initial emphasis of WSU's illicit discharge detection and elimination (IDDE) program will be to investigate sources of bacteria to storm drain 34SFPRWSU1 (Benewah Street). WSU has developed a quality assurance project plan that describes its methods for IDDE detection and monitoring in this and other stormsheds. WSU will sample various branches of the storm sewer system to determine areas where sources may be originating. As potential sources are found, they will be recorded and scheduled for correction.

During this same period (2011-2012), Pullman will investigate stormwater outfall 34MissSD120 which empties into Missouri Flat Creek near the Jack-in-the-Box restaurant. WSU's campus contributes stormwater to this sewer system, which is part of Pullman's MS4. WSU will determine its IDDE priority for the 2012-2013 investigation based on the results of Pullman's study. If Pullman finds higher bacteria loading coming from campus storm sewer lines to the 34MissSD120 (Missouri Flat Creek) system than the loads coming from 34SFPRWSU2 (College Street) during the TMDL study (conducted in 2006-2007), WSU will prioritize the location of sources in the 34MissSD120 system as the second priority (2012-2013) and 34SFPRWSU as the third priority (2013-2014). If 34SFPRWSU2 has higher bacteria loading, it will be WSU's second priority (2012-2013) followed by 34MissSD120 (2013-2014). All monitoring will be conducted under a quality assurance project plan.

As required by the Municipal Stormwater Permit, WSU will conduct stormwater-related education and outreach. Emphasis will be placed on animal waste management to reduce potential bacteria-laden stormwater washing into storm sewers.

The Capital Planning Department at WSU incorporated the TMDL into its SEPA checklist process and review. Projects will be considered for their potential to increase runoff and fecal coliform bacteria sources.

The Civil and Environmental Engineering Program at WSU is currently seeking funding to study the feasibility of implementing low impact development (LID) practices on campus. The project could include retrofitting existing pedestrian areas, paths, driving lanes, and parking areas, and incorporating LID into new construction projects. Ideally, the end result would be to create an LID demonstration campus. These efforts would help reduce stormwater runoff so fewer pollutants, including bacteria, would be carried into the South Fork Palouse River directly and through storm sewers.

The Washington Stormwater Center (WSC) was officially established on December 9, 2010 as a result of House Bill 2222 legislation, and codified in RCW 90.48.545 to improve stormwater quality through education, information sharing, and research on new technologies. The WSC was created with grants from the Washington State Department of Ecology, and is co-located at the WSU Research and Extension Center, Puyallup, WA, and the University of Washington, Urban Waters Center, Tacoma. The WSC is a non-profit organization that serves as a centralized resource for stormwater managers, providing information and training related to stormwater technologies, research, testing, management practices and stormwater pollution prevention, in addition to serving as a connection and support point for industry leaders and National Pollutant Discharge Elimination System (NPDES) permittees. The WSC held a stormwater management forum in Pullman, Washington on June 3, 2010, focusing on low impact development (LID) techniques and initiating an eastern Washington focus that will continue into 2012. Using the pilot LID research program now in place in Puyallup, and the strong interest of eastern Washington permittees, the WSC will work to create a responsive and effective branch

located on the WSU Pullman campus. This branch of the WSC will service eastern Washington permittees, stormwater professionals, and managers. Work is already underway with the creation of the WSU Pullman Stormwater Workgroup, which will continue to increase in members and help to produce research, education and demonstration relevant for stormwater managers in eastern Washington.

A summary of WSU's actions is included in Table 15.

**Table 15. Summary and schedule for WSU implementation actions.**

| Action | Timeline |
|---|---|
| Implement Phase II Municipal Stormwater NPDES Permit requirements | On-going |
| Investigate stormwater outfall 34SFPRWSU1 (Benewah Street) and eliminate sources of fecal coliform bacteria | 2011 – until outfall concentrations meet standards |
| Investigate stormwater outfall 34SFPRWSU2 (College Street) and eliminate sources of fecal coliform bacteria | 2012 **OR** 2013 – until outfall concentrations meet standards |
| Investigate campus stormwater sources to Pullman's 34MissSD120 (near Jack-in-the-Box) and eliminate sources of fecal coliform bacteria | 2012 **OR** 2013 – until outfall concentrations meet standards |
| Emphasis animal waste management in educational programs | On-going |
| Consider potential bacteria sources and TMDL requirements during all SEPA review processes | On-going |
| Seek funding for feasibility study to create an LID demonstration project on campus | On-going until funded or determined infeasible |
| Continue to develop an eastern branch of the Washington Stormwater Center to be located on the WSU Pullman Campus | On-going |

### Whitman County Health Department (Health Department)

The 2007 Washington Legislature strengthened the legal statutes (WAC 246-272A) regulating on-site septic systems (OSS). Whitman County Health Department adopted the state code and is developing procedures to implement the new requirements. The requirements include developing a written plan to guide development and management activities for all OSS. This plan must describe educational efforts regarding operation and maintenance of all types of systems, and how the department will remind and encourage homeowners to complete required operation and maintenance inspections.

As part of the new procedures, the Health Department updated its databases to better track locations and status of septic systems and permits. The Health Department uses the database to follow-up on final system installation and permitting.

The county is currently developing a State-mandated operation and maintenance (O&M) program to improve system functionality, identify and address maintenance needs, and to ensure compliance with regulations and permits. Specifics of the program should be available by 2013.

The Health Department collaborated with the Assessor's Office to ensure property deeds include information regarding unpermitted and permitted septic systems.

The Health Department's education and outreach will emphasize areas the TMDL study identified as having high bacteria loading along the South Fork Palouse River and its tributaries. An educational brochure regarding OSS maintenance and operation is under development. The Whitman County Health Department will send this brochure as a direct mailing to residents in

target areas. The brochure will explain the updates in regulations and homeowner responsibilities.

The Health Department is forming a septic system committee that will discuss the impacts of new legislation and develop procedures for improving OSS procedures within Whitman County.

To assist landowners who may not be able to afford to repair or replace their failing septic systems, the Health Department will partner with the county's conservation districts to seek funding.

Whitman County Health Department's actions are listed in Table 16.

**Table 16. Summary and schedule for Whitman County Health Department implementation actions.**

| Action | Timeline |
|---|---|
| Develop and maintain written plan regarding how the department regulates septic systems | Defer to WAC 246-272A |
| Direct septic system educational mailing to residents | Yearly |
| Form a septic system committee | By October 2011 |
| Seek funding to assist homeowners with septic system repair and replacement | By October 2012 and on-going until funded. |

### Whitman County Planning Department

The Whitman County Planning Department needs to consider this and other TMDLs in the watershed during State Environmental Policy Act (SEPA) and other local land use planning reviews. If the land use action under review is known to potentially increase fecal coliform levels, then the project may have a significant adverse environmental impact. Land use planners and project managers should consider findings and actions in the TMDL report and this implementation plan to help prevent new land uses from contributing to a violation of the water quality standards. Ecology published a focus sheet on how TMDLs play a role in SEPA impact analysis, threshold determinations, and mitigation (www.ecy.wa.gov/biblio/0806008.html).

Whitman County is scheduled to update its Shoreline Master Program in 2014. This update will include considerations for protecting water quality based on the findings of the bacteria and future TMDL studies.

## Adaptive management

Natural systems are complex and dynamic. The way a system will respond to human management activities is often unknown and can only be described as probabilities or possibilities. Adaptive management involves testing, monitoring, evaluating applied strategies, and incorporating new knowledge into management approaches that are based on scientific findings. In the case of TMDLs, Ecology uses adaptive management to assess whether the actions identified as necessary to solve the identified pollution problems are the correct ones and whether they are working. As the actions described above are implemented, the system will respond, and it will also change. Adaptive management allows us to fine-tune our actions to make them more effective, and to try new strategies if we have evidence that a new approach could help us to achieve compliance.

The actions described should result in at least a 50% achievement of the required bacteria reductions by 2015, and attainment of bacteria water quality standards by 2020. Partners will

work together to monitor progress towards these goals, evaluate successes, obstacles, and changing needs, and make adjustments to the implementation strategy as needed.

Ecology will use adaptive management when water monitoring data show that the TMDL targets are not being met or implementation activities are not producing the desired result. A feedback loop (Figure 10) consisting of the following steps will be implemented:

Step 1. The activities in the water quality implementation plan are put into practice.

Step 2. Programs and (best management practices) BMPs are evaluated for technical adequacy of design and installation.

Step 3. The effectiveness of the activities is evaluated by assessing new monitoring data and comparing it to the data used to set the TMDL targets.

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

Step 3b. If not, then BMPs and the implementation plan will be modified or new actions identified. The new or modified activities are then applied as in Step 1.

Additional monitoring may be necessary to better isolate the bacteria sources so that new BMPs can be designed and implemented to address all sources of bacteria to the streams.

It is ultimately Ecology's responsibility to assure that implementation is being actively pursued and water standards are achieved.

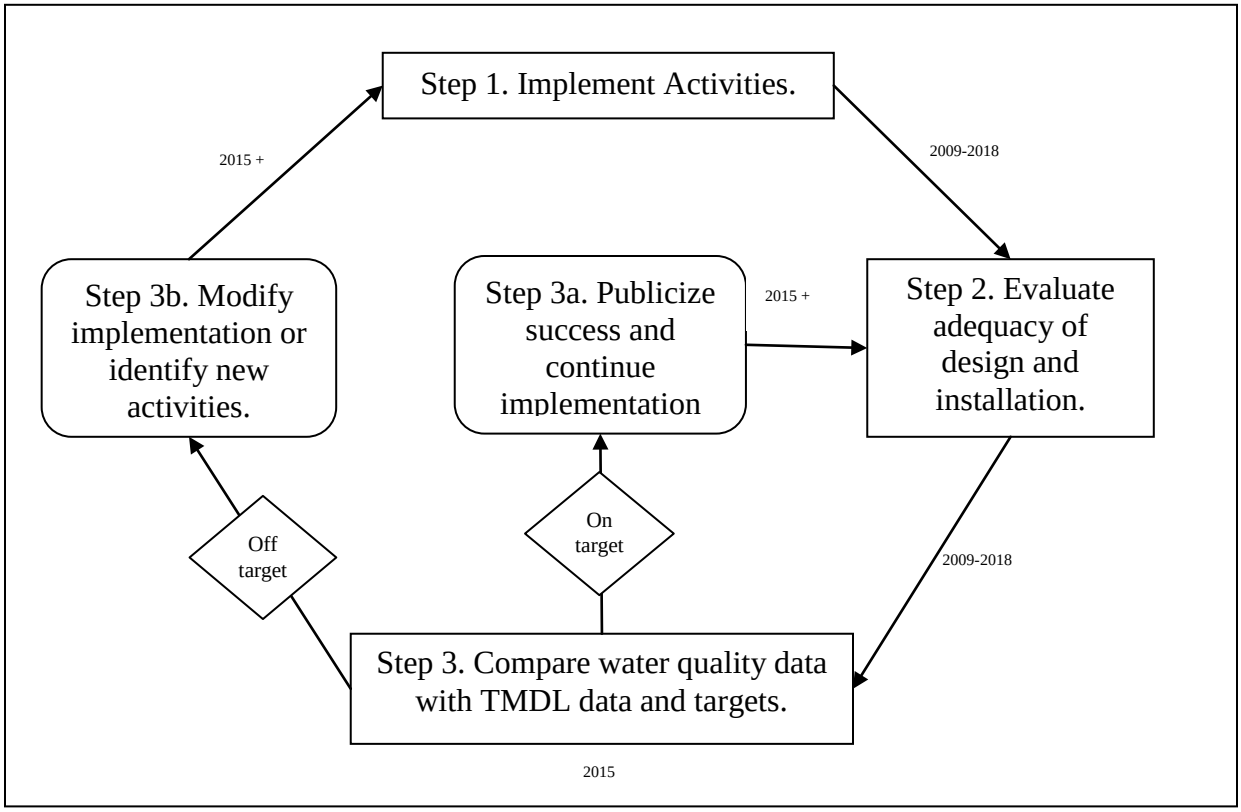


**Figure 10. Feedback loop for determining need for adaptive management.** *Dates are estimates and may change depending on resources and implementation status.*

*This page is purposely left blank*

# Funding Opportunities

Multiple sources of financial assistance for water quality improvement activities are available through Ecology's grant and loan programs, local conservation districts, and other sources. Refer to the website (www.ecy.wa.gov/programs/wq/tmdl/TMDLFunding.html) for a list and descriptions of funding sources.

Ecology's Centennial Clean Water Fund, Section 319, and State Water Pollution Control Revolving Fund grants and loans can provide funding to help implement this TMDL. In addition to Ecology's funding programs, there are many other funding sources available for watershed planning and implementation, point and nonpoint source pollution management, fish and wildlife habitat enhancement, stream restoration, and water quality education. Public sources of funding include federal and state government programs, which can offer financial as well as technical assistance. Private sources of funding include private foundations, which most often fund nonprofit organizations with tax-exempt status. Forming partnerships with other government agencies, nonprofit organizations, and private businesses can often be the most effective approach to maximize funding opportunities. Some of the most commonly accessed funding sources for TMDL implementation efforts are shown in Table 17 and are described below.

**Centennial Clean Water Fund (CCWF)**

A 1986 state statute created the Water Quality Account, which includes the Centennial Clean Water Fund (CCWF). Ecology offers CCWF grants and loans to local governments, tribes, and other public entities for water pollution control projects. The application process is the same for CCWF, 319 Nonpoint Source Fund, and the State Water Pollution Control Revolving Fund.

**Section 319 Nonpoint Source Fund**

The 319 Fund provides grants to local governments, tribes, state agencies and nonprofit organizations to address nonpoint source pollution to improve and protect water quality. These organizations can apply to Ecology during the annual combined funding cycle for funding through a 319 grant to provide additional implementation assistance.

**State Water Pollution Control Revolving Fund**

Ecology also administers the Washington State Water Pollution Control Revolving Fund. This program uses federal funding from U.S. Environmental Protection Agency and monies appropriated from the state's Water Quality Account to provide low-interest loans to local governments, tribes, and other public entities. The loans are primarily for upgrading or expanding water pollution control facilities, such as public wastewater and stormwater plants, and for activities to address nonpoint source water quality problems.

**Coastal Zone Protection Fund**

Since July 1998, Ecology deposits water quality penalties issued under Chapter 90.48 RCW into a sub-account of the Coastal Protection Fund (also referred to as Terry Husseman grants). A portion of this fund is made available to regional Ecology offices to support on-the-ground projects to perform environmental restoration and enhancement. Local governments, tribes, and state agencies must propose projects through Ecology staff. Stakeholders with projects that will reduce bacteria pollution are encouraged to contact their local TMDL Coordinator to determine if their project proposal is a good candidate for Coastal Zone Protection funding.

**Table 17. Potential funding sources for implementation projects**

| Fund Source | Type of Project Funded | Maximum Amounts |
|---|---|---|
| Centennial Clean Water Fund | Watershed planning, stream restoration, & water pollution control projects. | $500,000 |
| Section 319 Nonpoint Source Fund | Nonpoint source control; i.e., pet waste, stormwater runoff, & agriculture, etc. | $500,000 |
| State Water Pollution Control Revolving Fund | Low-interest loans to upgrade pollution control facilities to address nonpoint source problems; failing septic systems. | 10% of total SRF annually |
| Coastal Zone Protection Fund (also referred to as Terry Husseman grants) | Stream restoration projects to improve water quality. | ~$50,000 |
| Conservation Reserve Program (CRP) | Establishes long-term conservation cover of grasses, trees and shrubs on eligible land. | Rental payments based on the value of the land; plus 50% - 90% cost share dependent on practices implemented |
| Environmental Quality Incentives Program (EQIP) | Natural resource protection. | Dependent on practices implemented |
| Wildlife Habitat Incentive Program (WHIP) | Provide funds to enhance and protect wildlife habitat including water. | $25,000 dependent on practices implemented |
| Conservation Stewardship Program (CSP) | Provides financial assistance for conservation on private working lands | Dependent on practices implemented |
| Community Action Center (CAC) Housing Rehabilitation Loan Program | Loans to low-income homeowners for safety & sanitation. | 0-6% interest dependent on household income |
| Wetland Reserve Program (WRP) | Wetland enhancement, restoration, and protection by retiring agricultural land. | Dependent on appraised land value |

### Conservation Reserve Program (CRP)

The CRP is a voluntary program for agricultural landowners. Through CRP, landowners can receive annual rental payments and cost-share assistance to establish long-term, resource conserving vegetative or vegetation covers on eligible farmland. Included under CRP is the Continuous Conservation Reserve Program (CCRP), which provides funds for special practices for both upland and riparian land. Landowners can enroll in CCRP at anytime. There are designated sign up periods for CRP.

The Commodity Credit Corporation (CCC) makes annual rental payments based on the agriculture rental value of the land, and it provides cost-share assistance for 50 to 90 % of the participant's costs in establishing approved conservation practices. Participants enroll in CRP contracts for 10 to 15 years.

The program is administered by the CCC through the Farm Service Agency (FSA), and program support is provided by Natural Resources Conservation Service, Cooperative State Research and Education Extension Service, state forestry agencies, and local conservation districts (Farm Service Agency, 2006).

**Environmental Quality Incentives Program (EQIP)**

The federally funded Environmental Quality Incentives Program (EQIP) is administered by NRCS. EQIP is the combination of several conservation programs that address soil, water, and related natural resource concerns. EQIP encourages environmental enhancements on land in an environmentally beneficial and cost-effective manner. The EQIP program:

- Provides technical assistance, cost share, and incentive payments to assist crop and livestock producers with environmental and conservation improvements on the farm.
- Has 75 percent cost-share, but allows 90 percent if the producer is a limited resource or beginning farmer.
- Has contracts lasting five to ten years.
- Has no annual payment limitation; sum not to exceed $450,000 per farm.

**Wildlife Habitat Incentive Program (WHIP)**

WHIP is administered by NRCS and is a voluntary program for people who want to develop and improve wildlife habitat primarily on private land. Through WHIP, NRCS provides both technical assistance and up to 75 percent cost-share assistance to establish and improve fish and wildlife habitat. WHIP agreements between NRCS and the participant generally last from five to ten years from the date the agreement is signed.

**Conservation Stewardship Program (CSP)**

CSP through NRCS will provide financial and technical assistance to eligible producers to conserve and enhance soil, water, air, and related natural resources on their land. Eligible lands include cropland, grassland, prairie land, improved pastureland, rangeland, nonindustrial private forest lands, agricultural land under the jurisdiction of an Indian tribe, and other private agricultural land (including cropped woodland, marshes, and agricultural land used for the production of livestock) on which resource concerns related to agricultural production could be addressed. Participation in the program is voluntary.

CSP encourages land stewards to improve their conservation performance by installing and adopting additional activities, and improving, maintaining, and managing existing activities on agricultural land and nonindustrial private forest land. The NRCS will make CSP available nationwide on a continuous application basis.

The state conservationist, in consultation with the state technical committee and local work groups, will focus program impacts on natural resources that are of specific concern for a state, or the specific geographic areas within a state. Applications will be evaluated relative to other applications addressing similar priority resource concerns to facilitate a competitive ranking process among applicants within a state who face similar resource challenges.

The entire operation must be enrolled and include all eligible land that is operated separate from other operations.

CSP offers participants two possible types of payments:

1. Annual payment for installing and adopting additional activities, and improving, maintaining, and managing existing activities.
2. Supplemental payment for the adoption of resource-conserving crop rotations.

**Community Action Center Housing Rehabilitation Loan Program**

The Housing Rehabilitation Loan Program provides zero-interest and low-interest loans to residents to repair and improve the quality and safety of their homes. These loans can be used to repair and replace failing septic systems. Interest rates are based on household income. To qualify for funding, homeowners must have an inspection performed for their residences and upgrade any other potential health risks that are identified.

**Rural Housing Repair and Rehabilitation Loans**

The Rural Housing Repair and Rehabilitation Loans are funded directly by the federal government. Loans are available to low-income rural residents who own and occupy a dwelling in need of repairs. Funds are available for repairs to improve or modernize a home, or to remove health and safety hazards such as a failing on-site system. This loan is a one percent loan that may be repaid over a 20-year period.

To obtain a loan, homeowner-occupants must have low income (defined as under 50 percent of the area median income), and be unable to obtain affordable credit elsewhere. They must need to make repairs and improvements to make the dwelling more safe and sanitary. Grants (up to $7,500) are available only to homeowners who are 62 years old or older and who cannot repay a Section 504 loan (USDA, 2006).

**Wetland Reserve Program (WRP)**

WRP is a voluntary program administered by NRCS to restore and protect wetlands on private property (including farmland that has become a wetland as a result of flooding). The WRP provides technical and financial assistance to eligible landowners to address wetland, wildlife habitat, soil, water, and related natural resource concerns on private lands. The program offers three enrollment options: permanent easement, 30-year easement, and restoration cost-share agreement. Landowners receive financial incentives to enhance wetlands in exchange for retiring marginal agricultural land.

Under WRP, the landowner limits future use of the land, but retains ownership, controls access, and may lease the land for undeveloped recreational activities and possibly other compatible uses. Compatible uses are allowed if they are fully consistent with the protection and enhancement of the wetland.

# 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 attained to ensure implementation measures are effective and standards continue to be met.

Ecology will monitor the progress of implementation and resulting in-stream FC bacteria concentrations. The implementation activities are expected to be carried out on the schedules described in the "What will be done" section of this plan. Based on this implementation schedule, the South Fork Palouse River and its tributaries are expected to meet primary contact recreation bacteria standards by 2020. Ecology will track both the progress of the implementation activities and the in-stream bacteria concentrations to make sure the Palouse River and its tributaries are on track for meeting this schedule.

A quality assurance project plan (QAPP) should be prepared before any 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 activities listed in this implementation plan 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 coordinator will work with the organizations outlined in this document to track implementation activities occurring in the watershed. Depending on Ecology's resources and current implementation tracking tools, the coordinator will either use an Excel© spreadsheet, Ecology's TMDL management database or geographic information system (GIS) mapping to track where implementation has occurred or is planned.

Each organization should track the progress they have made on implementation. Entities conducting restoration projects or installing best management practices (BMPs) are responsible for monitoring plant survival rates and maintenance of improvements, structures and fencing. Agencies with enforcement authority are responsible for following up on any enforcement actions. Wastewater treatment plants are responsible for monitoring effluent bacteria concentrations and reporting those to Ecology on their discharge monitoring reports (DMRs). Municipalities regulated under a stormwater permit are responsible for monitoring outfalls to determine if IDDE efforts are successful.

# Effectiveness monitoring plan

Effectiveness monitoring is usually conducted approximately five years after implementation begins to determine if the interim targets and water quality standards have been met. Effectiveness monitoring of TMDLs is usually conducted by Ecology's Environmental Assessment Program. This program provides a range of scientific, monitoring, laboratory, and quality assurance services and conducted the original TMDL study.

The Ecology TMDL coordinator will recommend monitoring schedules and locations based on the TMDL report and completed implementation. The coordinator will use the results of monitoring by Ecology and others to determine if this plan is working as written. If sufficient progress is not made the coordinator will begin adaptive management (discussed previously).

The minimum locations that should be considered for monitoring to determine effectiveness include:

- 34SFPR33.8
- 34SFPR24.7
- 34SFPR22.8 (34B110)
- 34SFPR22.0
- 34SFPR15.8 (34B080)
- 34SFPR01.2
- 34SFPR00.1
- 34PARA06.6
- 34PARA00.1 (34C060)
- 34MISS00.1 (34N070)
- 34DRY00.1 (34M070)
- 34MISSSD120
- 34SFPRWSU1
- 34SFPRWSU2

Fecal coliform concentrations and flows should be obtained at all monitored stations so both concentration and loads can be compared to the TMDL study results. In addition, sites at the Idaho-Washington state line should also include *E. coli* counts for comparison to Idaho's TMDL targets.

Ecology's long term ambient stations (34B110, 34B080, 34C060, 34N070, and 34M070) should continue to be monitored so long-term trends can be analyzed.

# Summary of Public Involvement Methods

The South Fork Palouse River Water Quality Advisory Group and staff from the various entities discussed in this implementation plan reviewed and provided input to this document. A public comment period on this plan was held from October 19, 2011 to November 18, 2011. Letters announcing the comment period were sent to Ecology's Palouse Watershed mailing list. A press release was issued to local media outlets and display ads were placed in Whitman Gazette and Moscow – Pullman Daily News newspapers. The comments received are responded to in Appendix B.

*This page is intentionally left blank*

# References

Carroll, J. & Snouwaert, E., 2009. South Fork Palouse River Fecal Coliform Bacteria Total Maximum Daily Load: Water Quality Improvement Report. Washington State Department of Ecology, Olympia, WA. Publication No. 09-10-060. www.ecy.wa.gov/biblio/0910060.html

EPA, 2001. Overview of Current Total Maximum Daily Load - TMDL - Program and Regulations. U.S. Environmental Protection Agency. www.epa.gov/owow/tmdl/overviewfs.html

EPA, 2001. Impaired Waters and Total Maximum Daily Loads - Glossary. U.S. Environmental Protection Agency. www.epa.gov/owow/tmdl/glossary.html

Idaho Department of Environmental Quality (IDEQ), 2007. South Fork Palouse River Watershed Assessment and TMDLs. IDEQ, Lewiston, ID. www.deq.idaho.gov/water/data_reports/surface_water/tmdls/palouse_river_sf/palouse_river_sf_entire.pdf

RPU, Inc., 2002. South Fork Palouse River Watershed Characterization and Implementation Plan. Resource Planning Unlimited, Inc., Moscow, ID.

Snouwaert, E., 2006. North Fork Palouse River Fecal Coliform Total Maximum Daily Load – Water Quality Implementation Plan. Washington State Department of Ecology, Olympia, WA. Publication No. 06-10-028. www.ecy.wa.gov/biblio/0610028.html

Snouwaert, E. & Ahmed, A., 2005. North Fork Palouse River Fecal Coliform Total Maximum Daily Load – Submittal Report. Washington State Department of Ecology, Olympia, WA. Publication No. 04-10-067. www.ecy.wa.gov/biblio/0410067.html

Tarbutton, S., Carroll, J. & Snouwaert, E., 2010. Palouse River Fecal Coliform Bacteria Total Maximum Daily Load – Water Quality Improvement Report and Implementation Plan. Washington State Department of Ecology, Olympia,, WA. Publication No. 10-10-067. www.ecy.wa.gov/biblio/1010067.html

*This page is intentionally left blank*

# Appendices

*This page is purposely left blank*

# Appendix A. 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 designated uses of the water – such as for drinking, recreation, aquatic habitat, and industrial use – are impaired by pollutants. These are water quality limited estuaries, lakes, and streams that 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.

**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 24 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): (1) owned or operated by a state, city, town, borough, county, parish, district, association, or other public body having jurisdiction over disposal of wastes, storm water, or other wastes and (2) designed or used for collecting or conveying stormwater; (3) which is not a combined sewer; and (4) which is not part of a Publicly Owned Treatment Works (POTW) as defined in the Code of Federal Regulations at 40 CFR 122.2.

**National Pollutant Discharge Elimination System (NPDES):** 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 NPDES program. Generally, any unconfined and diffuse source of contamination. Legally, any source of water pollution that does not meet the legal definition of "point source" in section 502(14) of the Clean Water Act.

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

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

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

**Point source:** Sources of pollution that discharge at a specific location from pipes, outfalls, and conveyance channels to a surface water. Examples of point source discharges include municipal wastewater treatment plants, municipal stormwater systems, industrial waste treatment facilities, and construction sites that clear more than 5 acres of land.

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

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

**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, saltwater, wetlands and all other surface waters and water courses within the jurisdiction of the state of Washington.

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

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

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

*This page is purposely left blank*

# Appendix B. Response to comments

A public comment period on the South Fork Palouse River Fecal Coliform Bacteria Implementation Plan was held from October 19, 2011, to November 18, 2011. Comments were received from two individuals. The comment letters are copied in their entirety below with Ecology's response inserted into the text where appropriate. Ecology's response is in *italics* to distinguish it from the comments.

**Comments from Kenneth Stone, Resource Programs Branch Manager, Washington Department of Transportation.**

The Washington State Department of Transportation (WSDOT) Environmental Services Office has reviewed the South Fork Palouse River Fecal Coliform Bacteria TMDL Water Quality Implementation Plan Draft – September 2011 (Washington State Department of Ecology Publication No. 11-10-074). We appreciate the opportunity to provide comments on this TMDL document.

First and foremost, WSDOT is committed to working collaboratively with others to address the fecal coliform contributions of state highways to the South Fork Palouse River.

We would like to provide the following specific comments, which include the page number and wording in question/of concern:

1) Page viii, first sentence: "Ecology will ensure activities and bacteria discharge limits are included in permits for entities discharging water to streams."

   *Comment:* Suggest replacing this sentence with the text from page 19 for consistency, "Ecology will ensure requirements to implement the TMDL are incorporated into the respective NPDES permits." This revision is suggested because only applicable actions will be listed in the permits.

   *Ecology's Response: This sentence also refers to wastewater treatment plants. The NPDES permits for treatment plants receive numeric limits for the amount of bacteria they are allowed to discharge. However, since these numeric limits are also requirements to implement the TMDL this sentence was partially modified.*

2) Page 15 and 16, Prioritizing Implementation:

   *Comment:* Suggest adding a map that shows the locations identified as priorities for the dry season, wet season, and storm events so permittees can prioritize implementation.

   *Ecology's Response: It's important to note much of the implementation needed will address nonpoint source pollution; therefore, organizations and individuals other than permittees will also need to prioritize implementation efforts. Ecology agrees it may be helpful for all implementing entities to have the prioritization represented graphically. Ecology has developed and inserted two maps for this purpose. An additional paragraph was inserted to explain the maps and their limitations.*

3) Page 17, second paragraph, last sentence: "Because the TMDL study showed bacteria loading was correlated with total suspended solids (mainly sediment) in some areas, efforts to control sediment runoff and delivery should also be implemented."

*Comment:* Suggest the following revision: "Because the TMDL study showed bacteria loading was correlated with total suspended solids (mainly sediment) in some areas, efforts to control sediment runoff and delivery are encouraged ~~should also be implemented~~." This TMDL addresses a fecal coliform impairment; therefore, only actions pertaining directly to fecal coliform reduction should be required.

*Ecology's Response: Since there were areas that show a correlation between sediment and fecal coliform, Ecology feels this language is appropriate. This language does not specifically assign an action to any entity but may need to be considered as part of future adaptive management if actions to reduce bacteria are not effective.*

4) Page 25, last sentence and page 26: "Along the highways in the rural portions of the watershed, it is reasonable to assume WSDOT stormwater is a source or conveyance of fecal coliform in areas where adjacent land uses are recognized sources."

*Comment*: Suggest the following revision: "Along ~~the~~ highways in ~~the~~ rural portions of the watershed, it is reasonable to assume WSDOT stormwater may be ~~is~~ a ~~source or~~ conveyance of fecal coliform in areas where adjacent land uses are recognized sources."

*Ecology's Response: Suggestion accepted.*

5) Page 26, second, third and fourth paragraphs describing WSDOT's assigned actions and Table 14 on page 27:

*Comment*: Suggest modifying the text in the Implementation Plan to reflect the specific TMDL actions, which are above and beyond the obligations specified in WSDOT's Permit and which will appear in the November 2011 draft permit language.

- WSDOT will implement its fecal coliform programmatic approach within the South Fork Palouse River fecal coliform bacteria TMDL boundary. These efforts will focus on identification of illicit sources of bacteria and sediment discharges to WSDOT's stormwater conveyance system. Prioritization of inventory, illicit discharge detection, and source identification efforts will occur in the following order:
  - Highway 195 stream crossings, stormwater discharge locations, and the stormwater conveyance ditches discharging to the South Fork Palouse River and Spring Flat Creek.
  - Highway 270 stormwater discharge locations and stormwater conveyance ditches discharging into Paradise Creek.
  - Highway 27 stormwater discharge locations and stormwater conveyance ditches discharging into Missouri Flat, Dry Fork, and Four Mile Creeks.

  (Complete by March 2014)

- If stormwater discharges that transport bacteria over natural background levels to the listed receiving waters are found, WSDOT will apply BMPs from its SWMPP or perform remediation to correct the situation.
  (Initiate remediation within 60 days of completion of discharge inventory)

- WSDOT will inspect under the Highway 195 bridge in Colfax and take any necessary action to prevent pigeons from roosting there.
  (Inspection to occur annually; Initiate action to prevent pigeon roosting within 90 days of annual inspection)

  *Ecology's Response: It is not imperative to have the language in the TMDL Implementation Plan and the stormwater NPDES permit match exactly. Typically, TMDLs and the Implementation Plans are written prior to language being included in the permit; it is only coincidental that in this case both items were out for public review at approximately the same time. Ecology's permit writer for the WSDOT stormwater permit has the discretion to translate TMDL requirements into permit requirements appropriate for the discharger. Therefore, we do not see added value to changing this language to match the language in the permit.*

Thank you for considering our comments. If you have questions or wish to discuss, please contact WSDOT's TMDL Lead, Jana Ratcliff, at 360-570-6649 (office), 360-701-6353 (cell), or ratclij@wsdot.wa.gov.

**Comments from Cheryl Morgan, Property Owner along South Fork Palouse River and Member of South Fork Palouse River TMDL Advisory Group.**

*Comment 1*:
Page 15 **Prioritizing implementation**
" Since [children] have been observed playing in sections of the SFPR Watershed, the [first priority] should be to address any areas used for recreational purposes or that have public access."
As stated on page 3, the SFPR and Paradise Creek have been listed on Washington's first comprehensive CWA 303(d) list published in [1996] for streams impaired with elevated bacteria levels. This 1996 303(d) listing was of great concern to me, thus I became an active participant in watershed planning of the SFPR Watershed in 1998.

Based on the plan outlined, it is expected that the SFPR and its tributaries will meet fecal coliform bacteria water quality standards by [2020]. Years of ignoring mandated enforcement of the CWA to protect people from waterborne illnesses within the SFPR Watershed by the City of Pullman, WSU, DOE, EPA and Professional Engineers **have placed the public at a high risk of infectious diseases. The highest at risk are children, causing them to suffer neurological and intestinal symptoms that could be life threatening if not treated in a timely manner.** A 24year time line is unacceptable.

*Ecology's Response 1: Twenty-four years is too long for a stream to be impaired by fecal coliform bacteria. Many efforts have been made to find the sources of bacteria and correct them over the years. However, Ecology's process of developing a total maximum daily load (TMDL) plan under the requirements of the Clean Water Act did not begin until 2006. The TMDL development process, from initiating the study to beginning implementation, is typically a 5-year process. Given those expectations, we are on schedule since many of the actions outlined in the plan are being implemented this year. We expect to see significant reductions in bacteria levels prior to 2020.*

*While other Watershed Planning efforts led by other entities have certainly helped us gather momentum and understanding with regard to water quality and water quantity in this watershed, it was not until our TMDL study that we were able to characterize where fecal coliform bacteria was coming from and develop a comprehensive plan to address this pollution.*

*Comment 2*:
Through-out my numerous years of watershed planning for the SFPR watershed, my main concerns have been focused on the protection of the public safety and welfare from waterborne illnesses, thus I have been a strong advocate for the posting of signage along the SFPR and its tributaries warning the public against coming into contact with these impaired waterways. To date the City of Pullman, WSU, DOE and the Local Health Department have not been receptive towards my continued valid requests for the posting of signage along the impaired waterways.
The above mentioned entities use the excuse for not posting signage is because "most of the river access occurs from private property and they have no jurisdiction to post signs on private property". It is true that most of the river does run through private property, however, private property owners [do not provide a **public corridor** (bicycle, walking paths and sidewalks)] offering public access to the impaired waterways. Also, the public does not have the right to enter private property without permission. If they do, they would be in violation of trespassing laws which carries a fine.
On the other hand, the City of Pullman [does provide public corridors for walking and bicycle paths through-out the City.] These public paths are located adjacent to the SFPR and its tributaries offering easy access to these impaired waterways, **thus the highest exposure areas for waterborne illnesses to our children are located within the City of Pullman**.

**To protect the public safety and welfare (especially for our children) it must be mandated within this Water Quality Implementation Plan to post signage where the highest exposure areas are located.** News paper articles and outreach programs have not been effective in the Pullman area. Children are still being observed playing in the waterways located within the City of Pullman.

*Ecology's Response 2: As a result of the advisory group discussions regarding posting signs warning about the risks of bacteria in the river, the city of Pullman is investigating options for installing signs along the public path within the city. The current goal is to have 4 to 5 signs posted by June 30, 2012 (personal communication with Rob Buchert,*

*Pullman Stormwater Manager). Further questions regarding this effort should be directed to the city of Pullman.*

*Comment 3*:
Page 17&18 **Fecal coliform from stormwater (including pet waste)**
"All stormwater conveyance systems in the watershed should be assessed to determine where stormwater may be delivering pollutants……all entities must ensure their stormwater is not a source of pollution to waters of the state……"

Pullman and WSU stormwater conveyance systems consist of on-site detention ponds and street storm drains. **These systems [are not stormwater treatment systems].**

The relative impermeability of the soils located within the SFPR Watershed virtually [eliminates the use of infiltration for stormwater treatment], which results in close to 100% runoff, thus the polluted stormwater from on-site detention ponds is conveyed through piping systems which out-fall into the SFPR and/or tributaries of the SFPR.

The cumulative effects of conveyance of urban stormwater to off-site riparian areas has transformed the [once] healthy riparian areas into channelized urban stormwater sewer systems, thus the once healthy riparian areas which were once supported by natural springs and/or streams and grassy swales [can no longer] be recognized as key components ensuring infiltration of stormwater flows prior to reaching the streams.

Urban on-site stormwater detention ponds and street conveyance systems cannot continue to be approved as source stormwater treatment systems. They are simply collectors of on-site pollutants (containing high levels of bacteria as well as numerous other toxic pollutants) which are conveyed off-site to the nearest natural stream/s and riparian areas, thus these urban stormwater systems have been and will continue to be non-compliant of the CWA and to RCW 90.48 for many years to come, offering zero water quality sustainability to waters of the state.

**In order for the SFPR and its tributaries to meet fecal coliform bacteria water quality standards by 2020,** [**on-site retention ponds and/or stormwater treatment plants]** **must be mandated within this Water Quality Implementation Plan for compliance of age old water quality laws as mandated by the CWA and RCW 90.48.**
**Continuing to do business as usual simply will not allow water quality sustainability to the waters of the state of Washington for present and future generations.**

*Ecology's Response 3: Ecology has increased the level of water quality protection in the Pullman area in recent years. This should result in substantial improvements in water quality and continued long term improvements to the streams. Two major additions to Ecology's efforts include the development and implementation of the South Fork Palouse River fecal coliform TMDL (Publication No. 09-10-060) and the issuance of the Eastern Washington Stormwater Permit to include coverage for the City of Pullman and Washington State University (WSU). The TMDL specifies how much bacteria levels in stormwater must be reduced to help the South Fork Palouse River come into compliance with bacteria water quality standards. The TMDL and this Implementation Plan include*

*activities that should help the stormwater discharges achieve those reductions. In addition, the municipal stormwater permit requires the permittees to "effectively prohibit non-stormwater discharges into storm sewers that discharge to surface waters and must apply controls to reduce the discharge of pollutants to the maximum extent practicable" (Phase II Permit for Eastern Washington Fact Sheet, March 22, 2006, www.ecy.wa.gov/programs/wq/stormwater/municipal/phaseiiEwa/ewph2permit.html, p. 1).*

*Each permittee is responsible for determining the best methods to achieve the TMDL requirements and the permit requirements for controlling stormwater pollution under the permittee's jurisdiction. The staff, engineers, and consultants have the expertise to assess the hydrologic setting, existing stormwater system and management program, and funding abilities to determine the best management practices appropriate for their stormwater system. Ecology will hold the permittees accountable for meeting the TMDL and permit requirements but how to maintain compliance with those requirements is the permittee's responsibility.*

*In addition, Ecology is aware of the need for improved research in stormwater science and engineering in the Pullman area and throughout Eastern Washington. To address this need Ecology is pursuing an update to the Eastern Washington Stormwater Manual and the development of a Low Impact Development Manual for Eastern Washington. We hope WSU-Pullman will be involved in this effort. These efforts to increase the understanding for how to best approach stormwater in this region will continue to help the permittees meet the TMDL and stormwater permit requirements.*

*Comment 4:*
Page 19 **City of Albion**
"……Currently, Albion only discharges during high flow months from January to May. However, if the WWTP needs to discharge from June to December, the effluent must meet a fecal coliform concentration of 100cfu/100mL as monthly and weekly averages."
I cannot recall if there was much discussion during the TMDL Advisory Group meetings concerning the effluent discharges of Albion. June to December seems to be a long period of time to store effluent. How often does the plant release effluent during June to December? What kind of delusion (because the flows of the SFPR are normally very low during those months) process does the plant use before releasing to the SFPR during low flows?
I am in question, because I know landowners living along the river have witnessed dark flows in the SFPR coming from the treatment plant during the low flow months.

*Ecology's Response 4: According to Albion's discharge monitoring reports going back to 2007, Albion has discharged in June several times. They have not discharged in July, August, September, October, November, or December between 2007 and November 2011. Flows are still typically high in June so the discharge limit of 100 cfu/100mL will be adequate to not cause a violation of bacteria water quality standards as a result of its discharge.*

*While we have not received reports of "dark flows" from the treatment plant, discoloration of the river water could be a result of sediment transported from upstream or algal growth*

*due to elevated nutrient concentrations in the stream. Without being able to investigate "dark flows" when they occur we cannot be sure of their cause. Unusual water quality observations can be reported to Ecology for investigation.*

*Comment 5*:
Page 20&21 **City of Colfax**
"During the summer of 2009, Colfax collaborated with Ecology to investigate the source of the excessively high bacteria loading……Several city stormwater outfalls were also found to have elevated bacterial concentrations. Colfax will investigate three stormwater outfalls that were found to have high bacteria concentrations during the 2009 study……..This investigation will be completed by October 29, 2011."

The pigeon problems were mentioned during the SFPR TMDL Advisory Group meeting of July 11, 2011. (The Advisory Group has not met again since July 11th)
I am in request of an update of the locations and the results of the investigation that was to be completed by October 29, 2011 for the other three stormwater outfalls.

*Ecology's Response 5: The City of Colfax completed its initial investigation of its stormwater outfalls. There are many outfalls within the concrete channel but the three Ecology requested additional investigation of include one that enters the channel near the Wawawai street bridge, one that enters near the Codger Pole, and one that enters from under the Rosauer's parking lot. A copy of its investigation memo follows this response.*

RECEIVED
OCT 28 2011
DEPARTMENT OF ECOLOGY
EASTERN REGIONAL OFFICE

City of Colfax

10-27-2011

Fecal Contamination Investigation Report

Recently the City performed an investigation to attempt to determine where the fecal coli form contamination is entering the South fork of the Palouse River. Our main tool for the investigation was a sewer line video camera. There are two outfalls along the bottom of the river channel that are allowing fecal to enter the river, both are approximately 12" corrugated pipe. The camera was inserted into both pipes, but because of large debris, i.e. bricks and large rocks, we were only able to get between 30' and 50' of video. There was not sufficient time before the deadline of our report to get in and clear out the debris. During the next dry season the City will attempt to cleanout and video the lines.

Spring Flat Creek in a know source of fecal contamination to the SFPR. We are currently installing pigeon deterrents to eliminate the fecal contamination caused by the pigeons.

Because of the lack of room in the creek channel, we are unable to camera any of the outfalls coming into the creek. Dye was put in several of the upstream sewer manholes to see if there was any cross connection with the storm drains. No dye was visible in the creek channel.

Once the pigeons are eliminated from Spring Flat Creek, the City will test all the outfalls within the creek channel and determine if anymore action is required.

Matt Hammer

WWTP Manager

*Comment 6:*
Page 22 **City of Moscow**
"The City of Moscow will be covered under EPA's Municipal Stormwater NPDES permit, which is expected to be issued in 2011."
Has EPA issued this permit yet?

*Ecology's Response 6: The draft stormwater permit for the City of Moscow was released for review and comment in 2011 and according to EPA is expected to be issued in early 2012.*

*Comment 7*:
Pages 22, 23 &24 **City of Pullman**
"Pullman's stormwater is regulated under the Eastern Washington Phase II Municipal Stormwater NPDES and State Waste Discharge General Permit."

The permit requires implementation of numerous management elements, thus Pullman will conduct activities to locate and reduce potential sources of bacteria to its municipal separate storm sewer systems (MS4).

Page 24 Summary and schedule of actions for Pullman
Action: **Clean public catch basins** Timeline: **Annually**

The stormwater conveyance systems of Pullman consist of on-site detention ponds (also known as sedimentation ponds) and street drainage piping systems.

**Street Stormwater Drainage Systems:**

Catch basins are located within the underground street stormwater piping systems to hopefully allow sediments to settle out of the stormwater runoff before conveyance to the nearest stream/s. [Street stormwater systems are not water quality treatment systems.] The street catch basins are cleaned out by the use of a vactor truck. The systems must be cleaned out for removal of the collected sediments on a regular documented maintenance schedule. The disposal of the polluted sediment that is removed from the system is then disposed of in accordance to the Eastern Washington Phase II Municipal Stormwater Permit.

**Structural Stormwater Control Systems (Above ground on-site Detention Ponds)**

The dual purpose of stormwater detention ponds is to slow the runoff rate that may cause [flooding to downstream properties] and [allow suspended solids to settle in the ponds] prior to discharging to off-site natural waterways.

The construction of Stormwater Detention Ponds are scientifically engineered to control discharge rates of stormwater runoff not to exceed predeveloped flows, thus various staged outlet controls are included within the engineered design of these systems. Detention systems are scientifically designed to reduce the peak runoff rates, thereby reducing erosion potential and conveyance capacity to off-site downstream properties and natural waterways. They are also engineered to permit suspended solids to settle in the pond before stormwater is released to the staged outlet controls for conveyance to off-site properties and to the SFPR and its tributaries.

One major problem with detention ponds located within SFPR watershed is the high clay content of the soils. Because of the nature of the clay, it can take days for clay to settle out. Another storm event will cause turbulence in the settling basins and will re-suspend the clay particles, allowing pollutants such as fecal coliform and other toxic pollutants to attach to the suspended clay soils, thus conveying the turbid stormwater runoff to off-site properties and to the SFPR and its tributaries.

The vast majority of all stormwater systems are dedicated to the city as properties are developed within the City, thus the City is responsible for the maintenance of these stormwater detention systems as well as the street stormwater systems.

**I can attest to the fact, that Pullman has not implemented the cleaning out of sediments from stormwater dentention pond catch basins located within the City, thus these stormwater detention and control systems are not providing the engineered design level of performance needed to protect the water quality of the SFPR and its tributaries from conveyance of polluted turbid stormwater. Currently Pullman is non-compliant with the provisions of The Eastern Washington Phase II Municipal Stormwater Permit, RCW 90.48 and the Clean Water.**

**As stated on page 19: "If necessary, Ecology will use its authority under RCW 90.48 to enforce water quality regulations". <u>When will enforcement commence?</u>**

*Ecology's Response 7: The City of Pullman is in compliance with the operation and maintenance requirements of the current Eastern Washington Phase II Municipal Stormwater Permit. The permit, which was issued in January 2007 and modified in June 2009, requires the city to develop and implement a schedule of municipal Operation and Maintenance activities (an O&M Plan). The City of Pullman has met this requirement. Therefore, Ecology does not have reason for enforcement action regarding this permit requirement.*

*The language on page 24 of the draft TMDL Implementation Plan regarding annual cleanout of catch basins is specified in this O&M Plan but it is not a requirement of the current stormwater permit. However, because this action is included in this Implementation Plan, it has also been included in the draft stormwater permit out for review until February 2012. This new stormwater permit will be effective in 2013.*

*The TMDL associated with this Implementation Plan only addresses fecal coliform bacteria; therefore there are not requirements to reduce turbidity. There is language encouraging the reduction of sediment where it may in turn reduce bacteria but there are not specific actions regarding activities to reduce sediment.*

*Comment 8*:
I am in request that this comment letter and responses by DOE be entered within the Final Document of the SFPR Watershed Fecal Coliform Bacteria TMDL Water Quality Implementation Plan.

*Ecology's Response 8: This comment letter and Ecology's responses are included in the final implementation plan.*