North Fork Palouse River Fecal Coliform Total Maximum Daily Load

Submittal Report

February 2005
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A Partnership between:
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&
The Washington State Department of Ecology

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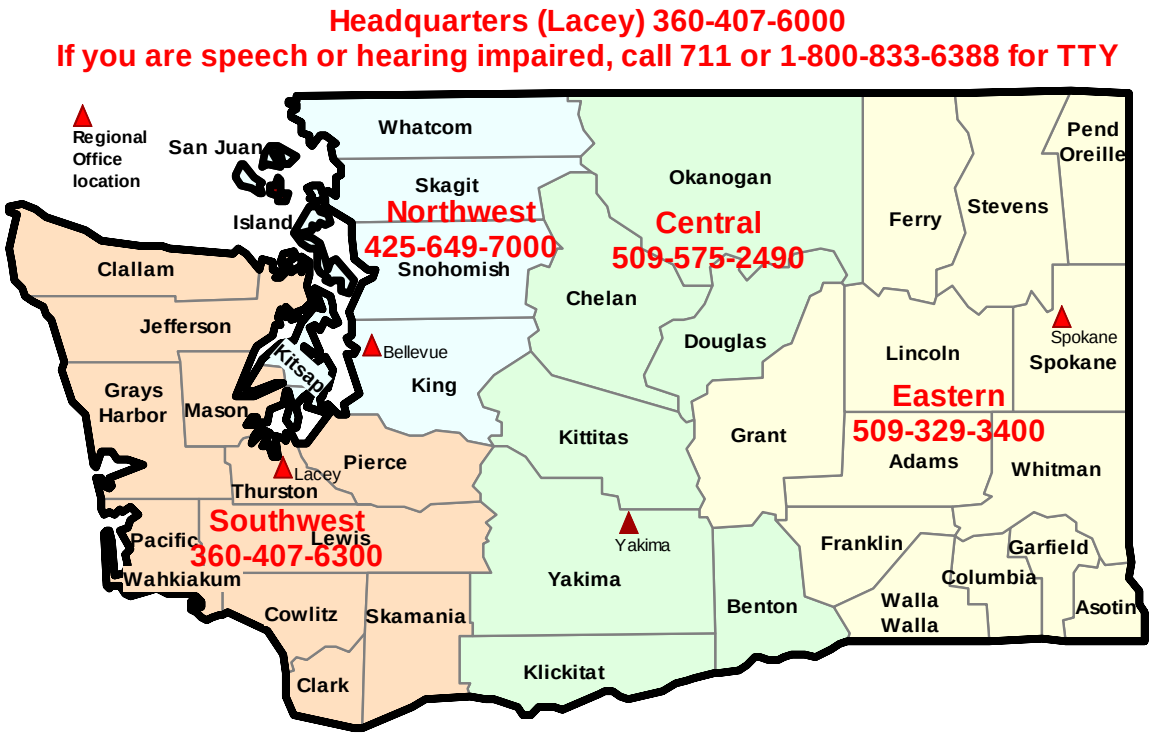

Map of Regions

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Acknowledgements

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- The North Fork Palouse River Watershed Committee
- The North Fork Palouse River Technical Advisory Group
- Shelly Gilmore, Resource Planning Unlimited, Inc.
- Rob Buchert and Nancy Hoobler, Palouse Conservation District

Introduction

The Washington State Department of Ecology (Ecology), with assistance from the North Fork Palouse River Watershed Committee, is establishing a total maximum daily load (TMDL) for fecal coliform bacteria in the north fork of the Palouse River. This TMDL (or Water Cleanup Plan) will address impairments of the beneficial uses of the north fork of the Palouse River and its tributaries.

Under the Clean Water Act, every state has its own water quality standards designed to protect, restore, and preserve water quality. Water quality standards consist of designated uses, such as cold-water biota, drinking water supply and numeric standards to achieve those uses. When a water body fails to meet water quality standards after application of required technology-based controls, the Clean Water Act requires that the state place the water body on a list of impaired water bodies and to prepare an analysis called a TMDL. The U.S. Environmental Protection Agency (EPA) has established regulations (40 Code of Federal Regulations (CFR) Part 130) and developed guidance for setting TMDLs (EPA, 1991).

The goal of a TMDL is to ensure that the impaired water body will attain water quality standards within a reasonable time period. A TMDL includes a written, quantitative assessment of the water quality problem and of the pollutant sources that cause the problem. The TMDL determines the amount of a given pollutant, called the **loading capacity**, which can be discharged to the water body and still meet water quality standards and, subsequently, allocates that load among the various sources. If the pollutant comes from a discrete source (referred to as a **point source**) such as an industrial facility's discharge pipe, that facility's share of the loading capacity is a **wasteload allocation**. If the pollution comes from a diffuse source (referred to as a **non-point source**) such as runoff from roads, parking lots, and fields, that share is a **load allocation**. However, each location that makes up the diffuse source does not receive an individual allocation. Load allocations are assigned to the broad non-point source.

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. The sum of the individual allocations and the margin of safety must be equal to or less than the loading capacity.

The general purposes of this submittal document are to:

- Provide an analysis of fecal coliform data from the north fork of the Palouse River from sampling performed by the Palouse Conservation District between June 2001 and September 2003 and the ongoing long term monitoring by Ecology;
- Identify potential non-point sources of fecal coliform;
- Summarize ongoing and planned actions that will allow the north fork of the Palouse River to meet fecal coliform water quality standards; and
- Fulfill requirements of the federal Clean Water Act.

A detailed implementation plan will be developed within one year after TMDL approval by EPA, and will be based on the information presented in this document.

Background

The Palouse Conservation District initiated this watershed planning effort with funding obtained from the Washington State Legislature, the Washington State Conservation Commission, and the Washington State Department of Ecology. The *North Fork Palouse River Water Quality Improvement Plan* (RPU 2002b) (Appendix A) was developed and completed with input from the North Fork Palouse River Watershed Committee and the Technical Advisory Group. The North Fork Palouse River Watershed Committee is made up of local stakeholders who live, work, or otherwise have an interest in the watershed. The committee members expressed their desire to see improvements realized in the watershed through voluntary efforts, not mandated changes. Consistent and productive participation by the committee members and technical advisors resulted in a locally acceptable and technically sound plan (RPU, 2000b).

A great deal of time and energy was put into creating this report. Enough thanks cannot be expressed to the people on the watershed and technical advisory committees who contributed their valuable time and input to develop the final plan. For that reason, large portions of this submittal report come directly from the *North Fork Palouse River Water Quality Improvement Plan* (RPU 2002b) prepared by Shelly Gilmore of Resource Planning Unlimited, Inc. in Moscow Idaho. The report, in its entirety, is included in this document as Appendix A.

WATERSHED DESCRIPTION

The North Fork of the Palouse River is a sub-watershed (Figure 1) within the larger Palouse River Basin. The North Fork of the Palouse River sub-watershed begins at its headwaters in Latah County, Idaho. From the Hoodoo Mountains of Idaho, the watershed continues west through timbered uplands towards the Idaho/Washington state line. Bordered on the north by the North South Ski Bowl and Mary Minerva McCroskey State Park in Benewah and Latah counties, and the Palouse Range (Moscow Mountain) to the south, the watershed extends westward toward lower elevations. As the drainage crosses into Washington, the river flows through pasture and farmland towards Colfax where the North and South Forks of the Palouse River merge. This segment from the Idaho state line to Colfax is locally referred to as the "North Fork Palouse River" and will be referred to as such throughout the remainder of this document.

The entire North Fork Palouse River watershed encompasses 316,910 acres (including acres in Idaho and Washington). The North Fork Palouse River watershed comprises 15 percent of the Palouse River Basin that totals over 2.1 million acres. The Palouse River Basin is a sub-watershed of the Snake River, joining the river downstream of Hooper, Washington. The Snake River enters the Columbia River as it travels to the Pacific Ocean.

The North Fork Palouse River encompasses 81,405 acres within its Washington State boundaries (Figure 1). Nearly 96 percent of the watershed in Washington is agricultural land; approximately 2 percent is in forestland, cliff areas and rock outcrops; less than 2 percent is occupied by urban uses such as towns, railway lines and roadways; riparian/wetland areas occupy less than 1 percent; and perennial and intermittent streams occupy less than 1 percent (RPU, 2000b).

The North Fork Palouse River contributes about 83 percent of the mean annual flow of the Palouse River at Colfax, below the confluence with the south fork. Major tributaries of the North Fork Palouse River are Duffield, Cedar, Silver and Clear creeks. All creeks except Clear Creek originate in Idaho.

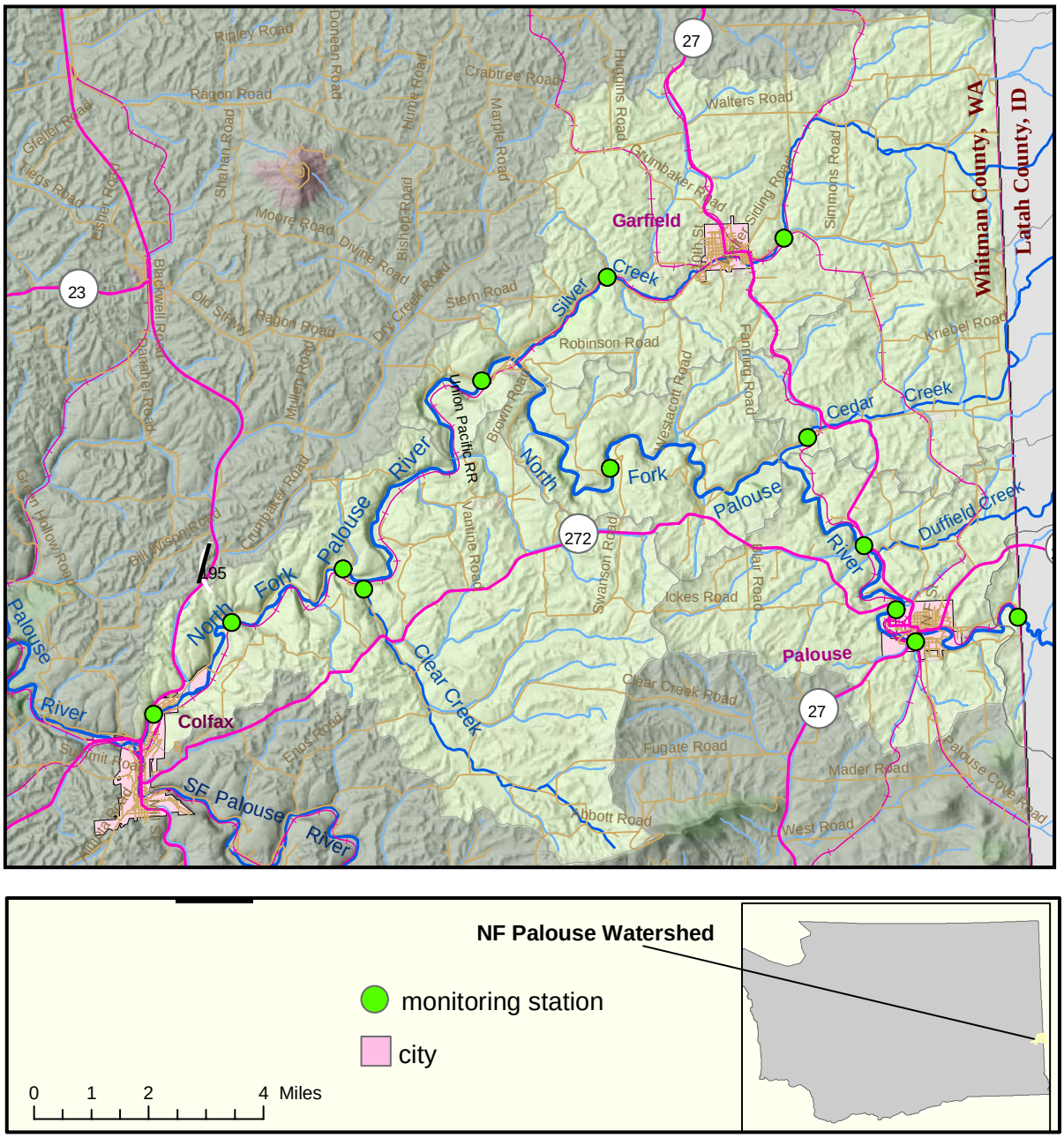

Figure 1. The North Fork Palouse Watershed in Washington State

Applicable Criteria

The Washington State Water Quality Standards are published pursuant to Chapter 90.48 of the Revised Code of Washington (RCW). The authority to adopt rules, regulations, and standards as necessary to protect the environment is vested with the state Department of Ecology. Under Section 303(c)(3) of the federal Clean Water Act, the EPA Regional Administrator approves the water quality standards adopted by the state. Through adoption of these standards, Washington has designated certain characteristic uses to be protected and the criteria necessary to protect these uses (WAC 173-201A).

Although the Washington State Water Quality Standards were revised and adopted by the state on July 1, 2003, the standards from November 1997 will be used for this TMDL. The new water quality standards will not take effect for projects that require federal action until EPA, U.S. Fish and Wildlife Service, and the National Marine Fisheries Service (NOAA Fisheries) approve the new standards. Per Ecology document *Concise Explanatory Statement and Responsiveness Summary for the Adoption of Water Quality Standards, Chapter 173-201A WAC* published July 1, 2003, TMDLs under development with field work completed will continue to use the 1997 version of the water quality standards; however, the summary implementation strategy (SIS) and monitoring plan should address the new criteria. It should be noted that the adoption of the revised state water quality standards would not change the fecal coliform bacteria standard in the North Fork Palouse River.

Under WAC 173-201A (1997) the North Fork Palouse River is classified as a Class A water body. The characteristic beneficial uses of a Class A water body are described in WAC 173-201A (1997):

> *Characteristic uses shall include, but not be limited to, the following:*
> *(i) Water supply (domestic, industrial, agricultural).*
> *(ii) Stock watering.*
> *(iii) Fish and shellfish:*
> *Salmonid migration, rearing, spawning, and harvesting.*
> *Other fish migration, rearing, spawning, and harvesting.*
> *Clam, oyster, and mussel rearing, spawning, and harvesting.*
> *Crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing, spawning, and harvesting.*
> *(iv) Wildlife habitat.*
> *(v) Recreation (primary contact recreation, sport fishing, boating, and aesthetic enjoyment).*
> *(vi) Commerce and navigation.*
>
> [WAC 173-201A-030(2)(b)]

The water quality standards for fecal coliform bacteria levels in a Class A water body as outlined in WAC 173-201A (1997) are:

(i) Fecal coliform organisms:

(A) Freshwater - fecal coliform organism levels shall both not exceed a geometric mean value of 100 colonies/100 mL, and not have more than 10 percent of all samples obtained for calculating the geometric mean value exceeding 200 colonies/100 mL.

[WAC 173-201A-030(2)(c)(i)(A)]

The state water quality standards describe the averaging periods in the calculation of the geometric mean fecal coliform criterion:

In determining compliance with the fecal coliform criteria in WAC 173-201A-030, averaging of data collected beyond a thirty-day period,…shall not be permitted when such averaging would skew the data set so as to mask noncompliance periods.

[WAC 173-201A-060(3)]

The state of Idaho uses *Escherichia coli (E. coli)* as the bacterial indicator to protect surface waters for recreation. The Palouse River in Idaho is protected for secondary contract recreation, which is defined as:

Secondary contact recreation (SCR): water quality appropriate for recreational uses on or about the water and which are not included in the primary contact category. These activities may include fishing, boating, wading, infrequent swimming, and other activities where ingestion of raw water is not likely to occur.

[Idaho State Administrative Rule 58.01.02]

The following Idaho State water quality standard is designed to protect waters for secondary contract recreation:

Waters designated for secondary contact recreation are not to contain E.coli bacteria significant to the public health in concentrations exceeding:

a. A single sample of five hundred seventy-six (576) E.coli organisms per one hundred (100) ml; or

b. A geometric mean of one hundred twenty-six (126) E.coli organisms per one hundred (100) ml based on a minimum of five (5) samples taken every three (3) to five (5) days over a thirty (30) day period.

[Idaho State Administrative Rule 58.01.02]

Due to the trans-boundary jurisdiction of the Palouse River, it is recommended that any future monitoring by Idaho DEQ on the North Fork Palouse River include both fecal coliform and *E. coli* bacteria to better facilitate joint efforts to improve water quality.

Water Quality and Resource Impairments

The North Fork Palouse River was listed on the 1998 303(d) list of impaired water bodies for fecal coliform bacteria, pH, dissolved oxygen, and temperature violations. The segment of the river (NX00WQ189.622) where these listings occurred is near the town of Palouse in Township 16N, Range 46E, Section 6 (Figure 2).

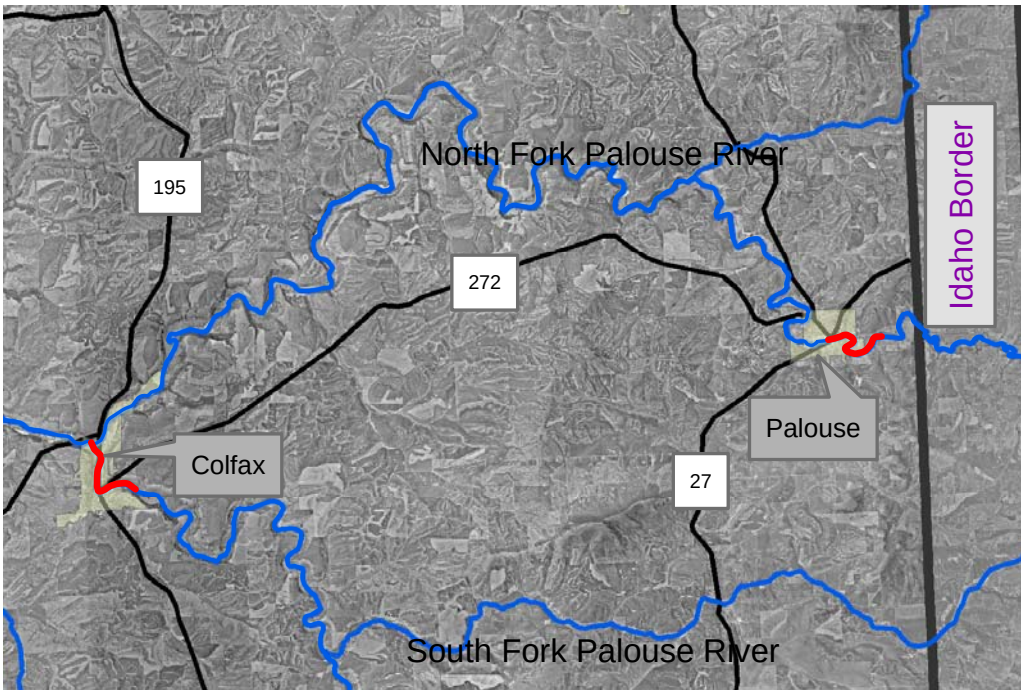

Figure 2. Map showing the 1998 303(d) listed segment of the North Fork Palouse River.

The proposed 2002/2004 303(d) list includes listing this same segment of the North Fork Palouse River for fecal coliform bacteria, dissolved oxygen, and temperature (pH has not been proposed for inclusion on this update).

This report addresses only fecal coliform bacteria. The other impairments will be addressed at a later date.

Although several tributaries of the Palouse River are on the Idaho impaired waterbodies list, the mainstem of the North Fork Palouse River is not currently listed in Idaho under the 1998 303(d) list within the Clean Water Act. Each state sets its own water quality standards as a requirement of the Clean Water Act, and Idaho is required to meet Washington State water quality standards at the state line (RPU, 2000b).

This TMDL addresses the 1998 303(d) listing near the town of Palouse and several other segments where data collection during this study revealed a water quality impairment for fecal coliform bacteria. The segments addressed are summarized in Table 1.

Table 1. *Bacteria impaired waterbody segments in the North Fork Palouse River Watershed addressed by this TMDL.*

Stream	Waterbody ID (old)	Waterbody ID (new)	Township, Range, Section	Description	Proposed 2002	1998	1996	Unlisted but impaired
North Fork Palouse River	WA-34-1030	NXOOWG	16N, 46E, 06	Segment near the town of Palouse Ecology Station A (RM 121.2)	Yes	Yes	Yes	
North Fork Palouse River	WA-34-1030	NXOOWG	17N, 45E, 35	Segment above mouth of Duffield Creek Station 1 (RM 118.5)	No	No	No	X
North Fork Palouse River	WA-34-1030	NXOOWG	17N, 45E, 35	Segment below mouth of Duffield Creek Station 2 (RM116.3)	No	No	No	X
Cedar Creek	N/A	VB90TS	17N, 45E, 22	Mouth of Cedar Creek Station 3 (NFPR RM 113.1)	No	No	No	X
Silver Creek	WA-34-1032	VW12BW	18N, 45E, 34	Upstream of town of Garfield Station 5 (RM 6)	No	No	No	X
Silver Creek	WA-34-1032	VW12BW	17N, 45E 06	Downstream of town of Garfield Station 6 (RM 2.3)	No	No	No	X
Clear Creek	N/A	RZ29MS	17N, 44E, 32	Mouth of Clear Creek Station 9 (NFPR RM 96.2)	No	No	No	X
North Fork Palouse River	WA-34-1030	NXOOWG	17N, 44E, 32	Downstream of mouth of Clear Creek Station 8 (RM 96)	No	No	No	X
North Fork Palouse River	WA-34-1030	NXOOWG	17N, 43E, 36	Station 10 (RM 92.7)	No	No	No	X
North Fork Palouse River	WA-34-1030	NXOOWG	17N, 43E, 11	Upstream of confluence with South Fork Palouse River and town of Colfax Ecology Station B (RM 90.2)	No	No	No	X

RM – River mile
NFPR – North Fork Palouse River
N/A – Not assigned an "old" number

Point Sources

Two point source pollution contributors exist within the watershed, including the cities of Garfield and Palouse wastewater treatment plants that discharge into the North Fork Palouse River and Silver Creek respectively (Silver Creek is a main tributary to the North Fork Palouse River). Both systems underwent process upgrades that were completed in 1995 and 1996 respectively. Both facilities perform required water quality monitoring and report results to adhere to their National Pollution Discharge Elimination System permits (NPDES). Each of the facility's permits will be up for renewal in 2005. NPDES permits for these facilities allow for discharge of water quality constituents at or near the state water quality standards (RPU, 2000b).

Non-Point Sources

Several water-quality-related issues were identified in the North Fork Palouse River Watershed Characterization (RPU, 2002a) and are summarized in the *North Fork Palouse River Water Quality Improvement Plan* (RPU, 2002b) as:

- *Cropland erosion was identified as a source of non-point pollution in the North Fork Palouse River Watershed Characterization. The Characterization estimated erosion and subsequent sediment delivery to receiving streams from highly erodible cropland to be approximately 49,973 tons per year (including sheet, rill, and ephemeral gully erosion); and erosion and subsequent sediment delivery from non-highly erodible cropland to be 9,583 tons per year.*

- *The Characterization also estimated erosion and sediment delivery to receiving streams from pasturelands at approximately 716 tons per year; from stream channels at approximately 7,715 tons per year; and from roadways (unsurfaced and/or unmaintained) to be approximately 3,492 tons per year.*

- *Winter-feeding operations for livestock located in close proximity to surface water areas were also identified as a source of non-point pollution including bacteria and nutrient contributions. A typical farm in the watershed runs an average herd size between 20 and 40 in their cow-calf operation. There are an estimated 20 to 30 cow-calf operations within the watershed and currently only 2 sizable hog operations. Many smaller operations and hobby farms exist; including minor animal production of llamas, horses, chickens, etc. Bacteria and nutrient contributions from animal feeding operations have not been quantified.*

- *All rural residents (living outside the boundaries of the cities of Palouse and Garfield) are on individual septic systems for domestic waste treatment. Most of the existing homes and their associated septic systems within the watershed have been in place before mandatory permits ensuring proper installation or replacement of systems within Whitman County have been enforced. Potential contributions of bacteria and nutrients from substandard septic systems are suspected, although the extent of improperly operating septic systems within the watershed, as well as the concentrations of bacteria and nutrient contributions, has not been quantified.*

- *According to the Characterization, an estimated 98 percent of the wetlands within the Palouse region (including the North Fork Palouse River watershed) have been drained or altered by drainage ditches, subsurface drainage, tree and shrub removal, and straightening of natural watercourses. Most existing wetlands are ephemeral and are filled by flooding along streams, being recharged by surface flood events instead of ground water recharge. The Characterization also reviewed existing riparian status and identified that approximately 71 percent of the areas adjacent to streams and tributaries within the watershed are bordered by farming activities (cultivation and hayland), followed by 14 percent bordered by grazing, nearly 12 percent bordered by non-intensive uses (steeper valleys, brush/shrub riparian vegetative cover, brushy draws, etc.), and 3 percent of the streams and tributaries bordered by urban use. The impacted present state of wetlands, springs and seeps; annually cropped uplands; loss of functioning floodplains; and loss of permanently vegetated riparian areas within the watershed are the result of cumulative impacts from land use activities such as agriculture, grazing and road building. The result of these cumulative impacts includes an altered hydrograph, or flow pattern within the watershed; resulting in exaggerated peak flows during winter and spring storm events, as well as lower sustained summer base flows.*

Seasonal Variation and Critical Conditions

Long-term fecal coliform and flow data are available at Ecology's Station A (RM 121.2) above the town of Palouse. Figure 3 shows the long-term (1992-2003) monthly fecal coliform concentrations, the water quality standards, and the mean monthly flows at this location. Individual data points exceeded the water quality standards during both high and low flows. The lowest average monthly flow was 11 cfs in September, and the highest was 759 cfs in March.

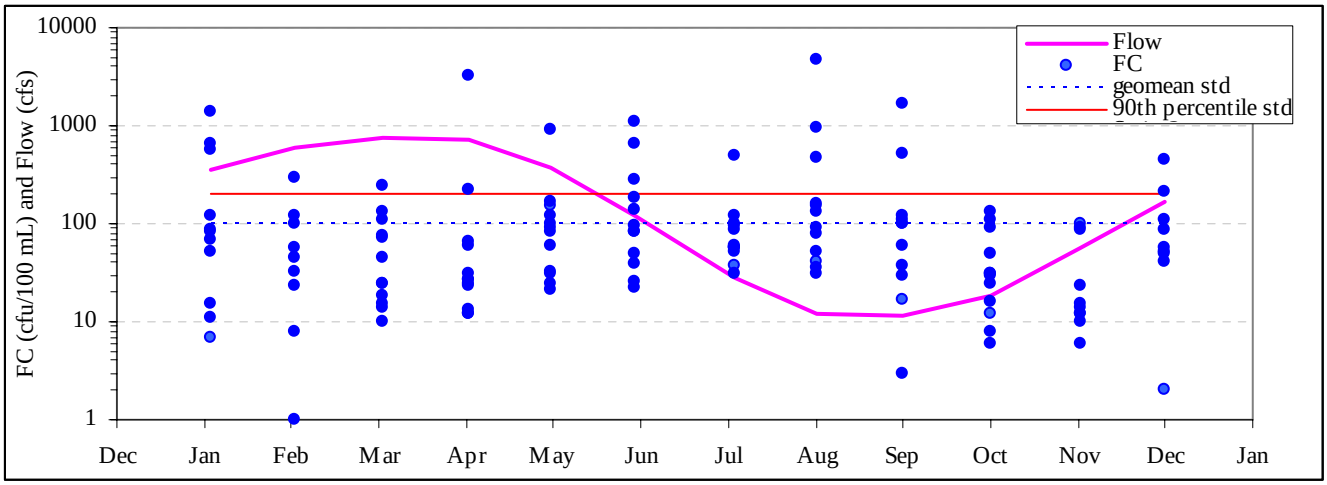

Figure 3. Historical fecal coliform concentrations at RM 121.2 (Ecology Station A), 1992-2003.

In addition to data collected by Ecology (Figure 3), the Palouse Conservation District collected fecal coliform and flow data at 11 stations in the North Fork Palouse River and its tributaries in 2001-2003. Figure 4 shows the fecal coliform concentrations at these stations, with the highest concentrations observed in Clear Creek.

Seasonal variation in the concentration of fecal coliform bacteria has been considered in this TMDL by applying the water quality criteria to observed fecal coliform concentrations at monthly or seasonal intervals, depending on the availability of fecal coliform data.

The critical ambient conditions determined to be appropriate for point source evaluation is the lowest seven-day average flow with a recurrence interval of one in ten years (7Q10 flow). Dilution factors used in the existing NPDES permits for point sources have been based on the 7Q10 stream flows. The critical conditions for non-point sources may occur during high-rainfall periods, particularly during the start of a rainfall event when bacteria are "flushed" from surface soils into the streams. The critical condition can also be during dry weather, resulting from groundwater seepage contaminated by failing on-site sewage treatment systems and/or stream access by livestock and/or wildlife.

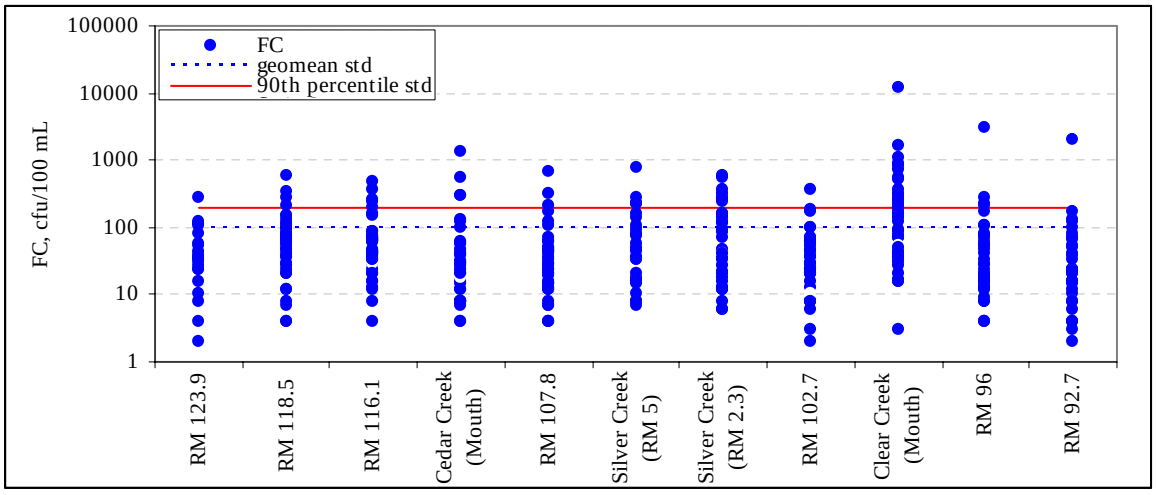

Figure 4. Fecal coliform concentrations at stations monitored by the Palouse Conservation District, 2001-2003.

Technical Analysis

The technical analysis is based on analysis of historical and recent field data. Historical data were obtained from Ecology's Environmental Information Management database. Recent data were obtained from the Palouse Conservation District.

Excel® spreadsheets were used to evaluate the data, including mass balances, statistical analyses, and plots.

The statistical rollback method (Ott, 1995) was employed to establish fecal coliform reduction targets for the various segments of the mainstem and tributaries. This method has been employed in Washington TMDLs by Roberts (2003), Coots (1994), Joy (2000), Pelletier and Seiders (2000), and Ahmed (2004).

The rollback method assumes that the distribution of fecal coliform concentrations follows a lognormal distribution. The cumulative probability plot of the observed data gives an estimate of the geometric mean and 90th percentile, which can then be compared to the fecal coliform bacteria standards. The rollback procedure is as follows:

a) When data are plotted on a log-scale against a linear cumulative probability function, a straight line signifies a lognormal distribution of the data.

b) The geometric mean of the data has a cumulative probability of 0.5.

c) The 90th percentile of the data has a cumulative probability of 0.9. This is equivalent to the "no more than 10 percent samples exceeding …." criterion in the fecal coliform standard (WAC 173-201A).

d) Alternately, the 90th percentile can also be estimated by using the following statistical equation:

$$90^{th}\text{ percentile} = 10^{(\mu_{log} + 1.28 * \sigma_{log})}$$

where: $\mu_{\log}$ = mean of the log transformed data

$\sigma_{\log}$ = standard deviation of the log transformed data

e) The target percent reduction required is the highest of the following two comparisons:

either: $\left[\frac{observed\ 90th\ percentile - 200\ cfu/100mL}{observed\ 90th\ percentile}\right] x100$

or: $\left[\frac{observed\ geometric\ mean - 100\ cfu/100mL}{observed\ geometric\ mean}\right] x100$

f) As "best management practices" for non-point sources and treatment technologies for point sources are implemented and the target reductions are achieved, a new but similar distribution (same coefficient of variation) of the data is assumed to be realized with the previous mean and standard deviation reduced by the target percent reductions.

g) If the 90th percentile is limiting, then the goal would be to meet a 90th -percentile fecal coliform of 200 cfu/100 mL, and no goals would be set for the geometric mean; with the implementation of the target reductions, the already low geometric mean (<100 cfu/100mL) would only get better. Similarly, if the geometric mean is limiting, the goal would be to achieve a geometric mean of 100 cfu/100mL, with no goal for the already low (<200 cfu/100mL) 90th percentile.

The procedures and assumptions discussed above were used to evaluate fecal coliform data in the respective segments of the mainstem North Fork Palouse River and tributaries to establish target bacterial reductions necessary to meet water quality standards.

The mainstem North Fork Palouse River addressed in this document extends from the mouth of the North Fork Palouse River (RM 89.6) to the Idaho/Washington border (RM 123.9). Several stations have been monitored along this reach for fecal coliform bacteria by the Palouse Conservation District and the Department of Ecology. For convenience, the North Fork Palouse River has been divided into three segments:

1. Upper Mainstem Segment (ID/WA Border to Duffield Creek), RM 123.9 – RM 116.1
2. Middle Mainstem Segment (Duffield Creek to Silver Creek), RM 116.1 – RM 102.7
3. Lower Mainstem Segment (Silver Creek to mouth of North Fork Palouse River), RM 102.7 – RM 89.6

The following section summarizes the results of the technical analysis including the load and wasteload allocations. Data from the monitoring stations are evaluated, discussed, and target reductions developed in the *North Fork Palouse River Fecal Coliform Bacteria Total Maximum Daily Load Recommendations* report (publication number 04-03-022) in Appendix B.

Loading Capacity

"Loading capacity" means the maximum amount of pollution a water body can withstand and still fulfill beneficial uses (i.e. meet state water quality standards). In this TMDL, it is assumed that if the individual tributaries and the various segments of the mainstem North Fork Palouse River were to meet the water quality standard, the North Fork Palouse River as a whole will meet the standard prior to its confluence with the South Fork Palouse River.

The observed data in the mainstem North Fork Palouse River and its tributaries show that the water quality standards for fecal coliform bacteria were not being met at the various monitoring stations (Table 2).

Table 2. *Summary of observed data*

Location	Critical Period	Number of samples	Geometric mean (cfu/100 mL)	90th percentile (cfu/100 mL)
Ecology Station A (RM 121.2)	August	12	156	1022
Station 1 (RM 118.5)	Dec-Mar	15	64	286
Station 2 (RM 116.1)	Dec-Mar	14	60	252
Station 3 (RM 113.1)	June-Sept	11	71	703
Station 5 (RM 5)	Mar-June	13	75	435
Station 6 (RM 2.3)	Mar-June	13	93	954
Station 8 (RM 96)	Dec-Mar	11	34	378
Station 9 (RM 96.2)	July-Oct	15	360	2622
Station 10 (RM 92.7)	Dec-Mar	10	50	431
Ecology Station B (RM 90.2)	Annual	12	37	313

Load Allocation Summary

Load allocations, which include a margin of safety, are the non-point source reductions that need to be achieved in each segment of the river for the loading capacity to be met. Using the procedure outlined in the "Technical Analysis" section, target reductions were established at various locations on the mainstem North Fork Palouse River and its tributaries to meet the water quality standard for fecal coliform bacteria. Individual load allocations for the tributaries and mainstem are summarized in Table 3. The amount of bacteria in the stream needs to be at or below the loading capacity to meet water quality standards. The target reduction is how much the current load needs to be reduced to meet the loading capacity and therefore the water quality standards.

Table 3. *Summary of target load reductions necessary to comply with fecal coliform water quality standards.*

Reach	Loading capacity (cfu/day)	Target reduction (%)	Basis	Critical period
Upper Mainstem Segment (Border to Duffield Creek), RM 123.9 – RM 116.1				
Mainstem RM 123.9: Station 11 (WA/ID State line)	no reduction required*			
Mainstem RM 121.2: Station Ecology A	6×10^{10}**	80**	90th % std	August
Mainstem RM 118.5: Station 1	3.6×10^{12}	30	90th % std	Dec-Mar
Duffield Creek at mouth (NFPR RM 116.3)	no reduction required*			
Mainstem RM 116.1: Station 2	4.4×10^{12}	21	90th % std	Dec-Mar
Middle Mainstem Segment (Duffield Creek to Silver Creek), RM 116.1 – RM 102.7				
Cedar Creek at mouth (NFPR RM 113.1): Station 3	1.9×10^{10}	72	90th % std	June-Sept
Mainstem RM 107.8: Station 4	no reduction required			
Silver Creek (mouth at NFPR RM 103.5)				
RM 5: Station 5	3.7×10^{11}	54	90th % std	Mar-June
RM 2.3: Station 6	1.9×10^{11}	79	90th % std	Mar-June
Mainstem RM 102.7: Station 7	no reduction required			
Lower Mainstem Segment (Silver Creek to mouth of NFPR), RM 102.7 – RM 89.6				
Clear Creek at mouth (NFPR RM 96.2): Station 9	7×10^{9}	92	90th % std	July-Oct
Mainstem RM 96: Station 8	6.8×10^{12}	47	90th % std	Dec-Mar
Mainstem RM 92.7: Station 10	6.9×10^{12}	54	90th % std	Dec-Mar
Mainstem RM 90.2: Ecology Station B	2.9×10^{12}	36†	90th % std	Annual

NFPR – North Fork Palouse River
* based on limited data, further monitoring recommended
** based on long-term data
† annual average basis

Wasteload Allocation Summary

Wasteload allocations are effluent limits recommended for point sources for meeting water quality standards either at the end-of-pipe or at the edge of an authorized mixing zone.

The existing water quality based effluent limits contained in NPDES permits issued by Ecology in the North Fork Palouse River watershed, are deemed protective of the water quality standards. The existing effluent limits for the major point sources in the North Fork Palouse River watershed are summarized in Table 4.

Table 4. *Summary of effluent limitations for fecal coliform bacteria in NPDES permits for point sources.*

Point Sources	Geometric Mean (cfu/100 mL)	
	Monthly	Weekly
City of Palouse WWTP	100	200
City of Garfield WWTP	100	100

Margin of Safety

The margin of safety for this TMDL is implicit through the use of conservative assumptions, summarized below.

The target reductions recommended in this report for the various segments of the mainstem North Fork Palouse River and its tributaries are based on observed fecal coliform concentrations. Compliance with the water quality standards will ultimately be achieved through BMP implementation and a follow-up monitoring plan. However, it is likely that BMPs may reduce bacteria concentrations in excess of the target reductions. For example, if a source of high bacterial concentration is completely eliminated, higher reduction of bacteria than the target may result.

The estimated targets do not account for any bacterial die-off in the water column or during travel from the source to the stream. As sources are removed from the stream, bacterial travel time from the source to the stream during a storm event would increase. This would allow for greater exposure of the bacteria to the environment and potential die-off.

Target reductions were based upon seasonal evaluations where sufficient data were available. BMPs based upon seasonal targets will substantially reduce the annual load at the various segments and tributaries.

The target reductions were based upon a 90^{th} percentile of fecal coliform distributions, which takes into account the variability of the data. This is more conservative than the 10^{th} percentile water quality criterion, which allows for 10 percent of the samples to exceed the criterion without considering the distribution of the data.

Summary Implementation Strategy

A summary implementation strategy (SIS) is needed to meet the requirements of a TMDL submittal for approval as outlined in the 1997 Memorandum of Agreement between the U.S. Environmental Protection Agency and the Washington State Department of Ecology. Its purpose is to present a clear, concise, and sequential concept of how the waters covered in the TMDL will achieve water quality standards. The SIS includes an outline of how a more detailed implementation plan will be developed; those implementation activities that are planned or already underway; a strategy for developing follow-up monitoring plans; a summary of public involvement methods; and potential funding needs and sources to make implementation of the plan a reality.

Implementation Overview

The development of the *North Fork Palouse River Water Quality Improvement Plan* (RPU 2002b) (Appendix A) was a collaborative effort by a diverse group of interests in the watershed and the process was facilitated by the Palouse Conservation District. The North Fork Palouse River Watershed Committee's plan was completed in September of 2002 and is the basis for this SIS. If the activities outlined in this plan are carried out it is expected that the North Fork Palouse River can achieve water quality standards for fecal coliform bacteria by 2014.

The North Fork Palouse River Watershed Committee and Technical Advisory Group identified individual on-site septic symptoms, livestock and wildlife as the primary contributors of fecal coliform bacteria to the North Fork Palouse River and its tributaries. These issues will be addressed through further monitoring, education and implementation of best management practices. The various agencies and organizations in the watershed will work collaboratively to ensure these actions are realized. There are many funding sources that can be accessed to support work in the watershed to address water quality issues. In addition, Ecology will support and assist agencies and organizations seeking funding. The individual responsibilities of each agency and organization will be decided during the development of the detailed implementation plan. Until the detailed implementation plan is completed, Ecology will take responsibility of tracking progress towards fecal coliform bacteria reduction and facilitating the process. Ecology anticipates that another entity may prefer to take on this responsibility and will encourage continued local oversight.

Implementation Plan Development and Activities

The North Fork Palouse River watershed committee first met in November 2000. The official committee formed soon after and held monthly meetings (except during spring and harvest months) to conduct watershed planning activities. The group continued meeting regularly until March 2002; the implementation plan was finished in September 2002. Since September, the group has met intermittently depending upon the need to discuss various developmental stages of the final TMDL (Buchert, 2004).

The intent of the planning process was twofold; first, to raise the level of awareness of local stakeholders on water quality problems, policies, and related issues; and second, to produce a locally developed water quality improvement plan that would lead to positive changes in the watershed in a manner consistent with local needs, values, and priorities (RPU, 2000b).

The watershed committee and technical advisory group represented many interests in the watershed. The agencies or entities that participated in the planning process included the Palouse Conservation District, Washington Department of Ecology, Whitman County Commissioners, Washington Association of Wheat Growers, Washington Cattleman Association, Washington Department of Transportation, USDA Natural Resources Conservation Service, Washington Department of Fish and Wildlife, Washington State University, Idaho Department of Environmental Quality, Whitman County Extension, Farm Bureau, Whitman County Health Department, Whitman County Public Works (roads), Palouse River/Coulee City River Railroad, Palouse Clearwater Environmental Institute, Resource Planning Unlimited, Inc., and the wastewater treatment operations of the cities of Palouse, Garfield, and Colfax.

In addition, livestock producers, agricultural-chemical businesses, crop producers and citizens at large were represented on the committee. The Water Quality Improvement Plan developed by the watershed committee and technical advisory group had two main purposes:

1) to express the thoughts and feelings of the stakeholders within the watershed who came together as a group to proactively discuss ways to make their watershed a better place to live, work, and play; and
2) to be used by these and other watershed residents to apply for grant money and other resources to help put the actions identified in the plan into practice (RPU, 2000b).

To accomplish their purpose, the North Fork Palouse Watershed Committee developed a goal and established objectives to achieve that goal. Each objective has a set of action items to help facilitate their implementation. A rationale is provided to discuss and support the action item based on the North Fork Palouse River Watershed Committee's input and decisions. These objectives and actions are listed in Table 5. The rationale for each action item is described in the following text.

Table 5. *Goals, Objectives and Actions of the North Fork Water Quality Improvement Plan (RPU, 2002b)*

Goal: **Improve water quality (specifically fecal coliform impairments) in the Washington portion of the North Fork Palouse River (from Idaho state line to Colfax)**							
Objectives:	Actions						
1. **Reduce fecal coliform bacteria contributions**	A) Identify and quantify source of fecal coliform bacteria by contributing species	B) Increase awareness by development and implementation of an information and education program targeting septic system issues	C) Pursue funding for sub-standard septic system replacement and/or upgrade	D) Increase awareness by development and implementation of an information and education program targeting livestock issues	E) Implement livestock best management practices (BMPs)	F) Encourage innovative BMPs and demonstration projects that promote new technology	G) Encourage development and implementation of wildlife BMPs and other management approaches
2. **Identify resources to achieve goal**	A) Prospect for potential sources of financial support	B) Identify and deploy technical support.	C) Identify and recruit volunteer support				
3. **Implement the feedback loop**	(Adaptive Management)						

Objective 1: Reduce fecal coliform bacteria contributions.

Action Item A): **Identify and quantify the source of fecal coliform bacteria by contributing species.**

Rationale: Pathogens (disease causing bacteria) most commonly identified and associated with waterborne diseases can be grouped into three general categories: bacteria, protozoans, and viruses (EPA 2001). Washington state standards currently require compliance with the number of fecal coliform bacteria present in a sample of water. Fecal coliform bacteria are thought of as indicator organisms. The numbers of pathogenic organisms (bacteria, protozoans or viruses) present in polluted waters are generally few and difficult to identify and isolate. Therefore, water is monitored for nonpathogenic bacteria that are usually associated with pathogens transmitted by fecal contamination, but are more easily sampled and measured. These indicator organisms are assumed to indicate the presence of pathogenic organisms.

Because bacteria survival in our streams is highly dependent on temperature, it is important to continue to monitor the North Fork Palouse River watershed to evaluate where bacteria source and transport is occurring. In other words, the source of the bacteria should be verified as well as the potential for the bacteria to be transported. Bacteria can be transported to surface waters directly or by diffuse methods such as re-suspension and distribution of bacteria found in streambed sediments. Contrary to what one would think, survival of microorganisms originating in fecal waste decrease as water temperature increases (EPA, 2001). Soil temperature and moisture are other important factors influencing the survival of bacteria in soil. Bacteria survival time increases with moisture content and moisture holding capacity.

Typically, higher clay content in soil results in increased soil moisture retention and, consequently, increased bacteria survival. It is important to evaluate the North Fork Palouse River watershed and

sub-watersheds independently as to bacteria source, transport, and predicted survivability within the seasons.

Technology has recently become available to determine the source of fecal coliform bacteria by contributing species, *i.e.*, human, cattle, and wildlife. DNA analysis can be used to trace the source of bacteria contribution. However, the bacteria found in cattle carry a slightly different DNA than those found in people or geese, for example. Again, it is important to evaluate the North Fork Palouse River watershed and sub-watersheds independently as to bacteria source to facilitate implementation of land management decisions (RPU, 2000b).

Action Item B): Increase awareness by development and implementation of an information and education program targeting septic system issues.

Rationale: Rural residents are on individual septic systems for domestic waste treatment. Households installing or replacing septic systems within the last 30 years acquire a mandatory permit (on-site sewage disposal permit) from Whitman County that ensures proper placement, size and function of a septic system (Skyles, 2001). Literature on suggested system maintenance is distributed along with the permit. Although the permitting process has been in place since the early 1960s, it has not been aggressively enforced until the late 1980s (Skyles, 2001). Most of the existing homes within the watershed were in place before the county permitting process became ordinance. The extent of improperly operating septic systems within the watershed is not known but is suspected to include the majority of systems.

Awareness of water quality impacts (both surface and well water contamination) from improperly operating septic systems is necessary to begin to inform rural residents of water quality concerns in the North Fork Palouse River watershed. Providing information to rural residents will allow them to make educated management decisions and to take responsibility for septic system improvements.

Resident awareness can be achieved through information campaigns that may include workshops, newsletters, informational brochures and public meetings (RPU, 2000b).

Action Item C): Pursue funding for sub-standard septic system replacement and/or upgrade.

Rationale: Rural Whitman County residents can currently apply through the Community Action Center for low interest loans for full rehabilitation of their property. For example, a percentage of the overall cost for septic system replacement or upgrades can be funded. However, residents must also have an audit performed of their residence and agree to upgrade any other potential health risks identified (i.e., asbestos shingles). Senior citizens (older than age 62) can receive up to 75 percent of the cost of septic system replacement or upgrade from a USDA Rural Development program.

Septic system replacement, maintenance, and upgrades could be expedited if a funding source was available that better served the needs of rural residents (RPU, 2000b).

Action Item D): Increase awareness by development and implementation of an information and education program targeting livestock issues.

Rationale: An increased awareness of potential water quality impacts from livestock grazing and winter-feeding operations is necessary to begin addressing water quality concerns in the North Fork Palouse River watershed. Providing information to livestock operators will allow them to make informed management decisions on any changes that may be necessary to reduce fecal coliform contributions.

Increased livestock operator awareness can be achieved through an information campaign that may include workshops, tours, newsletters, informational brochures, and public meetings. Information should be targeted to all livestock owners including production operations, hobby farms, pets, etc. and applicable to all types of livestock, such as llamas, cattle, sheep, horses, etc. (RPU, 2000b).

Action Item E): Implement livestock best management practices (BMPs).

Rationale: BMPs can be stand-alone practices or a combination of practices that offer a solution to reduce fecal coliform contributions from livestock operations. BMPs are categorized as management, structural, and/or vegetative practices. Management practices can include grazing management and pasture rotations. Structural practices can include off-site watering facilities, diversions, downstream catchment facilities, fencing, etc. Vegetative practices can include filter strips, pasture and hayland planting, riparian plantings, etc.

BMPs used in Washington are found in the USDA Natural Resources Conservation Service (NRCS) Field Office Technical Guide (FOTG). The FOTG provides the standards and specifications for conservation practices applicable for use in Washington, and the purpose is to promote the conservation of natural resources in a consistent and responsible fashion. The FOTG is the primary technical reference for the NRCS. It contains technical information about conservation of soil, water, air, plant, animal, and human resources. The technical guide used in any NRCS field office is localized so that it specifically applies to that geographic area (RPU, 2000b).

Action Item F): Encourage innovative BMPs and demonstration projects that promote new technology.

Rationale: Some solutions may not be included in the NRCS list of standards and specifications of conservation practices. Farmers, ranchers, other rural residents, and city and county managers are encouraged to identify potential bacterial contributions from off site delivery and devise a practical solution to correct the problem.

Operators should be encouraged to work with the Palouse Conservation District, NRCS and natural resource professionals to implement demonstration projects in an effort to evaluate practice effectiveness and acceptance (RPU, 2000b).

Action Item G): Encourage development and implementation of wildlife BMPs* and other management approaches.

Rationale: The North Fork Palouse River Watershed Committee discussed that wildlife may be a significant contributor of fecal coliform bacteria to the system and felt that something should be done to address this. Wildlife may congregate unnecessarily in riparian and lowland areas if upland habitat is limited or negligible. Landowners and operators are encouraged to work with wildlife resource managers to improve wildlife distribution throughout the watershed, as well as minimize bacteria contribution from wildlife (RPU, 2000b).

> ** It should be noted that bacteria contributed to surface waters from local wildlife are considered natural background. Because wildlife's contribution is considered natural it is not a target for reduction but their contribution is included in the total fecal coliform that needs to be reduced.*

Objective 2: Identify resources to achieve goal.

Action Item A): Prospect for potential sources of financial support.

Rationale: A list of potential sources of funding is found in Appendix B of the *North Fork Palouse River Water Quality Improvement Plan* (RPU, 2002b) in Appendix A of this report. Financial support is a crucial element in implementation of action items to help reach the goal.

Action Item B): Identify and deploy technical support.

Rationale: Technical support is also a crucial element in implementation of action items to help reach the goal. Technical assistance identified includes a long list of agency professionals and organizations within the area:

- Palouse Conservation District
- USDA Natural Resources Conservation Service
- USDA Farm Service Agency
- Whitman County
- Whitman County Health Department
- Cities of Palouse, Garfield, and Colfax
- Washington Department of Ecology
- Washington Department of Transportation
- Washington Department of Fish and Wildlife
- Washington Department of Natural Resources
- US Army Corps of Engineers
- Washington State University
- University of Idaho
- Area agri-chemical businesses
-

Action Item C): Identify and recruit volunteer support.

Rationale: Volunteerism is a fundamental element in implementation of action items to help reach the goal. Potential sources of volunteers identified include:

- Area elementary and high schools
- Boys Scouts of America

- Girl Scouts of America
- 4H Clubs
- Future Farmers of America
- Washington State University and University of Idaho student organizations
- Washington State University Community Service Learning Center
- AmeriCorp volunteers
- League of Women Voters

Adaptive Management (Objective 3 - Implement the feedback loop)
The feedback loop concept is a mechanism for evaluating the success of this plan and whether the goal of improving water quality is being achieved. The feedback loop occurs in five steps (presented graphically in Figure 5):

Step 1. The process begins by reviewing and evaluating current water quality status.

Step 2. The existing water quality is compared to the desired water quality levels or standards. A water quality improvement plan is developed based on this comparison and analysis.

Step 3. The water quality improvement plan and associated action items are implemented. Programs and on-site BMPs are evaluated for technical adequacy of design and installation.

Step 4. The effectiveness of the water quality improvement plan in achieving the goal and objectives is evaluated by comparison to water quality monitoring data. If the goal and objectives are achieved, the implementation efforts are adequate as designed, installed and maintained. If not, the plan is modified and objectively reevaluated.

Step 5. Project success and accomplishments should be publicized and reported to continue project implementation and support.

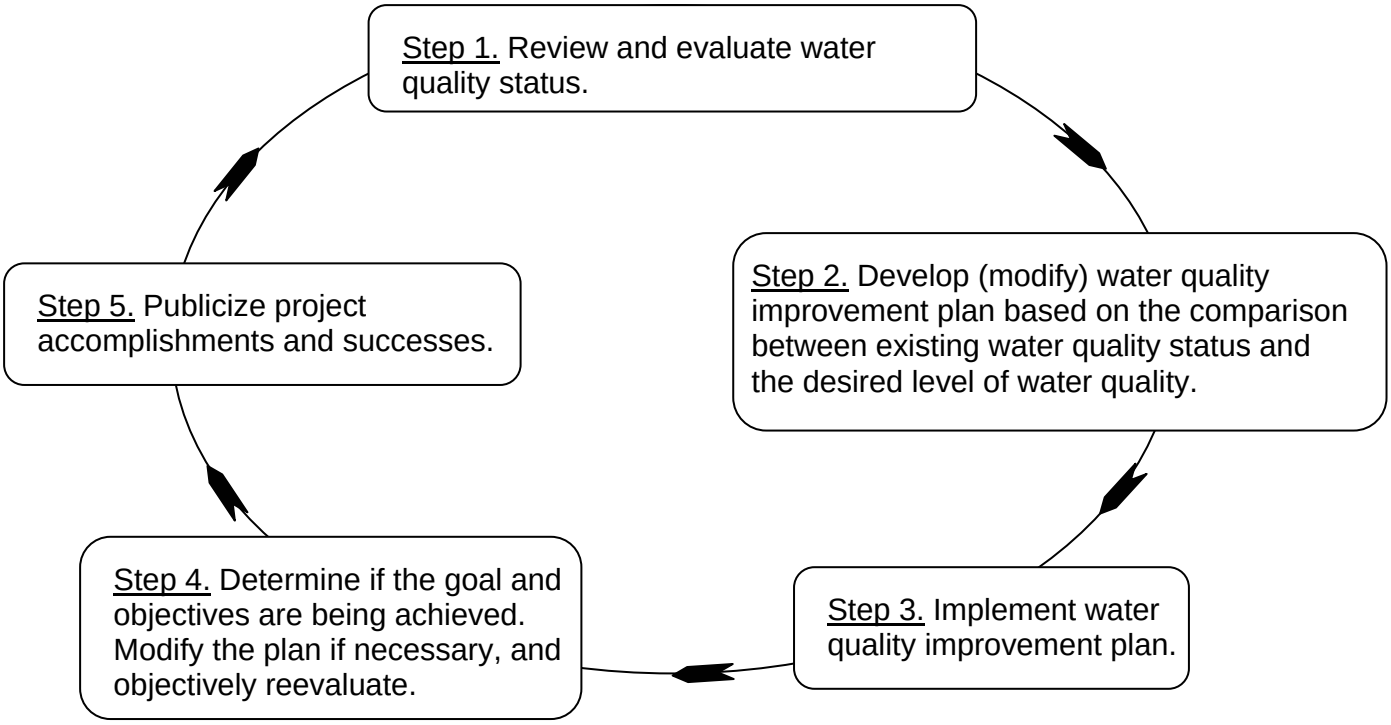

Figure 5. Feedback Loop, (RPU, 2000b)

Reasonable assurances

Improved water quality will be achieved through the combined efforts of all basin stakeholders. Local involvement and commitment to resolving fecal coliform problems in the North Fork Palouse River watershed are substantial and are evidenced by the dedication of the people and organizations involved in the development of this plan. To support this TMDL, Ecology will work cooperatively with all basin stakeholders to promote the implementation of activities contained in this plan.

This water cleanup plan, its TMDL targets, and the associated implementation activities listed in the plan, are not in themselves enforceable. However, Ecology is obligated to implement the approved TMDL. Organizations and their commitments under laws, rules, and programs to resolve bacteria problems in the watershed are described below.

Washington Department of Ecology – Ecology has been delegated authority under the federal Clean Water Act by the U.S. EPA to establish water quality standards, administer the NPDES wastewater permitting program and enforce water quality regulations under Chapter 90.48 RCW. Ecology responds to complaints, conducts inspections, and issues NPDES permits as part of its responsibilities under state and federal laws and regulations. In cooperation with conservation districts, Ecology will pursue implementation of BMPs for agricultural and other land uses and may use formal enforcement, including fines, if voluntary compliance is unsuccessful.

Palouse Conservation District – Conservation districts have authority under Chapter 89.08 RCW to develop farm plans to protect water quality and provide animal waste management information, education and technical assistance to residents on a voluntary basis. Farmers receiving a Notice of Correction from Ecology or local health jurisdictions will normally be referred to the local conservation district for assistance. When developing farm plans, the district uses guidance and specifications from the U.S. Natural Resources Conservation Service.

In addition, the Palouse Conservation District received a Centennial Clean Water Fund grant (GO400216) from Ecology in 2004. This grant funds the Palouse/Snake River Riparian Buffer Project, which will assist landowners to implement BMPs that improve riparian health and protect water quality to Snake River tributaries, including the North Fork Palouse River. The grant will help implement BMPs where federal cost-share programs are not reasonable and will help supplement these programs where necessary. In addition, education materials will be developed to recruit participants and explain the importance of riparian health. This grant expires in 2008.

Whitman County Health Department – The Whitman County Health Department regulates on-site sewage systems in the North Fork Palouse River watershed in accordance with Chapter 246-272 WAC. There are existing systems that have drainfields with pipes discharging directly to the river, but the existence of such systems is sparse and not well documented (Skyles, 2004). When the department receives a complaint about a failing system, the department verifies the failure and assists the landowner with coming into compliance with Chapter 246-272 WAC. In addition, the Whitman County Health Department is often involved in the investigation of complaints about agricultural animal waste.

Whitman County and City of Palouse (with the Department of Ecology) – The North Fork Palouse River falls under the requirements of the Shoreline Management Act (SMA) (RCW 90.58). The SMA is administered principally by local governments through locally developed Shoreline Master Programs (SMPs) while Ecology provides technical and financial assistance for the development and implementation of the SMPs.

Ecology reviews and approves the SMPs and with the local governments has the authority for compliance and enforcement of the SMA and SMPs. Local governments review projects in their jurisdiction for compliance with local SMPs and the SMA, through a permit process. The SMA specifically lists protecting water quality as a purpose of the SMA (RCW 90.58.020). Local governments must periodically update their SMPs and must integrate them with their Growth Management Act provisions, including critical area ordinances.

State of Idaho – Since the North Fork Palouse River originates in Idaho, the work underway in Idaho has the potential to positively affect water quality in the Washington portion of the river. In Idaho, the water quality standards program is a joint effort between the Department of Environmental Quality (DEQ) and the EPA. DEQ is responsible for developing and enforcing water quality standards that protect beneficial uses such as drinking water, coldwater fisheries, industrial water supply, recreation, and agricultural water supply. The EPA develops regulations, policies, and guidance to help Idaho implement the program and to ensure that the Idaho adopted standards are consistent with the requirements of the Clean Water Act and relevant regulations. The EPA has authority to review and approve or disapprove state standards and, where necessary, to

promulgate federal water quality rules. DEQ has the authority and the responsibility to ensure that TMDLs are completed and submitted to EPA. TMDLs are being developed on Idaho's tributaries to the North Fork Palouse River. These include Flannigan Creek, Deep Creek, Gold Creek, West Fork Rock Creek, Big Creek, and Hatter Creek. The final *Palouse River Tributary Sub-Basin Assessment and TMDL* is due in 2004 (Henderson, 2004).

Monitoring Strategy

The North Fork Palouse River watershed consists of several segments and tributaries that do not meet the Washington State water quality standard for fecal coliform bacteria. To address the listings in a comprehensive manner, the following monitoring strategy is recommended:

- Use the highest fecal coliform reduction targets to prioritize where resources should be first invested.
- Begin implementation of best management practices (BMPs) first at the most upstream segment, tributary, or sub-tributary. Monitoring should follow wherever BMPs are implemented.
- As the segment, tributary, or sub-tributary with the worst problem is brought into compliance with standards, the monitoring station should be moved to a less severe area where the next set of BMPs would be implemented.

Ongoing monitoring of water quality trends and activity implementation is essential in order to:

- Show where water quality is improving
- Help locate sources of pollution
- Help indicate effectiveness of cleanup activities
- Document achievement of compliance with state water quality standards

A comprehensive monitoring plan will be included in the *Detailed Implementation Plan* for the North Fork Palouse River, to be developed by the Department of Ecology within one year of the approval date of this TMDL.

If ambient or other monitoring data show that progress towards targets is not occurring or if targets are not being met, compliance water quality monitoring will occur. Compliance monitoring will be designed to verify preliminary data and then identify the specific sources of fecal coliform loading. Sampling over time will be adjusted to locate the source by narrowing the geographic area where contamination is occurring.

Tributaries

Mouths of tributaries should be monitored so that the overall effects of BMPs implemented in the tributary can be evaluated.

- Clear Creek should be monitored from June through October and from February through March.
- Cedar Creek should be monitored from May through September.
- Duffield Creek should be monitored initially for one year for both flow and fecal coliform bacteria.

- Silver Creek should be monitored from March through September. Concentrations of fecal coliform bacteria measured at Silver Creek RM 5 (Station 5) likely reflect contributions by non-point sources. However, the increase in fecal coliform bacteria between RM 5 (Station 5) and RM 2.3 (Station 6) is likely from urban sources. The city of Garfield is between these two stations. Lack of flow also may play a role in the elevated fecal coliform concentrations at Station 6.
- Flow at Station 6 is lower than the flow at Station 5 (Figure 6). Both Stations 5 and 6 should be monitored during and following BMP implementation.

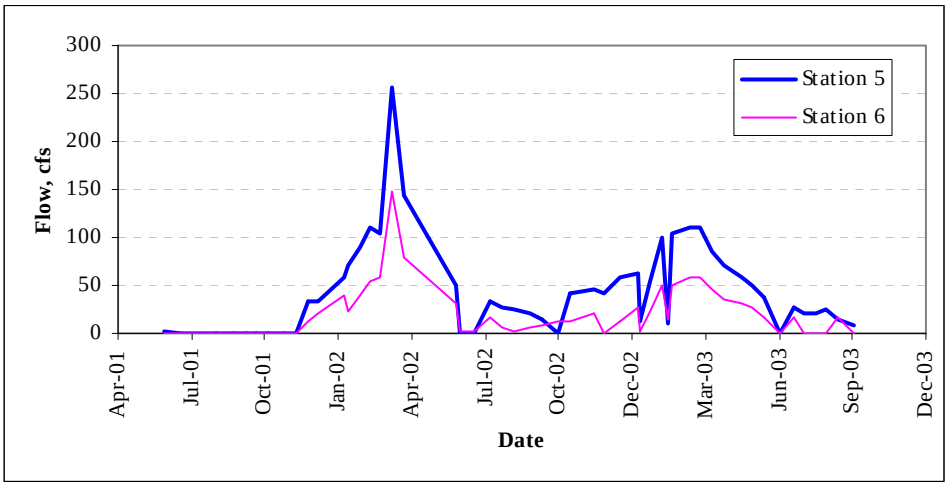

Figure 6. Flow at Stations 5 and 6 in Silver Creek, 2001-2003.

Mainstem

In general, monitoring locations and periods for the mainstem North Fork Palouse River should follow those presented in Table 13. However, Station 11 (RM 123.9 at the Washington/Idaho border) should continue to be monitored monthly. Data collected at this station should be evaluated to establish the need for BMP implementation above the state line.

The number of monitoring stations can be reduced. For example, only one station (Ecology Station B, RM 90.2) is needed between Clear Creek and the mouth of the North Fork Palouse River in Colfax, unless there are reasons for establishing additional stations. Stations where no reductions have been required (Stations 4 and 5) may be eliminated from future monitoring.

Potential Funding Sources

Ecology's Centennial Clean Water Fund, Section 319, and State Revolving Fund loans can provide funding resources to help implementation of the TMDL (water cleanup plan). In addition to Ecology's funding programs, there are many other funding sources available for watershed planning and implementation, point and non-point source pollution management, fish and wildlife habitat enhancement, stream restoration, and 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. There is an extensive list of funding sources available in Appendix B of the *North Fork Palouse River Water Quality Improvement Plan* (RPU, 2002) (Appendix A).

Summary of Public Involvement

The North Fork Palouse River Watershed Committee and Technical Advisory Group conducted watershed-planning activities from November 2000 through present. This group represented many interests in the watershed. Ecology met with the groups on several occasions to discuss different aspects of the TMDL process. On March 11, 2004, Ecology presented a summary of the *North Fork Palouse River Fecal Coliform Bacteria Total Maximum Daily Load Recommendations* report (publication number 04-03-022) to the watershed committee and asked them to review the document and provide us with feedback. Their review resulted in several changes to the document before it was finalized.

The draft version of this submittal report was presented to the watershed committee at a meeting on September 22, 2004. The committee reviewed the report and submitted their comments. A 30-day public comment period on the draft report was held from November 10, 2004 to December 10, 2004. A press release about the report and public comment period was issued to the local media in the watershed and display ads were published in two newspapers (The Whitman County Gazette and The Boomerang!). An article about the report was witnessed in the Boomerang!, the Capital Press, and the story was heard on the local radio.

The comments received during the committee's review and the public comment period were responded to individually and are summarized in Appendix C of this document. Also included in the Public Participation appendix are copies of the display ads and articles that appeared in the newspapers.

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Appendix A

North Fork Palouse River Water Quality Improvement Plan

September 2002

Prepared for:
Palouse Conservation District
Pullman, Washington

Prepared by:
Resource Planning Unlimited, Inc.
Moscow, Idaho

Available on the Internet at:
http://www.ecy.wa.gov/programs/wq/tmdl/watershed/nfpalouse/nfpr_wq_improvement_plan.pdf

Appendix B

North Fork Palouse River Fecal Coliform Bacteria
Total Maximum Daily Load
Recommendations

By Anise Ahmed

May 2004
Publication No. 04-03-022

This report is available on the Department of Ecology home page on the World Wide Web at http://www.ecy.wa.gov/biblio/0403022.html

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Appendix C

Public Participation

A 30-day public comment period on the draft report was held from November 10, 2004 to December 10, 2004. A press release about the report and public comment period was issued to the local media in the watershed and display ads were published in two newspapers (The Whitman County Gazette and The Boomerang!). An article about the report was witnessed in the Boomerang!, the Capital Press, and the story was heard on the local radio.

Ecology received several comments during the watershed committee's review and the public comment period. The comments and the agencies responses to them are summarized below.

Response to Comments

Comment:

I met this morning with Rhod McIntosh (President, Whitman County Cattlemen's) and David Lange (President, WC Farm Bureau) to go over last nights meeting and there was a concern over the changes made in the draft (publication # 04-10-067) [from the language used in the committee's water quality improvement plan]. Is there any way we can identify these changes as to where they are in the document and where they originated from?

In regards to the comment on wildlife [last sentence of Action Item G on page 23], I would like to see you write that "Wildlife is not a target for reduction, but their fecal counts will be included in the totals to be reduced." (Unless this is not true).

I also have been thinking about the "Clear Creek" numbers. If a creek does not flow into the Palouse River for a certain time of the year then I believe the samples taken from those stagnant pools should not be entered into the formula. I use Clear Creek as an example because it has the highest fecal counts at the most critical time of year and at that time is not flowing into the Palouse. What does DOE's protocol call for in this event?

I was also wondering if there had been any more thought to the test samples taken from Clear Creek during times when it doesn't flow into the North Fork. It is really flowing now which is great to see. (John Pearson - Colfax, WA)

Response:

Each paragraph that had the (RPU, 2002b) reference after it came almost directly from the North Fork Palouse Watershed Committee's *North Fork Water Quality Improvement Plan.* In most instances, any change to the language was just to make it fit this report since it was copied out of another report. There are several instances where words were deleted because they were not needed in this context. The only other changes made were that every place that the NFPR abbreviation was used, it was spelled out as North Fork Palouse River and where the % was used, it was spelled out as percent.

As discussed at the meeting, you were correct that an error was made in Action Item G under Objective 1. The reference to (RPU, 2000b) should have been placed right after the words

...minimize bacteria contribution from wildlife… as that is a direct quote from the watershed committee improvement plan; the other two sentences were added. The first sentence says basically the same thing as the sentence that precedes it, so it can be deleted.

Action Item G has been updated to correct the reference and the language about wildlife per your suggestion.

It is true that data indicating a zero flow was used in the analysis. This is because at the time of zero flow, there was some flow and water was present in pools. Primary contact recreation may be present in pools, although the smaller the size of pool, the less likely the presence of this beneficial use. There were only two data points with zero flow; both in September. When the conservation district reported the flow, they used the following nomenclature which was later confirmed with Nancy Hoobler as to what they meant:

Nomenclature	**Definition**
"no flow"	This meant no measurable flow, *i.e.*, flow was below the instrument's detection level, but there was flow. A water sample was taken.
"na" (not applicable)	This meant that flow was not measured, but there was flow and a water sample was taken.
"dry"	This meant there was no flow and a water sample was not taken.

The two September flows that were zero were actually labeled no flow and na in conservation the district data base. Thus, strictly speaking, there was flow. Even if we take these two data points out, the target reduction (92%) does not change. Although this TMDL is for the North Fork Palouse River, we do need to address water quality in all water bodies. Therefore, we also need to set targets for Clear Creek to protect the beneficial uses of that stream too.

There are not any current plans to sample Clear Creek unless the Palouse Conservation District has plans to do so. We can talk about more monitoring as we start implementing the plan. Most likely, there are going to be places where we will want more information.

Thanks for all your help reviewing this document and the great suggestions that you have made.

> *Note: A copy of the TMDL Submittal Report, highlighting any changes between the language in the watershed committee's report and the language carried over to the TMDL Submittal report, was sent to this commenter and several other committee members for their review.*

Comment:

Thank you for your letter and invitation to respond RE: North Fork Palouse River Water Quality Study. The stated emphasis on fecal coliform is obvious but to keep the watershed in perspective, I might comment on the broader aspects (REF P.9)

1. Cropland and pasture erosion and subsequent chemical and fertilizer residues;

2. Animal production;
3. Grandfathered septics;
4. The large portion of the watershed in Idaho (this I have added as it is a necessary consideration).

To summarize my comments on subjects above:

1. Farming practices are currently reducing pollution, example; no till and minimum till. Our farm uses these practices, and as a result the road ditches have not been cleaned for 20 years.
2. Farm animal populations are continually declining in Eastern Whitman County. Due to the impact of government which emphasize set aside acres and crop production records for compliance payments, under the present U.S. Department Agriculture regulations. In my opinion, if the trend continues, commercial livestock production will be practically non existent in a few more years (for eastern Whitman County).
3. Septics – They are gradually being updated as they should be.
4. Portion of Watershed of the North Palouse River in Idaho – totally omitted and it has a rapidly growing population.

In my opinion, the reports quantitative facts leave much to estimation. As a permanent resident of over 70 years in the North Palouse, I can truthfully say the Palouse River appears to be improving and "that is encouraging." (Burgess Lange - Garfield, WA)

Response:

Thank you for your comments. The items you reference on page nine of the draft *North Fork Palouse River Fecal Coliform Total Maximum Daily Load Submittal Report* are quoted verbatim from the North Fork Palouse River Watershed Committee's *North Fork Palouse River Water Quality Improvement Plan* which was produced in September 2002. It was Ecology's intent to keep as much of the submittal report in the words produced by the watershed committee, therefore, much of the language in the document comes from direct quotes from their previously developed plan.

Ecology agrees with you that new advances in farming practices have lead to a decrease in polluted runoff to our streams. Great progress has been made over the years.

Ecology understands the importance of balancing the economic needs with the environmental needs of the region. We will work with the watershed committee and local organizations and agencies to develop solutions to the water quality problems that are compatible with the livestock operations in the area.

Ecology will continue to support efforts to update septic systems or to connect homes with antiquated septic systems to sewer systems.

Although, Idaho's portion of the North Fork Palouse River watershed was not referenced in the quote on page nine, information about Idaho and their efforts is included on pages 26-27 of the

report. Ecology will continue to work with the Idaho Department of Environmental Quality on cross-border efforts.

Ecology agrees that the progress we have seen towards addressing water quality in the Palouse is working and it is very encouraging.

Thanks again for reviewing the document and your comments.

Comment:

Saw the blurb concerning the North Palouse watershed clean up and it brought to mind the business I am in by using barley straw in enclosed amounts to prevent algae from forming. Now if this does not fit what you are doing then pass me on to those who need this expertise.
I have the backing of Kathy Hamel and the Ecology best management practice for slow running water and running water. You will find me on www.barleyworld.org out of Corvallis, Oregon. I am here in Whitman County waiting to serve you and others. I have the testimony of others that this material really works. (Dave Kernkamp or strawman523@aol.com - Rosalia, WA)

Response:

Thanks for the information. This sounds like a very interesting practice. At this point, the focus of the clean up on the North Fork Palouse River is for fecal coliform bacteria. Ecology has a focus sheet about using barley straw to control algae. If you are interested you can view it at http://www.ecy.wa.gov/pubs/0410056.pdf. If we need to address any algae issues in the North Fork Palouse River in the future you will be kept in mind.

Additional Materials from Public Comment Period

Plan to clean up North Fork Palouse River ready for review

A draft plan to solve the problem of excessive fecal-coliform bacteria in the North Fork Palouse River watershed is available for public review and comment through Dec.10.

The draft water-quality cleanup plan, or total maximum daily load (TMDL) as these reports are sometimes called, was started in 2000 by the Palouse Conservation District. The district received money from the Washington legislature, the state Conservation Commission and the state Department of Ecology (Ecology) to conduct a study and develop a plan.

Fecal coliform bacteria are microscopic organisms that live in the intestines and waste material of warm-blooded animals. Although not necessarily agents of disease, the bacteria can be an indicator of disease-carrying organisms.

Sources of fecal coliform pollution in the North Fork Palouse River from the Idaho border to Colfax include leaking septic systems, birds, wild animals and domestic animals such as cattle, horses and pets.

The cleanup plan identifies broad methods for alleviating the problem, such as education, particularly about properly operating and maintaining septic systems, promoting the use of established "best management practices" for livestock owners, and promoting ways to manage wildlife to minimize contact with the river and its tributaries.

In addition to forming a committee to develop a plan, the Palouse Conservation District also monitored water quality from June 2001 through September 2003.

Ecology used the data from the monitoring to determine how much the fecal-coliform bacteria need to be reduced at various locations in the watershed to meet water quality standards. These targets, combined with the local committee's work, became the basis of the current plan being released for public review.

"This plan is a superior product because of the active participation of the community," said Jim Bellatty, who manages Ecology's water-quality program in Spokane. "We couldn't have understood local issues and concerns as well without the local committee's hard work."

After the public has a chance to review the plan, it will be submitted to the U.S. Environmental Protection Agency for final approval.

To view the draft report, go to http://www.ecy.wa.gov/biblio/0410067.html.

The next step will be to work on the specifics of how to implement the plan, such as what organizations and entities will take action, when it will be done and how it will be paid for.

Comments on the plan should be sent to Elaine Snouwaert at the Department of Ecology, 4601 N. Monroe St., Spokane, Wash., 99205, or by e-mail to esno461@ecy.wa.gov, by Dec. 10.

To understand how to submit effective comments, a publication is available at http://www.ecy.wa.gov/biblio/0410039.html.

Public Comment Period
On
The North Fork Palouse River Water Quality Improvement Plan For Fecal Coliform Bacteria

The Washington State Department of Ecology (Ecology), with assistance from the North Fork Palouse River Watershed Committee, is establishing a Water Quality Improvement Plan, also known as a total maximum daily load (TMDL) for fecal coliform bacteria in the North Fork Palouse River. This report includes targets for how much the fecal coliform bacteria needs to be reduced to meet water quality standards and recommends actions to achieve those targets. The recommendations in the report came from the North Fork Palouse River Watershed Committee's *North Fork Palouse River Water Quality Improvement Plan* which was published in September 2002.

The public is invited to review the document and submit written comments to Elaine Snouwaert, Department of Ecology, 4601 N. Monroe St., Spokane, WA 99205 or by email to esno461@ecy.wa.gov. **Written comments must be received by December 10, 2004.**

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An electronic version of the report can be found at:
http://www.ecy.wa.gov/biblio/0410067.html

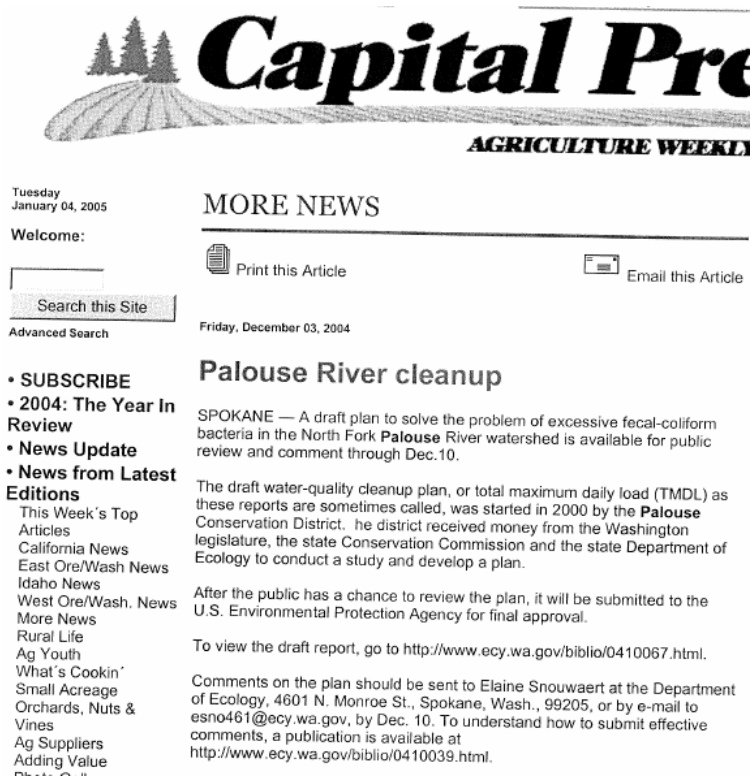
For a paper copy please contact:
Elaine at 509-329-3503 or at one of the above addresses.

For information about this project please visit:
http://www.ecy.wa.gov/programs/wq/tmdl/watershed/nfpalouse/index.html

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Your comments please!

From *The Boomerang!* November 18,2004



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Friday, December 03, 2004

Palouse River cleanup

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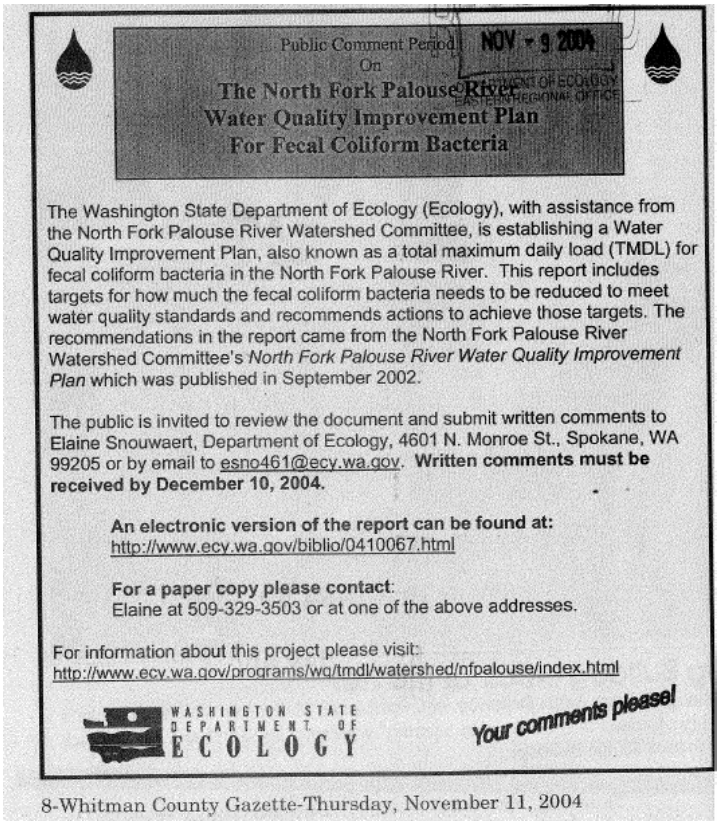

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WASHINGTON STATE DEPARTMENT OF ECOLOGY

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8-Whitman County Gazette-Thursday, November 11, 2004

Department of Ecology News Release - November 8, 2004

04-201

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# # #

Media contact: Jani Gilbert, public information manager, 509-329-3495; pager, 509-622-3073