FINAL

Shoreline Analysis Report for for Shorelines in Whitman County; the Cities of Colfax, Palouse, Pullman and Tekoa; and the Towns of Albion, Malden and Rosalia

Prepared for:

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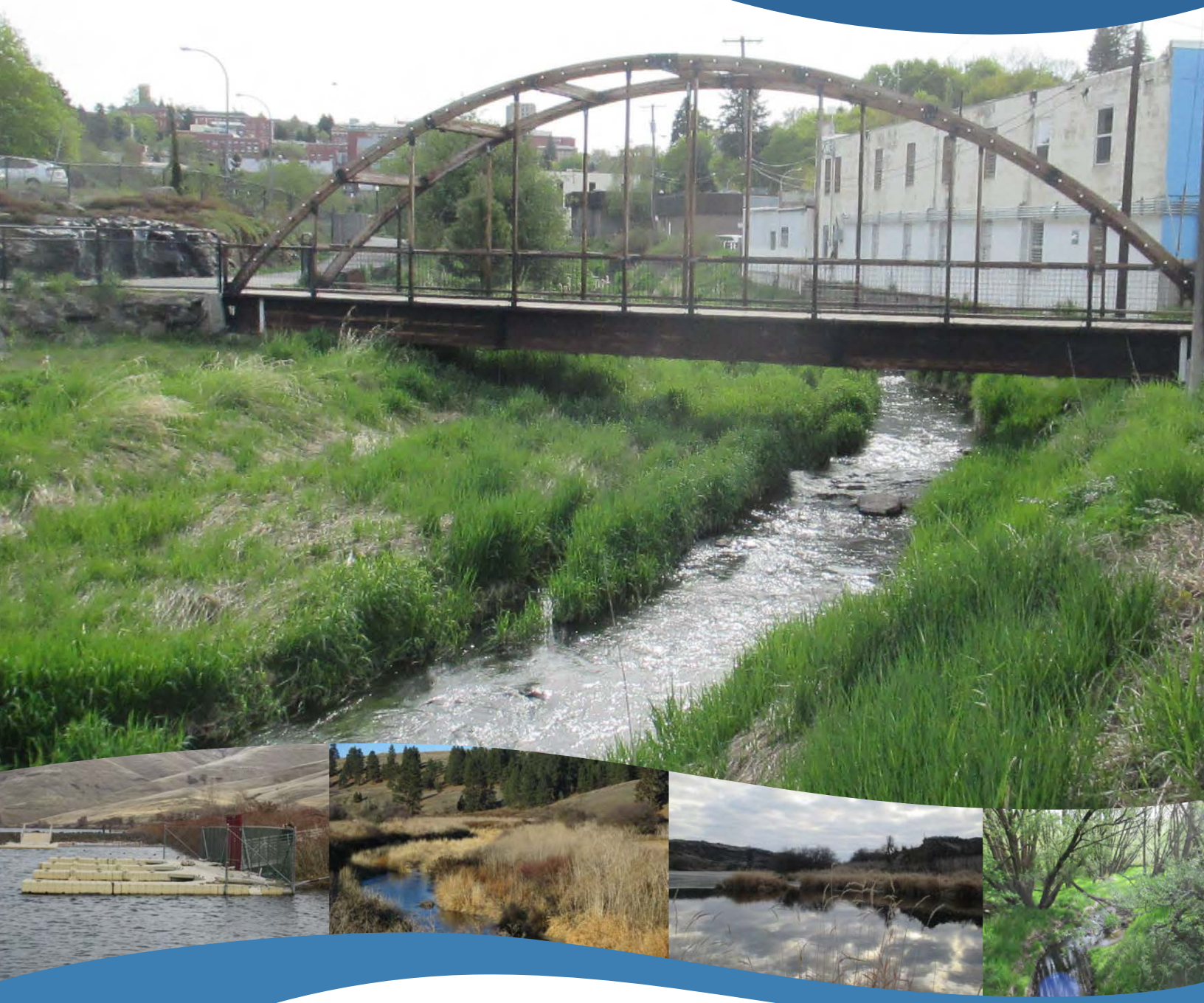

WHITMAN COUNTY COALITION SMP UPDATE

THE WATERSHED COMPANY

BERK

August 2014

FINAL

WHITMAN COUNTY
GRANT NO. G1400494

SHORELINE ANALYSIS REPORT

FOR SHORELINES IN WHITMAN COUNTY; THE CITIES OF COLFAX, PALOUSE, PULLMAN AND TEKOA; AND THE TOWNS OF ALBION, MALDEN AND ROSALIA

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SHORELINE ANALYSIS REPORT

WHITMAN COUNTY; THE CITIES OF COLFAX, PALOUSE, PULLMAN, AND TEKOA; AND THE TOWNS OF ALBION, MALDEN AND ROSALIA

1 INTRODUCTION

1.1 Background and Purpose

Whitman County (County); the Cities of Colfax, Palouse, Pullman and Tekoa; and the Towns of Albion, Malden and Rosalia (cities and towns collectively referred to as Cities) obtained a grant from the Washington Department of Ecology (Ecology) in 2013 to complete a comprehensive update of their Shoreline Master Programs (SMP). One of the first steps of the update process is to inventory and characterize the County and City shorelines as defined by the State's Shoreline Management Act (SMA) (RCW 90.58). This Shoreline Analysis Report was conducted in accordance with the Shoreline Master Program Guidelines (Guidelines, Chapter 173-26 WAC) and project Scope of Work promulgated by Ecology. Under these Guidelines, the County and Cities must identify and assemble the "most current, accurate, and complete scientific and technical information available that is applicable to the issues of concern" regarding natural and built environment characteristics in shoreline jurisdiction.

This Shoreline Analysis Report inventories and describes existing conditions and characterizes ecological functions in the shoreline jurisdiction. This assessment of current conditions will serve as the baseline against which the impacts of future development actions in shoreline jurisdiction will be measured. The Guidelines require that the County and Cities demonstrate that their updated SMPs yield "no net loss" in shoreline ecological functions relative to the baseline (current condition) due to its implementation. By describing and inventorying existing conditions, this Shoreline Analysis Report will be used to help inform the development of appropriate SMP policies, regulations, and environment designations to help meet the "no net loss" goal.

1.2 Shoreline Jurisdiction

1.2.1 Shorelines of the State

As defined by the Shoreline Management Act of 1971, shorelines include certain waters of the state plus their associated "shorelands." At a minimum, the waterbodies designated as shorelines of the state are streams whose mean annual flow is 20 cubic feet per second (cfs) or greater, lakes whose area is greater than 20 acres, and all marine waters. Ecology has identified the upstream limits of shoreline streams and rivers based on projected mean annual flow of 20 cfs (Higgins 2003), and those lakes that are 20 acres or greater in size.

Shorelands are defined as:

> "those lands extending landward for 200 feet in all directions as measured on a horizontal plane from the ordinary high water mark; floodways and contiguous floodplain areas landward 200 feet from such floodways; and all wetlands and river deltas associated with the streams, lakes, and tidal waters which are subject to the provisions of this chapter…Any county or city may determine that portion of a one-hundred-year-floodplain to be included in its master program as long as such portion includes, as a minimum, the floodway and the adjacent land extending landward two hundred feet therefrom… Any city or county may also include in its master program land necessary for buffers for critical areas (RCW 90.58.030)"

The ordinary high water mark (OHWM) is:

> "that mark that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland, in respect to vegetation as that condition exists on June 1, 1971, as it may naturally change thereafter, or as it may change thereafter in accordance with permits issued by a local government or the department: PROVIDED, That in any area where the ordinary high water mark cannot be found, the ordinary high water mark adjoining salt water shall be the line of mean higher high tide and the ordinary high water mark adjoining fresh water shall be the line of mean high water" (RCW 90.58.030(2)(b)).

A detailed discussion of the initial jurisdiction assessment and determination process, which concluded in March 2014, can be reviewed in full in Appendix A of this report. During the more detailed shoreline investigations conducted to prepare this report,

additional modifications to the shoreline jurisdiction map were made in the City of Pullman area as follows.

The FEMA map identified two floodway areas that extend down South Grand Avenue and generally up North Grand Avenue. The City's planning and public works/engineering staff provided additional information about these features that resulted in their omission from shoreline jurisdiction. According to the City, the floodway along South Grand Avenue is actually a part of Dry Fork Creek, a piped system underneath the roadway. There is no surface flow associated with this piped feature, and thus it cannot reasonably be considered a shoreland. City staff have determined that a second floodway finger shown along North Grand Avenue is associated with Missouri Flat Creek (a non-shoreline stream), and is caused by drainage problems on that creek rather than flows and processes in the Palouse River. Shoreline jurisdiction up the Missouri Flat Creek floodway was terminated at the point where flood activity shifts from being related to the Palouse River to being a byproduct of internal Missouri Flat Creek conditions.

On the mainstem South Fork Palouse River near the north end of the City, shoreline jurisdiction area was also reduced by omitting areas mapped as hydric soils, but not mapped as wetland in the National Wetlands Inventory. The affected lands are active industrial area; examination of the aerial photo clearly shows that wetland conditions could not be present.

1.2.2 Shorelines of Statewide Significance

A subset of state shorelines, called Shorelines of Statewide Significance, receives special attention in the Shoreline Management Act and Guidelines. In Eastern Washington, all streams and rivers which have mean annual flow of 200 cfs or greater or portions of waterbodies downstream from the first 300 square miles of drainage area are considered Shorelines of Statewide Significance. Additionally, any lakes larger than 1,000 acres are also Shorelines of Statewide Significance. This special status applies to all shorelines within the County along the Palouse and Snake Rivers and Rock Creek and to most of the shoreline on Pine and Union Flat Creeks. Rock Lake is also a Shoreline of Statewide Significance. For Shorelines of Statewide Significance, the SMA sets specific preferences for uses and calls for a higher level of effort in implementing its objectives.

1.3 Study Area

Whitman County encompasses 2,178 square miles and is located in the southeast part of Washington. Whitman County is bounded to the south by the Snake River. The County

is bordered to the east by Idaho, to the north by Spokane and Lincoln Counties, and to the west by Adams and Franklin Counties. The County includes portions of three Water Resource Inventory Areas (WRIAs). The majority of the County is in the Palouse River Watershed (WRIA 34), the southern portion of the County is in the Middle Snake River Watershed (WRIA 35), and a relatively small area in the northeastern portion of the County is in the Hangman, or Latah, Creek Watershed (WRIA 56).

The County is predominantly rural and agricultural in nature, with unincorporated areas making up most of the county territory. Incorporated towns include Albion, Colton, Endicott, Farmington, Garfield, La Crosse, Lamont, Malden, Oakesdale, Rosalia, Saint John and Uniontown. The two largest cities are Pullman and Colfax where the majority of housing, commercial and industrial activities are centered. Pullman has a designated Urban Growth Area (UGA) in which the County retains governance until the area is annexed. Other incorporated cities include Tekoa and Palouse.

The study area for this report includes all land currently within proposed shoreline jurisdiction for unincorporated and incorporated areas within Whitman County. The study area includes relevant discussion of the contributing watersheds.

In total, this shoreline inventory has mapped approximately 464 miles of river/stream shoreline and 40 miles of lake shoreline that meet shoreline jurisdiction criteria. Total jurisdictional shoreland area equals approximately 29 square miles, which includes associated wetlands, floodways, and portions of associated floodplains. Federal lands make up approximately 19 percent of that area, or 5.5 square miles. The three federal entities that own the majority of the federal land are the U.S. Bureau of Reclamation, the U.S. Army Corps of Engineers (Corps), and the U.S. Bureau of Land Management. State lands make up approximately 6 percent of the total shoreline area, or 1.7 square miles.

2 SUMMARY OF CURRENT REGULATORY FRAMEWORK

2.1 Shoreline Management Act

The Shoreline Management Act of 1971 promoted planning along shorelines and coordination among governments. The legislative findings and policy intent of the SMA states:

> "There is, therefore, a clear and urgent demand for a planned, rational, and concerted effort, jointly performed by federal, state, and local governments, to prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines (RCW 90.58.020)."

While protecting shoreline resources by regulating development, the SMA is also intended to provide balance by encouraging water-dependent or water-oriented uses while also conserving or enhancing shoreline ecological functions and values. SMPs will be based on state guidelines, but should be tailored to the specific conditions and needs of the local community.

Whitman County adopted its present Shoreline Management Master Plan in 1974, and it has not been updated since that time. The Cities are all currently using the County's SMP.

2.2 Local Regulations

2.2.1 Whitman County

Whitman County adopted its present Shoreline Management Master Plan in 1974, and it has not been updated since that time. Shoreline uses, developments, and activities are also subject to the County's Comprehensive Plan, County Code, and various other provisions of County, state and federal laws.

The current Shoreline Management Master Plan designations for Whitman County are briefly described below.

- Urban: The Urban environment is an area of high density land-use including residential, commercial, recreational and industrial development. It is particularly suitable to those areas presently subjected to extremely intensive use pressure, as well as areas planned to accommodate urban expansion.
- Rural: The Rural environment is intended for those areas characterized by intensive agriculture and recreational uses and those areas having a high capability to support active agricultural practices and intensive recreational development
- Conservancy: The Conservancy environment is for those areas which are intended to maintain their existing character. Preferred uses in the Conservancy environment are those which are non-consumptive of the physical and biological resources of the area.

- Natural: The Natural environment is characterized by the presence of some unique natural or cultural features considered valuable in their natural or original condition which are relatively intolerant of intensive human use.

The County Comprehensive Plan, last updated in 2010, is a statement of policies and goals that guides growth and development throughout the County. The County is not required to plan under the Growth Management Act (GMA), although its non-GMA plan contains many of the same elements required by the GMA. The County Comprehensive Plan addresses the following elements: land use, transportation, environmental quality and natural conservation, renewable energy, economic development, telecommunication, and parks and recreation.

County regulations applicable to critical areas are detailed in Whitman County Code (WCC) Chapter 9.05. These regulations were adopted in 1994, and were most recently revised in 2012. In those regulations the County specifies minimum Riparian Habitat Area buffer widths of 150 feet to 250 feet depending on the stream type (WCC 9.05B.050(B)(30(b)). The regulations also require wetland buffers between 25 and 250 feet based on wetland classification and intensity of proposed land use (WCC 9.05A.050). The County's Critical Areas regulations also apply to geologically hazardous areas, critical aquifer recharge areas, and frequently flooded areas.

Many shoreline and wetland areas within the County contain functioning buffers of the required widths. Smaller functioning buffers are found where developments existed prior to the critical areas regulations or where buffers of different widths were previously established in approved site plans or protected critical area easements.

Shoreline uses, developments, and activities regulated under the Critical Areas regulations are also subject to the County's Comprehensive Plan, WCC, and various other provisions of County, state and federal laws. Any applicant must comply with all applicable laws prior to commencing any use, development, or activity. The County will ensure consistency between the SMP and other County codes, plans and programs by reviewing each for consistency during periodic updates.

2.2.2 Town of Albion

The Town of Albion has adopted the County's SMP.

2.2.3 City of Colfax

The City of Colfax has adopted the County's SMP. However, the City has its own critical areas regulations contained in Colfax Municipal Code Title 17, adopted via

Ordinance 13-02 in May 2013. In those regulations, the City requires wetland buffers of between 50 and 250 feet based solely on wetland category (CMC 17.14.040.C). No stream buffer widths are specified, although the regulations require preparation of a habitat management plan based on best available science and a demonstration that a project would not degrade functions and values of the habitat (CMC 17.14.060).

2.2.4 Town of Malden

The Town of Malden has adopted the County's SMP. However, the City has its own critical areas regulations contained in Malden Municipal Code Chapter 17.12, adopted via Ordinance No. 444 in July 2007. In those regulations, the City requires wetland buffers of between 50 and 250 feet based solely on wetland category (MMC 17.12.050.C). No stream buffer widths are specified, although the regulations require preparation of a habitat management plan based on best available science and a demonstration that a project would not degrade functions and values of the habitat (MMC 17.12.070).

2.2.5 Town of Rosalia

The Town of Rosalia has adopted the County's SMP.

2.2.6 City of Palouse

The City of Palouse has adopted the County's SMP. However, the City has its own critical areas regulations contained in Palouse Municipal Code Chapter 17.26, last updated in 2007. In those regulations, the City requires wetland buffers of between 50 and 250 feet based solely on wetland category (PMC 17.26.050). No stream buffer widths are specified, although the regulations require preparation of a habitat management plan based on best available science and a demonstration that a project would not degrade functions and values of the habitat (PMC 17.26.070).

2.2.7 City of Pullman

The City of Pullman has adopted the County's SMP. However, the City has its own critical areas regulations contained in Title 16 of the Pullman Municipal Code, most recently updated in 2007. In those regulations the City specifies recommended minimum Riparian Habitat Area buffer widths of 50 feet to 150 feet depending on the stream type (PMC 16.50.470). Wetland buffers of between 25 and 200 feet are required based on wetland category and intensity of proposed land use (PMC 16.50.270).

2.2.8 City of Tekoa

The City of Tekoa has adopted the County's SMP. However, the City has its own critical areas regulations contained in Ordinance 764, which amends Tekoa Municipal Code Chapter 4.24, Critical Areas Protection. These regulations from 2007 require wetland

buffers of between 50 and 250 feet based solely on wetland category (TMC 4.24.050.C). No stream buffer widths are specified, although the regulations require preparation of a habitat management plan based on best available science and a demonstration that a project would not degrade functions and values of the habitat (TMC 4.24.070).

2.3 State Agencies and Regulations

Aside from the Shoreline Management Act, State regulations most pertinent to development in the County's shorelines include the State Hydraulic Code, State Environmental Policy Act, Watershed Planning Act, Water Resources Act, Salmon Recovery Act, and case law. A variety of agencies (e.g., Washington Department of Ecology, Washington Department of Fish and Wildlife, Washington Department of Natural Resources) are involved in implementing these regulations or otherwise managing public shoreline areas. The Department of Ecology reviews all shoreline projects that require a shoreline permit, but has specific regulatory authority over shoreline conditional use permits and shoreline variances. Other agency reviews of shoreline developments are typically triggered by in- or over-water work, discharges of fill or pollutants into the water, or substantial land clearing.

Depending on the nature of the proposed development, state regulations can play an important role in the design and implementation of a shoreline project, ensuring that impacts to shoreline functions and values are avoided, minimized, and/or mitigated. During the comprehensive SMP update, the County will consider other state regulations to ensure consistency as appropriate and feasible with the goal of streamlining the shoreline permitting process. A summary of some of the key state regulations and/or state agency responsibilities follows.

Hydraulic Code: Chapter 77.55 RCW (the Hydraulic Code) gives the Washington Department of Fish and Wildlife (WDFW) the authority to review, condition, and approve or deny "any construction activity that will use, divert, obstruct, or change the bed or flow of State waters." These activities may include stream alteration, culvert installation or replacement, pier and bulkhead repair or construction, among others. In a permit called a Hydraulic Project Approval (HPA), WDFW can condition projects to avoid, minimize, restore, and compensate adverse impacts.

Section 401 Water Quality Certification: Section 401 of the federal Clean Water Act allows states to review, condition, and approve or deny certain federal permitted actions that result in discharges from fills or excavations to State waters, including wetlands and streams. In Washington, the Department of Ecology is the State agency that has been

delegated responsibility for conducting that review, with their primary review criteria of ensuring that State water quality standards are met. Actions within streams or wetlands within the shoreline zone that require a Section 404 permit (see below), Coast Guard Permit, or a Federal Energy Regulatory Commission (FERC) license require a Section 401 water quality certification.

Washington Department of Natural Resources: Washington Department of Natural Resources (WDNR) is charged with protecting and managing use of state-owned aquatic lands. WDNR manages more than 5.6 million acres of state-owned forest, range, commercial, agricultural, conservation, and aquatic lands. WDNR manages these lands for revenue, outdoor recreation, and habitat for native fish and wildlife. Water-dependent uses waterward of the ordinary high water mark require review by WDNR to establish whether the project is on state-owned aquatic lands. WDNR recommends that all proponents of a project waterward of the ordinary high water mark make contact with WDNR to determine jurisdiction and requirements.

Watershed Planning Act: The Watershed Planning Act of 1998 (Chapter 90.82 RCW) was passed to encourage local planning of local water resources, recognizing that there are citizens and entities in each watershed that "have the greatest knowledge of both the resources and the aspirations of those who live and work in the watershed; and who have the greatest stake in the proper, long-term management of the resources." Whitman County is within three watershed basins. The Palouse Watershed Plan (WRIA 34) was approved and adopted in 2007. However, the Palouse Watershed Planning Group is not currently operating under the Watershed Planning Act and has not met for several years. The Middle Snake Watershed Plan (WRIA 35) was completed in 2007 and had an updated, detailed implementation plan completed in 2011. However, the Middle Snake Watershed Planning Group is not currently operating under the Watershed Planning Act. Whitman County adopted the final Hangman (Latah) Creek Watershed Management Plan (WRIA 56) in September 2005. Phase 4 implementation started in October 2006, and the detailed implementation plan was completed in early 2008.

Water Pollution Control Act: Chapter 90.48 RCW establishes the State's policy "to maintain the highest possible standards to insure the purity of all waters of the State consistent with public health and public enjoyment thereof, the propagation and protection of wild life, birds, game, fish and other aquatic life, and the industrial development of the State, and to that end require the use of all known available and reasonable methods by industries and others to prevent and control the pollution of the waters of the State of Washington." The Department of Ecology is the agency charged

with crafting and implementing rules and regulations in accordance with this legislation.

2.4 Federal Regulations

Federal regulations most pertinent to development in the County's shorelines include the Endangered Species Act, the Clean Water Act, and the Rivers and Harbors Appropriation Act. Other relevant federal laws include the National Environmental Policy Act, Anadromous Fish Conservation Act, Clean Air Act, and the Migratory Bird Treaty Act. A variety of agencies (e.g., Corps, National Marine Fisheries Service, U.S. Fish and Wildlife Service) are involved in implementing these regulations, but review by these agencies of shoreline development in most cases would be triggered by in- or over-water work, or discharges of fill or pollutants into the water. Depending on the nature of the proposed development, federal regulations can play an important role in the design and implementation of a shoreline project, ensuring that impacts to shoreline functions and values are avoided, minimized, and/or mitigated. During the SMP update, the County will consider other federal regulations to ensure consistency as appropriate and feasible with the goal of streamlining the shoreline permitting process. A summary of some of the key federal regulations and/or federal agency responsibilities follows.

Clean Water Act: Major components of the Clean Water Act include Section 404, Section 401, and the National Pollutant Discharge Elimination System (NPDES).

Section 404 provides the Corps, under the oversight of the U.S. Environmental Protection Agency, with authority to regulate "discharge of dredged or fill material into waters of the United States, including wetlands" (http://www.epa.gov/owow/wetlands/pdf/reg_authority_pr.pdf). The extent of the Corps' authority and the definition of fill have been the subject of considerable legal activity. As applicable to the County's shoreline jurisdiction, however, it generally means that the Corps must review and approve most activities in streams and wetlands. These activities may include wetland fills, stream and wetland restoration, and culvert installation or replacement, among others. The Corps requires projects to avoid, minimize, and compensate for impacts.

A Section 401 Water Quality Certification is required for any applicant for a federal permit for any activity that may result in any discharge to waters of the United States. States and tribes may deny, certify, or condition permits or licenses based on the proposed project's compliance with water quality standards. In Washington State, the

Department of Ecology has been delegated the responsibility by the U.S. Environmental Protection Agency for managing implementation of this program.

The NPDES is similar to Section 401, and it applies to ongoing point-source discharge. Permits include limits on what can be discharged, monitoring and reporting requirements, and other provisions designed to protect water quality. Examples of discharges requiring NPDES permits include municipal stormwater discharge, wastewater treatment effluent, or discharge related to industrial activities.

Endangered Species Act (ESA): Section 9 of the ESA prohibits "take" of listed species. Take has been defined in Section 3 as: "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." The take prohibitions of the ESA apply to everyone, so any action that results in a take of listed fish or wildlife would be a violation of the ESA and is strictly prohibited. Per Section 7 of the ESA, activities with potential to affect federally listed or proposed species and that either require federal approval, receive federal funding, or occur on federal land must be reviewed by the National Marine Fisheries Service (NOAA Fisheries) and/or U.S. Fish and Wildlife Service (USFWS) via a process called "consultation." Activities requiring a Section 10 or Section 404 permit also require such consultation if these activities occur in waterbodies with listed species. Section 4(f) of the ESA directs the Services to develop or appoint teams to develop and implement recovery plans for threatened and endangered species. Whitman County is a member of the Snake River Salmon Recovery Board and County staff contributed to the development of the 2011 Snake River Salmon Recovery Plan for Southeast WA.

Magnuson-Stevens Fishery Conservation and Management Act: The Magnuson-Stevens Fishery Conservation and Management Act of 1996 is administered by the National Marine Fisheries Service to foster and protect commercial and recreational fisheries of designated species that "contribute to the food supply, economy, and health of the Nation and provide recreational opportunities" (18 U.S.C. §1801-a). In Whitman County, Chinook salmon and steelhead are the two designated species. The primary avenue for on-the-ground management of those species is designation and protection of "essential fish habitat" (EFH), which is "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The National Marine Fisheries Service incorporates consideration of EFH into the same process under which projects are reviewed per the Endangered Species Act.

Rivers and Harbors Act: Section 10 of the federal Rivers and Harbors Appropriation Act of 1899 provides the U.S. Army Corps of Engineers (Corps) with authority to regulate

activities that may affect navigation of "navigable" waters. The only designated "navigable" water in Whitman County is the Snake River. Proposals to construct new or modify existing over-water structures (including bridges), to excavate or fill, or to "alter or modify the course, location, condition, or capacity of" navigable waters must be reviewed and approved by the Corps.

3 SUMMARY OF ECOSYSTEM CONDITIONS

Portions of three major watersheds are located within Whitman County; these include: the Palouse (34), Middle Snake (35), and Hangman (Latah) Creek (56) Water Resource Inventory Areas (WRIAs). A map of the WRIAs within Whitman County is provided in Figure 3-1. These watersheds are described in the following sections.

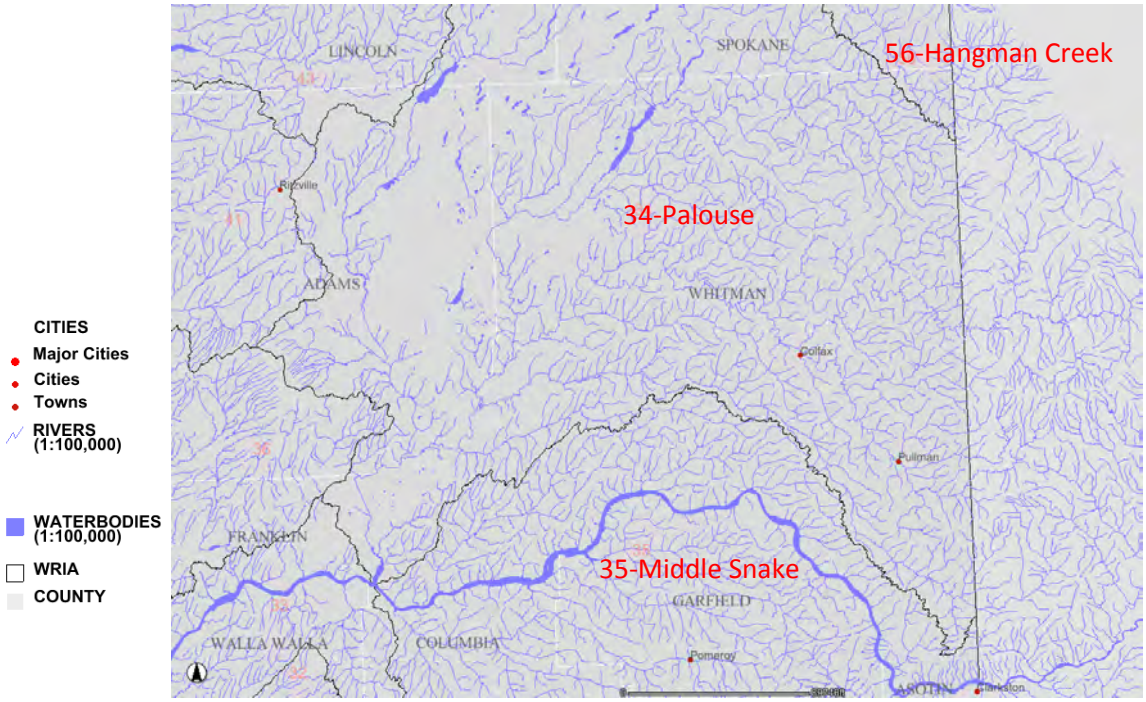


Figure 3-1. Map of Water Resource Inventory Areas in Whitman County (WDFW, Salmonscape)

3.1 Palouse (WRIA 34)

3.1.1 Geographic and Ecosystem Context

The Palouse watershed covers the majority of Whitman County. The Palouse River originates in the Bitterroot Mountains in northern Idaho, and flows westerly into Whitman County before joining the Snake River at the Whitman/Franklin County line.

Although there are no man-made dams on the Palouse River, the 185-foot Palouse Falls, approximately 6 miles upstream from the River's confluence with the Snake River, prevents anadromous salmon passage (Golder Associates, Inc. 2009).

3.1.2 Topography, Geology, and Drainage Patterns

The topography of the Palouse watershed transitions from mountainous terrain in Idaho to rolling hills composed of basalt covered with loess in the central portion of the watershed. The far western portion of the watershed is in an area called the Channeled Scablands. This area was shaped by massive floods over the past million years, which left behind exposed channels of the underlying basalt amongst islands of loess (HDR and EES 2007).

Precipitation primarily occurs in the winter months, and ranges from 10 inches in the west to 50 inches in the eastern portion or the watershed (HDR and EES 2007). Many of the smaller steam channels are dry in the summer. Major tributaries in the watershed include the North and South Forks, Rebel Flat Creek, Rock Creek, Pine Creek, Union Flat Creek and Cow Creek. Several lakes occur in the Palouse Watershed, mostly in the Cow Creek and Rock Creek subbasins. Many of the lakes are natural depressions with basalt bottoms and no outlets (HDR and EES 2007). Extensive wetlands are present in the Rock Creek and North Fork Palouse subbasins.

3.1.3 Major Land Use Changes

Historically, the dominant vegetation in the Palouse watershed was a bunchgrass association. Much of that vegetation has been converted to dryland agriculture or altered by rangeland uses. Soil erosion resulting from storm water runoff has been a continuing problem throughout WRIA 34 as a result of land conversions to agriculture. An estimated 40% of the topsoil in the Palouse has been lost to erosion during this time (HDR and EES 2007). Most livestock grazing occurs in the westernmost portion of the basin, within the Channeled Scablands. Urban development makes up a small portion of the watershed; however, several cities are located directly adjacent to the Palouse River and its tributaries. The South Fork Palouse River passes through the City of Pullman and Town of Albion. The North Fork Palouse River passes through the City of Palouse. The City of Colfax is situated at the confluence of the North and South Forks. As a result of a flood control project, constructed in 1965, the North Fork Palouse River is channelized through the City of Colfax, including 3,740 feet of concrete-lined channel (HDR and EES 2007). Riparian areas have been significantly altered by land use in the South Fork Palouse subbasin, and many small intermittent streams have been converted to drainage ditches throughout the North and South Fork subbasins.

Water quality concerns are primarily from non-point sources throughout most of the watershed, including erosion, livestock, fertilizers, and septic systems, which contribute sediment, fecal coliforms, and nutrients. Temperature is also a concern in many of the waterbodies in the watershed. The Washington Department of Ecology performs regular water quality assessments and places waterbodies into one of five categories to describe the status of their water quality. Polluted waters fall into Category 4 and 5. Category 4 are polluted waters that either have or do not require a TMDL, and Category 5 are polluted waters requiring a TMDL, traditionally referred to as waters on the 303(d) list. Category 4 and 5 shoreline waterbodies within WRIA 34 are identified in Tables 3-1 and 3-2 below.

Potential point sources of pollutants are particularly significant in the South Fork Palouse River, where municipal wastewater discharges from the City of Pullman and the City of Moscow, Idaho contribute nearly all of the summer flows (HDR and EES 2007). In 1997, the South Fork was listed as impaired by elevated levels of ammonia; however, the City of Pullman and the City of Moscow upgraded their wastewater treatment facilities, such that water quality standards are now being met on the South Fork (HDR and EES 2007).

Consumptive water uses are not expected to change significantly within the watershed, except in the City of Pullman, where municipal, domestic, and university water demand is expected to increase by approximately 45 percent between 2006 and 2028 (HDR and EES 2007).

Table 3-1. Category 4 Waterbodies in WRIA 34

River	Category	Bacteria	Ammonia-N	Other chemical compounds, including pesticides	PCB
Palouse River, south fork	4a (has a TMDL)	X	X	X	X
Palouse River	4a (has a TMDL)	X		X	X

Table 3-2. Category 5 Waterbodies (Impaired) in WRIA 34

River	Dieldrin	Dissolved Oxygen	pH	Temperature	Bacteria
Palouse River		X	X	X	
Palouse River, south fork		X	X	X	
Pine Creek		X			X
Rock Lake	X				

3.1.4 Fish and Wildlife

There are no ESA-listed salmonids or other listed aquatic species above the Palouse Falls. Resident fish species above the falls include rainbow trout, brown trout, smallmouth bass, sculpin, largescale sucker, northern squawfish, shiner perch and speckled dace (HDR and EES 2007). Trout are less common in the lower portions of the watershed, presumably as a result of temperature and water quality constraints in the lower watershed. Rainbow trout have been stocked in Rock Lake, and Kokanee salmon that are annually stocked into Chapman Lake in Spokane County are found downstream as far as Rock Lake (HDR and EES 2007). Various warm-water fish are also found in many of the lakes in the watershed.

Table 3-3 below lists the priority habitats and species (PHS) WDFW has identified in Whitman County. Fish and Wildlife PHS maps are included as Maps 15-17 in the map folio (Appendix B).

Table 3-3. Priority Habitats and Species in Whitman County

Priority Habitat/Species	State	Federal Status
Habitats		
Aspen Stands		
Biodiversity Areas & Corridors		
Eastside Steppe		
Shrub-Steppe		
Riparian		
Freshwater Wetlands & Freshwater Deepwater		
Instream		
Caves		
Cliffs		
Snags and Logs		
Talus		
Fish		
Pacific Lamprey		Species of Concern
River Lamprey	Candidate	Species of Concern
White Sturgeon		
Leopard Dace	Candidate	
Mountain Sucker	Candidate	
Bull Trout/Dolly Varden	Candidate*	Threatened*
Chinook Salmon	Candidate	Threatened (Upper Columbia Spring run is Endangered)
Rainbow Trout/Steelhead/Inland Redband Trout	Candidate**	Threatened**
Sockeye Salmon	Candidate	Endangered in Snake River
Westslope Cutthroat		
Wildlife		
Columbia Spotted Frog	Candidate	
Western Toad	Candidate	Species of Concern
Sagebrush Lizard	Candidate	Species of Concern

Priority Habitat/Species	State	Federal Status
American White Pelican	Endangered	
E WA breeding concentrations of: Grebes, Cormorants		
E WA breeding: Terns		
Great Blue Heron		
Waterfowl Concentrations		
Bald Eagle	Sensitive	Species of Concern
Ferruginous Hawk	Threatened	Species of Concern
Golden Eagle	Candidate	
Peregrine Falcon	Sensitive	Species of Concern
Prairie Falcon		
Chukar		
Ring-necked Pheasant		
Wild Turkey		
Upland Sandpiper	Endangered	
E WA breeding occurrences of: Phalaropes, Stilts and Avocets		
Burrowing Owl	Candidate	Species of Concern
Vaux's Swift	Candidate	
Pileated Woodpecker	Candidate	
Loggerhead Shrike	Candidate	
Sage Sparrow	Candidate	
Sage Thrasher	Candidate	
Merriam's Shrew	Candidate	
Preble's Shrew	Candidate	Species of Concern
Roosting Concentrations of: Big-brown Bat, Myotis bats, Pallid Bat		
Townsend's Big-eared Bat	Candidate	Species of Concern
Black-tailed Jackrabbit	Candidate	
White-tailed Jackrabbit	Candidate	
Washington Ground Squirrel	Candidate	Candidate
Moose		
Northwest White-tailed Deer		
Elk		
Rocky Mountain Mule Deer		
Columbia River Tiger Beetle	Candidate	
Mann's mollusk-eating Ground Beetle	Candidate	
Giant Palouse Earthworm	Candidate	
Shepard's Parnassian	Candidate	
Silver-bordered Fritillary	Candidate	

Source: Washington Department of Fish and Wildlife 2008
*Bull trout only
**Steelhead only

3.2 Middle Snake (WRIA 35)

3.2.1 Geographic and Ecosystem Context

The Snake River originates in western Wyoming, passing through Idaho, and into southeastern Washington. The Middle Snake River includes areas in Idaho and Oregon, and extends downstream to the confluence of the Palouse and Snake Rivers. The Middle

Snake Basin is semi-arid, with annual precipitation ranging from 5 inches in the lowlands up to 45 inches in the Blue Mountains (Kuttel 2002).

3.2.2 Topography, Geology, and Drainage Patterns

The Snake River contributes about 20 percent of the Columbia River flow (Snake River Salmon Recovery Board 2011). Stream flows are controlled by the hydropower system, as well as seasonally variable flows in smaller tributaries corresponding with winter precipitation and spring snowmelt. The Snake River receives inflow from groundwater aquifers along its reach, including upper aquifers and deeper basalt aquifers.

3.2.3 Major Land Use Changes

Historically, the Middle Snake River watershed was covered by prairie and canyon grasslands and shrub-steppe at low to mid-elevations. Forests dominated as elevation and proximity to the Blue Mountains increased (Kuttel 2002). As a result of land use changes and development, much of the prairie, shrub-steppe, and riparian habitats have been lost or modified. Conversion of perennial bunchgrass prairies to production of annual crops has led to significant quantities of fine sediment erosion and deposition in WRIA 35 streams (Kuttel 2002).

Floodplains throughout WRIA 35 have been converted to agricultural and residential use (Kuttel 2002). This development has resulted in channel straightening, armoring, and simplification (Kuttel 2002).

The hydrology along the Snake River has been severely altered by the installation of hydroelectric dams. The Corps operates four dams along the lower and middle Snake River. The dams were built to provide hydroelectric power, river navigation, irrigation water, and flood control. The upper two dams, Little Goose Dam and Lower Granite Dam, are located along Whitman County's shorelines. The dams on the Lower Snake and Columbia Rivers impound water, creating shallow reservoirs that fill the width of the steep-sided canyons. Lower Granite Lake is located upstream of Little Granite Dam. Between Little Goose Dam to the base of Lower Granite Dam, the River is called Lake Bryan; below Little Goose Dam, it is called Lake Herbert G. West.

Water quality in portions of the Snake River is impaired by several pesticides, dioxin, PCBs, temperature and dissolved oxygen. Category 4 and 5 shoreline waterbodies within WRIA 35 are identified in Tables 3-4 and 3-5 below.

Table 3-4. Category 4 Waterbodies in WRIA 35

River	Category	Total Dissolved Gas	Invasive Exotic Species	Dioxin
Snake (Herbert G West Lake)	4c		X	
	4a	X		
Snake (Bryan Lake)	4c		X	
Snake (Lower Granite Lake)	4a	X		X

Table 3-5. Category 5 Waterbodies in WRIA 35

River	PCB	2,3,7,8-TCDD	Dieldrin	Dissolved Oxygen	pH	Temperature	Dioxin	4,4'-DDE	Total Chlordane
Snake (Bryan Lake)	X	X	X			X		X	X
Snake (Herbert G West Lake)						X			
Snake (Lower Granite Lake)	X		X	X	X	X	X	X	

3.2.4 Fish and Wildlife

The Snake River Basin historically produced substantial runs of spring Chinook, fall Chinook, coho, and sockeye salmon, and steelhead; however, the abundance of these species decreased substantially through the 1900s, primarily as a result of fish passage barriers, poaching, and changes to habitat (Kuttel 2002). In the case of Snake River sockeye salmon, three of the four main sockeye-rearing lakes were poisoned for decades in an effort to reduce competition with Kamloops rainbow trout (Kuttel 2002). Snake River coho salmon have been considered extinct since the early 1980s. Snake River spring/summer Chinook, fall Chinook, and steelhead are listed as federally threatened. Snake River sockeye salmon are federally listed as endangered.

The Middle Snake River primarily serves as a migratory corridor for these species. Fall Chinook salmon also spawn in the Snake River downstream from Hells Canyon Dam, with limited spawning in the tailraces of the four lower Snake River Dams and the lower portions of the Grande Ronde, Tucannon, and Palouse Rivers (Kuttel 2002).

3.3 Hangman (Latah) Creek (WRIA 56)

3.3.1 Geographic and Ecosystem Context

The Hangman Creek watershed originates in the mountains in Idaho, and flows south through the Palouse region in Whitman County.

3.3.2 Topography, Geology, and Drainage Patterns

Hangman Creek flows through sedimentary hills of sand, gravel and cobbles deposited during the Lake Missoula floods (Spokane County Conservation District (SCCD) 2005). Precipitation in the Hangman Creek watershed ranges from 18 inches per year at the mouth to over 40 inches per year in the southeastern headwaters SCCD 2005). Precipitation occurs primarily in the winter, and summers are dry. As such, flows are highest (over 200 cfs at the State line) in the winter months, and lowest (less than 1 cfs at the State line) in late summer.

In upper Hangman Creek, the underlying aquifer occurs within the Columbia River Basalts.

3.3.3 Major Land Use Changes

Hangman Creek historically supported a tribal salmon fishery upstream of the Town of Tekoa (Edelen and Allen, 1998 in SCCD 2005). However, as vegetation was cleared and soils were tilled to accommodate agriculture in the late 1800s, stream conditions became degraded. In 1893, Gilbert and Evermann described Hangman Creek in the Town of Tekoa as "an unimportant stream … found to be a small, rather filthy stream, not suitable for trout or other food-fishes" (Edelen and Allen, 1998 in SCCD 2005).

Today, agriculture is the predominant land use in the upper and middle reaches of the Hangman Creek watershed. Removal of riparian vegetation has resulted in increased bank erosion and stream siltation. Forestry practices in the upper watershed have altered stream flows, increasing peak flows and lowering summer low-flows. The Lower Hangman Creek watershed supports significant urban development in and around the City of Spokane, and this area is expected to undergo 50 percent of the City of Spokane's urban growth in the next ten years (SCCD 2005).

Water quality is a concern in Hangman Creek. It is on the State's list of impaired waters (Category 5) for dissolved oxygen and has a Category 4a listing (has an approved TMDL in place) for bacteria, temperature and turbidity.

3.3.4 Fish and Wildlife

Riparian corridors along Hangman Creek support a variety of wildlife, including white-tailed deer, Rocky Mountain elk, moose, coyote, river otter, beaver, meadow vole, and deer mice (SCCD 2005). Birds commonly found in riparian habitats include great blue heron, kingfisher, yellow warbler, mallard, cinnamon teal, green-winged teal, wood duck, common merganser, western bluebirds, red-winged blackbirds, magpies and Canada geese. Bald eagles may migrate through the Hangman Creek riparian corridor, but no known nesting sites have been reported (SCCD 2005).

Native trout and salmon populations that were once documented in Hangman Creek have decreased substantially as a result of dams, loss of habitat, and water quality degradation. Corresponding with habitat degradation and temperature increases, more tolerant fish species, such as sculpin and redside shiners, have apparently expanded their distribution and increased their population (SCCD 2005).

4 SHORELINE INVENTORY

4.1 Inventory Data Sources, Assumptions and Data Gaps

Development of a shoreline inventory is intended to record the existing or baseline conditions upon which the development of SMP provisions will be examined to ensure the adopted regulations provide no net loss of shoreline ecological functions. At a minimum, local jurisdictions shall gather the inventory elements listed in the Guidelines, to the extent information is relevant and readily available. Given the nature of the rural County, the Cities other than Pullman are generally managed by a very small staff, typically a clerk and a couple of public works personnel. The ability of these small towns to provide information that supports mapping and analysis is limited. Collected information principally included Watershed Resource Inventory Area (WRIA) and other basin documents, Whitman County studies, scientific literature, aerial photographs, and Geographic Information Systems (GIS) data from a variety of data providers.

Appendix C identifies the data sources used in the development of each of the Map Folio elements. The table in Appendix C also describes the information collected for each of the required inventory elements. Map figures are provided in the Map Folio (Appendix B), and they depict the various inventory pieces listed in the table, as well as additional analysis. Data gaps and limitations are discussed further in Appendix C. The

Guidelines do not require generation of new information or mapping to fill identified data gaps.

4.1.1 Ecological Characterization

The following discussion identifies assumptions and limitations for each of the inventory elements, and may provide a brief Countywide or watershed-wide narrative where qualitative descriptions provide more information than quantitative measures. Despite data gaps and limitations, a substantial quantity of information is available for the shorelines of Whitman County to aid in the development of the inventory and analysis report, as well as the updated SMP(s).

Land Cover (Vegetation)

The data was generated using multi-spectral satellite imagery with 30x30-meter cell resolution. Spectral data was classified using Multi-Resolution Land Characteristics (MRLC) Consortium, National Land Cover (NLC) Database. Because each cell represents 900 square meters, the classification may over or under represent coverage when the type of coverage within cells is mixed. The spatial resolution of the NLC data provides a good foundation for broad scale assessment of land cover, including vegetation coverage. Its utility is higher in rural areas where vegetative cover is more uniform over broad areas compared to more developed towns and cities.

Because the data is based on interpretation of multi-spectral imagery, classification of some data may be inaccurate. Most notably, shrub steppe vegetation on steeper slopes is frequently miscategorized as "cultivated crops" using the NLC model. So long as the inherent inaccuracies of the data are recognized, the NLC data provides a good broad-scale assessment of vegetation coverage.

Finally, because the ordinary high water mark changes over time, water is occasionally included within the total shoreline area used for the calculation of vegetation coverage. For this reason, any area identified as "Water" was excluded from the calculation of percent coverage.

Impervious Surfaces

Similar to the vegetation coverage data, impervious surface data was generated using MRLC Consortium NLC data (2006) of multispectral satellite imagery with 30x30-meter cell resolution. National Land Cover categories that apply to areas of higher impervious surface coverage include Developed- Low, Medium, and High Intensity categories. The same limitation as the vegetation coverage data apply to impervious surfaces. With

these limitations in mind, a comparison of impervious surface coverage among reaches provides useful information on broad scale spatial trends in development.

Wetlands

Wetland mapping was assembled from the National Wetlands Inventory (NWI) and hydric soils data from USDA NRCS. Neither Whitman County nor the Cities have completed a County or City-wide inventory of potential wetlands, and therefore the NWI dataset along with hydric soils mapping was used as the most relevant and useful information. The NWI dataset is based on many factors, including soil inventories and aerial interpretations. Although it is very comprehensive and is fairly accurate in approximating wetland locations, it is acknowledged that many wetlands, especially small wetlands, are not identified by NWI and may not be indicated by hydric soils mapping. Likewise, some areas identified as NWI wetlands or hydric soils may not meet wetland criteria. Whether or not they are captured by this mapping effort and included in the preliminary shoreline jurisdiction maps, actual wetland conditions that may or may not be found on a site will determine shoreline jurisdiction (as a potential shoreline-associated wetland) on a site-specific basis.

Soils

Soil data are derived from the Natural Resource Conservation Service (NRCS) national soil survey. These data represent soils over broad areas; therefore, site-specific soil characteristics may differ from what is mapped. Information on alluvial soil presence and distribution was used to assess hyporheic functions.

Surficial Geology

Data on surficial geology are based on information from Washington DNR. The data is based on broad-scale geologic classifications; therefore, site-specific characteristics may differ. The map should not be used in place of site-specific studies.

Fish and Wildlife Habitat Conservation Areas

WDFW Priority Habitat and Species maps are presented as three separate units: Habitat Regions (species or habitat ranges by area), Habitat Species (precise species locations); and Fish (fish species presence).

These maps do not capture every priority species location or habitat in shoreline jurisdiction, particularly rare species or species that use the water for foraging and drinking, but that nest or den farther from the shoreline. Absence of mapping information does not indicate that a particular species does not or could not utilize the shoreline or adjacent lands. Furthermore, the number of documented species may

reflect the relative amount of past survey efforts rather than the presence or absence of suitable habitat.

Frequently Flooded Areas

For all practical purposes, "frequently flooded areas" are those areas within the 100-year floodplain. Floodplain and floodway maps were developed using FEMA's Q3 map for Whitman County.

Channel Migration Zone

Channel Migration Zone (CMZ) data is not available for shorelines within Whitman County. For the purpose of this analysis report, the 100-year floodplain (FEMA's Q3) is being used as a proxy for the CMZ extent with the following conditions per WAC 173-26-221(3)(b):

- Where available data indicates areas separated from the active river channel by legally existing artificial channel constraints that limit channel movement, those areas are excluded from the channel migration zone.

- All areas separated from the active channel by a legally existing artificial structure(s) that is likely to restrain channel migration, including major transportation facilities, built above or constructed to remain intact through the one hundred-year flood, will not be considered to be in the channel migration zone.

Additionally, a visual spot check of aerial photos was used to search for evidence of historic migration outside the floodplain. Those areas would have been considered within the CMZ; however, no such areas were identified within the subject area. In general, this approach may slightly over-estimate the CMZ in flatter lowland areas and slightly under-estimate the CMZ in higher-gradient areas through the Snake River bluffs.

The CMZ map represents a graphical overlay of the different elements and does not include field surveys or onsite data collection. Approvals for projects and permits relying on these boundaries should include detailed assessments with stream surveys.

Geologically Hazardous Areas

Maps of geologically hazardous areas were developed by Washington Department of Natural Resources. The data primarily focus on seismic hazards, and landslide hazard data seems limited. Data on the distribution and location of steep slopes within the

proposed shoreline jurisdiction was not available, and this represents a data gap. Steep slopes should be evaluated for landslide hazard potential on a site and project specific basis.

The presence of geologically hazardous areas in shorelines can be a factor in determining suitability of the area for certain activities, including restoration and development. Human safety is an important concern for development in geologically hazardous areas. In addition, geologically hazardous areas can be important sources of large woody debris and sediment to the aquatic system, the latter to the benefit or detriment of aquatic life.

Water Quality

As a requirement of Section 303(d) of the federal Clean Water Act that all waterbodies be "fishable and swimmable," Ecology classifies waterbodies into five categories:

- Category 1: Meets tested standards,
- Category 2: Waters of concern,
- Category 3: No data,
- Category 4: polluted waters that either have or do not require a TMDL, and
- Category 5: polluted waters requiring a TMDL.

Individual waterbodies are assigned to particular "beneficial uses" (public water supply; protection for fish, shellfish, and wildlife; recreational, agricultural, industrial, navigational and aesthetic purposes). Waterbodies must meet certain numeric and narrative water quality criteria established to protect each of those established beneficial uses. Waterbodies may provide more than one beneficial use, and may have different levels of compliance with different criteria for those beneficial uses in different segments of the stream or lake. As a result, many waterbodies may be on the 303(d) list for more than one parameter in multiple locations.

As presented in the Water Quality map of Appendix B, only Category 4 and 5 waters are depicted. For more information on specific waterbodies and their water quality classifications, Ecology provides an interactive on-line viewer at the following website: http://apps.ecy.wa.gov/wqawa2008/viewer.htm.

Shoreline Modifications

Shoreline modifications are human-caused alterations to the natural water's edge. The most common types of shoreline modifications include overwater structures and shoreline armoring.

The Washington Department of Natural Resources has digitized piers and other in-water structures such as boatlifts, boathouses, and moorage covers. However, this dataset does not differentiate between each of these various types of overwater structures. Thus, reporting of overwater cover is usually an overstatement when assessing just piers, docks, and floats. Although not technically overwater structures, boat ramps are also reported in the inventory.

Levees were mapped based on data from the Department of Ecology. Countywide data were not available for shoreline stabilization, including rip rap armoring and dikes. A visual assessment of shoreline stabilization using aerial photography was incorporated into the analysis of ecological functions. This visual assessment is likely to underestimate the extent of armoring and diked areas.

Critical Aquifer Recharge Areas

Critical aquifer recharge area data was not available. This is a data gap in this analysis.

4.1.2 Land Use Characterization

This shoreline inventory reviews current land use, zoning, and ownership within shoreline jurisdiction, and land use plans, where available. The ultimate purpose is to provide a basis to establish a compatible use pattern over the 20-year planning period of the SMP and to identify current or planned preferred or water-oriented uses in shoreline jurisdiction that should be protected or promoted to meet SMA goals for water-oriented uses, shoreline access, and ecological protection.

The SMA promotes the following use preferences (RCW 90.58.020) for Shorelines of Statewide Significance (identified in Section 1.2) in the stated order:

1. Recognize and protect the statewide interest over local interest;
2. Preserve the natural character of the shoreline;
3. Result in long term over short term benefit;
4. Protect the resources and ecology of the shoreline;

5. Increase public access to publicly owned areas of the shorelines;

6. Increase recreational opportunities for the public in the shoreline; and

7. Provide for any other element as defined in RCW 90.58.100 deemed appropriate or necessary.

In addition, the following use preferences apply within shoreline jurisdiction in the following order [from WAC 173-26-201(2)(d)]:

1. Reserve appropriate areas for protecting and restoring ecological functions to control pollution and prevent damage to the natural environment and public health. In reserving areas, local governments should consider areas that are ecologically intact from the uplands through the aquatic zone of the area, aquatic areas that adjoin permanently protected uplands, and tidelands in public ownership. Local governments should ensure that these areas are reserved consistent with constitutional limits.

2. Reserve shoreline areas for water-dependent and associated water-related uses. Harbor areas, established pursuant to Article XV of the state Constitution, and other areas that have reasonable commercial navigational accessibility and necessary support facilities, such as transportation and utilities, should be reserved for water-dependent and water-related uses that are associated with commercial navigation unless the local governments can demonstrate that adequate shoreline is reserved for future water-dependent and water-related uses and unless protection of the existing natural resource values of such areas preclude such uses. Local governments may prepare master program provisions to allow mixed-use developments that include and support water-dependent uses and address specific conditions that affect water-dependent uses.

3. Reserve shoreline areas for other water-related and water-enjoyment uses that are compatible with ecological protection and restoration objectives.

4. Locate single-family residential uses where they are appropriate and can be developed without significant impact to ecological functions or displacement of water-dependent uses.

5. Limit nonwater-oriented uses to those locations where the above described uses are inappropriate or where nonwater-oriented uses demonstrably contribute to the objectives of the Shoreline Management Act.

Current Land Use

Existing land use provides a baseline for types of land use and land use patterns found within shoreline jurisdiction. Existing land use data was obtained from the Washington State department of Ecology and the Whitman County Assessor, and then overlaid on Map Folio maps for current land use, land ownership patterns, and aerial images. These data sources may not be updated frequently, but they are the best sources for a County-wide land use analysis. The predominant shoreline land use pattern across all shoreline jurisdiction in Whitman County is agriculture with the exception of the port industrial sites that are zoned Heavy Industrial. Within the Cities and Towns, commercial, residential and industrial uses are present.

Water Oriented Use

According to Ecology's SMP Guidelines (WAC 173-26-020), "water-oriented use means a use that is water-dependent, water-related, or water-enjoyment, or a combination of such uses." The Shoreline Management Act promotes uses that are "unique to or dependent upon use of the state's shoreline," as well as "ports, shoreline recreational uses including but not limited to parks, marinas, piers, and other improvements facilitating public access to shorelines of the state, industrial and commercial developments which are particularly dependent on their location on or use of the shorelines of the state and other development that will provide an opportunity for substantial numbers of the people to enjoy the shorelines of the state." (RCW 90.58.020)

Definitions and examples of water-oriented uses are included in Table 4-1 below.

Table 4-1. Water-Oriented Uses Definitions and Examples.

Water-Oriented Use Definitions	Examples
"Water-dependent use" means a use or portion of a use which cannot exist in a location that is not adjacent to the water and which is dependent on the water by reason of the intrinsic nature of its operations. (WAC 173-26-020(39))	Examples of water-dependent uses may include ship cargo terminal loading areas, ferry and passenger terminals, barge loading facilities, ship building and dry docking, marinas, aquaculture, irrigation diversions, float plane facilities and sewer outfalls.
"Water-related use" means a use or portion of a use which is not intrinsically dependent on a waterfront location but whose economic viability is dependent upon a waterfront location because: (a) The use has a functional requirement for a waterfront location such as the arrival or shipment of materials by water or the need for large quantities of water; or (b) The use provides a necessary service supportive of the water-dependent uses and the proximity of the use to its customers makes its services less	Examples of water-related uses may include warehousing of goods transported by water, seafood processing plants, hydroelectric generating plants, gravel storage when transported by barge, oil refineries where transport is by tanker, log storage, and potentially agriculture and agriculturally related water transportation systems.

Water-Oriented Use Definitions	Examples
expensive and/or more convenient. (WAC 173-26-020(43))	
"Water-enjoyment use" means a recreational use or other use that facilitates public access to the shoreline as a primary characteristic of the use; or a use that provides for recreational use or aesthetic enjoyment of the shoreline for a substantial number of people as a general characteristic of the use and which through location, design, and operation ensures the public's ability to enjoy the physical and aesthetic qualities of the shoreline. In order to qualify as a water-enjoyment use, the use must be open to the general public and the shoreline-oriented space within the project must be devoted to the specific aspects of the use that fosters shoreline enjoyment. (WAC 173-26-020(40))	Primary water-enjoyment uses may include, but are not limited to, parks, piers and other improvements facilitating public access to the shorelines of the state; and general water-enjoyment uses may include, but are not limited to, restaurants (where views or other features allowing significant public access are provided), museums, aquariums, scientific/ecological reserves, and resorts/hotels (as part of mixed-use development or with significant public access or restoration components), and commercial/office as part of a mixed-use development.

Water-oriented uses were identified through review of land use data, as well as other inventory data sources such as public access and shoreline modification data.

Transportation and Utility Infrastructure

There are several County, state and federal highway road sections and railroad corridors in Whitman County that either parallel, cross or are otherwise located in existing or future shoreline jurisdiction. Road densities are highest in the eastern portion of the County near the Cities and Towns. Railroads are prevalent throughout the County to support the County's agricultural industry.

Utility infrastructure, such as water, wastewater, electrical, communication, and other facilities, is found throughout the County as well, although data on each is not readily available in all cases. Utility infrastructure has a higher prevalence in populated areas of the County. More information about transportation and utility infrastructure by waterbody is found in Chapter 6.

Existing and Potential Public Access

The waterbodies of Whitman County are accessed at federal, state, and County parks and trails, though there are gaps in the network, which are the subject of parks and recreation plans. Information about Whitman County shoreline public access facilities and potential opportunities was obtained from land use data, review of County and City documents, and review of aerial photographs. Notable sources included the Whitman County Comprehensive Parks Plan (2008), as well as Comprehensive Plans from Pullman, Colfax and Palouse.

Historical or Archaeological Sites

Shorelines are typical places for ancient and historic human settlement and use. Data gathered from the Department of Archaeology and Historic Preservation was used to identify any listed sites.

Future Land Use

Whitman County is not a GMA County. As a result, the communities within the County are not required to maintain updated future land use maps. Because of this, data on future land use patterns was limited. In order to identify potential future land uses, general growth trends in the County were analyzed to understand potential demand for private development. Undeveloped lands were analyzed to identify if they existed within areas of recent growth. City and County plans were reviewed to identify planned projects or future recommended projects. Lastly, County and City staff were contacted and asked to identify anticipated or potential new developments or uses in the shoreline.

4.2 Reach Delineation

In order to assess shoreline functions at a local scale, each shoreline was broken into discrete reaches based on political boundaries, and then a review of maps and aerial photography. In most cases where the level of existing and potential future development is very low, an entire lake may constitute a reach. Establishing political boundaries as the first step in reach breaks enables discrete characterizations of each City/Town and the County, and the single jointly planned urban growth area outside of Pullman.

Land use (e.g., land use patterns, zoning, vegetation coverage, and shoreline modifications) was weighted heavily in determining reach break locations because the intensity and type of land use has affected and will affect shoreline ecological conditions. Furthermore, functional analysis outcomes will be more relevant for future determination of appropriate shoreline environment designations if the reach breaks occur at likely transition points in environment designations.

In addition to land use, physical drivers of shoreline processes were used to establish an overall framework for determining reach break locations. The following criteria in the following general order were used for determining reach break locations:

- City and urban growth area boundaries
- Changes in land use

- Changes in vegetation (coverage and type)
- Shoreline modifications (levees, dikes, dams)
- Significant wetland areas

Reach breaks were placed at parcel boundaries whenever feasible. In all of the above criteria (except the city/UGA boundaries), reach breaks were made where fairly significant changes were evident. For example, the presence of a couple of single-family residences along a stretch of undeveloped shoreline would not necessitate creation of a reach break to separate out those two different uses.

The following is a complete list of the 79 reaches initially created for this effort. A map of shoreline reaches is included as Map 23 in Appendix B.

Table 4-2. Shoreline Reaches Used in Functional Analysis

Shoreline Reaches		
County		
Lakes (each own reach)		
○ Alkali Lake	○ Lavista Lake	○ Texas Lake
○ Crooked Knee Lake	○ Rock Lake	○ Tule Lake
○ Duck Lake	○ Snyder Slough	○ Bonnie Lake
○ Folsom Lake	○ Stevens Lake	○ Sheep Lake
Hangman Creek		
1. Hangman Creek-Agriculture		
Pine Creek		
1. Pine Creek-Agriculture		
2. Pine Creek-Waste Water Treatment Lagoons		
3. Pine Creek-Scrub/Shrub		
Cottonwood Creek		
1. Cottonwood Creek-Agriculture		
2. Cottonwood Creek-PAW		
Palouse River		
1. Palouse River-Confluence with Snake		
2. Palouse River-Cliffs		
3. Palouse River-Canyon		
4. Palouse River-Palouse Falls State Park		
5. Palouse River- Agriculture		
6. Palouse River-Western Palouse		
7. Palouse River- Meanders		
8. Palouse River- County Industrial		
9. Palouse River- Open Space		
10. North Fork Palouse River- Agriculture		
South Fork Palouse River		
1. South Fork Palouse- South Fork River Road		
2. South Fork Palouse-Agriculture		
3. South Fork Palouse-Agriculture/Residential		

Shoreline Reaches
4. South Fork Palouse-Commercial
5. South Fork Palouse- Pullman UGA
Snake River
1. Snake River- Cliffs
2. Snake River- Railroad
3. Snake River- Parks/Open Space
4. Snake River- Industrial
5. Snake River- Steptoe Canyon
Rock Creek
1. Rock Creek- Agriculture
2. Rock Creek- Escure Ranch
3. Rock Creek- Imbler Creek
4. Rock Creek- Cottonwood Confluence/PAW
5. Rock Creek- Lake Outlet
6. Rock Creek- Pine Creek Confluence
Union Flat Creek
1. Union Flat Creek- Scablands
2. Union Flat Creek- Agriculture
3. Union Flat Creek- Agriculture Riparian
Cities
Albion - South Fork Palouse River
1. Albion, Industrial
2. Albion, Agriculture
3. Albion, Residential
Colfax
Palouse River
1. Colfax, Industrial/Commercial
2. Colfax, Scrub/shrub/PAW
3. Colfax, Residential
4. Colfax, Agriculture
5. Colfax, Parks
South Fork Palouse River
1. Colfax, Flume/Commercial
2. Colfax, Flume/Residential
3. Colfax, Flume/Undeveloped
4. Colfax, Open Space
Malden - Pine Creek
1. Malden
Pullman - South Fork Palouse River
1. Pullman, Industrial
2. Pullman, Parks
3. Pullman, Commercial/Business District
4. Pullman, South Commercial
5. Pullman, Residential
Palouse - Palouse River
1. City of Palouse, Agriculture
2. City of Palouse, Industrial

Shoreline Reaches
3. City of Palouse, Residential
4. City of Palouse, Commercial
5. City of Palouse, Open Space
Rosalia - Pine Creek
1. Rosalia, Airport
2. Rosalia, Agriculture
3. Rosalia, Residential/Open Space
4. Rosalia, City Park
Tekoa - Hangman Creek
1. Tekoa, Rural Residential
2. Tekoa, Urban Residential/Commercial
3. Tekoa, Open Space
4. Tekoa, Floodway

4.3 Summary of Shoreline Inventory Results

In order to assess shoreline conditions and functions at a local scale, each shoreline waterbody's jurisdictional area was broken into discrete segments known as reaches (see Section 4.2 above for a description of how the reaches were determined). Appendix D expands upon the relevant required inventory elements, providing specific detail and data for each reach. Unless otherwise noted, the results reported in Appendix D consider only information available within the boundaries of shoreline jurisdiction of each reach.

5 ANALYSIS OF ECOLOGICAL FUNCTIONS

5.1 Approach, Rationale and Limitations of Functional Analysis

A GIS-based semi-quantitative method was developed to characterize the relative performance of relevant ecological processes and functions by shoreline reach, as outlined in WAC 173-26-201(3)(d)(i). The assessment used the available information gathered as part of the shoreline inventory and applied a standardized ranking criterion for each independent shoreline reach to provide a consistent methodological treatment among reaches. These semi-quantitative results will ensure consistent and well-documented treatment of all reaches when assessing existing ecological conditions, yet allow for a qualitative evaluation of functions for data that are not easily summarized by GIS data alone. The results are intended to complement the inventory information in Chapter 4 and provide a comparison of watershed functions relative to other reaches in

the County. Analysis scores and descriptions are accompanied by photographs taken during site visits or aerial images from Google Earth (Google, electronic reference).

5.1.1 Functions and Impairments

The analysis of reach functions was based on the Department of Ecology's list of processes and functions for freshwater lakes and streams (WAC 173-26-201(3)(d)(i)(C)). The list includes the evaluation of three major processes: 1) hydrologic; 2) vegetative; and 3) habitat.

Table 5-1. Ecological processes and functions used to evaluate shoreline reaches.

Lake Processes and Functions	Stream Processes and Functions
1. Hydrologic Functions • Storing water and sediment • Attenuating wave energy • Removing excess nutrients and toxic compounds • Recruitment of large woody debris (LWD) and other organic material	**1. Hydrologic Functions** • Storing water and sediment • Moderating erosion processes and the transport of water and sediment • Attenuating flow energy • Developing pools, riffles, and gravel bars • Removing excess nutrients and toxic compounds • Recruitment of LWD and other organic material
2. Vegetative Functions • Temperature regulation • Water quality improvement • Attenuating wave energy • Sediment removal and bank stabilization • LWD and organic matter recruitment	**2. Vegetative Functions** • Temperature regulation • Water quality improvement • Slowing riverbank erosion; bank stabilization • Attenuating of flow energy • Sediment removal • Provision of LWD and organic matter
3. Habitat Functions • Physical space and conditions for life history • Food production and delivery	**3. Habitat Functions** • Physical space (upland and aquatic, including migration corridors) and conditions for life history • Food production and delivery
	4. Hyporheic Functions • Removing excess nutrients and toxic compounds • Water storage and maintenance of base flows • Support of vegetation • Sediment storage

Based on data availability, these functions were further broken down into those most meaningful for the purposes of this analysis. The available information gathered County-wide in the Shoreline Inventory Map Folio (Appendix B) was used to determine the performance of these functions (High, Moderate, or Low) (Tables 5-3 and 5-4). Metrics were developed based on best professional judgment related to known impacts of different parameters and the data available. Rankings were developed for each

function based on the distribution of conditions within the County or City for each waterbody, so that each ranking provides a relative measure of functions compared to other reaches in the waterbody and local jurisdiction.

Table 5-2 provides a description of the significance of each function, and how each function may be affected by human alterations. It should be noted that alterations to watershed-wide processes (e.g., flow regulation) affect functions throughout all reaches of each river. Since the purpose of this analysis is to differentiate between levels of function and anthropogenic alterations, the effects of these watershed-wide impairments are addressed in Table 5-2, and not incorporated into the scoring of each reach.

Scoring of functions was done separately for the reaches within each local jurisdiction and within each waterbody in order for the range of scores for reaches to represent the range of relative functions of each reach compared to other reaches in both the same river and within the same local jurisdiction. For example, the levees within the City of Colfax lower many of the functions of the South Fork Palouse River through the City. These reaches were scored and ranked relative to one another in order to represent a more accurate range of functions within the City's shorelines, and differentiate between varying levels of function despite the overall functional impairment due to the levees.

Table 5-2. Description of shoreline functions and common sources of human disturbance.

Hydrology	Vegetative	Habitat	Hyporheic (Rivers/Streams Only)
Functions			
Sediment Production Sediment transport is an integral process to building and maintaining instream habitat features. Gravel beds and sand bars help form diverse geomorphic conditions. Metered sediment delivery typically occurs through bank erosion, landslides, and bedload transport. Excessive fine sediment delivered to channels can suffocate salmonid eggs, inhibit emergence of fry from gravels, decrease feeding success, increase physiological stress, and through adsorption, may facilitate the transport and persistence of chemical contaminants. Alternatively, if banks are too stable in reaches without bedrock control, the erosive power of high flows may scour the bed of the river, causing channel incision and disconnecting the river from its floodplain. Development of Instream Habitat Features Diverse channel habitat features are formed by islands and backwaters. Large woody debris (LWD) that is transported downstream from mature tree cover influences stream channel morphology and habitat complexity. Wave and Flow Attenuation Floodway areas and riverine wetlands provide a transition between upland and riverine habitats. Vegetated floodways help slow and disperse flood flows. The extent to which local conditions affect flow is related to the position of a reach within a watershed and the size of the floodplain or wetland area relative to watershed size. Water quantity For the lakes of Whitman County, water quantity is the main hydrologic function. Lakes capture and store water and can help retain flood flows.	Shade Riparian vegetation helps maintain cool water temperatures through provision of shade and creation of a cool and humid microclimate over the stream. Thermal refugia can also be derived by hyporheic activity, groundwater inputs, and small tributaries (which can significantly benefit from riparian shading). These are the primary mechanisms along wider rivers, or areas where the natural vegetation present is not a type to provide much overbank shade. Large Woody Debris/Organic Inputs Riparian vegetation provides a source of large woody debris recruitment, and provides organic matter which is important to the ecosystem in the form of leaves, branches, and terrestrial insects. Removing Excess Nutrients Dense riparian vegetation encourages infiltration of surface water. Nutrients and contaminants in subsurface water are filtered out of the soil and taken up by the roots of plants. Shoreline Stabilization The root structure of woody vegetation stabilizes shoreline soils and prevents excessive erosion.	Wetland/Riparian Habitats Continuous riparian vegetation along the length of a waterbody provides a dispersal corridor for animals using riparian habitats. Larger and wider riparian and wetland areas tend to have more complex vegetation communities and more habitat types. Wetlands adjacent to streams provide an important habitat niche for a variety of species, particularly amphibians. Physical Space for Life History Some areas support important or rare species assemblages or habitat features that require an elevated level of protection to ensure that these natural features are conserved. Many aquatic species, including some species of salmon, rely heavily on off–channel areas, for rearing. Riparian vegetated habitats are particularly important for breeding, foraging, and rearing of many terrestrial species.	Water storage, cool water refugia, and filtration Storage of peak flows is provided by floodplains, off channel areas and large wetland complexes; these features serve to reduce peak flows and contribute to summer low flows. Groundwater from shallow aquifers is often a substantial component of base flows, and groundwater seeps provide an important source of cool water refugia. Storage of peak flows is provided by local topography. Within shallow alluvial soils adjacent to steam nutrients and toxic compounds may be filtered or removed by uptake, especially in floodplain areas. Support of Vegetation Hyporheic flow helps support vegetated riparian floodways and floodplains.
Watershed-wide Alterations			
Dam regulation affects the timing, duration, and frequency of flood events. As discussed in Section 4, dam regulation has substantially altered they hydrograph in the Snake River. By limiting the frequency and intensity of flood events, flow regulation reduces floodplain connectivity and habitat-forming processes. Irrigated agriculture has transformed much of Whitman County's watersheds. Irrigation water is drawn from groundwater and late spring and summer surface flow and irrigation returns have substantially replaced natural groundwater recharge.	Dam regulation (on the Snake River), channelization, and armoring limit floodplain connectivity, which helps support the establishment of riparian vegetation. Over time, as flood events are reduced in magnitude and frequency, the area of riparian vegetation is reduced. As described in Section 4, LWD recruitment from within Whitman County was likely always limited given the climate and type of riparian and upland vegetation naturally occurring in the County. Instead, LWD was transported from upstream reaches. Clearing and	Roads and railroads running parallel to the shoreline limit wildlife dispersal opportunities. Agriculture production has led to native vegetation clearing, limiting riparian habitat widths in many places. On the Snake River hydrologic alteration from dams interrupts natural habitat forming processes, which create diversity in channel form and suitable instream habitat function.	Irrigation-induced groundwater flows and agricultural return flows discharge to the rivers to provide cool water refugia. On the Snake River, dam regulation limits the frequency and intensity of flooding events, which limits the recharge capacity of the aquifer.

Hydrology	Vegetative	Habitat	Hyporheic (Rivers/Streams Only)
	development in the upper watersheds has limited recruitment of LWD to Whitman County shoreline reaches.		
Localized Alterations			
Armored shorelines prevent natural erosion and sediment delivery processes. Shoreline armoring can limit floodway interactions, accelerate streamflow along the bank, and contributing to erosion of adjacent properties. Loss of mature native vegetation and wetlands affects the timing, rate, magnitude, and duration of stream flows. An increase in impervious surfaces results in increased frequency and intensity of flooding. Changes in flow volume or frequency can alter channel morphology and the sediment balance of the stream. In addition to watershed scale effects, irrigation withdrawals can have localized effects on stream flow. The effect of withdrawals on stream flow may depend on the withdrawal rate, as well as the local groundwater interchange (i.e. if the reach is a gaining or losing reach).	Clearing and grading for development often results in the removal of significant vegetation. Impervious surfaces related to roadways, driveways and parking areas tend to produce hydrocarbon pollutants and heavy metals. Depending on management activities, even pervious surfaces such as lawns and pastures can substantially increase nutrients from fertilizers and pollutants and toxins through herbicides and pesticides. Armored shorelines can isolate the river from potential sources of organic matter and eliminate filtration potential.	Historic draining, ditching, and fill of wetlands for agriculture and development have reduced the availability of suitable habitat for aquatic and terrestrial species. In water structures interrupt the longitudinal flow of sediment and alter habitat associations.	Impervious surfaces reduce infiltration, increasing surface flows. The net result is a reduction in shallow groundwater and hyporheic flows capable of maintaining summer low flows in streams and rivers. Levees that limit channel migration and floodplain area also restrict hyporheic activity.

Table 5-3. Functional score ranking criteria for streams and rivers.[1]

Process/Function		High	Moderate	Low
Hydrologic	Moderation of sediment transport	• No armoring or dams present within the reach AND • If present, creek mouths present with natural deltas	• Steep slopes present, but well-vegetated or not developed AND • Limited armoring present	• Steep slopes present with development OR • Majority of the reach is armored[2]
	Development/ maintenance of in-stream habitat features	Backwater areas, islands, and/or wetlands occupy >60% of the reach	Backwater areas, islands, and/or wetlands occupy 20-60% of the reach	Backwater areas, islands, and/or wetlands occupy <20% of the reach
	Attenuation of flow energy	• Majority of the reach is not armored or protected by levees AND • Floodplain >70% of area or floodway >5% of the area	• Majority of the reach is not armored or protected by levees AND • Floodplain 60-70% of area or floodway is present, but less than 5%	• Levees present OR • Majority of the reach is armored OR • Floodplain area <60% of total area
Vegetative	LWD and organic matter recruitment	• Forest, shrub, or wetland vegetation >80% of area within the reach AND • No armoring or structures separate vegetation from the water's edge.	• Forest, shrub, or wetland vegetation 40-80% of area within the reach OR • A portion of the vegetation isolated from the water's edge by armoring or other structures	• Forest, shrub, or wetland vegetation <40% of area within the reach OR • Vegetation is separated from the shoreline by armoring and other structures
	Filtration of upland inputs	A broad band of dense vegetation separates uplands from the river	A narrow band of dense vegetation or a broad band of sparse vegetation separates uplands from the river	• No vegetation along the shoreline OR • A narrow band of sparse vegetation separates uplands from the river
	Bank stabilization	Riparian trees and shrubs stabilize the banks in the majority of the reach	• Riparian trees and shrubs are sparsely present along the shoreline OR • A portion of the shoreline is armored	The majority of the reach is armored
Habitat	Wetland/ riparian habitat	• Wetland area >60% of total area OR • A broad band of dense riparian vegetation is present	• Wetland area 20-60% of total area OR • Limited areas of dense riparian vegetation are present	• Wetland area <20% of total area AND • Dense riparian vegetation is absent

Process/Function		High	Moderate	Low
	Space and conditions supporting wildlife, including PHS species	• Two PHS regions > 50% of area OR • Four or more different PHS regions present OR • Significant wetland, riparian, or unique habitat features are present and corridors between habitats are free from roads and other development	Significant wetland, riparian, or unique habitat features are present within the reach, but the corridors between habitats are impaired by development	Significant wetland, riparian, or unique habitat features are absent of significantly degraded
Hyporheic	Water storage and filtration	• Riverine wetlands are present AND • Armoring does not isolate the wetland from the mainstem channel	• Banks of the river are moderately sloped AND • The majority of the banks are not armored	• Banks slope steeply up from the River OR • The majority of the banks are armored
	Support of vegetation	• Large, riverine wetlands occur within the reach OR • Alluvial soils comprise over 65% of the reach	• River banks support moderate density of scrub or forested vegetation AND • Alluvial soils comprise 10-65% of the reach	• Banks of the river support little, if any, vegetation OR • Alluvial soils comprise under 10% of the reach

[1.] For City/Town shorelines, the numeric thresholds were not used to distinguish between high, moderate, and low levels of function. Rather, best professional judgment was applied to allow for more meaningful differentiation between reach scores, relative to the range of conditions present within each local jurisdiction (see Section 5.3)

[2.] For purposes of this scoring, armoring includes both artificial structures and similarly functioning naturally occurring features such as bedrock

Table 5-4. Functional score ranking criteria for lakes

Process/Function		High	Moderate	Low
Hydrologic	Storage of sediment and water	Water quantity function is the primary hydrologic function occurring in all of the lakes. All lakes have the capacity for providing water and sediment storage and are given a "high" score for this function.		
Vegetative	LWD and organic matter recruitment	• Forest, shrub, or wetland vegetation >80% of area within the reach AND • No armoring or structures separate vegetation from the water's edge.	• Forest, shrub, or wetland vegetation 40-80% of area within the reach OR • A portion of the vegetation isolated from the water's edge by armoring or other structures	• Forest, shrub, or wetland vegetation <40% of area within the reach OR • Vegetation is separated from the shoreline by armoring and other structures
	Filtration of upland inputs	A broad band of dense vegetation separates uplands from the river	A narrow band of dense vegetation or a broad band of sparse vegetation separates uplands from the river	• No vegetation along the shoreline OR • A narrow band of sparse vegetation separates uplands from the river
	Bank stabilization	Riparian trees and shrubs stabilize the banks in the majority of the reach	• Riparian trees and shrubs are sparsely present along the shoreline OR • A portion of the shoreline is armored	The majority of the reach is armored
Habitat	Wetland/ riparian habitat	• Wetland area >60% of total area OR • A broad band of dense riparian vegetation is present	• Wetland area 20-60% of total area OR • Limited areas of dense riparian vegetation are present	• Wetland area <20% of total area AND • Dense riparian vegetation is absent
	Space and conditions supporting wildlife, including PHS species	• Two PHS regions> 50% of area OR • Four or more different PHS regions present OR • Significant wetland, riparian, or unique habitat features are present and corridors between habitats are free from roads and other development	Significant wetland, riparian, or unique habitat features are present within the reach, but the corridors between habitats are impaired by development	Significant wetland, riparian, or unique habitat features are absent of significantly degraded

For purposes of ranking the relative function of each reach within the County and assisting with later development of the Restoration Plan, the descriptive ratings were assigned a value of 1 through 3, with 1 representing low function and 3 representing high function.

5.1.2 Limitations

This evaluation was limited by the quality and availability of inventory data. Therefore, limitations presented in Appendix C also apply to this evaluation.

In evaluating shoreline functions, the area of shoreline impacts and conditions assessed was generally limited to the area of shoreline jurisdiction. In many cases, shoreline impacts may occur at a site due to ecological and geomorphological processes that are disturbed at a remote site upstream, further inland, or up-current. This evaluation approach may not identify all of the functional responses occurring as a result of impacts to nearby or remote areas.

The approach was limited to an evaluation of shoreline ecological potential, and it did not integrate this potential with the opportunity to perform a given function based on site-specific conditions. For example, the analysis assessed the ability of a shoreline to store water, but it did not consider the frequency of flooding downstream and the corresponding significance of such a function.

5.2 County Shoreline Results

The following sections summarize the results of the functional analysis for each shoreline waterbody.

5.2.1 Lakes

There are twelve shoreline lakes present in Whitman County, all located in the northwest portion of the County in the far western portion of the Palouse watershed known as the Channeled Scablands. The level of existing and potential future development surrounding the lakes is generally low. For this reason, and because of fairly consistent conditions along each lake's shoreline, each lake was kept as one discrete reach for the purposes of this analysis. The shoreline lakes range from approximately 34 acres (Duck Lake) to 367 acres (Rock Lake). Half of the lakes are under 100 acres.

The Channeled Scablands is an area shaped by massive floods over the past million years, which left behind exposed channels of the underlying basalt amongst islands of loess (HDR and EES 2007). Many of the lakes are natural depressions with basalt

bottoms and no outlets (HDR and EES 2007). Various warm-water fish are found in many of the lakes in the watershed and rainbow trout have been stocked in Rock Lake. No anadromous salmonid use is documented.

The table below shows the functional scores for each lake for each of the four ecological processes categories identified in Table 5-1. The following pages provide a summary of the main functional attributes and impacts contributing to the scores for similarly scoring groups of lakes.

Table 5-5. Functional scoring for shoreline lakes

Lake	Rank	Hydrologic	Vegetative			Habitat	
		Storage of water and sediment	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife
Lavista Lake	1	H	H	H	M	H	H
Tule Lake	2	H	H	H	M	M	H
Sheep Lake	3	H	H	M	M	H	M
Snyder Slough	3	H	H	M	M	H	M
Alkali Lake	3	H	H	M	M	M	H
Duck Lake	3	H	H	M	M	M	H
Stevens Lake	3	H	M	M	M	H	H
Bonnie Lake	4	H	M	M	M	M	H
Crooked Knee Lake	4	H	H	M	M	M	M
Folsom Lake	4	H	H	M	M	M	M
Texas Lake	5	H	M	M	M	M	M
Rock Lake	5	H	M	L	M	M	H

Relative ranking order from highest to lowest function based on mean reach scores (L= Low function, M=Medium function, H= High function).

Lavista Lake & Tule Lake

Process	Function	Notes
Hydrologic	Storage of water and sediment	The Lavista Lake shoreline jurisdiction includes nearly 49 acres and Tule Lake includes approximately 32 acres. 74.1% of the Lavista Lake area and 55.4% of Tule Lake is mapped as wetland which further helps to store water and sediment.
Vegetation	LWD and organic matter recruitment Filtration of upland inputs Bank stabilization	Evergreen forest makes up 46.3% of the shorelands land cover of Lavista Lake. Shrub/scrub, herbaceous and woody wetlands are also present. Emergent herbaceous wetlands, shrub/scrub and woody wetlands are each around 30% of the Tule Lake jurisdiction. A narrow band of dense vegetation is present along the shoreline helping to provide filtration function. Vegetation appears most dense along the shorelines of these two lakes compared to the other County lakes.
Habitat	Wetland/riparian habitat Space and conditions supporting wildlife, including PHS species	The John Wayne Pioneer Trail runs along the eastern edge of Lavista Lake shoreline jurisdiction. No other developed infrastructure is present which allows for good access for wildlife and undisturbed corridors between habitat types. Bald eagle and mule deer PHS regions cover nearly 100% of both jurisdictions. A high percentage of wetland and woody vegetation is also present compared to the other lakes.

Key Environmental or Land Use Factors Affecting Processes/Functions:

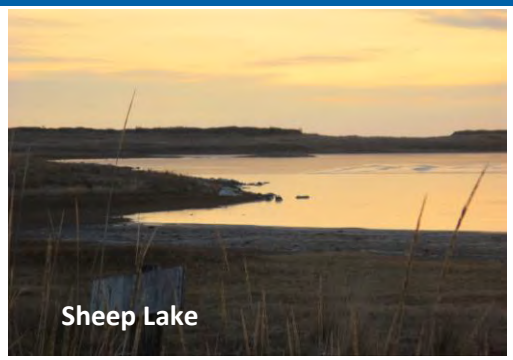
Lavista Lake receives the highest functional ranking overall due mainly to the large area of associated wetland which helps provide filtration of upland inputs and high habitat values. Tule Lake has similar structure and function, but less wetland which decreases its wetland/riparian habitat score.

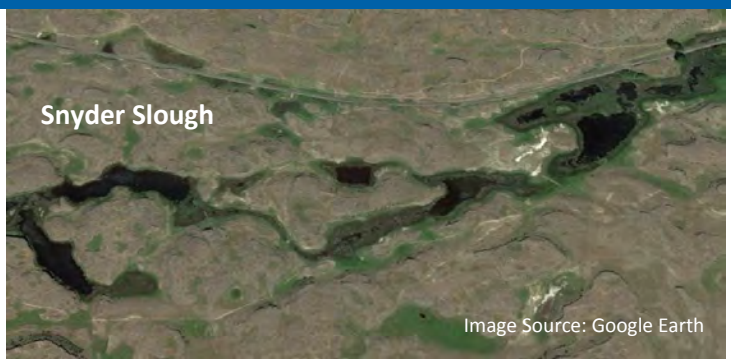
Sheep Lake & Snyder Slough

Process	Function	Notes
Hydrologic	Storage of water and sediment	Sheep Lake and Snyder Slough are connected by a swath of potentially associated wetland and have similar characteristics and overall functional rankings compared to the other lakes. Both have wetland mapped over half of their jurisdiction providing further water and sediment storage functions in addition to their holding capacity. Floodplain is less than a quarter of each jurisdiction.
Vegetation	LWD and organic matter recruitment Filtration of upland inputs Bank stabilization	Emergent herbaceous wetlands and scrub/shrub vegetation are the majority landcover types. Vegetation is naturally sparse along the shoreline edge.
Habitat	Wetland/riparian habitat Space and conditions supporting wildlife, including PHS species	A road and railroad run through the Sheep Lake and Snyder Slough jurisdictions otherwise no development is present which allows for good access for wildlife and undisturbed corridors between habitat types. Several PHS habitat regions are mapped over these areas including prairies and steppe (both lakes), American white pelican and waterfowl concentrations (Sheep Lake).

Key Environmental or Land Use Factors Affecting Processes/Functions:

Existing and potential development pressure is limited and few modifications exist to the natural system. Impacts to these shorelines to these shorelines are mainly from a road and railroad.


Sheep Lake



Alkali Lake, Duck Lake & Stevens Lake

Process	Function	Notes
Hydrologic	Storage of water and sediment	Shoreline jurisdiction of these lakes ranges from 34 acres (Duck Lake) to 134 acres (Stevens Lake), but all three have similar characteristics and overall functional rankings compared to the other lakes. Wetland is present over greater than 30% of each of the lake's jurisdictional areas, providing further water and sediment storage functions in addition to their holding capacity.
Vegetation	LWD and organic matter recruitment Filtration of upland inputs Bank stabilization	Herbaceous and scrub/shrub vegetation are the dominant land cover types. These lakes scored lower than the previous ones for filtration function due to more sparse and narrow areas of shoreline vegetation.
Habitat	Wetland/riparian habitat Space and conditions supporting wildlife, including PHS species	Several PHS habitat regions are mapped over these areas including prairies and steppe, mule deer and bald eagle. Extensive wetland areas are also present, particularly associated with Stevens Lake. Few roads and no development are present providing good access for wildlife and undisturbed corridors between habitat types.

Key Environmental or Land Use Factors Affecting Processes/Functions:

Existing and potential development pressure is limited and few modifications exist to the natural system. Lower scores for vegetation functions are due to naturally sparse riparian areas.

Bonnie Lake, Crooked Knee Lake, Folsom Lake & Texas Lake

Process	Function	Notes
Hydrologic	Storage of water and sediment	These four lakes comprise some of the largest lake shoreline jurisdictions from 98 acres (Crooked Knee Lake) to 195 acres (Texas Lake). All but Texas Lake have wetland included in over half of their jurisdictional area which provides further water and sediment storage functions in addition to their holding capacity.
Vegetation	LWD and organic matter recruitment Filtration of upland inputs Bank stabilization	Emergent herbaceous wetlands are the dominant land cover type. Bonnie Lake also has significant evergreen forest land cover and Folsom Lake has a majority shrub/scrub component. Vegetation is naturally sparse along the shoreline edge. Few trees and shrubs are present at Crooked Knee and Texas Lakes.
Habitat	Wetland/riparian habitat Space and conditions supporting wildlife, including PHS species	Several PHS habitat regions are mapped over these areas including prairies and steppe (Crooked Knee and Folsom), and waterfowl concentrations (Folsom, Crooked Knee, Texas). Bonnie Lake has higher habitat function than the others due to the unique forested areas and additional PHS mapping including Rocky Mountain elk regions and surrounding cliffs/bluffs which provide unique upland habitat.

Key Environmental or Land Use Factors Affecting Processes/Functions:

Existing and potential development pressure is limited and few modifications exist to the natural system. These lakes score lower overall based mainly on less wetland presence, naturally sparse riparian areas, and less woody landcover.


Crooked Knee Lake


Bonnie Lake
Image Source: Google Earth


Texas Lake
Image Source: Jeremy Sikes

Rock Lake

Process	Function	Notes
Hydrologic	Storage of water and sediment	The Rock Lake shoreline jurisdiction includes nearly 467 acres, by far the largest of all the lakes. 13.5% of the area is mapped as wetland which further helps to store water and sediment. Three overwater structures are present. Rock Creek flows into the lake at its northern end and flows out of it at the southern end where it continues south and west to where it converges with the Palouse River.
Vegetation	LWD and organic matter recruitment Filtration of upland inputs Bank stabilization	Shrub/Scrub vegetation makes up approximately half of the shorelands land cover. Evergreen forest, herbaceous and woody wetlands are also present. Some narrow bands of dense vegetation are also present along the shoreline but most of the vegetation is sparse limiting filtration functions.
Habitat	Wetland/riparian habitat Space and conditions supporting wildlife, including PHS species	Rock Lake is the largest natural lake in Eastern WA. Provides habitat for various warm-water fish and is stocked with rainbow trout. Development around the lake is very limited providing good access for wildlife and corridors between habitat types. Associated wetland area is limited and riparian vegetation is sparse in areas, but surrounding cliffs and bluffs also provide unique upland habitat.

Key Environmental or Land Use Factors Affecting Processes/Functions:

Existing and potential development pressure is limited and few modifications exist to the natural system. Riparian vegetation is naturally minimal.

5.2.2 Palouse River

The Palouse River enters the County from northern Idaho, flowing west through the City of Palouse, into the center of the County. At Colfax it meets with the south fork which flows through Albion and Pullman and is discussed separately below. From Colfax, the mainstem Palouse meanders east then turns south and flows along the southern half of the County's western border until it enters the Snake River in the southwest corner of the County. For the purposes of this report, the shoreline jurisdiction area of the Palouse River that lies within the County has been divided into ten reaches. Spatially divergent portions of the shoreline with similar characteristics have been aggregated together into one reach. For example, several agricultural areas are present throughout the entire length of the river which have been joined together into one agriculture reach for the purpose of this analysis. Reaches are numbered sequentially upstream from where the first instance of that reach type occurs.

The portion of the Palouse River from the Idaho border to Colfax may locally be referred to as the North Fork Palouse River. For purposes of this analysis, this segment is included in the mainstem Palouse discussion. It is identified as Reach 10- "North Fork Palouse Agriculture." Reaches of the Palouse which flow through Cities are discussed in the relevant City's section in 5.3.

Shoreline conditions vary greatly throughout the reaches from steep cliffs and canyons in the lower sections (Reach 2, 3), to forested meanders through the center of the County (Reach 7). The longest reaches are Reaches 5 and 10, which constitute the shorelands which are predominantly in agricultural use.

There are no ESA-listed salmonids or other listed aquatic species above the Palouse Falls which is located in Reach 4. Upstream of the falls, resident rainbow trout are present in all reaches. Downstream of the falls, there is documented presence of Dolly Varden/bull trout, summer steelhead and fall Chinook in Reaches 1 and 4 and the portions of Reaches 2 and 3 which are below the falls, including known spawning of fall Chinook in Reaches 1 and 4.

The following table provides the functional scores for each reach for each of the four ecological processes categories identified in Table 5-1. Reaches are ranked according to their overall functional score. The table is followed by a summary page which discusses the main functional attributes and impacts contributing to the scores.

Table 5-6. Functional scoring for Palouse River reaches

Reach Name	Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
		Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
3- Canyon	1	M	H	H	H	M	M	H	H	H	M
6- Western Palouse	1	H	H	M	H	H	M	M	M	H	H
7- Meanders	2	H	H	H	M	M	H	M	M	H	M
4- Palouse Falls State Park	3	M	H	L	H	M	M	M	M	M	M
5- Agriculture	4	M	M	M	L	L	M	M	H	M	H
9- Open Space	4	M	M	H	L	M	M	M	L	M	H
10- North Fork Palouse Agriculture	4	M	M	M	M	M	M	M	M	M	M
2- Cliffs	5	L	L	L	H	L	L	L	H	L	L
1- Confluence with Snake	6	L	L	L	M	L	L	L	H	L	L
8- County Industrial	7	L	L	L	L	L	L	M	L	L	M

Relative ranking order from highest to lowest function based on mean reach scores (L= Low function, M=Medium function, H= High function).

Palouse River (County reaches)

Process/Function		Notes
Hydrologic	Moderation of sediment transport Development and maintenance of in-stream habitat features Attenuating flow energy	Functions are highest in Reaches 3, 6 and 7 where islands and backwater areas are present and there is little armoring. Function is lowest in Reaches 1 and 2 where steep cliffs act as natural armoring and in Reach 8 where the majority is leveed. Palouse Falls is located in Reach 4. Overwater structures are present in many reaches, particularly Reach 5. Floodplain is greatest in the upper reaches. Floodway is present in Reaches 7 and 9.
Vegetation	LWD and organic matter recruitment Filtration of upland inputs Bank stabilization	Landcover varies greatly. Naturally sparse vegetation is present on the cliffs of the lower reaches and agriculture has impacted much of the riparian vegetation in Reach 5. The meanders through the central portion of the County (Reaches 7 and 6) have the highest amount of woody shoreline vegetation.
Habitat	Wetland/riparian habitat Space and conditions supporting wildlife, including PHS species	Moderate to high amounts of wetland are mapped in all but Reaches 1 and 2. However the cliffs in those reaches provide unique upland habitat. At least one PHS region or species is documented in all reaches except for 8. ESA listed salmonids are present below the Falls in Reaches 1, 2 and 3.
Hyporheic	Water storage, cool water refugia, and filtration Support of vegetation	High percentages of alluvial soils are present in the more agricultural reaches (5, 6, and 9). Hyporheic functions are limited by armoring and/or natural cliffs particularly in Reaches 1, 2 and 8.

Key Environmental or Land Use Factors Affecting Processes/Functions:

Environmental and land use factors affecting Palouse River reach functions varies from significant agricultural impacts to natural steep cliffs and bluffs. The majority of shorelands are undeveloped outside of agricultural uses.

5.2.3 South Fork Palouse River

The South Fork of the Palouse River flows through the central eastern portion of the County, through Pullman and Albion to where it meet with the mainstem Palouse in Colfax. Reaches within the cities are discussed in Section 5.3 below. For the purposes of this report, the shoreline jurisdiction area of the South Fork Palouse River that lies within the County has been divided into five reaches, numbered sequentially upstream.

Reach five consists of a very small (0.2 acre) piece of Pullman's Urban Growth Area (UGA) which lies within shoreline jurisdiction but is not contiguous with the river channel itself (see Map 23 in Appendix B). It is currently a forested area mapped predominately as wetland with high vegetation and habitat functions, however it is isolated from the river channel by a railroad grade. Reach 4 is also not contiguous with the river channel. It consists of a commercial area east of River road and is designated as its own reach because of the existing land use which is unique compared to that of the other reaches. It is predominantly developed and has low function overall. These small areas are not ranked with the other reaches as some of the ecological processes are not applicable given that the river channel is not within the reach.

The following table provides the functional scores for each reach for each of the four ecological processes categories identified in Table 5-1. The table is followed by a summary page which discusses the main functional attributes and impacts contributing to the scores.

Table 5-7. Functional scoring for South Fork Palouse River reaches

Reach Number/ Name	Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
		Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
1- South Fork River Road	1	M	M	M	M	M	M	M	M	M	M
3- Agriculture/Residential	2	M	H	H	L	L	M	H	L	L	M
2- Agriculture	3	M	L	H	L	M	M	M	L	M	M
5- Pullman UGA*	-	NA*	NA*	L	H	H	NA*	H	M	M	L
4- Commercial*	-	NA*	NA*	L	L	L	NA*	L	L	L	L

Relative ranking order from highest to lowest function based on mean reach scores (L= Low function, M=Medium function, H= High function).

*reach only includes shorelands that are not contiguous with river

South Fork Palouse River (County reaches)

Process / Function		Notes
Hydrologic	Moderation of sediment transport	Floodway is present in Reaches 2, 3 and 4, however Reach 4 is separated from the channel and is mostly developed with roads and impervious surface decreasing its function. Wetlands cover the majority of Reach 3, which help slow and disperse flood flows however riparian vegetation is very limited. Several overwater structures are present in Reaches 1 and 2.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	Occasional trees and shrubs are present in all reaches, most in Reach 1, which provide some filtration and bank stabilization but vegetation function is generally low overall. Riparian vegetation widths are narrow in most areas and shorelands are dominated by agricultural uses.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Low to moderate wildlife function is present. A high percentage of wetland in Reach 3 raises its score above the others. No PHS regions are mapped in any of the reaches. Narrow riparian vegetation separates the agriculture fields and associated development from the river in most places but roads or development are also present in all reaches. No anadromous fish use is documented.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	Moderate hyporheic function scores due to presence of alluvial soils that can store water and support vegetation within the shoreline area, except for Reach 4 which is mainly commercially developed.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

Hydrologic functions are generally the highest functions of this waterbody due to extensive floodplain and some floodway and generally good connections to the channel. Vegetation and habitat functions are limited mainly by modifications from agricultural use.

5.2.4 Rock Creek

Rock Creek enters Whitman County from Spokane County to the north, and flows southwest though the northwest corner of the County. It briefly enters Adams County and then re-enters Whitman County and flows south parallel to the County's western border until it converges with the Palouse River west of Endicott. For the purposes of this report, the shoreline jurisdiction area of Rock Creek has been divided into five reaches, numbered sequentially upstream.

There are no ESA-listed salmonids documented in Rock Creek, but rainbow trout are documented throughout all reaches.

The following table provides the functional scores for each reach for each of the four ecological processes categories identified in Table 5-1. The table is followed by a summary page which discusses the main functional attributes and impacts contributing to the scores.

Table 5-8. Functional scoring for Rock Creek reaches

Reach Number/ Name	Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
		Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
5- Lake Outlet	1	H	H	M	H	H	H	H	H	H	H
2- Escure Ranch	2	H	H	L	H	H	H	M	H	H	M
6- Pine Creek Confluence	2	H	H	M	M	M	M	H	H	H	H
4- Cottonwood Confluence/PAW	3	H	H	L	H	M	M	H	M	H	H
3- Imbler Creek	4	H	M	H	H	M	M	M	M	H	L
1- Agriculture	5	H	H	L	M	L	L	H	M	H	H

Relative ranking order from highest to lowest function based on mean reach scores (L= Low function, M=Medium function, H= High function).

Rock Creek

Process	Function	Notes
Hydrologic	Moderation of sediment transport	No armoring and high percentages of wetland yield high hydrologic function scores for moderation of sediment transport and in stream habitat features. Floodplain is relatively low in Reaches 1, 2 and 4 m lowering those reaches scores for attenuating flow energy. Towell Falls is present in Reach 2 along with some meanders and backwater areas.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	Function is highest in Reaches 2 and 5 where shrubby riparian vegetation is generally present separating the channel from uplands and stabilizing banks. More intact natural vegetation and less agricultural impacts are found in these reaches. Reach 1 has the lowest scores due to agricultural impacts and a lack of trees and shrubs.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Overall, moderate to high habitat functions are present. Several PHS regions are mapped including Rocky Mountain Elk over almost all of Reach 6. Some off-channel habitat and small island areas are present in Reaches 2 and 5.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	High hyporheic functions are present in Reaches 1 and 4-6 due to a high percentage of alluvial soils which help store water and support vegetation within the shoreline area. Lower percentages are present in Reaches 2 and 3 but riverine wetlands are present in all reaches and are well connected to the mainstem channel.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

Agricultural use is the main shoreline modification but is mostly limited to Reach 1. Reach 2 includes a recreational use area. Vegetation is naturally limited by the basalt landscape throughout the region.


Rock Creek

5.2.5 Cottonwood Creek

Cottonwood Creek originates in the northeastern quadrant of the County and flows east to where it converges with Rock Creek, just south of Rock Lake. Only the very western end of Cottonwood Creek meets jurisdictional requirements. For the purposes of this report, the shoreline jurisdiction area was divided into two reaches, numbered sequentially upstream. The reach division was based mainly on the extensive potentially associated wetland included in Reach 2. No anadromous fish species are documented in Cottonwood Creek.

The following table provides the functional scores for each reach for each of the four ecological processes categories identified in Table 5-1. The table is followed by a summary page which discusses the main functional attributes and impacts contributing to the scores.

Table 5-9. Functional scoring for Cottonwood Creek reaches

Reach Number/ Name	Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
		Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
1- Agriculture	1	H	H	H	H	L	M	H	M	H	L
2- PAW	2	H	H	L	M	L	M	H	M	H	H

Relative ranking order from highest to lowest function based on mean reach scores (L= Low function, M=Medium function, H= High function).

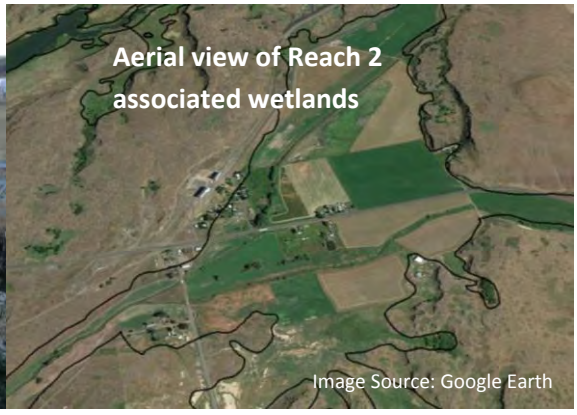
Cottonwood Creek

Process	Function	Notes
Hydrologic	Moderation of sediment transport	High hydrologic function is present overall, however, limited floodplain in Reach 2 lowers its score for attenuating flow energy. No levees or overwater structures. Generally simple channel structure, few backwater areas or meanders but high percentage of wetland.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	The channel itself is a vegetated swale in some areas. No armoring or structures are present. Function is limited by very narrow width of riparian vegetation in many places. Much of the wetland is in agricultural use. Only sparse trees or shrubs occasionally present.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Moderate to high habitat functions are present. Reach 2 is entirely wetland and a high percentage is present in Reach 1 as well. Some PHS regions are mapped in each reach but generally unique habitat features are lacking and habitat is impacted from agricultural uses.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	High hyporheic functions are present in Reach 2 due to a high percentage of alluvial soils which help store water and support vegetation within the shoreline area. Alluvial soils are less present in Reach 1, but good wetland connectivity is present.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

Agricultural uses are the main shoreline modificaitons in this reach. The narrow channel has herbaceous vegetation present within it in places. Trees and shrubs are limited throughout most of both reaches. Most of the PAW in Reach 2 are in agricultural use.

Cottonwood Creek near St. John (Reach 2)



Aerial view of Reach 2 associated wetlands

Image Source: Google Earth

5.2.6 **Fourmile Creek**

Fourmile Creek is a tributary to the South Fork of the Palouse River that originates in the Blue Mountains of Idaho. Only the portion of Fourmile Creek directly east of the convergence with the South Fork of the Palouse meets the jurisdictional threshold. For the purposes of this analysis, only one reach was delineated. No anadromous fish use is documented. The reach runs through primarily agricultural lands.

The following table provides the functional scores for the reach for each of the four ecological processes categories identified in Table 5-1. The table is followed by a summary page which discusses the main functional attributes and impacts contributing to the scores.

Table 5-10. Functional scoring for Fourmile Creek

Reach Number/ Name	Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
		Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
1- Fourmile Creek		H	L	H	L	M	M	L	L	M	H

L= Low function, M=Medium function, H= High function

Fourmile Creek

Process	Function	Notes
Hydrologic	Moderation of sediment transport Development and maintenance of in-stream habitat features Attenuating flow energy	High functional scores for moderation of sediment transport and attenuating flow energy due to a significant amount of floodplain with good connectivity to the channel and little armoring present. One bridge crosses the reach along Albion Parvin Road. However, no backwater areas, island or wetlands are present.
Vegetation	LWD and organic matter recruitment Filtration of upland inputs Bank stabilization	Low to moderate vegetation function is present. Riparian vegetation is generally limited to dense herbaceous species which provide some filtration function. Shoreland area is dominated by cultivated crops which have limited the width of natural vegetation.
Habitat	Wetland/riparian habitat Space and conditions supporting wildlife, including PHS species	Low habitat function is present overall. No wetlands are present and riparian habitat is limited to mainly agriculture fields and a narrow band of herbaceous vegetation. No documentation of PHS species.
Hyporheic	Water storage, cool water refugia, and filtration Support of vegetation	Shallow alluvial soils along the majority of the creek increases hyporheic function. However, limited woody riparian vegetation and no adjacent wetlands are present, limiting water storage.

Key Environmental or Land Use Factors Affecting Processes/Functions:

Agricultural uses are the primary modification in this reach. No other development is present within the reach except for roads.


Fourmile Creek in December

5.2.7 **Hangman Creek**

Hangman Creek (also known as Latah Creek), is a tributary to the Spokane river which flows northwest through the northeast corner of Whitman County, through the City of Tekoa. City reaches are addressed in Section 5.3.8. For the purposes of this analysis the jurisdictional area of Hangman Creek in the County was left as one reach. Shorelands in the County reach have been modified mainly by agricultural practices.

Hangman Creek has degraded water quality and is on the 303(d) list for dissolved oxygen and has a Category 4a listing (TMDL in place) for bacteria and temperature. No anadromous fish presence is documented.

The following table provides the functional scores for the reach for each of the four ecological processes categories identified in Table 5-1. The table is followed by a summary page which discusses the main functional attributes and impacts contributing to the scores.

Table 5-11. Functional scoring for Hangman Creek

Reach Number/ Name	Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
		Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
1- Agriculture		M	L	H	L	M	M	L	L	M	H

L= Low function, M=Medium function, H= High function

Hangman Creek–Agriculture (County Reach)

Process	Function	Notes
Hydrologic	Moderation of sediment transport	Hydrologic function varies. A high percentage of floodplain and some floodway are mapped throughout the reach yielding a high score for attenuating flow energy. Little armoring and no dams or overwater structures are present. However the channel structure is generally simple, with little backwater areas, meanders or wetland.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	Scattered trees and shrubs are present providing some screening between the channel and agricultural lands. However riparian vegetation is generally very narrow and cultivated crops dominate the shore lands.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Low habitat function is present. Riparian habitat is limited to mainly agriculture fields and a narrow band of herbaceous vegetation. Very little wetland is mapped and there is no documentation of PHS species.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	High hyporheic functions are present due to a high percentage of alluvial soils along the reach which help store water and support vegetation within the shoreline area. However very little wetland is present, decreasing the storage and filtration functions.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

Agriculture is a significant land use in this area and is the primary modification in this reach. Development of agriculture has led to a reduction of natural riparian vegetation and altered channel structure. Degraded water quality is a concern in this reach.

5.2.8 **Pine Creek**

Pine Creek flows west near the northern border of the County, through the Towns of Rosalia and Malden (See Sections 5.3.4 and 5.3.3 for analysis of those reaches). For the purposes of this report, the shoreline jurisdiction area of Pine Creek that lies within the County has been divided into three reaches, numbered sequentially upstream. Reaches 1 and 3 each include several spatially divergent portions of the shoreline with similar characteristics which have been aggregated together into two reaches. Reach 1 is heavily agricultural with limited riparian vegetation, while Reach 3 has more woody vegetation present and less agricultural impact in the shorelands. Reach 2 is a small area just outside of Rosalia which includes a wastewater treatment facility.

The following table provides the functional scores for the reach for each of the four ecological processes categories identified in Table 5-1. The table is followed by a summary page which discusses the main functional attributes and impacts contributing to the scores.

Table 5-12. Functional scoring for Pine Creek reaches

Reach Number/ Name	Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
		Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
3- Scrub/Shrub	1	H	L	L	M	M	M	M	H	M	M
1- Agriculture	2	H	L	H	L	L	M	L	L	M	H
2- Waste Water Treatment Lagoons	2	M	L*	H	L	M	M	L*	L	M*	M

Relative ranking order from highest to lowest function based on mean reach scores (L= Low function, M=Medium function, H= High function).

*excluding artificial treatment lagoons, mapped as wetland

Pine Creek (County Reaches)

Process	Function	Notes
Hydrologic	Moderation of sediment transport	A high percentage of floodplain and some floodway is present in Reaches 1 and 2, but is limited in Reach 3. Excluding the treatment lagoons in Reach 2 which are mapped as wetland, wetland is limited in all reaches. No dams are present and armoring is limited.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	Highest vegetative function is present in Reach 3 where evergreen forest makes up over 40% of the landcover. Reach 1 is dominated by agriculture and Reach 2 by the wastewater treatment lagoons.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Low habitat function is present in Reaches 1 and 2. Function increases in Reach 3 where more undisturbed shorelands are present with forested vegetation. Multiple PHS regions are also present in Reach 3 including Rocky Mountain Elk and Cliffs/Bluffs
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	Alluvial soils are present throughout all reaches, the highest percentage in Reach 1, which help store water and support vegetation within the shoreline area. However minimal wetland is present, decreasing the storage and filtration functions.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

Agricultural uses and loss of riparian vegetation are the primary modifications along the county reaches of Pine Creek, primarily in Reach 1.

5.2.9 Union Flat Creek

Union Flat Creek is a tributary to the Palouse River. It flows west through the central portion of Whitman County, entering the Palouse just northwest of Lacrosse. No anadromous salmonid species are documented in the creek. For the purposes of this report, the shoreline jurisdiction area Union Flat Creek has been divided into three reaches, numbered sequentially upstream. Reach 1 flows through a canyon through the scabland region while Reaches 2 and 3 are within regions with more agricultural use. Reach 2 has a very narrow area of riparian vegetation with shorelands dominated by agricultural fields, while Reach 3 has a somewhat wider area of riparian vegetation including areas of sparse evergreen forest. Rainbow trout are documented in all reaches.

The following table provides the functional scores for the reach for each of the four ecological processes categories identified in Table 5-1. The table is followed by a summary page which discusses the main functional attributes and impacts contributing to the scores.

Table 5-13. Functional scoring for Union Flat Creek reaches

Reach Number/ Name	Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
		Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
2- Agriculture	1	H	L	H	L	M	M	L	L	H	H
3- Riparian/Agriculture	1	H	L	H	L	M	M	M	L	M	H
1- Scablands	2	M	M	L	H	M	M	M	L	M	M

Relative ranking order from highest to lowest function based on mean reach scores (L= Low function, M=Medium function, H= High function).

Union Flat Creek

Process	Function	Notes
Hydrologic	Moderation of sediment transport	Very high percentages of floodplain in Reaches 2 and 3 with good connectivity to the channel. Hydrologic functions are more limited in Reach 1 by fairly steep slopes. Wetland is greatest in Reach 1, otherwise development and maintenance of in stream features is low.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	Reaches 2 and 3 are dominated by cultivated crops. Reach 1 flows through an area with naturally sparse scrub/shrub vegetation but has some denser vegetation present along the banks and less agriculture modifications.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Low wetland in Reach 3 but more riparian veg. Wetland in Reach 2 and scablands.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	Shallow alluvial soils are present throughout all reaches, with highest amounts in Reaches 2 and 3. Wetlands connected to the channel contribute to water storage primarily in Reach 2 where wetland percentage is highest and slopes are limited.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

Agricultural uses and loss of riparian vegetation are the primary modifications. Functions in Reach 1 are limited by naturally sparse vegetation and steeper slopes.

5.2.10 **Snake River**

The Snake River forms the southern border of Whitman County. For the purposes of this report, the shoreline jurisdiction area has been divided into five reaches. Spatially divergent portions of the shoreline with similar characteristics have been aggregated together in to one reach for example, several industrial areas are present throughout the entire length of the river which have been joined together into one industrial reach for the purpose of this analysis. Reaches are numbered sequentially upstream from where the first instance of that reach type occurs.

The channel in most areas has steeply sloped banks or is within steep-sided canyons with limited vegetation. The largest reach, Reach 2 (Railroad), is impacted from a railroad and associated armoring that parallels the shoreline for the majority of the river. Reach 1 (Cliffs) consists entirely of predominantly unvegetated steep cliffs along the lowest portion of the Snake. The railroad does not run through Reach 1 except where is cuts across the reach perpendicularly at the point where it crosses the river and enters Columbia County.

Reach 3 (Parks/Open Space) includes official parks, recreation areas and distinct areas where more riparian or buffer vegetation is present, usually where banks are less steep. Industrial uses are present within Reach 4 (Industrial) including two dams, the Lower Granite and Little Goose Dams. Reach 5 (Steptoe Canyon) includes the backwater area and associated wetland near Steptoe Canyon Road.

The following table provides the functional scores for each reach for each of the four ecological processes categories identified in Table 5-1. The table is followed by summary pages which discuss the main functional attributes and impacts contributing to the scores. Reaches 1, 2, 3 and 5 are summarized together. Reach 4 (Industrial) is described separately given its unique uses and modified condition.

Table 5-14. Functional scoring for Snake River reaches

Reach Number/ Name	Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
		Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
5- Steptoe Canyon	1	M	H	H	M	M	M	H	H	H	H
3- Parks/Open Space	2	M	M	L	L	M	H	M	H	H	M
4- Industrial	3	L	M	L	L	L	L	M	M	L	M
2- Railroad	4	L	L	L	M	L	L	L	H	L	L
1- Cliffs	4	L	L	M	M	L	L	L	M	L	L

Relative ranking order from highest to lowest function based on mean reach scores (L= Low function, M=Medium function, H= High function).

Snake River–Reaches 1, 2, 3 and 5

Process	Function	Notes
Hydrologic	Moderation of sediment transport	Armoring and natural steep cliffs along the majority of the shoreline (Reaches 1 and 2) limits flow attenuation and instream habitat diversity. Functions are higher in Reaches 3 and 5 where less armoring, more wetland and backwater areas are present. The percentage of floodplain is generally high but connectivity to the channel is limited due to the natural and artificial armoring.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	A railroad and associated armoring runs along much of the shoreline. Shrub steppe vegetation is located upland of the railroad prism, limiting its potential shoreline functions. Reaches 3 and 5 have more riparian vegetation.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	The railroad running parallel to the river limits wildlife dispersal opportunities. Riparian vegetation is also limited along these reaches. However, shrub steppe vegetation and bluffs provide upland habitat value. Wetland habitat is most significant in Reaches 3 and 5. Anadromous fish use is documented throughout the river.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	Hyporheic functions are limited by armoring and/or natural cliffs throughout most of the shoreline (Reaches 1 and 2). However high percentages of alluvial soils that store water and support vegetation are present in Reaches 3 and 5 where wetland is also highest.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:
The railroad prism and associated armoring limits shoreline functions and natural cliffs limit vegetative and hyporheic functions. However, cliffs and bluffs provide unique upland habitats and waterfowl concentration areas are present throughout.

Snake River– Reach 4, Industrial

Process	Function	Notes
Hydrologic	Moderation of sediment transport	Armoring and natural steep cliffs along the majority of the shoreline limits flow attenuation and instream habitat diversity. Lower Granite and Little Goose Dams (Reach 4) impound water, creating shallow reservoirs that typically fill the width of the steep-sided canyons. The percentage of floodplain is moderately high but connectivity to the channel is limited due to the armoring.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	Armoring associated with industrial development and roads runs along much of the shoreline. Very limited shrub steppe vegetation is located immediately along the river's edge in some locations.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Anadromous fish use is documented in the reach and bluffs, where not developed provide upland habitat value. Waterfowl concentrations, mule deer and chukar PHS regions are documented. However, roads, railroad and industrial development limits wildlife dispersal opportunities and riparian vegetation is very limited.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	Hyporheic functions are limited by armoring and/or natural cliffs, however wetland is documented over 43% of the reach which helps provide water storage and filtration.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:
Dam operations retain sediment and result in seasonal and daily fluctuations in water levels. Industrial development and associated armoring limits shoreline functions and development and natural cliffs limit vegetative and hyporheic functions. Lack of vegetation and development limits terrestrial wildlife habitat.

5.3 City and Town Shoreline Results

The following sections discuss the functions are shorelines within each City and Town. As the results of this analysis may be used to create or update separate SMPs for each local jurisdiction, the shorelines within each City/Town have been analyzed separately so that functional rankings are relative to other reaches within the same local jurisdiction.

The same ecological processes and functions used to evaluate the County reaches (Table 5-1) have been used to evaluate the City reaches; however, rather than using the numeric thresholds identified in Table 5.4 to distinguish between high, moderate and low function, best professional judgment has been applied based on the range of conditions present within each local jurisdiction. This allows the scores and rankings to represent a more accurate range of functions within the City's shorelines, and to more meaningfully differentiate between varying levels of function despite the overall greater level of impairment found in the City's shorelines compared to the County's due to the greater level of development present.

5.3.1 Town of Albion

The South Fork of the Palouse River flows north through the Town of Albion. It crosses the southwest corner of the City. Shorelands are primarily undeveloped but some residential and industrial development is present. Agricultural uses are dominate. For the purposes of this analysis three reaches have been delineated. For descriptive purposes, reaches are numbered sequentially from downstream to upstream. Reach 1 encompasses multiple spatially divergent industrial areas that have been aggregated together into one reach.

All reaches have a water quality Category 4a listing for bacteria.

The following table provides the functional scores for each reach for each of the four ecological processes categories identified in Table 5-1 and ranks the reaches according to their overall functional score. The table is followed by summary pages which discuss the main functional attributes and impacts contributing to the scores for similarly functioning reaches.

Table 5-15. Functional scoring for South Fork Palouse River reaches in the Town of Albion

Reach Number/Name	Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
		Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
1-Albion, Industrial	1	H	M	L	H	L	M	M	L	M	M
3-Albion, Residential	2	H	L	H	M	L	M	L	L	L	H
2-Albion, Agriculture	3	H	L	M	L	L	M	L	L	L	M

Relative ranking order from highest to lowest function based on mean reach scores (L= Low function, M=Medium function, H= High function).

South Fork Palouse River– Albion Agriculture and Residential (Reaches 2 / 3)

Process	Function	Notes
Hydrologic	Moderation of sediment transport Development and maintenance of in-stream habitat features Attenuating flow energy	These two reaches have the highest function for attenuating flow energy due to extensive floodplain and floodway present. No armoring and moderate slopes provide good connectivity to the floodplain. However, no wetland is present in Reach 2 and only constitutes only 1% of Reach 3. No unique in-stream features are present and the channel form is simple.
Vegetation	LWD and organic matter recruitment Filtration of upland inputs Bank stabilization	Low to moderate vegetation function is present in these reaches. Reach 3 has some evergreen forest landcover present, but developed open space and cultivated crops dominate both reaches. Occasional trees and shrubs are present in the shorelands and along stream banks. However, most of the shoreline vegetation consists of a narrow but dense band of herbaceous vegetation separating the channel from surrounding agriculture and residential development.
Habitat	Wetland/riparian habitat Space and conditions supporting wildlife, including PHS species	Low habitat function is present. Residential development and city roads are present in the reaches limited habitat connectivity. No PHS documentation occurs within the reach and very little wetland habitat is mapped.
Hyporheic	Water storage, cool water refugia, and filtration Support of vegetation	Both reaches are located on shallow alluvial soils (Reach 3 has more than Reach 2) which increase the hyporheic function score because of their ability to store water and help support vegetation within the shoreline area.

Key Environmental or Land Use Factors Affecting Processes/Functions:
Agricultural uses and loss of riparian vegetation are the primary modifications to these reaches.

South Fork Palouse River– Albion Industrial (Reach 1)

Process	Function	Notes
Hydrologic	Moderation of sediment transport Development and maintenance of in-stream habitat features Attenuating flow energy	Relatively little floodplain and floodway are present in this reach, though the most wetland are is mapped here of the three reaches. No overwater structures or levees are present. Few unique in-stream features are present and the channel form is simple.
Vegetation	LWD and organic matter recruitment Filtration of upland inputs Bank stabilization	This reach has the highest vegetation score due to a greater presence of shrubs and trees. 58.5% of the reach is mapped as Evergreen Forest land cover. A moderately wide and dense band of vegetation generally separates the channel from surrounding land use.
Habitat	Wetland/riparian habitat Space and conditions supporting wildlife, including PHS species	Low habitat function is present overall though the highest percentage of wetland is found in this reach which increases its wetland/riparian habitat score. No PHS documentation occurs within the reach and several roads run through it, decreasing the connectivity to other habitat types.
Hyporheic	Water storage, cool water refugia, and filtration Support of vegetation	Shallow alluvial soils are present, as well as some wetland which increase the hyporheic function score. Currently impervious surface is limited to roads except for one small area of industrial development.

Key Environmental or Land Use Factors Affecting Processes/Functions:

Roads and loss of riparian vegetation are the primary modifications to this reach.

5.3.2 City of Colfax

The north and south forks of the Palouse River meet in the City. The north fork meanders through recreational, residential, and agricultural uses before entering a concrete flume. Most of the south fork meanders through more dense residential and commercial areas and is contained with a concrete flume for most of its length. Downstream of the confluence, the Palouse River continues along some minor residential uses and primarily industrial uses. For the purposes of this analysis, nine reaches have been delineated. For descriptive purposes, reaches are numbered sequentially from downstream to upstream.

The following table provides the functional scores for each reach for each of the four ecological processes categories identified in Table 5-1 and ranks the reaches according to their overall functional score. The table is followed by summary pages which discuss the main functional attributes and impacts contributing to the scores for similarly functioning reaches.

Table 5-16, below, provides a summary of functional ranking of reaches on the Palouse River in the City of Colfax.

Table 5-16. Functional scoring for Palouse River reaches in the City of Colfax

Reach Number/Name	Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
		Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
2- Colfax, Scrub/Shrub/PAW	1	H	M	H	H	H	H	H	M	H	H
4- Colfax, Agriculture	2	H	L	H	M	H	M	M	L	M	H
5- Colfax, Parks	3	M	L	L	M	M	M	L	L	M	H
8- Colfax, Flume Undeveloped	3	M	L	L	M	M	M	M	L	M	M
9- Colfax, Open Space	4	M	L	M	M	M	M	L	L	L	M
3- Colfax, Residential	5	L	L	L	M	M	L	L	L	L	L
1- Colfax, Industrial/Commercial	6	L	L	L	L	L	M	L	L	L	L
6- Colfax, Flume Commercial	7	L	L	L	L	L	L	L	L	L	L
7- Colfax, Flume Residential	7	L	L	L	L	L	L	L	L	L	L

Relative ranking order from highest to lowest function based on mean reach scores (L= Low function, M=Medium function, H= High function).

Palouse River – Colfax Scrub Shrub/PAW

Process/Function		Notes
Hydrologic	Moderation of sediment transport	This reach has the highest performance of hydrologic functions relative to other City reaches because it lacks armoring, has substantial area of floodplain and floodway (~66% of the reach for both), and contains a wetland fringe. No unique in-stream features are present and the channel form is simple, although it does contain a floodway bench.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	Again, relative to other City reaches, this reach rates the highest based on the structure and width of the riparian vegetation. While the floodway bench appears to be mostly herbaceous vegetation, the slope above the bench is vegetated with a mix of dense shrubs and small trees.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Although this reach is uniquely vegetated, the upper limit of the reach is defined by a railroad. Aside from the floodway wetland, no PHS documentation or key habitats occur within the reach.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	The reach is located over mapped alluvial soils, which, in combination with the riverine wetland, boosts the hyporheic function score because of its ability to store water and help support vegetation within the shoreline area.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

The proximity of the reach to intense development and alteration on the opposite bank, as well as the presence of the railroad at the upland edge of the reach, limits reach function.

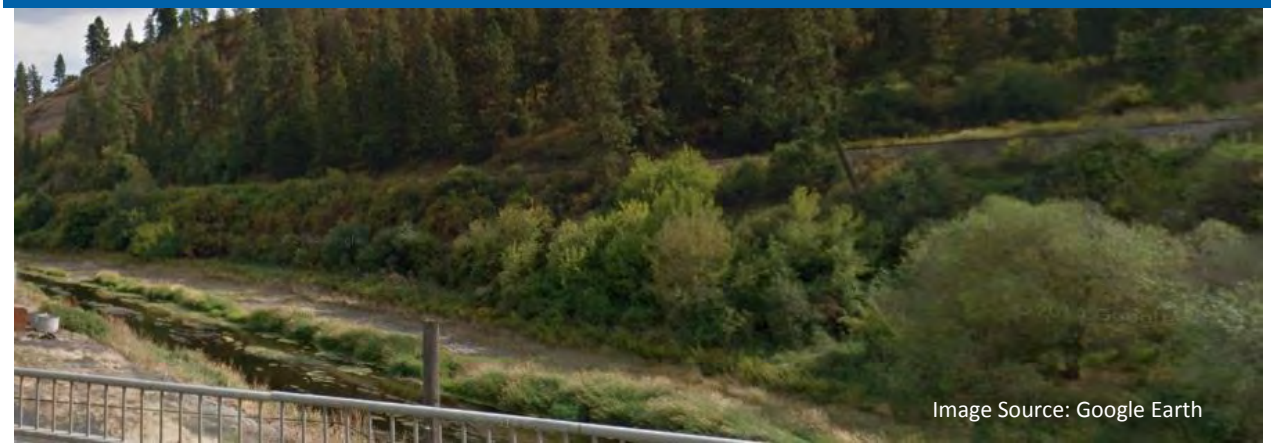


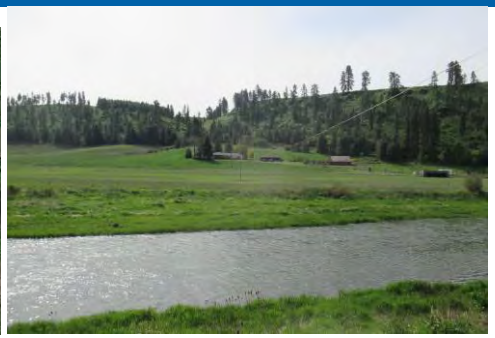
Image Source: Google Earth

Palouse River – Colfax Agriculture

Process/Function		Notes
Hydrologic	Moderation of sediment transport	High function due to extensive floodplain. No armoring and low banks provide good connectivity to the floodplain. Significant wetland areas are found in the reach, as well as a few "islands" and some other channel complexity.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	This reach is a mix of actively farmed lands, riparian areas with some alteration (network of mostly dirt paths), and what may be range lands that maintain sparse conifer forest. Approximately a third of the reach is mapped as wetland. While there are some more developed roadways along the reach, these are mostly set well back from the water.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	This reach contains a mix of habitats, including a variety of in-stream conditions (riffles, runs, side channels). Vegetation is highly variable depending on the character of the agricultural activity (farming, range). According to NWI mapping, approximately one-third of the reach is wetland. There is no PHS documentation.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	The reach is located over mapped alluvial soils, which, in combination with the significant wetland areas, boosts the hyporheic function score because of its ability to store water and help support vegetation within the shoreline area.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

Agricultural uses and loss of riparian vegetation are the primary modifications to these reaches, as well as a network of dirt paths and roads.

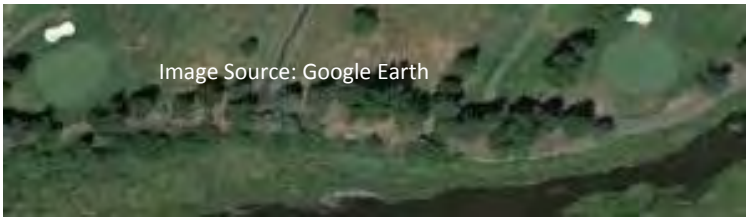


Palouse River – Colfax Parks

Process/Function		Notes
Hydrologic	Moderation of sediment transport	Approximately a third of the reach is mapped as floodplain. Although the mapping does not indicate this, the reach appears to be almost fully leveed, with stretches of rip rap armoring along the upper levee. Some wetland areas are mapped in the reach, as well as a few "islands" and some other channel complexity.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	The river is flanked by a variable width band of dense herbaceous and shrubby vegetation, with a narrow strip of trees along the waterward edge of the golf course. McDonald Park is more limited in its shoreline vegetation, but there is still a narrower band of dense shrubby/herbaceous vegetation. The banks appear to be adequately stabilized, either by vegetation or stretches of riprap. It is unknown what treatments may be applied to the golf greens and ball fields, but the riparian strip likely provides some good filtration.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	The reach is compromised upland of the riparian strip by levee and some riprap armoring, and heavily altered golf course and ballfield maintained grass areas. According to NWI mapping, approximately one-third of the reach is wetland. There is no PHS documentation.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	The reach is entirely located over mapped alluvial soils, which, in combination with the modest wetland areas, boosts the hyporheic function score because of its ability to store water and help support vegetation within the shoreline area.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

Maintained golf course and ballfields limit upland functions.

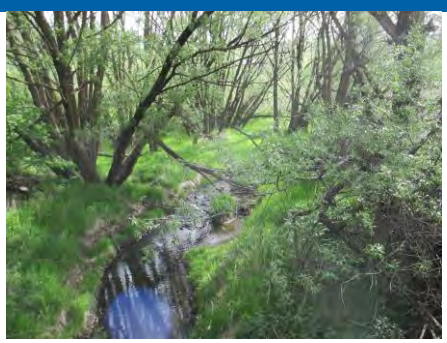


Palouse River – Colfax Flume Undeveloped and Colfax Open Space (Reaches 8 and 9)

Process/Function		Notes
Hydrologic	Moderation of sediment transport	The portion of the reaches upstream of the flume is limited by sloped banks and levees (less levee in Reach 9), but the banks are also well vegetated which can help moderate flows before entering the flume.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	Upstream of the flume, the banks are densely vegetated with trees and shrubs for a depth of approximately 50 feet before being interrupted by a road on the north side and 70-100 feet before being interrupted by development/alterations on the south side. This vegetation likely provides good filtration for any pollutant inputs, and maintains stable banks.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	The flume portion has no habitat benefits, but the upstream section between and upstream of the levees has a densely vegetated bank that provides habitat for birds and small mammals. There is no PHS documentation.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	The concrete flume walls eliminate any potential for adjacent lands to perform hyporheic functions. Upstream of the flume, the presence of alluvial soils is modest but the banks lack armoring and are well-vegetated.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

A portion of the reach is in the flume and the entire reach is bounded by levees and/or roads/development. These modifications limit performance of functions and processes.



Palouse River – Colfax Residential

Process/Function		Notes
Hydrologic	Moderation of sediment transport	This reach is flanked by levees, and a large portion is in a concrete flume or has concrete sidewalls. The levees and the concrete flume have a significant adverse effect on hydrologic function. Some functions are performed in the portions of the reach downstream and upstream of the flume where there are banks densely vegetated by herbaceous and shrubby vegetation.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	Downstream and upstream of the flume, there is some in-channel and bank riparian vegetation – primarily weedy herbaceous and shrub. The banks are stabilized by concrete flume walls or concrete sidewalls, or vegetation upstream and downstream of the flume. This vegetation likely provides good filtration for any pollutant inputs.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Again, the lining of the concrete channel eliminates any potential for stream-associated wetlands or meaningful riparian habitat in the flume portion. Downstream and upstream of the flume, densely vegetated banks and some riparian wetland provides habitat for birds and small mammals.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	The concrete flume walls eliminate any potential for adjacent lands to perform hyporheic functions. Downstream and upstream of the flume, the presence of alluvial soils and well-vegetated banks indicate some hyporheic function.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

The flume and levees, as well as upland residential development, have a strong, adverse impact on processes and functions.


Image Source: Google Earth

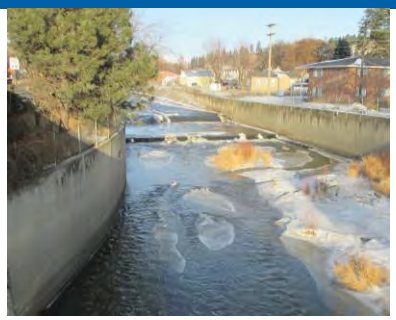

Image Source: Google Earth

Palouse River – Colfax Industrial/ Commercial

Process/Function		Notes
Hydrologic	Moderation of sediment transport Development and maintenance of in-stream habitat features Attenuating flow energy	This reach is flanked by levees, and more than half of the reach that includes the river itself is in a concrete flume or has concrete sidewalls. The levees and the concrete flume have a significant adverse effect on hydrologic function. Some functions are performed in the portion of the reach downstream of the flume where there are banks densely vegetated by herbaceous and shrubby vegetation.
Vegetation	LWD and organic matter recruitment Filtration of upland inputs Bank stabilization	Downstream of the flume, there is some in-channel and bank riparian vegetation – primarily weedy herbaceous and shrub. The banks are stabilized by concrete flume walls or concrete sidewalls on the north fork. Downstream, vegetation appears to be maintaining stable banks. This vegetation likely provides good filtration for any pollutant inputs.
Habitat	Wetland/riparian habitat Space and conditions supporting wildlife, including PHS species	Again, the lining of the concrete channel eliminates any potential for stream-associated wetlands or meaningful riparian habitat in the flume portion. Downstream of the flume, densely vegetated banks and some riparian wetland provides habitat for birds and small mammals.
Hyporheic	Water storage, cool water refugia, and filtration Support of vegetation	The concrete flume walls eliminate any potential for adjacent lands to perform hyporheic functions. Downstream of the flume, the presence of alluvial soils and well-vegetated banks indicate some hyporheic function.

Key Environmental or Land Use Factors Affecting Processes/Functions:

The flume and levees, as well as upland commercial and industrial development, have a strong, adverse impact on processes and functions.

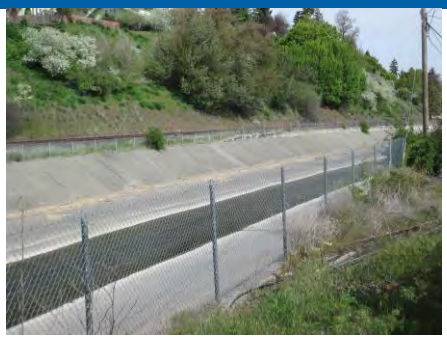


Palouse River – Colfax Flume Commercial and Flume Residential (Reaches 6 and 7)

Process/Function		Notes
Hydrologic	Moderation of sediment transport	Reaches 6 and 7 have the lowest possible hydrologic function by virtue of being entirely lined with concrete. The bottom of the flume is flat, with a narrow low-flow channel and steeply sloped or vertical sides. There are no in-stream habitat features, wetlands, or other special habitat elements.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	Reach 7 does have a limited fringe of sparse trees/shrubs and weedy vegetation along the flume margins. However the ability of any vegetation in the uplands to provide functions other than limited organic input (leaf drop) is extremely reduced as the runoff from pollution-generating surface typically passes into the stream directly via the stormwater system, rather than flowing through a buffer. The banks are stabilized by concrete flume walls.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Again, the lining of the concrete channel eliminates any potential for stream-associated wetlands or meaningful riparian habitat. There is no PHS documentation.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	The concrete flume walls eliminate any potential for adjacent lands to perform hyporheic functions.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

The fenced concrete flume prevents performance of most ecological functions or natural processes.



5.3.3 Town of Malden

Pine Creek flows west through the northern half of Malden. Shorelands are primarily in agricultural use with occasional sparse scrub/shrub or forested vegetation scattered along the reach, mostly in the western half.

The following table provides the functional scores for the reach of Pine Creek in Malden, for each of the four ecological processes categories identified in Table 5-1. The table is followed by a summary page which discusses the main functional attributes and impacts contributing to the scores.

Table 5-17. Functional scoring for Pine Creek reaches in the Town of Malden

Reach Name	Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
		Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
Malden	NA	H	M	L	L	M	M	M	M	M	H

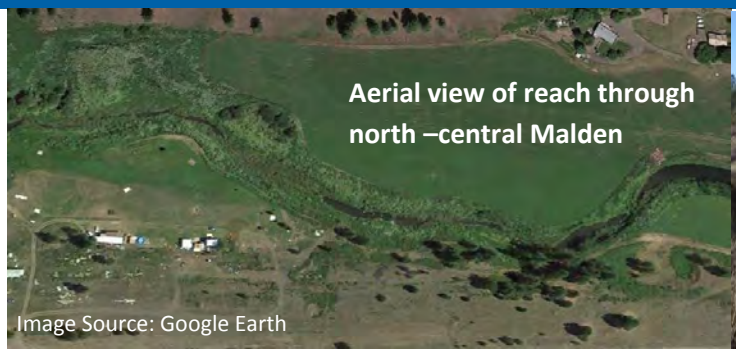
L= Low function, M= Medium function, H= High function

Pine Creek– Malden

Process / Function		Notes
Hydrologic	Moderation of sediment transport	Moderate to high function due to no armoring and moderate slopes however no floodplain is present. Wetland is present but no backwater areas or islands.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	Generally a narrow band of dense herbaceous vegetation separates the channel from cultivated crops which dominate the shorelands. Trees or shrubs are occasionally present helping to provide bank stabilization.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Moderate habitat function is present. No PHS documentation occurs within the reach however there is very little development and some wetland and riparian habitat is present. There is also undisturbed connectivity between the channel and evergreen forest located upslope.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	The reach is located on shallow alluvial soils which increase the hyporheic function score because of their ability to store water and help support vegetation within the shoreline area. Some riverine wetlands are present to store and filter water.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

Agricultural uses are the main shoreline modifications in this reach.



5.3.4 Town of Rosalia

Pine Creek flows north through the western half of Rosalia. It then briefly enters Spokane County before turning and continuing back southwest into Whitman County toward Malden. This southwest flowing portion of Pine Creek shoreline jurisdiction encompasses a small piece of the parcel containing the Town of Rosalia airport located directly west of the Town. For the purposes of this analysis, this area is identified as Reach 1, though it is not contiguous with the river channel. Its condition does affect the function of the southwest flowing portion of Pine Creek, but a County reach separates the Town jurisdiction from the channel. Three other reaches have been delineated, numbered sequentially upstream, all within the northern flowing section of Pine Creek within Rosalia city limits.

The following table provides the functional scores for each reach for each of the four ecological processes categories identified in Table 5-1 and ranks the reaches according to their overall functional score. The table is followed by summary pages which discuss the main functional attributes and impacts contributing to the scores for Reaches 2, 3 and 4. (The small piece of the airport parcel (Reach 1) described above is not further discussed).

Table 5-18. Functional scoring for Pine Creek reaches in the Town of Rosalia

Reach Number/ Name	Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
		Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
3- Rosalia, Residential/Open Space	1	H	L	H	M	M	M	L	L	M	H
4- Rosalia, City Park	2	H	L	H	L	L	L	L	L	M	H
2- Rosalia, Agriculture	3	H	L	H	L	L	L	L	L	M	M
1- Rosalia, Airport*		NA	NA	L	L	L	NA	L	L	M	L

Relative ranking order from highest to lowest function based on mean reach scores (L= Low function, M=Medium function, H= High function).

*reach only includes shorelands that are not contiguous with river

Pine Creek– Rosalia Residential/Open Space (Reach 3)

Process / Function		Notes
Hydrologic	Moderation of sediment transport	High function due to extensive floodplain (96.6% of reach) and floodway (30.7%). No armoring and moderate slopes provide good connectivity to the floodplain. However, no wetland or unique in-stream features are present and the channel form is simple.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	Vegetation function is slightly higher in this reach than in Reaches 2 and 4 due to more shrubs and trees occasionally present in the shorelands and along stream banks. However, most of the shoreline vegetation consists of a narrow but dense band of herbaceous vegetation separating the channel from surrounding open space fields and residential development.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Low habitat function is present. W 7th St. bisects the reach. Residential development and city roads are present particularly in the southern half of the reach. No PHS documentation occurs within the reach and no wetland habitat is mapped.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	The reach is located on shallow alluvial soils which increase the hyporheic function score because of their ability to store water and help support vegetation within the shoreline area.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

This reach is most impacted from development and roads, but also has the most woody vegetation present upland of the channel.

Pine Creek–Rosalia Agriculture & City Park (Reaches 2 and 4)

Process / Function		Notes
Hydrologic	Moderation of sediment transport	High function due to extensive floodplain and floodway in both reaches. No armoring and moderate slopes provide good connectivity to the floodplain. However, no wetland or unique in-stream features are present and the channel form is simple.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	Vegetation function is slightly lower in these reaches than in Reach 3 due to the dominance of mowed fields and cultivated crops. Few shrubs and trees are present and there is little riparian vegetation separating the channel from surrounding uses.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Low habitat function is present. No PHS documentation occurs within the reaches and no wetland habitat is mapped. The reaches are intersected by roads limiting connectivity to other habitat types. Reach 2 has impaired water quality and is on the 303(d) list for bacteria and dissolved oxygen.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	Both reaches are located on shallow alluvial soils (Reach 4 has more than 2) which increase the hyporheic function score because of their ability to store water and help support vegetation within the shoreline area.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:
Agricultural uses and loss of riparian vegetation are the primary modifications to these reaches.

Typical Condition

5.3.5 City of Palouse

The Palouse River flows west from the Idaho border into the southeast corner of the City of Palouse. It meanders north and continues flowing west through the center of the City. For the purposes of this analysis five reaches have been delineated. Spatially divergent portions of the shoreline jurisdiction with similar characteristics have been aggregated together into one reach, for example, multiple open space areas are present throughout the entire length of the river which have been joined together into one Open Space reach (Reach 5). For descriptive purposes, reaches are numbered sequentially upstream from where the first instance of that reach type occurs.

The following table provides the functional scores for each reach for each of the four ecological processes categories identified in Table 5-1 and ranks the reaches according to their overall functional score. Reach 3 is a residentially zoned and developed shoreland area that is separated from the river channel by a small arm of Reach 5. Therefore, not all functions were applicable and it is not ranked along with the others. The table is followed by summary pages which discuss the main functional attributes and impacts contributing to the scores for similarly functioning reaches.

Table 5-19. Functional scoring for Palouse River reaches in the City of Palouse

Reach Number/ Name	Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
		Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
5- City of Palouse, Open Space	1	M	M	M	H	H	H	M	H	M	M
1- City of Palouse, Agriculture	2	H	M	H	M	L	M	M	M	M	H
2- City of Palouse, Industrial	3	M	L	M	L	M	H	L	L	L	H
4- City of Palouse, Commercial	4	M	L	M	L	L	M	L	L	L	L
3- City of Palouse, Residential	-	M	M	M	M	M	NA*	M	L	M	L

Relative ranking order from highest to lowest function based on mean reach scores (L= Low function, M=Medium function, H= High function).
*Reach is not contiguous with stream bank, separated by a small piece of Reach 5

City of Palouse, Open Space and Agriculture (Reaches 1 and 5)

Process / Function		Notes
Hydrologic	Moderation of sediment transport Development and maintenance of in-stream habitat features Attenuating flow energy	Hydrologic function is highest in Reach 1 which includes 89% active floodplain and 38% floodway. Less, though still significant floodplain and floodway are present in Reach 5. Little or no armoring and moderate slopes provide good connectivity to the floodplain. Some wetland, islands and backwater areas are also present, predominantly in Reach 5.
Vegetation	LWD and organic matter recruitment Filtration of upland inputs Bank stabilization	Vegetation function is highest in Reach 5 which has areas of dense riparian forested vegetation. Function is lower in Reach 1 which is dominated by cultivated crops and has limited areas of vegetation capable of providing filtration functions. However, the majority of shorelands in Reach 1 are vegetated compared to the other, more developed city reaches.
Habitat	Wetland/riparian habitat Space and conditions supporting wildlife, including PHS species	Generally moderate habitat function is present, with some relatively high function in Reach 5. No PHS documentation occurs within the reach and only a minimal amount of wetland habitat is mapped. However, minimal development is present and more vegetated riparian corridor compared to the other reaches.
Hyporheic	Water storage, cool water refugia, and filtration Support of vegetation	Shallow alluvial soils are mapped throughout portions of both reaches which, together with undeveloped open space, moderate slopes and wetland, provide moderate to high hyporheic function.

Key Environmental or Land Use Factors Affecting Processes/Functions:
Agriculture and roads are the primary modifications to these reaches. Some small areas of development are also present

City of Palouse, Industrial and Commercial (Reaches 2 and 4)

Process /Function		Notes
Hydrologic	Moderation of sediment transport	Floodplain and floodway are present within both reaches. Banks are moderately sloped but generally vegetated. Little wetland is present and channel has a simple form through these reaches with no backwater areas or islands. Three overwater structures are present in Reach 4 and one in Reach 2.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	The banks of Reach 2 are quite well vegetated with trees and shrubs; however, the shorelands upland are almost all developed with industrial uses. Reach 2 is also predominantly developed with a narrow band of shoreline vegetation separating the channel from the development.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Low habitat function is present. No PHS documentation occurs within the reach and only a minimal amount of wetland habitat is mapped. Reaches are predominantly and corridors from the stream channel to other habitat types are impaired by development.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	Low hyporheic function is present. Alluvial soils are mapped in Reach 2 which could support shoreline vegetation and filtration functions however the majority of the reach is impervious surface.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:
These reaches are the most modified and lowest functioning due to commercial and industrial development.

City of Palouse, Residential (Reach 3)

Process/Function		Notes
Hydrologic	Moderation of sediment transport	This reach is 100% within the active floodplain of the river. A little over 4% of the reach is also identified as floodway. The reach is not directly contiguous with the channel however the narrow portion of Reach 5 which connects the two has similar conditions and currently provides connectivity between the channel and Reach 3.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	While this reach is predominantly developed with residential lots, 42% of the landcover is identified as developed open space. Trees and shrubs area present throughout the residential development providing a source of LWD and organic matter and helping filter inputs from the development.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Generally low habitat function is present, though relative to Reaches 2 and 4 some habitat is provided by the forested and scrub/shrub vegetation present and the corridor it provides to the stream channel. No PHS documentation occurs within the reach and no wetland is mapped.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	Virtually no alluvial soils and no wetland are mapped within this reach, however some vegetation is supported near the top of the stream bank.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

Residential development is the primary modification in this reach. It is entirely located within floodplain.

5.3.7 City of Pullman

The South Fork of the Palouse River flows northwest through the City. The first two reaches heading upstream (Industrial and Commercial/Business District) pass through the most developed areas of the town, with a number of crossings, narrower riparian corridor, and high impervious surface. The next reach (Parks) contains more open space, active recreational lands, and scattered pockets of more intense commercial development. The most upstream reach is South Commercial. Similar to the Industrial reach, this reach has some intense commercial developments, but these are separated from the stream by wider riparian corridors generally. The Residential reach is composed of a number of scattered segments, most of which do not directly abut the river, but are separated from the river by other reaches.

Table 5-20, below, provides a summary of functional ranking of reaches on the South Fork Palouse River in the City of Pullman.

Table 5-20. Functional scoring for Palouse River reaches in the City of Pullman

Reach Number/ Name	Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
		Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
3- Pullman, Parks	1	M	L	H	H	M	M	H	H	H	H
5- Pullman, Residential*	1	H	L	H	H	M	H	M	M	H	H
4- Pullman, South Commercial	2	M	L	H	M	M	M	M	L	H	H
1- Pullman, Industrial	3	M	L	H	L	M	M	L	L	M	M
2- Pullman, Commercial/Business District	4	L	L	L	M	M	M	M	L	L	L

Reach ranking order from highest to lowest function for South Fork Palouse River reaches in the City of Pullman based on mean reach scores (L= Low function, M=Medium function, H= High function).
* Completed for the portion of the reach that is contiguous with the River.

Palouse River – Pullman South Commercial

Process/Function		Notes
Hydrologic	Moderation of sediment transport	This reach has a mix of hydrologic functions. While the presence of armoring appears to be limited to road and trail crossing areas and the stream has good connectivity to significant floodplain and floodway, the channel still lacks complexity with no backwater areas or islands.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	Although much of the reach area is altered, most of the stream length in the reach has a modest riparian area of herbaceous, shrubby and scattered tree vegetation. The vegetation appears to be maintaining stable banks.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	There are no mapped wetlands within the reach, and the riparian area is flanked on either side by railroad, pedestrian trail, paved roads, or intense development. The stream corridor likely has limited use for smaller mammals, birds and other urban wildlife.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	The reach is located over mapped alluvial soils, and the banks are generally not armored except likely at crossings. Vegetation support appears to be good except where development is located.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

The reach is closely bounded by railroad, trails, roads and other development.

Palouse River – Pullman Parks

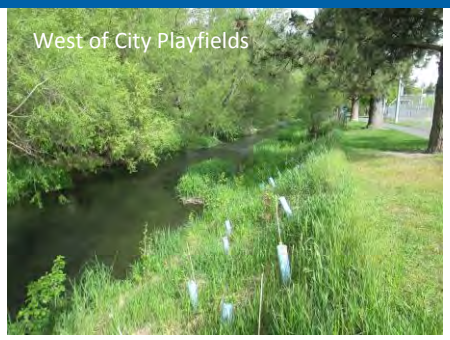
Process/Function		Notes
Hydrologic	Moderation of sediment transport	Some of the banks have some rock armoring, but this does not appear to be a consistent feature. More than three-quarters of the reach is floodplain. No armoring or levees and low banks in most places provide good connectivity to the floodplain. Although no wetlands are mapped in the reach, riverine wetland was observed on the west side of the stream west of the ball fields.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	The river is flanked by a variable width band of dense herbaceous, shrubby and tree vegetation, including a mix of deciduous and coniferous species (narrower in general on the side closest to park). The banks appear to be adequately stabilized in most places by vegetation. It is unknown what treatments may be applied to the ball fields and other formal park areas, but the riparian strip likely provides some good filtration.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Relative to the other reaches, the area contains substantial riparian vegetation (much of it dense) and open spaces that may provide habitat for a variety of wildlife. As mentioned, wetland presence seems very likely. Some spotty but intense development is also present in the reach, but the riparian corridor is generally unbroken except for crossings.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	The reach is almost entirely located over mapped alluvial soils, which, in combination with the likely wetland areas, boosts the hyporheic function score because of its ability to store water and help support vegetation.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

Intensive recreational uses and related modifications outside of the riparian buffer affect function performance.

Downstream of E Main St.

West of City Playfields

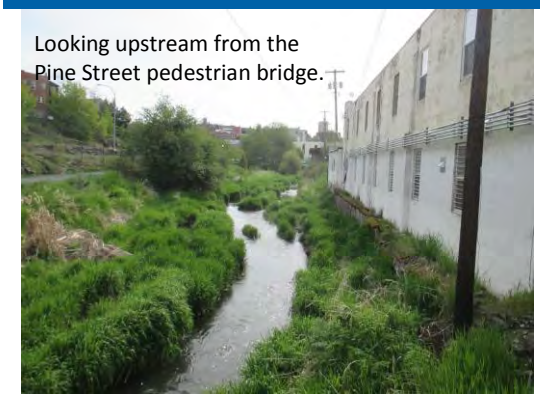


Palouse River – Pullman Commercial/ Business District

Process/Function		Notes
Hydrologic	Moderation of sediment transport	This reach is confined between vertical concrete walls in the section paralleling Main Street, railroad and trail grades, and/or other development. Although not formally designated levees, the effect on the channel through much of the reach is the same. Between these confining features, the banks are steeply to moderately sloped, with somewhat of a vegetated floodway bench in areas.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	Vegetation in the reach is mostly weedy herbaceous species, with a few shrubs and fewer trees. Depending on the mode of entry of stormwater runoff from adjacent development, the vegetation could provide suitable filtration. The banks appear stable.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	The narrow vegetated area and the proximity to a busy downtown with multiple stream crossings limits habitat potential.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	Low hyporheic function is present. Alluvial soils are mapped which could support shoreline vegetation and filtration functions; however, the majority of the reach is impervious surface.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

Channel confinement, roads and railroads, and extensive impervious surfaces limit functions and processes.



Looking upstream from the Pine Street pedestrian bridge.

Image Source: Google Earth

Palouse River – Pullman Industrial

Process/Function		Notes
Hydrologic	Moderation of sediment transport	No obvious indicators of levees or armoring were noted immediately adjacent to the channel. There appear to be some minor backwater/side-channels/wetland patches along the corridor, and a well-connected floodway and floodplain.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	Vegetation in the reach is mostly weedy herbaceous species, with scattered patches of shrubs and a few trees. Where the variable width band of vegetated is wider, it likely provides good filtration of runoff from adjacent disturbed industrial areas. The banks appear stable.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	The riparian corridor is very narrow in places, but widens to over 100 feet in a few areas. However, much of it is herbaceous and shrubby, which limits habitat value, or is located upland of an intervening road or railroad. The lack of cover between the stream and the adjacent land uses is also limiting.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	About half of the reach is mapped as alluvial soils, which could support shoreline vegetation and filtration functions. Lack of armoring and presence of hydric soils also supports hyporheic function.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

Agricultural uses and alteration of riparian vegetation are the primary modifications to these reaches.

Image Source: Google Earth

Palouse River – Pullman Residential

Process/Function		Notes
Hydrologic	Moderation of sediment transport	No obvious indicators of armoring were noted in the aerial photographs, and the slopes appear shallow to moderate. Vegetation is generally dense trees and shrubs, varying from 25-50+ feet wide, in the floodplain. The stream appears to lack channel form complexity.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	The river is flanked by a variable width band of dense shrub and tree vegetation. No obvious indicators of armoring were noted in the aerial photographs, and the banks appear to be adequately stabilized by vegetation. The riparian vegetation likely provides good filtration.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Relative to the other City reaches, the area contains substantial riparian vegetation (much of it dense) and open spaces that may provide habitat for a variety of wildlife. There is no wetland mapping in this reach, but wetland presence seems very likely. Some spotty but intense development is also present in the reach, but the riparian corridor is generally unbroken except for crossings.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	The reach is almost entirely located over mapped alluvial soils, which, in combination with the likely wetland areas, boosts the hyporheic function score because of its ability to store water and help support vegetation.
	Support of vegetation	

This functional characterization applies only to the portion of the reach that is contiguous with the river, mostly west of the City playfield. This piece of the reach is zoned Residential, but has very little residential development.

Key Environmental or Land Use Factors Affecting Processes/Functions:

Loss of riparian vegetation in the southern part of the reach and other development adversely affects function performance.

5.3.8 City of Tekoa

Hangman Creek flows northwest through the City of Tekoa in the northwest corner of the County. For the purposes of this analysis four reaches were delineated, numbered sequentially upstream. Reach 1 is a rural residential area with the highest function relative to the other reaches. Reach 2 is the lowest functioning reach which consists of a commercial and urban residential area. Reach 3 is the open space meanders in the southern end of the City. Reach 4 is an associated floodplain/floodway reach adjacent to the tributary to Hangman Creek near Highway 274.

The following table provides the functional scores for each reach for each of the four ecological processes categories identified in Table 5-1 and ranks the reaches according to their overall functional score. The table is followed by summary pages which discuss the main functional attributes and impacts contributing to the scores for similarly functioning reaches.

Table 5-21. Functional scoring for Hangman Creek reaches in the City of Tekoa

Reach Number/ Name	Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
		Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
1- Tekoa, Rural Residential	1	H	H	H	H	H	M	H	M	M	H
3- Tekoa, Open Space	2	H	M	M	M	M	M	M	M	M	H
4- Tekoa, Floodway	3	H	H	M	M	L	M	M	L	M	H
2- Tekoa, Urban Residential/Commercial	4	H	L	L	L	L	M	L	L	L	H

Relative ranking order from highest to lowest function based on mean reach scores (L= Low function, M=Medium function, H= High function).

Tekoa, Rural Residential and Open Space (Reaches 1 and 3)

Process	Function	Notes
Hydrologic	Moderation of sediment transport Development and maintenance of in-stream habitat features Attenuating flow energy	Moderate to high hydrologic function. No armoring is present and good connectivity exists between the channel and extensive floodplain. Reach 1 has the highest function due to the greatest amount of floodway and wetland present. Both reaches have some vegetated riparian areas helping to slow and disperse flood flows.
Vegetation	LWD and organic matter recruitment Filtration of upland inputs Bank stabilization	Relatively moderate to high vegetation function is present. Both reaches have some Evergreen Forest land cover and less developed areas than the other city reaches. An area of narrow but dense herbaceous vegetation is present along the channel with occasional shrubs and trees providing filtration and stabilization functions. Reach 1 has the broadest band of riparian vegetation of the city reaches, followed by Reach 3.
Habitat	Wetland/riparian habitat Space and conditions supporting wildlife, including PHS species	Habitat function is highest in these reaches. The least amount of development is present and the riparian corridor provides some connectivity between habitat types including forested areas. No PHS regions are documented.
Hyporheic	Water storage, cool water refugia, and filtration Support of vegetation	Low percentages of wetland are present but predominantly undeveloped shoreland, moderately slopes banks with little armoring and extensive areas of alluvial soil provide moderate to high hyporheic function.

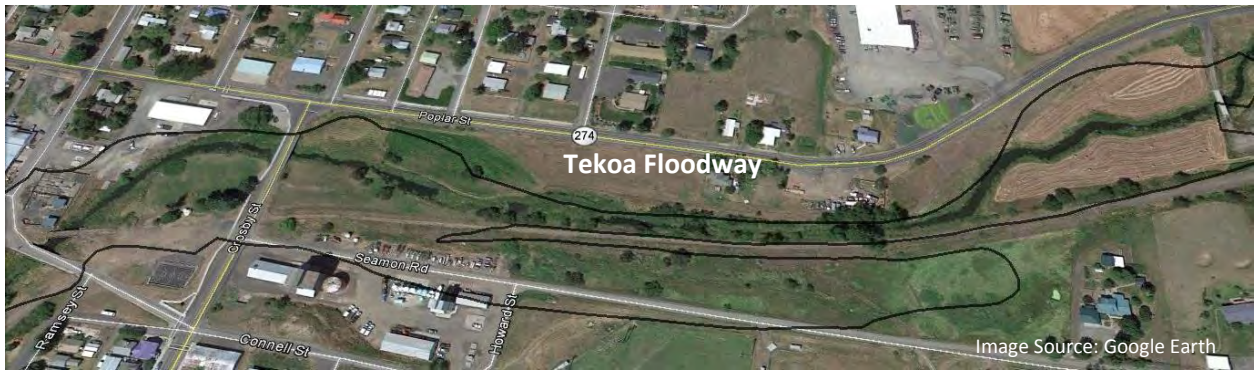
Key Environmental or Land Use Factors Affecting Processes/Functions:
These reaches are the highest functioning of the Tekoa reaches. The forested areas of Reach 1 and undeveloped open space in Reach 2 contribute to the higher functional scores.

Tekoa, Floodway (Reach 4)

Process	Function	Notes
Hydrologic	Moderation of sediment transport	Moderate to high hydrologic function. Some armoring is present along the tributary associated with this reach which consist of floodplain and floodway hydrologically connected to Hangman Creek.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	Relatively low to moderate vegetation function is present. Some industrial development is present along with agricultural fields and roads. Limited shrub or forested vegetation and a very narrow band of riparian herbaceous vegetation is present which limits filtration function and organic matter recruitment.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Low to moderate relative habitat function is present. Some wetland is mapped but surrounding development limits habitat connectivity. No PHS regions are documented.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	Extensive areas of alluvial soil provide hyporheic function but little wetland, impervious roads and other development limit water storage and filtration functions.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:

This reach is floodway associated with the Hangman Creek channel. It is contiguous to a tributary and is hydrologically connected to Hangman Creek. Industrial areas, farm land and roads dominate the land use.



Tekoa, Urban Residential/Commercial (Reach 2)

Process	Function	Notes
Hydrologic	Moderation of sediment transport	Floodplain is present but less than in the other city reaches. Floodway is also present. Less than 1% of the reach is mapped as wetland and no unique in stream features exist.
	Development and maintenance of in-stream habitat features	
	Attenuating flow energy	
Vegetation	LWD and organic matter recruitment	Low vegetation function is present overall. The dominate land cover is developed, low intensity. Some trees and shrubs are present but are predominantly in a developed residential area, and are separated from the stream bank by Water Street.
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Wetland/riparian habitat	Low habitat function is present. No PHS regions are documented. Water Street runs parallel to the western bank of the stream. There is some connectivity to other habitat types through the stream corridor to the north but surrounding development and limited vegetation decrease this function.
	Space and conditions supporting wildlife, including PHS species	
Hyporheic	Water storage, cool water refugia, and filtration	Extensive areas of alluvial soils are mapped which could help support shoreline vegetation, however little wetland, impervious roads and other development limit water storage and filtration functions.
	Support of vegetation	

Key Environmental or Land Use Factors Affecting Processes/Functions:
Functions are lowest in this reach which has little vegetation present overall, a limited riparian area and shorelands that are dominated by residential and commercial development.

5.4 Restoration Opportunities

5.4.1 County- and City-wide

Some of the primary issues affecting the region's streams and waterbodies that may be addressed with restoration or protection include: (1) habitat degradation with the alteration of riparian zones and conversion of small channels to drainage ditches, (2) poor water quality where fecal coliform bacteria, nutrient levels, and water temperatures often exceed Washington state standards, and (3) soil erosion from storm water runoff with the conversion to agriculture. In the Palouse River basin, land use changes have led to the loss of most of the basin's riparian habitat and wetlands contributing to erosion, increased sedimentation, and higher water temperatures (HDR and EES 2007). Water quality concerns are primarily from non-point sources, including: erosion, livestock, fertilizers, and septic systems (HDR and EES 2007). In the Middle Snake River Watershed, restoration goals are often aimed at achieving healthy, sustainable, and harvestable salmonid populations.

Table 5-22 highlights potential restoration opportunities for the Palouse River, Middle Snake River, and Hangman Creek Watersheds. While many of these items are more applicable to the unincorporated areas of the County, many of them are also universally applicable in the Cities and Towns as well.

Table 5-22. Documented Restoration Opportunities in Whitman County

Actions/Waterbody	Benefit	Source
Palouse River Watershed		
Implement habitat improvement projects involving construction or placement of instream structures	water quality, streambank stabilization	Palouse Watershed Plan 2007
Implement habitat improvement projects involving out-of-stream riparian restoration or enhancement	stream temperature, water quality, streambank stabilization	Palouse Watershed Plan 2007
Move river dikes back from existing river channels to allow for floodplain restoration and channel maintenance	Instream flow, habitat enhancement	Palouse Watershed Plan 2007
Relocate campgrounds further from stream edges where assessments show potential for erosion and other adverse effects	Streambank stabilization	Palouse Watershed Plan 2007

Actions/Waterbody	Benefit	Source
Manage grazing in riparian areas by installing livestock exclusion fencing and off-stream watering	water quality, streambank stabilization	HDR and EES 2007
Work with individual landowners to review pesticide and fertilizer use, and to implement the following best management practices to limit water quality impacts: 1. Manage Sprague Lake inputs to reduce nutrient loading; 2. Enhance riparian areas; 3. Urban/rural education program; 4. Conservation tillage	Water quality	Palouse Watershed Plan 2007
Middle Snake River Watershed		
Near Shore Assessment WRIA 35 – Investigate alternatives for modifying near shore habitat in the Snake River Reservoirs to benefit salmonids survival.	Habitat improvement	Snake River Salmon Recovery Board
Head Cut Barrier Removal (Alkali Creek) (35-00133) - Investigate the severity of the fish barrier and determine a project design to rectify passage issues.	Barrier removal	Snake River Salmon Recovery Board
Palouse Prairie Protection (32-00161) – protect native wet uplands through fencing or conservation agreements; restoration through digging or plugging old drain ditches no longer in use	watershed retention, reduce sediment routing	Snake River Salmon Recovery Board
Hangman (Latah) Creek Watershed		
Restore buffer of mature riparian vegetation to reduce heat loads on the stream	stream temperature, water quality, streambank stabilization	Hangman Creek TMDL
Install livestock exclusion fencing and off-stream watering	stream temperature, water quality, streambank stabilization	Hangman Creek TMDL

5.4.2 City of Palouse

The City of Palouse's Comprehensive Plan (2014) identifies a number of strategies to improve environmental conditions within the City, including the following:

- Preserve natural areas through conservation easements, land acquisition and land swaps, designation of some areas as "critical wildlife habitat conservation areas," and using a Conservation Land Trust to acquire and manage natural areas.
- Planting native riparian vegetation along the Palouse River streambanks.

- In pursuit of improved water quality and to reduce flooding, "develop partnerships with upstream parties to improve upriver watershed management."

    - Implement and enforce North Fork Palouse River Water Quality Improvement Plan
    - Reduce soil erosion by requiring property owners to control storm run-off to a level that prevents soil erosion on their property.
    - Encourage native plantings when possible.

5.4.3 City of Pullman

The City of Pullman's *Comprehensive Plan* (1999) includes a specific goal and policies that would contribute significantly to improvements in ecological function in the City:

> "GOAL P4: Complete and protect a system of green belts, centered on streams and wildlife corridors, to protect natural resources and provide passive recreation.
>
> Policy P4.1: Attempt to restore the South Fork of the Palouse River to a more natural appearance and function.
>
> Policy P4.2: Protect riparian corridors along perennial streams from the adverse effects of development. Maintain a buffer of vegetation (preferably native vegetation) along all streams.
>
> Policy P4.3: Whenever possible, establish greenways to link open space areas located in close proximity to one another."

The Plan contains other goals and policies that support acquisition of habitat areas, setting back developments from the water's edge, and working with property owners to preserve and enhance riparian areas.

Stream restoration is also ongoing in the City through the Palouse-Clearwater Environmental Institute (PCEI). A long stretch of the South Fork adjacent to the City Playfields has been enhanced with native vegetation and banks stabilized with coir fabric "logs" to help minimize erosion. PCEI also organizes an annual spring stream cleanup activity for volunteers. At present, there are also 13 stream segments in the City, including South Fork Palouse River and tributary streams, that are sponsored by different organizations or families under the Adopt-A-Stream program.

6 LAND USE ANALYSIS

6.1 County

6.1.1 Lakes

Land Use Pattern

There are ten lakes in Whitman County that meet the criteria as Shorelines of the State. They include: Alkali Lake, Bonnie Lake, Crooked Knee Lake, Duck Lake, Folsom Lake, Lavista Lake, Rock Lake, Sheep Lake, Stevens Lake, Texas Lake and Tule Lake. The County's lakes are located in relatively remote locations in the western and northwestern portion of the County, and are fairly homogenous in terms of shoreline land use. For this reason, they are analyzed together in this section. The total shoreline jurisdiction around the lakes is 1,190 acres.

Agriculture is the dominant shoreline land use within the jurisdiction of all of the County's shoreline lakes. Open space (classified under 84.34 RCW) is the only other current land use identified within the lake shorelines. The classified open space is located along Rock Lake, which is the largest lake in the County. See Appendix D for summary tables of zoning and current land use by lake and reach.

Existing and Planned Land Uses

All of the lakes' shorelines are within unincorporated Whitman County and are zoned Agriculture under the County's zoning code. Roughly two thirds (67%) of the shoreline jurisdiction of the County's lakes is privately owned. Approximately 389 acres (33%) of the shoreline area are publicly owned. These publicly owned lake shorelines are presented in Table 6-1.

Table 6-1. Publicly Owned Whitman County Lake Shorelines

Lake	Total Shoreline Area (acres)	Publicly Owned Shoreline Area (acres)	Owner	Percent of Shoreline Jurisdiction
Alkali Lake	40	40	Bureau of Reclamation	100
Folsom Lake	131	131	State Parks and Recreation Commission	100
Rock Lake	467	184	Bureau of Reclamation	39
Tule Lake	34	9 25	Bureau of Reclamation Department of Natural Resources	27 73

The current shoreline environment designation for all of the lakes except Rock Lake is Rural. According to the current (1974) Shoreline Management Master Program, the Rural designation is intended "to protect agricultural land from urban expansion, restrict intensive development along undeveloped shorelines functions as a buffer between urban areas, and maintain open spaces and opportunities for recreational uses compatible with agricultural uses."

Rock Lake is designated Conservancy. The purpose of the Conservancy designation is "to protect, conserve and manage existing natural resources and valuable historic and cultural areas in order to ensure a continuous flow of recreational benefits to the public and to achieve sustained resource utilization."

Potential New Development and Uses

The majority of lands within the County's lake shorelines are in agricultural use. Existing structures may be repaired, but the overall trend for shoreline use along the lakes is likely to remain agricultural. The County's Parks and Recreation Master Plan (2004) contains several recommended recreational improvements (see Public Access discussion below), some of which may occur during the planning horizon of this SMP (20 years). No other planned future uses have been identified.

Water-oriented Use

Water-oriented uses along the lake shorelines are limited to agriculture and public access. Nearly all of the shorelines are currently identified as being in agricultural use. The public access sites listed below (see Public Access) are also considered water-oriented. Recreational activities such as fishing, swimming, and boating (motorized and non-motorized) that occur on the lakes are considered water-oriented.

Transportation and Utilities

In general, there is limited road or transportation infrastructure within the shoreline jurisdiction of the County's lake shorelines. Folsom Lake and Lavista Lake have minimal rail infrastructure within shoreline jurisdiction, all of which are abandoned rail. Folsom Lake has 0.04 mile of abandoned rail in shoreline jurisdiction.

Most lakes have no road infrastructure within shoreline jurisdiction. There is 0.11 mile of road infrastructure within shoreline jurisdiction of Rock Lake, and 0.41 mile of road infrastructure within shoreline jurisdiction of Sheep Lake. The majority of roads are classified as rural local access roads. Major roads include State Highway 23, which crosses Crooked Knee Lake.

There are two identified bridges within shoreline jurisdiction.

1. State Highway 23 crosses Crooked Knee Lake
2. Rock Lake Road crosses Rock Lake

Public Access

Current Parks and Public Open Space

Given the generally high amount of lake shoreline in the County, there are only a few established public access facilities. The John Wayne Trail extends along Rock Creek, Lavista Lake, Rock Lake, and Pine Creek, and offers visual and physical access to those waterbodies. Most of the publicly owned lands listed above are available for public use. There is a public access site and informal boat launch and parking area at the southern end of Rock Lake.

Future Public Access

The County's Parks and Recreation Comprehensive Plan (2004) notes several deficiencies in shoreline recreational opportunities and offers recommendations. It notes that the western portion of the County and the northwest section in particular have a lack of recreation facilities. It also notes that, to date, public access to Rock Lake and Bonnie Lake is limited. Access is available due to willingness of land owners to allow use of their lands by permission and, previously, by lease agreement at the southern end of Rock Lake. The Plan suggests that efforts be made to establish more public access to Rock Lake and Bonnie Lake. The Plan also includes the following implementation action related to the lakes:

1. Strive to insure public access to Rock Lake and Bonnie Lake.

Historic and Archeological Sites

According to available data, there are no historic or archeological sites within the shoreline reaches of lakes in unincorporated Whitman County.

6.1.2 Palouse River

This section addresses both the Palouse River and the North Fork Palouse River. The Palouse River flows across Whitman County from east to west. At the west side of the County, the river turns south forming the County's southwest border and flows into the Snake River. The Palouse River flows through the Cities of Palouse and Colfax (along the North Fork), but this section deals with the portion in the unincorporated County. There are very few uses or structures within the river and its shorelines. It is heavily leveed through Colfax (see Section 6.3).

The vast majority of the Palouse River shoreline jurisdiction is currently used for agriculture. Approximately 4,904 shoreline acres[1], representing 96 percent of the waterbody's total shoreline jurisdiction area, is used for agriculture. Other shoreline land uses include Open Space[2] (2.4%) and a variety of uses that occur on less than ten acres (<1%) (e.g., single-family residences, manufacturing, recreational, utilities). The North Fork's shorelines are also nearly all in agricultural use (98%). See Appendix D for summary tables of zoning and current land use by lake and reach

Land Use Pattern

Existing and Planned Land Uses

The river has been divided into ten reaches for the analysis. As noted, existing land use within shoreline jurisdiction for the Palouse River is dominated by agriculture. Small percentages of the land use (<1%) along the North Fork are classified as single-family households, manufacturing, recreation and utilities. These areas are near or adjacent to Colfax.

Land within shoreline jurisdiction is primarily privately owned. Public ownership includes County, Washington Department of Natural Resources, and U.S. Bureau of Land Management in the southwest of the County. With the exception of small areas along the North Fork, the entire shoreline is zoned as Agriculture.

The current shoreline environment designation for most of the unincorporated County areas along the river is Rural. According to the current (1974) Shoreline Management Master Program, the Rural designation is intended "to protect agricultural land from urban expansion, restrict intensive development along undeveloped shorelines functions as a buffer between urban areas, and maintain open spaces and opportunities for recreational uses compatible with agricultural uses." As the river turns south along the boundary with Adams County, it is designated Conservancy. Palouse Falls State Park is designated Natural. Appendix D presents current land use, ownership and zoning data by reach along the Palouse and North Fork Palouse Rivers.

Potential New Development and Uses

As noted, the vast majority of lands within the Palouse River's shoreline jurisdiction are in agricultural use. Additionally, a majority of those agricultural lands have been

[1] 62% of the agricultural lands are classified under current use chapter 84.34 RCW. The remaining lands are not classified.

[2] Classified under chapter 84.34 RCW

classified under 83.84 RCW, indicating they are likely to remain in agricultural use. Existing structures may be repaired, but the overall trend for shoreline use along the river will be to remain in agricultural use. An area north of Colfax is classified as undeveloped land, and is adjacent to other industrial uses. However, the area in the County is zoned Agriculture. A change of use would require a rezone.

Water-oriented Use

The primary identified potentially water-oriented use along the Palouse River's shoreline is agriculture. The three parks (Elberton County Park, Colfax Equestrian/Multi-use Trail, and Palouse Falls State Park) and other public access sites are considered water-oriented uses and are described in further detail below under Public Access.

Transportation and Utilities

In general, there is little to no road or transportation infrastructure within shoreline jurisdiction of the Palouse River reaches in unincorporated Whitman County.

There are approximately 11 miles of rail infrastructure in shoreline jurisdiction concentrated mainly along the Palouse River - Agriculture reach, which contains 4.61 miles of active rail. The Palouse River - Western Palouse reach contains approximately one mile of active rail, and the Palouse River - Meanders reach contains less than one mile of abandoned rail infrastructure.

There are approximately nine miles of roads within Palouse River reaches. The majority of road infrastructure is within the North Fork Palouse River – Agriculture reach (3.59 miles) and the Palouse River – Agriculture reach (3.43 miles). The majority of road infrastructure is classified as rural local access and minor roads. Major road infrastructure includes the following:

- State Highway 272 crosses the North Fork Palouse River near the City of Palouse in the North Fork Palouse River – Agriculture reach.
- State Highway 26 crosses the Palouse River in the Palouse River – Agriculture, Palouse River – County Industrial, and Palouse River - Open Space reaches.

There are approximately 19 bridges within shoreline jurisdiction.

- There are nine bridges in the North Fork Palouse River – Agriculture reach, including six minor road bridges, one abandoned rail bridge, one active rail bridge, and one bridge on State Highway 272.

- There are five bridges on minor roads in the North Fork Palouse River – Meanders reach.
- There are four bridges, including three on minor roads and one on State Highway 26, in the North Fork Palouse River – Agriculture reach.
- There is one bridge on State Highway 26 near the City of Colfax in the Palouse River – County Industrial and Palouse River - Open Space reaches.

Public Access

Current Parks and Public Open Space

Given the size of the Palouse River's shoreline area, there are relatively few public access sites, which is consistent with an area of intense agricultural use. Public access sites that are present are summarized in Table 6-2.

Table 6-2. Palouse River Open Space and Public Access Summary

Shoreline Reach	Open Space Acres (Percent of Reach)	Parks	Campground	Trail (Length in Feet)	Boat Launches	Moorage
North Fork Palouse River - Agriculture	0.3 (0)	1	-	-	-	-
Palouse River - Canyon	68.4 (64.7)	-	-	-	-	-
Palouse River – Meanders	37.7 (2.3)	-	-	Colfax Trail (7,334)	-	-
Palouse River – Palouse Falls State Park	-	1	1	-	-	-
Palouse River – Western Palouse	18.7 (2.2)	-	-	-	-	-

There are scenic highways that provide visual access to shorelines of the Palouse River. The County's Parks and Recreation Comprehensive Plan (2004) identifies the Palouse River as a popular destination for boating, canoeing and fishing. Specific locations are not provided.

The Palouse River has 4.5 acres of recreational off highway vehicle areas within shoreline jurisdiction. The following shoreline public access sites and trails are located within Palouse River shoreline jurisdiction:

- **Elberton County Park** is the site of the Whitman County Ropes Challenge Course. The Park's picnic area was considered a site for future development in the 2004-2009 Whitman County Parks and Recreation Comprehensive Plan.

- **Colfax Equestrian/Multi-use Trail** is a 3 mile long undeveloped abandoned railroad bed which follows the Palouse River west out of Colfax. The trail allows for non-motorized and equestrian uses.
- **Palouse Falls State Park** is a 105-acre park with camping, picnic and day use facilities.

Future Public Access

No future public access has been identified.

Historic and Archeological Sites

There are two historic sites within shoreline reaches of the Palouse River in unincorporated Whitman County.

- **Manning-Rye Covered Bridge** spans the Palouse River. It is also known as the Harpole Bridge. It is a Historic Bridge on the National Register of Historic Places.
- **Elberton Historic District** is on the State Register of Historic Districts. The district was on the National Historic Register, but it was removed in 1990. The District is near Washington State Highway 272 at the Palouse River.

There are 15 structures more than 50 years old within the shoreline reaches of the Palouse River in unincorporated Whitman County. The structures are concentrated in the North Fork Palouse River – Agriculture shoreline reach.

6.1.3 South Fork Palouse River

Land Use Pattern

The South Fork of the Palouse River (South Fork) flows from east to west from the City of Pullman (Section 6.2.6), through the Town of Albion (Section 6.2.1), entering the Mainstem Palouse River at the north end of Colfax (Section 6.2.2). The South Fork's shoreline jurisdiction comprises approximately 963 acres of uplands. There are very few uses or structures within the river and its shorelands. The vast majority of the South Fork's shoreline jurisdiction is in agricultural use. Approximately 907 shoreline acres (94%) are agriculture classified under chapter 84.34 RCW. Other shoreline land uses include Open Space[3] (2.9%), single-family residences (1.8%), and undeveloped land (1.2%).

[3] Classified under chapter 84.34 RCW

Existing and Planned Land Uses

The majority of land within shoreline jurisdiction is privately owned (95%). Approximately 28.5 acres are owned mapped under the ownership of Washington State University (3.0%). Land within shoreline jurisdiction of the South Fork is largely zoned agricultural with some small areas zoned for residential and industrial uses adjacent to the City of Pullman (<1% each).

The current shoreline environment designation along the South Fork is Rural. According to the current (1974) Shoreline Management Master Program, the Rural designation is intended "to protect agricultural land from urban expansion, restrict intensive development along undeveloped shorelines functions as a buffer between urban areas, and maintain open spaces and opportunities for recreational uses compatible with agricultural uses." Appendix D presents current land use, ownership and zoning along the South Fork Palouse River.

Potential New Development and Uses

The vast majority of land within the South Fork's shoreline jurisdiction is under agricultural use and classified under 83.84 RCW, indicating they will remain in agricultural use. Existing structures may be repaired, but the overall trend for shoreline use along the river will be to remain in agricultural use. An area north of Pullman is classified as undeveloped land. It is adjacent to more urban and industrial uses and new non-agricultural uses would be most likely in this area of the unincorporated South Fork.

Water-oriented Use

The only identified water-oriented uses along the South Fork shoreline include agriculture, of which the vast majority of the shoreline jurisdiction is used for. There are no other identified water-oriented uses.

Transportation and Utilities

There is a moderate amount of road and transportation infrastructure in shoreline jurisdiction of the South Fork in the unincorporated County. There are approximately 6.5 miles of road and 10 miles of rail infrastructure concentrated mainly in the South Fork Palouse River - Agriculture and South Fork Palouse River - South Fork River Road reaches.

There are approximately nine bridges within shoreline jurisdiction of the South Fork Palouse River.

Public Access

Current Parks and Public Open Space

There are approximately 28 acres of open space land classified under chapter 84.34 RCW located southeast of Colfax along South Palouse River Road. There are no other designated or established recreation sites within the shoreline of the South Fork Palouse River.

Future Public Access

There are no identified future public access sites.

Historic and Archeological Sites

There are no historic sites within the shoreline reaches of the South Fork Palouse River. There are two structures more than 50 years old within shoreline reaches of the South Fork Palouse River: the Whitman County Bridge and the Risbeck Grain Elevator.

6.1.4 Rock Creek

Land Use Pattern

Rock Creek flows generally south from Rock Lake to the Palouse River in the western side of the County. Rock Creek's shoreline jurisdiction comprises approximately 2,337 acres of uplands. Rock Creek's shorelines are primarily in agricultural (75%) and open space (25%) uses. There are very few uses or structures within the river and its shorelands.

Existing and Planned Land Uses

The shoreline areas within all five Rock Creek reaches are zoned Agriculture by the County. Roughly half (48%) of the shoreline area of Rock Creek is owned publicly by a combination of the Bureau of Reclamation (44 acres), Bureau of Land Management (767 acres), and WDFW (309 acres). The remainder (1,217 acres) is privately owned.

The current shoreline environment designation along Rock Creek is Rural. According to the current (1974) Shoreline Management Master Program, the Rural designation is intended "to protect agricultural land from urban expansion, restrict intensive development along undeveloped shorelines functions as a buffer between urban areas, and maintain open spaces and opportunities for recreational uses compatible with agricultural uses." Appendix D presents current land use, ownership and zoning by reach for Rock Creek.

Potential New Development and Uses

Shorelines of Rock Creek are completely in agricultural use and open space designated under 83.84, indicating they are likely to remain undeveloped. Existing structures may be repaired, but the overall trend for shoreline use along the creek will be to remain in agricultural and open space use.

Water-oriented Use

Potentially water-oriented uses along Rock Creek include agriculture, for which 75% of the shoreline jurisdiction is used. There are several public access areas which are considered water-oriented (refer to Public Access below). The County's Parks and Recreation Comprehensive Plan (2004) also identifies Rock Creek as a common fishing site.

Transportation and Utilities

In general, there is little road and rail infrastructure in the Rock Creek shoreline jurisdiction. There are approximately 0.39 mile of abandoned rail within shoreline jurisdiction, concentrated in the Rock Creek – Cottonwood Confluence/PAW reach.

There are approximately 1.31 miles of roads within shoreline jurisdiction, concentrated mainly in the Rock Creek – Agriculture reach. The majority of roads are classified as rural local roads. State Highway 23 crosses Rock Creek in the Rock Creek – Lake Outlet reach.

There are five bridges within shoreline jurisdiction.

- State Highway 23 crosses Rock Creek in the Lake Outlet reach.
- Endicott West Road crosses Rock Creek in the Agriculture reach.
- Hole-In-The-Ground Road crosses Rock Creek in the Pine Creek Confluence reach.
- Texas Lake Road crosses Rock Creek in the Cottonwood Confluence /PAW reach.
- Jordan Knott Road crosses Rock Creek in the Imbler Creek reach.

Public Access

Current Parks and Public Open Space

Shoreline public access sites are summarized in Table 6-3:

Table 6-3. Rock Creek Open Space and Public Access Summary by Reach

Shoreline Reach	Open Space Acres (Percent of Reach)	Parks	Campground	Trail (Length in Feet)	Boat Launches	Moorage
Rock Creek – Cottonwood Confluence/PAW	3.7 (0.6)	-	-	John Wayne Pioneer Trail (4,124)	-	-
Rock Creek – Escure Ranch	375.2 (76.6)	-	1	-	-	-
Rock Creek – Imbler Creek	198.4 (65.6)	-	-	John Wayne Pioneer Trail (702)	-	-
Rock Creek – Lake Outlet	-	-	-	John Wayne Pioneer Trail (412)	-	-

Source: Whitman County, 2014 TWC, 2014; BERK, 2014

The following shoreline public access sites and trails are located within Rock Creek's shorelines:

- **Escure Ranch Campsite** is managed by the Bureau of Land Management. It offers 30 miles of non-motorized trails, and is popular for camping, hiking, horseback riding, biking, fishing and hunting.
- **John Wayne Pioneer Trail** is a DNR-owned trail that covers 12 miles within Whitman County.

Future Public Access

According to the County's Parks and Recreation Comprehensive Plan (2004), the Bureau of Land Management's Escure Ranch is a potential site for future trail development for hiking, mountain biking, and equestrian use. Future development in that area could also include primitive camping facilities, trails, and interpretive signage.

Historic and Archeological Sites

There are eight structures more than 50 years old within the shoreline of Rock Creek. The structures are concentrated around the confluence of Rock and Cottonwood Creeks.

6.1.5 Hangman Creek

Land Use Pattern

Hangman Creek flows across the northeast corner of the County from Idaho to Spokane County. The Creek flow through the Town of Tekoa. This section only addresses the portion of the creek within the unincorporated County. There are approximately 7.5 miles of shoreline that comprise 372 acres of shoreline jurisdiction. Of that area, 99

percent (639 acres) is currently in agricultural use. The remaining one percent has been designated under chapter 84.34 RCW as open space.

Existing and Planned Land Uses

The shoreline area within Hangman Creek is completely zoned Agriculture by the County. The shorelines of Hangman Creek are primarily privately owned. Approximately seven acres on the west side of the river, downstream from Tekoa, are owned by the Washington Department of Natural Resources.

The current shoreline environment designation along Hangman Creek is Rural. According to the current (1974) Shoreline Management Master Program, the Rural designation is intended "to protect agricultural land from urban expansion, restrict intensive development along undeveloped shorelines functions as a buffer between urban areas, and maintain open spaces and opportunities for recreational uses compatible with agricultural uses." Appendix D presents current land use, ownership and zoning for Hangman Creek.

Potential New Development and Uses

Shorelines of Hangman Creek are completely in agricultural use that has been designated under 83.84 RCW, indicating they are likely to remain in agricultural use. Existing structures may be repaired, but the overall trend for shoreline use along the creek will be to remain in agriculture.

Water-oriented Use

Potential water-oriented uses along Hangman Creek include agriculture, for which 99% of the shoreline jurisdiction is used.

Transportation and Utilities

There is little road or transportation infrastructure within shoreline jurisdiction of Hangman Creek. Transportation facilities are concentrated near the City of Tekoa.

There are 1.18 miles of abandoned rail within shoreline jurisdiction. There are approximately 2.72 miles of minor roads within shoreline jurisdiction concentrated within the southeast section of Hangman Creek. The majority of roads are classified as rural access roads. State Highway 27 is within shoreline jurisdiction for less than half a mile.

There are four bridges within shoreline jurisdiction, including three bridges on minor roads and one abandoned rail bridge.

Public Access

Current Parks and Public Open Space

There is approximately 1.4 acres of open space land classified under chapter 84.34 RCW along Hangman Creek. There are no other designated or established recreation sites within the shoreline of Hangman Creek.

Future Public Access

There are no identified future public access sites.

Historic and Archeological Sites

There are no historic or archeological sites within shoreline jurisdiction of Hangman Creek. There are also no structures 50 years or older.

6.1.6 Pine Creek

Land Use Pattern

Pine Creek flows northwest through the Town of Rosalia and into Spokane County. It then re-enters Whitman County and travels west through the Town of Malden to its confluence with Rock Creek and Rock Lake. It travels approximately 34 miles through unincorporated Whitman County, and its shoreline uplands comprise approximately 1,705 acres. All of Pine Creek's shorelines are currently in agricultural use. Approximately a third of that agricultural use has been designated under chapter 84.34 RCW.

Existing and Planned Land Uses

The shoreline area within Pine Creek is completely zoned Agriculture by the County. The shorelines of Pine Creek are primarily privately owned (97%). Three percent of the shoreline jurisdiction is owned by DNR (23 acres) and the State Parks and Recreation Commission (34 acres).

The current shoreline environment designation along Pine Creek is Rural. According to the current (1974) Shoreline Management Master Program, the Rural designation is intended "to protect agricultural land from urban expansion, restrict intensive development along undeveloped shorelines functions as a buffer between urban areas, and maintain open spaces and opportunities for recreational uses compatible with agricultural uses." Appendix D presents current land use, ownership and zoning by reach for Pine Creek.

Potential New Development and Uses

Shorelines of Pine Creek are completely in agricultural use, much of which has been designated under 83.84 RCW, indicating they will likely remain in agricultural use. Existing structures may be repaired, but the overall trend for shoreline use along the creek will be to remain in agriculture. The Town of Rosalia has been completing updates to its wastewater treatment facility, some of which may be located north of town within the unincorporated County. The Town is developing a wetland mitigation plan which may include mitigation activities north of Town in the County.

Water-oriented Use

The primary potential water-oriented use along Pine Creek is agriculture, for which all of the shoreline jurisdiction is used. The public access sites listed below under Public Access are also considered water-oriented. The wastewater treatment facility and settling ponds are considered water-related facilities, but their outfalls are considered water-dependent uses.

Transportation and Utilities

There is a moderate amount of transportation infrastructure within shoreline jurisdiction of Pine Creek in the unincorporated County. There are approximately 5.48 miles of rail within shoreline jurisdiction, of which 4.92 miles are abandoned and 0.56 mile are active. The majority of rail is concentrated in the Agriculture reach (2.98 miles abandoned and 0.56 mile of active rail) and the Pine Creek – Scrub/Shrub reach (1.84 miles of abandoned rail). There are three rail bridges on the John Wayne Trail.

There is 8.32 miles of road infrastructure in shoreline jurisdiction. There are approximately 23 bridges within shoreline jurisdiction.

- There are 17 bridges in the Pine Creek – Agriculture reach, including three major road bridges, 14 minor road bridges, and three rail bridges- two that are part of the John Wayne Trail.
- There are a total of five bridges in the Pine Creek – Scrub/Shrub reach, including three minor road bridges and two rail bridges on the John Wayne Trail.
- There is one bridge on a minor road in the Pine Creek – Wastewater Lagoons reach.

Public Access

Current Parks and Public Open Space

There are limited public access sites along Pine Creek. SR 195, which is located near Rosalia, is a Scenic and Recreational Highway. The John Wayne Pioneer Trail (also referred to as Iron Horse State Park) runs along the creek most of its length and

continues along Rock Lake. Steptoe Battlefield State Park is located at the south end of Rosalia and within unincorporated County. The park is four acres and contains a monument with interpretive signs in memory of the battle between a band of Palouse, Spokane, and Coeur D'Alene Native Americans and 159 American soldiers.

Future Public Access

There are no identified future public access sites.

Historic and Archeological Sites

The Rosalia Railroad Bridge on Washington Highway 271 is the only historic site within the shoreline of Pine Creek. It is a Historic Bridge on the National Register of Historic Places.

6.1.7 Union Flat Creek

Land Use Pattern

Union Flat Creek flows for 58 miles east to west across the County to its confluence with the Palouse River. Union Flat Creek's shorelands comprise 2,181 acres. There are no incorporated towns or cities on Union Flat Creek. Nearly all (99%) of Union Flat Creek's shorelines are currently in agricultural use; approximately 80 percent of those lands have been designated under chapter 84.34 RCW. The remaining one percent is classified as open space under 84.34 RCW.

Existing and Planned Land Uses

Shoreline jurisdiction within Union Flat Creek's three reaches is completely zoned Agriculture by the County. The shorelines of Union Flat Creek are primarily privately owned. Approximately 63 acres (2.9%) of shoreline jurisdiction located at the end of Kincaid Road are County-owned (Klemgard County Park). Another 178 acres (8.2%) are owned by DNR.

The current shoreline environment designation along most of Union Flat Creek is Rural. According to the current (1974) Shoreline Management Master Program, the Rural designation is intended "to protect agricultural land from urban expansion, restrict intensive development along undeveloped shorelines functions as a buffer between urban areas, and maintain open spaces and opportunities for recreational uses compatible with agricultural uses." Klemgard County Park is designated Conservancy. Appendix D presents current land use, ownership and zoning by reach for Union Flat Creek.

Potential New Development and Uses

Shorelines of Union Flat Creek are almost completely in agricultural use, most of which has been designated as resource lands of long-term significance (83.84 RCW), indicating they are likely to remain in agricultural use. Existing structures may be repaired, but the overall trend for shoreline use along the creek will be to remain in agriculture. Some improvements at Klemgard County Park are possible. These are listed below under Public Access.

Water-oriented Use

Water-oriented uses along Union Flat Creek include agriculture, for which the entire shoreline jurisdiction is used. The public access sites listed below, under Public Access, are also considered water-oriented. Union Flat Creek has been identified as an area for swimming and fishing, which are both water-dependent activities.

Transportation and Utilities

There is little road and transportation infrastructure within the shoreline jurisdiction. Most of the road infrastructure is concentrated in the Union Flat Creek – Agriculture Riparian reach. There is a small amount of rail in shoreline jurisdiction, with .08 miles of active rail within the Union Flat Creek – Agriculture reach.

There are approximately 5.15 miles of roads within shoreline jurisdiction. Much of the road infrastructure is concentrated within the Union Flat Creek – Agriculture Riparian reach (3.13 miles) and the Union Flat Creek – Agriculture reach (1.84 miles). The two major roads present are:

- State Highway 194 crosses Union Flat Creek in the Agriculture Riparian reach, and
- State Highway 26 crosses Union Flat Creek in the Agriculture Riparian reach.

There are approximately 15 bridges within shoreline jurisdiction. The Union Flat Creek – Agriculture Riparian reach has seven bridges, including two bridges on major roads and five bridges on minor roads. The Union Flat Creek – Agriculture reach has seven bridges on minor roads, and the Scablands reach has one bridge on a minor road.

Public Access

Current Parks and Public Open Space

The only public access site along Union Flat Creek is Klemgard County Park. This park is 59 acres. Amenities include a hiking trail, playground, sand volleyball courts, horseshoe pits, shelters, picnic areas, and a playfield.

Future Public Access

The 2004-2009 Whitman County Parks and Recreation Comprehensive Plan (2004) outlines a number of renovations, including replacing the bridge crossing and roofing the large picnic shelter, to improve the Park for visitors. No other future public access sites have been identified.

Historic and Archeological Sites

There are no listed historic or archeological sites along Union Flat Creek. There are numerous structures identified as being 50 years old or older in the vicinity of the creek, but only one is within the shoreline jurisdiction of Union Flat Creek.

6.1.8 Snake River

The Snake River flows through southern Whitman County from the Washington/Idaho border to its confluence with the Palouse River, which marks the western boundary of the County. The Snake River forms the Southern boundary of the County with its southern shorelines in Columbia and Garfield Counties. The influences of the Lower Granite and Little Goose Dams are highly determinant of how the River's shorelines are used.

None of the River's shorelines are within an incorporated municipality. There are no residential or commercial uses along the river, although all of the Port of Whitman County's on-water lands are located along the River. The majority of the River's shoreline jurisdiction (2,215 acres) is under federal ownership (91% Corps and 6% BLM). The remainder is owned by WDNR and 26.5 acres (<2%) are owned by Washington State University.

Land Use Pattern

Existing Land Uses

The Snake River has been divided into five shoreline reaches. Existing land use within the shoreline jurisdiction is a mix of agriculture, water areas, manufacturing, food and kindred products, and open space (see Appendix D for summary tables). Nearly all of the land within the shoreline jurisdiction is publicly owned. None of the River's shorelines are within an incorporated municipality. Upland shoreline jurisdiction is the Snake River- Industrial reach is zoned Heavy Industrial (Port of Whitman County properties); the remaining reaches are zoned Agricultural by the County.

The most prevalent use along the River is transportation. The BNSF railway occupies a 20- to 30-foot-wide right-of-way within shoreline jurisdiction from the eastern County boundary to a crossing between Lyons Ferry and the Tucannon River. SR 194 is also

located within shoreline jurisdiction. It parallels the railroad from the County's boundary to Almota (transportation infrastructure is detailed below under Transportation and Utilities). Other uses include the in-water and upland facilities related to the Lower Granite and Little Goose Dams (refer to Water-oriented Uses below), three Port of Whitman County sites (refer to Water-oriented Uses below), and several public access and/or recreational sites (refer to Current Parks and Public Open Space below).

The current shoreline environment designations include Urban at several areas along the river and Rural. According to the current (1974) Shoreline Master Program, the Urban designation is meant to provide "optimum utilization of shorelines within urbanized areas by providing for intensive public use and by managing development so that it enhances and maintains shorelines for a multiplicity of uses." The Rural designation is intended "to protect agricultural land from urban expansion, restrict intensive development along undeveloped shorelines functions as a buffer between urban areas, and maintain open spaces and opportunities for recreational uses compatible with agricultural uses."

Water-oriented Uses

Army Corps of Engineers Dams

Both the Little Goose and Lower Granite Dams and associated facilities are considered water-dependent uses. The Little Goose Dam was constructed and is owned by the Corps. The Dam was completed in 1970. Waters behind the dam form Lake Bryan, which extends upstream about 37.2 miles and provides navigation to Lower Granite Lock and Dam. The lake has an area of 10,025 acres. There are 5,398 acres of project lands surrounding Lake Bryan on both sides of the river. These lands include fee lands that are federally owned and managed by the Corps, as well as easement lands to which the Corps has specific rights or easements. There are 5,143 acres of Corps-managed lands used for public recreation purposes, wildlife habitat, wildlife mitigation, and water-connected industrial development. Two areas totaling approximately 150 acres are licensed either to the state or local port for recreation (http://www.nww.usace.army.mil/Locations/DistrictLocksandDams/LittleGooseLockandDam.aspx).

The Lower Granite Dam is also owned by the Corps. It was completed in 1984. The dam and associated facilities are located approximately 23 miles south of Colfax and comprise approximately 500 acres on either side of the river. The project consisted of the dam, navigation lock, powerhouse, a fish ladder and associated facilities. The lake

created by the dam, known as Lower Granite Lake, extends upstream on the Snake River about 40 miles to Lewiston. There are about 13,000 acres of project lands surrounding Lower Granite Lake. These project lands include fee lands that are federally owned and managed by the Corps or are managed by lessees. Most of these lands are used for wildlife habitat, wildlife mitigation, public recreation purposes, and water-connected industrial development. There are 12 public boat launching facilities (http://www.nww.usace.army.mil/Locations/DistrictLocksandDams/LowerGraniteLockandDam.aspx).

Port of Whitman County

The Port of Whitman County was formed by vote in 1958 to fulfill three goals: 1) Provide access to slack water navigation on the Columbia and Snake River system, 2) promote industrial development, and 3) provide recreation opportunities on the Snake River. The Port of Whitman County has three on-water sites that, depending on the particular tenant's use, would be considered either water-dependent or water-related. These include, from upstream: the Port of Wilma, the Port of Almota, and the Port of Central Ferry. The Port also developed and operates Boyer Park and Marina.

The Wilma site is located roughly 2 miles west of the Idaho border. The site includes all lands south of the Camas Prairie Railroad and upland of the Snake River shoreline. As of 2010, the site was comprised of 279.9 acres of developed industrial property and 76 acres of undeveloped property. The Port holds an additional 76 acres on the landward side of SR 193 that is undeveloped and zoned agricultural. The developed shorelines of the Wilma site are nearly all leased. The property is currently occupied by the following users:

- A lumber milling and manufacturing company
- One wood chip processor and shipper
- A concrete block manufacturer
- Two propane distribution and storage companies
- A wood recycling company
- A tree service company
- A self-contained waste processing facility
- A helicopter business
- A meat processor
- A boat manufacturing company
- A break bulk shipper
- Two grain shipment and storage companies
- An agrichemical company

The Almota site, located 30 miles downstream of the Wilma site, is approximately 10.5 acres in size. The site serves as a transshipment point for white wheat. The property's users include two grain storage and shipping companies. Nearly all of the 10.5 Port-controlled acres along the shoreline are leased. Because of the topography, expansion at the site is impossible.

The Central Ferry Port site is the third and most downstream Port site on the Snake River. It is located immediately east of SR 127 and includes most of the land south (waterward) of the Camas Prairie Railroad. The site includes 131.9 acres. The site is divided into 15 lots, most of which are developed. Current tenants include four grain storage/shipping companies, three fertilizer companies, and the Fire District #8 fire house (Port of Whitman County 2010).

Other Water-oriented Uses

In addition to the dams, ports, and associated facilities, water-oriented uses along the Snake River include all of the parks, public access sites, trails, campgrounds, boat launches, docks and other recreational facilities described under Public Access. Water-related uses include outfalls and utilities that are located within shoreline jurisdiction. Lastly, agricultural use, which occupies 1,249.9 acres, may be considered water-oriented.

Developing or Redeveloping Waterfronts

There is very little private land along the Snake River in Whitman County. New private residential or commercial uses are not expected. As noted above, the major land uses include Corps dams and associated facilities; the Port's facilities at Wilma, Almota and Central Ferry; and the roads and railways. Ongoing maintenance and operation of the dams and associated facilities is expected. Siltation behind the dams has raised concerns about flooding, particularly in Lewiston, Idaho, where downtown is protected by a system of levees. The Corps issued a Programmatic Sediment Management Plan and Draft Environmental Impact Statement in 2012. The Corps' preferred alternative included dredging and dredged material management, along with other sediment and system management measures. Alternatives are currently being evaluated.

There are unleased areas at the Port's Wilma site that may be developed. Based on conversations with Port staff and site visits, there are current lease holders that may change uses or develop new facilities, but specific plans are not known. The Central Ferry site has undeveloped Port properties which may be developed for new industrial uses during the planning horizon of the Comprehensive Plan. However, the Port has noted that lack of workforce due to the site's isolation represents a challenge to new development. The Port's Comprehensive Plan includes a list of planned improvements

at each of its on-water sites. Listed improvement that could potentially occur in or affect shoreline resources include:

Wilma Site

- Possible rezone of upland land trade acreage
- Obtain more land from corps west of Wilma
- Improve and repair the public port site dock and booms
- Continue to aggressively market to and potentially develop or improve vacant land for potential tenants

Almota Site

- Pave gravel roads

Central Ferry Site

- Acquire additional lands near present site as the need arises
- Continue to level, prepare, and improve undeveloped sites as needed

Transportation and Utilities

In general, there is a large amount of road and rail infrastructure within shoreline jurisdiction of the Snake River. There are 39 miles of active rail within shoreline jurisdiction. The majority of rail infrastructure is within the Snake River – Railroad reach (35.22 miles), and the Snake River – Parks/Open Space reach (3.33 miles).

There are 25.38 miles of road infrastructure within shoreline jurisdiction. The majority of road infrastructure is within the eastern half of the Snake River – Railroad reach (21.94 miles). The Snake River – Industrial and Snake River – Parks/Open Space reaches each contain less than two miles of road. The majority of roads are classified as rural major roads. State Highway 128 crosses the Snake River to Clarkston.

There are approximately three bridges within shoreline jurisdiction of the Snake River – Railroad reach, including one bridge on State Highway 128 and two active rail bridges.

Public Access

Current Parks and Public Open Space

There are numerous public access opportunities and sites along the Snake River. Table 6-4 summarizes the public access lands and facilities, which are described in more detail below.

Table 6-4. Snake River Open Space and Public Access Summary

Shoreline Reach	Open Space Acres (Percent of Reach)	Parks	Campground	Trail (Length in Feet in Reach)	Boat Launches	Moorage Slips
Snake River – Parks/Open Space	57.6 (14.5%)	9	0	0	15	36
Snake River – Railroad	202.5 (13.8%)	0	0	0	2	0

The following are more detailed descriptions of public access sites along the Snake River:

- **Blyton Landing** is a 3-acre park with day use facilities, as well as boating and primitive camping facilities. Park amenities include fire pits, grills, and picnic tables. There is a one-lane boat launch ramp and a handling dock. The park is operated by the Army Corps of Engineers.
- **Boyer Park and Marina** is 80 acres and is open year round. The park has day-use facilities, boating, fishing, hunting, a bike/jogging path, an RV park, camping sites, a swimming area, a grocery and a motel. There is a three-lane boat launch ramp, 150 slips, three docks, and a marine dump station. Boyer Park is operated by the Port of Whitman County.
- **Central Ferry State Park** was a 185-acre day-use park. The area is transitioning to a Habitat Management Unit and was closed by the Army Corps of Engineers. There are no facilities available to the public.
- **Nisqually John Landing** is 8 acres and is for day-use, boating and primitive camping. It has camping facilities and a one lane boat launch ramp with a dock. It is open year round and operated by the Army Corps of Engineers.
- **Riparia** is a 32-acre day-use and primitive camping park with day use facilities and a RV/Tent campsite. Amenities include fire pits, grills, and picnic tables. It is operated by the Army Corps of Engineers.
- **Wawawai Landing** is three acres and offers camping and boating facilities. There is a tent/RV site, day-use facilities, and a one-lane boat launch ramp with a dock. The landing is operated by the Army Corps of Engineers.

Future Public Access

There is little information on future public access along the Snake River. The Port of Whitman County has included planned improvements at Boyer Park and Marina in its

Comprehensive plan. These improvement include needed repair and replacements and development of "income producing infrastructure" when feasible.

Historic and Archeological Sites

There is one historic site within the shoreline reaches of the Snake River in unincorporated Whitman County: the Interior Grain Tramway. The Interior Grain Tramway was built in 1901 near Pullman. The tramway was used to move grain from the Palouse hills to the Snake River. The tramway was listed on the National Register of Historic Places in 1988.

6.2 City and Towns

6.2.1 Town of Albion

Land Use Pattern

The Town of Albion is located on the South Fork Palouse River (South Fork). It has a current population of 572. The shoreline jurisdiction includes 54 acres along just under a mile of the River. The shoreline area extends from the south through mostly agricultural areas (72%). Shoreline jurisdiction includes some residential development (27%), governmental services (1%), and some industrial development in the form of grain silos (<1%).

Existing and Planned Land Uses

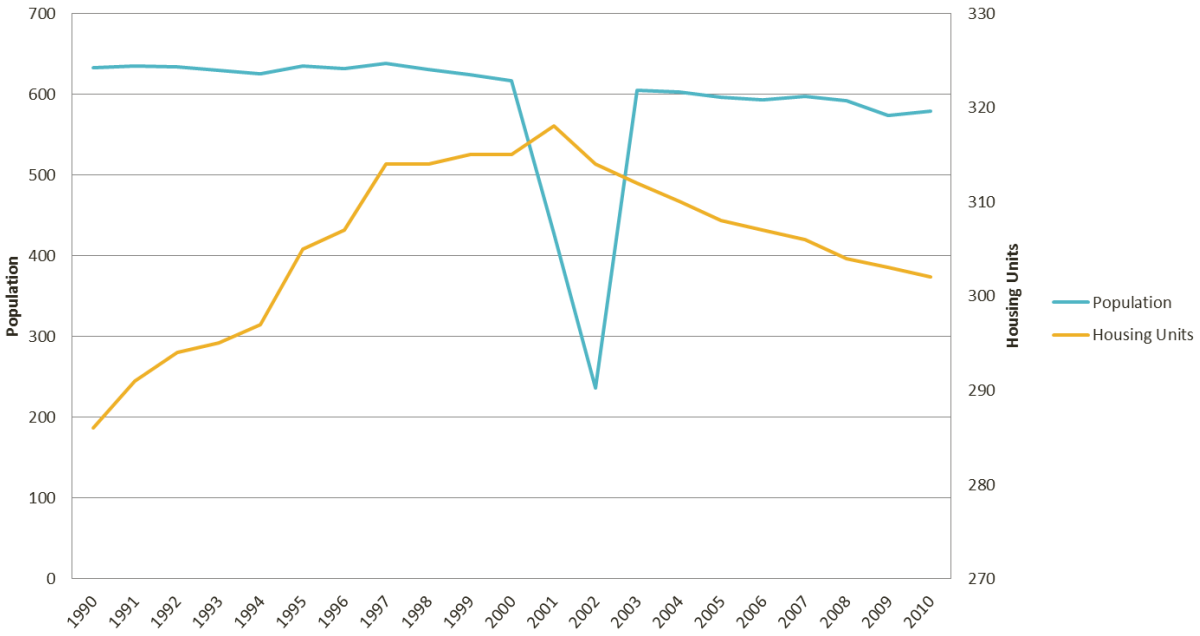
Most of the Albion shoreline jurisdiction contains agricultural uses. Residential uses are present in the center of town. The U.S. Post Office is also within shoreline jurisdiction. The railroad and grain silos are on the west side of the river. Zoning in Albion's shorelines is a mix of residential, commercial and industrial. There are several areas for which data is not available. This is a data gap. Ownership data shows no state or federal ownership in shoreline. Appendix D shows the current land use, ownership profile and current zoning for each shoreline reach.

The current shoreline environment designation is Urban. According to the current (1974) Shoreline Management Master Program, the Urban designation is meant to provide "optimum utilization of shorelines within urbanized areas by providing for intensive public use and by managing development so that it enhances and maintains shorelines for a multiplicity of uses."

Potential New Development and Uses

As a means of providing context for a discussion of future shoreline development and use, historic population and housing growth trends are presented for Albion. The Town

of Albion has steadily lost population since 1990. Albion experienced a dramatic drop in population from 2000 to 2002, but recovered most of its population by 2003. Since then, the population continues to decline, but at a slower rate. In 2010, Albion had 579 people. The population decline is not consistent with historical trends for housing units. In the Town of Albion, housing units steadily increased from 1991 to 2001, before trending downward. From 2001 to 2010, housing units in Albion have declined. In 2010, Albion had 302 housing units. Figure 6-1 compares historical trends for population and housing units for the Town of Albion, years 1990 through 2010.



Source: Washington State OFM, 2014.

Figure 6-1. Town of Albion Population and Housing Units 1990 – 2010

There are no known new uses or developments planned for Albion's shorelines.

Water-oriented Use

Water-oriented uses within Albion are limited. The South Fork is not commercially navigable. Waters are typically too shallow to allow water transportation. Agriculture is prevalent along the Town's shorelines (39 acres). Activities such as fishing and swimming are considered water-oriented as well. There are no other identified water-oriented uses.

Transportation and Utilities

There is 0.33 mile of active rail within shoreline jurisdiction. There is 0.66 mile of roads as well. The roads are classified as rural local access road; there are no major roads.

There are two bridges within shoreline jurisdiction of the South Fork Palouse within the Town of Albion, as follows:

- One active rail bridge in Albion – Agriculture reach
- South D Street crosses the South Fork Palouse River in the Albion – Agriculture reach

Public Access

There are no identified public access sites in the Town of Albion. There are no identified future public access sites in Albion.

Historic and Archeological Sites

There are no historic or archeological sites identified within the shoreline of the Town of Albion.

6.2.2 City of Colfax

Land Use Pattern

Colfax's population is 2,846. A significant portion of Colfax lies within shoreline jurisdiction. Colfax is located at the confluence of the North and South Forks of the Palouse River. Most of the City, including Main Street, lies along the South Fork. The rivers are almost completely contained within a system of concrete levees through town. Shoreline land use within the City's 368 acres of shoreline jurisdiction includes open space and agriculture at the south end of town; commercial and residential uses through the Main Street corridor; and residential and industrial uses at the north end of town. Colfax has railroad and road infrastructure throughout. Current land uses within the City's shorelines are as follows:

Resource production and extraction	54%
Transportation, communication, and utilities	15%
Residential	9%
Undeveloped land and water areas	8%
Trade	6%
Cultural, entertainment, and recreational	4%
Manufacturing	4%
Services	1%

Existing and Planned Land Uses

Colfax's shorelines are unique in the County. In the 1960s, a concrete levee system for the North Fork, South Fork and Mainstem of the Palouse River was constructed through

town. The primary purpose of the system is to protect the low-lying residential, commercial and business areas of the City. The system, which is operated and maintained by the City, includes two components. The Colfax No. 1 levee system is located along the North Fork and Mainstem. The project consists of approximately 3,700 feet of concrete-lined channel, 4,900 feet of revetted channel, 2,300 feet of unrevetted channel, and drainage structures (USACE 2014). The Colfax No. 2 Flood Reduction Project is located along the South Fork and Spring Flat Creek (a tributary). The project consists of approximately 7,190 feet of concrete-lined channel, 2,610 feet of left and right bank revetted levees, and drainage structures (USACE 2014). Both were completed in 1965. As a result of the levee system, a large portion of the City's shorelines are fenced and do not provide the typical visual experience of a free-flowing stream.

Agriculture (seen primarily in the Colfax–Agriculture reach) is the most common use in the City's shorelines. The use is largely located northeast of the town center along the North Fork. This area was recently annexed into the City in 2006 and, at 1,140 acres, doubled the land area of the City and greatly increased its shoreline jurisdiction as well. The City has applied a new zoning district to this area – Rural Residential. Current land use in the area is predominantly agriculture with cattle grazing. Residential development is extremely low density. The City views this area as appropriate for continued low-density residential development provided water and sewer services are extended (City of Colfax 2007).

Southeast of town, a large area of open space occurs. Several parks are located within the City's shoreline as well. Open space, parks and recreational activities comprise approximately 10 percent of the City's shorelines. Through the Main Street corridor, shoreline jurisdiction includes the west side of Main Street, which is characterized by retail, commercial, service and hotel/motel uses. Residential uses surround the commercial district and residential uses along the west bank of the South Fork are within shoreline jurisdiction as well.

Shoreline land use north of the town center and past the confluence includes more residential uses, but also includes industrial uses. The City's 6.5-acre wastewater treatment plant and settling pond are located in the northwest portion of the City between SR 26 and the Palouse River. After treatment, effluent is discharged to the Palouse River. The facility was last refurbished in 2004 (City of Colfax 2007).

Zoning through the City generally follows the current land use pattern with the exception of the northeast annexation area described above. Commercial zoning is applied along the South Fork through the City's business district and in the northwest

section of the City. It is surrounded by residential zoning. Areas of manufacturing zoning are generally located to the north of the town center. Current data shows zoning distributed throughout the City's shoreline jurisdiction as follows:

Business	1%
Commercial	7%
Manufacturing	2%
Residential	18%
No Zoning	71%[4]

The current shoreline environment designation is Urban. According to the current (1974) Shoreline Management Master Program, the Urban designation is meant to provide "optimum utilization of shorelines within urbanized areas by providing for intensive public use and by managing development so that it enhances and maintains shorelines for a multiplicity of uses." Appendix D shows the current land use, ownership profile, and zoning for each shoreline reach.

Colfax Comprehensive Plan

In 2007, the City of Colfax developed a Comprehensive Plan that established a future land use pattern (described above) and planned for the provision of housing, parks, public services, transportation and utilities for its expected population. Because of the levee system, shoreline issues in Colfax are not of paramount importance in the City's planning. However, listed here are the issues for future planning identified in the Comprehensive Plan that relate to the shoreline.

Parks:

- The swimming pool must be repaired and updated in order to maintain viability. The City should look toward replacement of the pool in long term planning. The formation of a park district should also be considered to help in the financing of the pool.

Utilities:

- Water service to the manufacturing area, and an adjacent residential area, on the north side of the Walla Walla Highway west of the Palouse River, should be

[4] This "No Zoning" category includes all of the City's rights-of-way and areas for which data was not available. This represents a data gap.

improved and extended to serve the entire area and any development that might occur there.

Storm Drainage system:

- Regular maintenance of the flood control channel should be considered at each budgeting time and a maintenance program established that will adequately keep the flood control channel free of rock and silt buildup.

Transportation:

- The City should investigate the possibility of making improvements to the road which parallels the North Fork of the Palouse River through the newly-annexed area. These improvements could include providing a BST or asphalt surface and the additions of some new exits. This could entail the construction of a bridge or a connection to Hilty Road on the southeast side or constructing a road across from the school grounds on the northwest side.

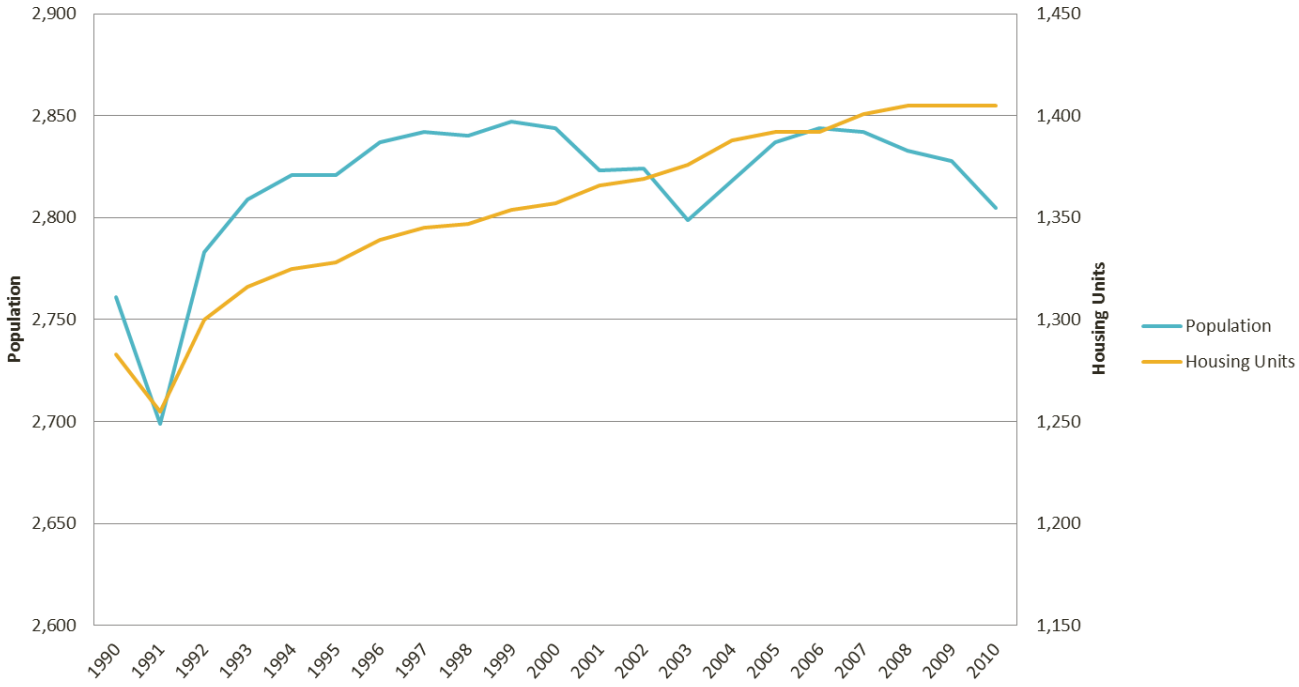
Environment:

- The city should strongly encourage conservation of natural resources.
- Any structure permitted in a flood area should be subject to strict flood proofing regulations.

Potential New Development and Uses

The City of Colfax has decreased in population year to year, since 2006. Colfax saw a steady increase in population from 1991 to 1999, and then from 2003 to 2006, but has not experienced any population growth since. In 2010, there were 2,805 people living in Colfax.

Housing units in the City of Colfax have steadily increased year to year since 1991, but appear to be leveling off and remaining steady beginning in 2008. In 2010, there were 1,405 housing units in Colfax. Figure 6-2 compares historical trends for population and housing units for the City of Colfax, years 1990 through 2010.



Source: Washington State OFM, 2014.

Figure 6-2. City of Colfax Population and Housing Units 1990 – 2010

The City has approximately 10 acres in shoreline jurisdiction classified as undeveloped land. However, as shown, population has been stable or declining in recent years. Housing has increased, but at a very moderate pace. These data indicate a slow to moderate rate of growth for the City and potentially within the shoreline jurisdiction as well.

There are some potential new uses, developments and activities that are likely to occur in the shoreline. According to City staff (Pers. Comm. Andy Burgard, 2014), the following new uses and developments may take occur:

- The owners of the storage facility on West River Drive along the Palouse River have expressed a desire to expand.
- SEPA documentation and a shoreline permit have been submitted for construction of new homes between Ballinger Street and West Railroad Avenue.
- The Walla Walla Highway bridge sidewalk has been closed by WSDOT. The City anticipates improvements to that bridge in the future, although no plan has been developed.
- Several park improvements are being contemplated and are described under Public Access.

Water-oriented Use

Water-oriented uses within Colfax are limited. None of the rivers through the City are commercially navigable. Because of the levee system, activities such as boating, fishing and swimming are not possible in the leveed areas. Agricultural uses in the northeast part of town may be considered water-oriented. There are approximately 197 shoreline acres in agricultural use.

The City's shoreline public access sites are considered water-oriented. There are approximately 35 acres of identified parks, open space and recreational activities within the City's shorelines (see Public Access below). Water-enjoyment amenities include trails, ball parks, and viewpoints. Some of the commercial uses adjacent to the shoreline may be considered water-enjoyment uses.

The City's wastewater treatment plant is considered water-related and its outflow is considered water-dependent. Other utility outfalls would also be considered water-oriented.

Transportation and Utilities

There is significant transportation infrastructure within the City's shorelines. There are 1.68 miles of rail and 1.19 miles of roads within City of Colfax shoreline jurisdiction. About 50 percent of the roads are classified as rural local access. The remaining roads are classified as major roads, including approximately 0.5 mile of US Highway 195 (crosses the Palouse River in the Colfax-Residential and Colfax –Industrial/Commercial reaches) and a stretch of US Highway 26 (crosses the Palouse River in the Colfax – Industrial/Commercial reach) where it meets US Highway 195.

There are three bridges within shoreline jurisdiction of the Palouse River in the City of Colfax, including the two highway bridges identified above and one abandoned rail bridge in the Colfax-Residential and Colfax – Industrial/Commercial reaches.

Public Access

Current Parks and Public Open Space

The following shoreline public access sites and trails are located within Colfax's shorelines:

- **Colfax Golf and Country Club** is a nine-hole public course with fairways, water hazards, sand traps, and chipping and putting areas. The Club has a pro shop and a full service bar.
- **Eels Park** features a fountain, restrooms, a half-basketball court, and a playground.

- **McDonald Park** is an athletic compound along the Palouse River. It has a regulation baseball field, a softball field, two multipurpose fields, and a soccer field. There is a press building with restrooms, an office, meeting rooms, and concession stands. The park is surrounded by a lighted path for walking/jogging.
- **Schmuck Park** offers a large covered picnic area, day use facilities, a playground, a sand volleyball court, a horse shoe pit, and a tennis court.
- **Good Park** is located on SR 195 at the south end of town.

Future Public Access

Several improvements are being considered at shoreline public access sites in the City. These include the flowing:

- At Good Park, the City is considering a pedestrian bridge across the South Fork and a restroom.
- The City is considering a restroom at the Codger Pole.
- At Schmuck Park, the City is considering improving, and potentially moving, the pool. The pool is 50 years old and in need of maintenance. (Andy Burgard, City of Colfax, personal communication)

Historic and Archeological Sites

The Colfax Main Street Historic District is within the shoreline reaches of the City of Colfax. There are also 58 structures that are fifty years or older within shoreline jurisdiction. Forty-two of these structures are concentrated within the Colfax – Flume Commercial reach.

6.2.3 Town of Malden

Land Use Pattern

The Town of Malden is located on Pine Creek roughly two miles south of the County boundary. It has a current population of 204. The shoreline jurisdiction includes 58 acres along slightly more than a mile of Pine Creek. The entire shoreline jurisdiction is classified as being in agriculture use.

Existing and Planned Land Uses

Zoning in Malden's shorelines is not available, which is a data gap. Appendix D shows the current land use and ownership profile for each shoreline reach.

The current shoreline environment designation is Urban. According to the current (1974) Shoreline Management Master Program, the Urban designation is meant to provide "optimum utilization of shorelines within urbanized areas by providing for

intensive public use and by managing development so that it enhances and maintains shorelines for a multiplicity of uses."

Potential New Development and Uses

There are no known new uses or developments planned for Malden's shoreline.

Water-oriented Use

Water-oriented uses within Malden are limited. As noted above, land use in the shoreline is classified as agriculture. There are no other identified water-oriented uses.

Transportation and Utilities

There is little transportation infrastructure within the shoreline of the Town of Malden. The existing transportation infrastructure includes only the former railbed that is now designated as the John Wayne Trail. There is one road (A Street) within shoreline jurisdiction that crosses Pine Creek and connects the north and south parts of town.

Public Access

Current Parks and Public Open Space

There are no recreation sites within the Town. The John Wayne Pioneer Trail provides public access to shorelines along 2,365 lineal feet of trail. Motorized access, hunting and any access except by permit from the state parks Rangers is prohibited.

Future Public Access

The Washington State Parks Department is planning to convert nine miles of abandoned rail bed to trail by 2015, and will construct a trailhead at Malden in a former rail yard (Prager 2014).

Historic and Archeological Sites

There are no historic or archeological sites within the Town.

6.2.4 Town of Rosalia

Land Use Pattern

Rosalia has a population of 557 and is located along the east bank of Pine Creek, roughly a mile and a half from the northern County boundary. The shoreline jurisdiction includes 47 acres along three quarters of a mile of shoreline. From south to north, Pine Creek flows through agricultural areas, residential and park areas, and then light industrial areas before leaving town. Shoreline jurisdiction includes some residential development and some industrial development in the form of grain silos. Current land uses along the Town's shoreline are as follows:

Agriculture classified under current use chapter 84.34 RCW	33%
Open space land classified under chapter 84.34 RCW	31%
Parks	20%
Household, single family units	11%
Recreational activities	3%
Food and kindred products	1%
Aircraft transportation	<1%

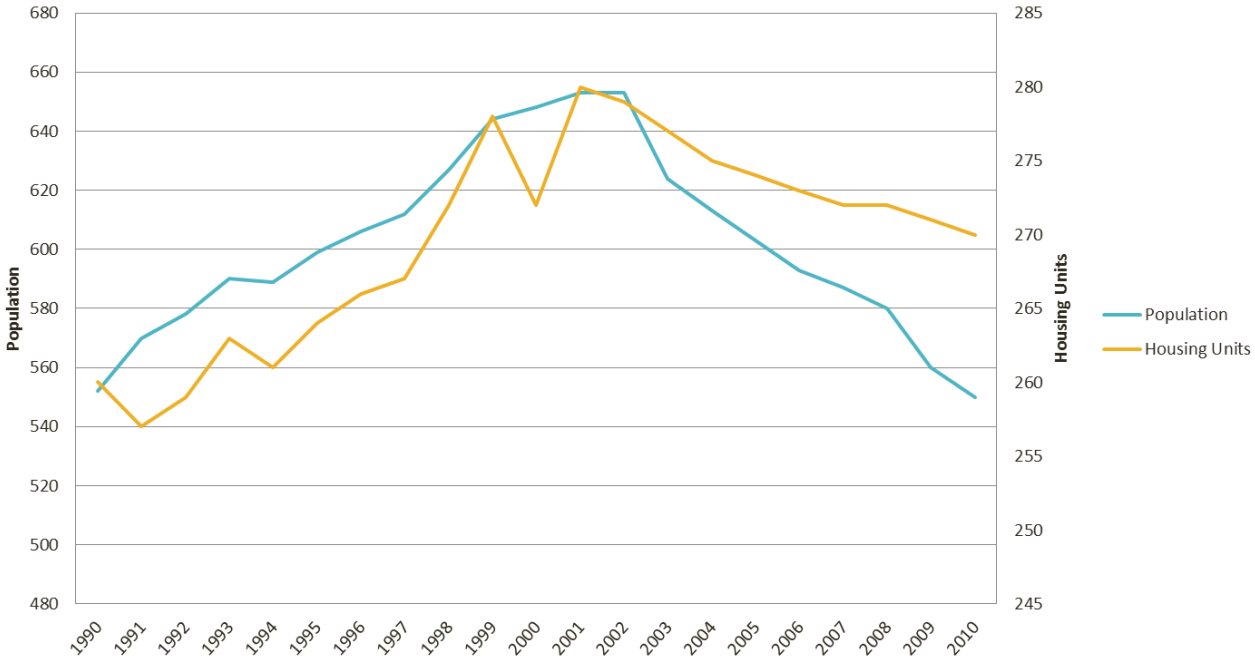
Existing and Planned Land Uses

Rosalia's shoreline jurisdiction contains agricultural uses on the east side of Pine Creek. Significant uses on the west side of the creek include Rosalia City Park, the Rodeo Grounds, the COAG facility, and the Town's wastewater treatment facility and pond. Residential uses are located throughout the Town's shoreline in a low-density configuration. There is no current zoning data for Rosalia, which is a data gap. Ownership data shows no state or federal ownership in shoreline jurisdiction. Appendix D shows the current land use and ownership profile for each shoreline reach.

The current shoreline environment designation is Urban. According to the current (1974) Shoreline Management Master Program, the Urban designation is meant to provide "optimum utilization of shorelines within urbanized areas by providing for intensive public use and by managing development so that it enhances and maintains shorelines for a multiplicity of uses."

Potential New Development and Uses

As a means of providing context for a discussion of future shoreline development and use, historic population and housing growth trends are presented for Rosalia. The Town of Rosalia grew in population from 1990 until 2002, but since then has steadily decreased in population to 1990 numbers. Trending for housing units is similar to that of population; there was steady growth until 2001, and then decline. In 2010, there were 550 people living in Rosalia and 270 housing units. Figure 6-3 compares historical trends for population and housing units for the Town of Rosalia, years 1990 through 2010.



Source: Washington State OFM, 2014.

Figure 6-3. Town of Rosalia Population and Housing Units 1990 - 2010

Based on growth trends, significant new private development is unlikely in the near future. No significant new uses or developments have been identified. The Town is working with State Parks to identify an access area for the John Wayne Trail (known also as the Iron Horse Trail). Such access would include road access and parking. A site near First Street is one of the sites being considered. The other sites would not be within shoreline jurisdiction.

The Town recently performed upgrades to its wastewater treatment plant. It may develop and implement a wetland mitigation plan associated with those improvements. Mitigation is likely to occur north of town in the County (Nanette Konishi, Town of Rosalia, personal communication).

Water-oriented Use

Water-oriented uses within Rosalia are limited. Pine Creek is not commercially navigable. Waters are typically too shallow to allow water transportation. Agriculture is prevalent along the Town's shorelines. Activities such as fishing or swimming are considered water-oriented as well. The wastewater treatment facility and outfall to Pine Creek are considered water-oriented.

Transportation and Utilities

There is 0.53 mile of abandoned rail within the shoreline reaches of the Town of Rosalia. 100 percent of the rail within the reaches is abandoned. There are 0.22 mile of roads within the shoreline. All roads are classified as rural local access roads. There is one bridge within shoreline jurisdiction on a minor road where West 7th Street crosses Pine Creek in the Rosalia – Residential/Open Space reach.

Public Access

Current Parks and Public Open Space

Rosalia City Park provides access to Pine Creek. It includes a swimming pool, ball fields, and open space. The John Wayne Trail follows Pine Creek on the east side. The rail offers visual access to the Creek.

Future Public Access

No future public access sites have been identified.

Historic and Archeological Sites

There are three structures 50 or more years old within the shoreline reaches of the Town of Rosalia.

6.2.5 City of Palouse

Land Use Pattern

The City of Palouse has a population of 1,021 and is located along the North Fork of the Palouse River (North Fork), approximately two miles from the Idaho border. The topography of Palouse is dominated by the Palouse River and its associated floodplain. The main street and downtown area are built in the floodplain and are subject to periodic flooding, most recently in 1996. The elevation of the City ranges from 2,400 feet to 2,660 feet.

The shoreline jurisdiction includes 115 acres along just under two miles of the North Fork. The river flows from the east through open space, residential areas, the City's business district (East Main Street), and back out into the County. Shoreline jurisdiction includes residential, commercial and recreational uses. Current land uses within the City's shoreline include the following:

Undeveloped land	59%
Utilities	21%
Parks	7%
Household, single family units	5%

Recreational activities	3%
Agriculture classified under current use chapter 84.34 RCW	1%
Business services	1%
Miscellaneous manufacturing	1%
Mobile home parks or courts	1%
Other retail trade	1%
Retail trade - automotive, marine craft, aircraft, and accessories	<1%
Wholesale trade	<1%

As shown, undeveloped land is the most prevalent current land use. The area of undeveloped land extends along both sides of the North Fork from the eastern boundary of the City to North Hall Street. Utilities are also a prominent use. That category includes all of the City's rights-of-way, which comprise a significant land area. Parks and residential uses are the next most common uses.

Existing and Planned Land Uses

As noted above, more than half of the City's shorelines are undeveloped. Much of the south side of East Main Street is within shoreline jurisdiction. According to the City's Comprehensive Plan, land use in the downtown corridor includes light industrial and/or agricultural-based businesses on the eastern and western borders. In the downtown area, businesses include a grocery store, several antique stores, an art gallery, a cafe, a museum, a quilt shop, and a tavern. The downtown corridor also contains residential housing, three parks, and the Palouse Community Center. There is some land still available for development, including a lot just west of the Palouse Community Center and the brownfield site (City of Palouse 2014).

Most of the commercial activity lies in the floodplain and faces the street. The backs of the buildings face the river. Toward the west end of the City, there are park uses and industrial uses in the form of grain silos and a rail yard. Zoning in Palouse is a mix of low-density residential, commercial, light industrial, and agriculture. Ownership Data shows no state or federal ownership in shoreline. Appendix D shows the current land use, ownership profile, and current zoning[5] for each shoreline reach.

The current shoreline environment designation is Urban. According to the current (1974) Shoreline Master Program, The Urban designation is meant to provide "optimum

[5] The City is currently in the process of updating its Zoning Map. When available, this analysis and the Appendix B zoning map will be updated.

utilization of shorelines within urbanized areas by providing for intensive public use and by managing development so that it enhances and maintains shorelines for a multiplicity of uses."

Palouse Comprehensive Plan

In 2014, the City of Palouse conducted a re-write of their Comprehensive Plan. The plan establishes a vision of the community and guidelines for making choices on growth, land use, protection of community values and other public development issues. Listed here are the issues of concern, objectives and strategies identified in the plan that relate to the City's shoreline:

Economic Development:

- The current commercial and industrial areas are located in a floodplain. This means that improvement and construction in those areas will need to comply with the Critical Areas Ordinance.

Land Use:

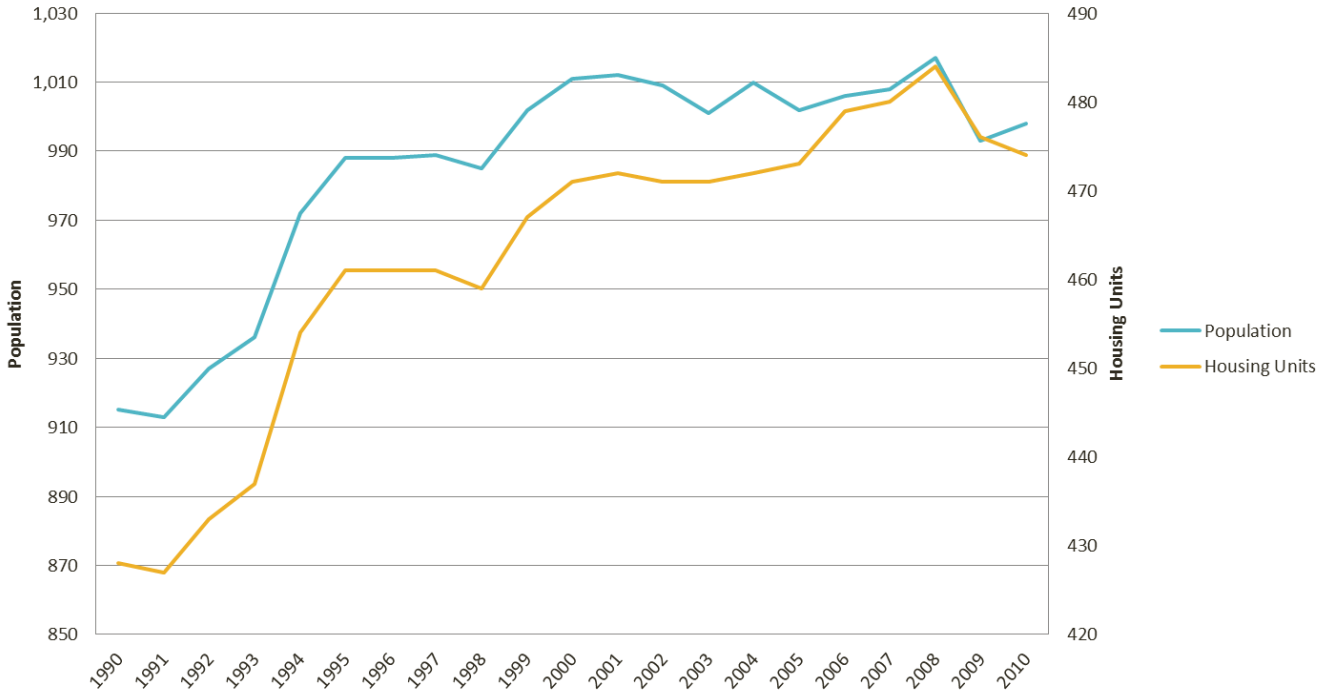
- Survey results indicate a strong and consistent desire for the creation of more open spaces, parks and recreational lands with particular emphasis on land near and around the river.
- Encourage the creation of more open spaces, parks and recreational lands with particular emphasis on land near and around the river.
    - Develop new walking trails including one near the river linking the existing path at Shady Lane with a path along the north bank of the river.
    - Build a bridge connecting Hayton-Greene Park with the south entrance park
    - Promote river streamside vegetation and reclamation including planting and maintaining
    - Compatible plants, trees and other vegetation.
    - Investigate the feasibility of biking and horseback riding trails.

Environment:

- Main Street (including residential, central business, and light industrial uses) is located in a flood prone area, the floodplain of the Palouse River.

Potential New Development and Uses

As a means of providing context for a discussion of future shoreline development and use, historic population and housing growth trends are presented for Palouse. The City of Palouse has seen fairly steady growth in population from 1990 to 2010. Housing unit growth has matched the population growth trend, year to year as well. In 2010, there were 998 people living in Palouse and 474 housing units. Figure 6-4 compares historical trends for population and housing units for the City of Palouse, years 1990 through 2010.



Source: Washington State OFM, 2014.

Figure 6-4. City of Palouse Housing and Population Units 1990 - 2010

That upward trend may result in demand for shoreline development. According to City staff (Joyce Beason, City of Palouse, personal communication), there are potential new uses and development likely in the shoreline. They include the following:

- Reconstruction of a fire-damaged building at 127 East Main Street.
- There is an ongoing brownfield clean up at a former gas station at 335 East Main Street. The City owns the property and has been working with EPA and Ecology on cleaning the site with the intention to sell the property to a private owner/developer.
- There is a vacant used car lot at 320 East Main Street on the north side of the street. There has been some private interest in developing a mini-storage facility.

- A non-profit in the City is looking for a site to develop a skate park. Two sites on East Main Street are being considered.

No other future uses or developments have been identified.

Water-oriented Use

Water-oriented uses are limited in Palouse. Those that do occur include the agricultural activities, as well as the public access sites described under Public Access. As noted above, most of the businesses along East Main Street are oriented away from the river. Uses such as restaurants and cafes that offer seating areas or windows with views of the river are considered water-oriented uses. The river is used for fishing, swimming and boating (primarily non-motorized).

Transportation and Utilities

There is 0.88 mile of rail within the shoreline of the City of Palouse, most of which is active. There is 0.71 mile of road infrastructure within the shoreline as well. The road infrastructure is a mix of rural local access and major roads, including State Highway 272 where it crosses the Palouse River in the City of Palouse – Commercial reach.

There are approximately six bridges within shoreline jurisdiction, including one active rail bridge in the City of Palouse – Agriculture reach, one minor road bridge in the City of Palouse – Industrial and City of Palouse – Open Space reaches, one highway bridge (SR 272) in the City of Palouse – Commercial reach, one minor bridge and one footpath bridge in the City of Palouse – Commercial reach, and one minor road bridge in the City of Palouse – Open Space reach.

The City's wastewater treatment plant is partially in shoreline jurisdiction. The sewage treatment facility was completed in 1995 and survived the 1996 flood. The facility includes an in-house lab for some testing. In 2006 the facility was upgraded.

Public Access

Current Parks and Public Open Space

According to the land use data, 10 percent of the City's shorelines are parks and recreational activities. There are several access points to the river along the City's streets and walking paths. The following park offers physical and visual access to the shoreline:

- **Hayton-Greene Park**, located along the Palouse River at the west end of Main Street, includes seven acres offering a variety of recreation activities. It has a public

swimming pool, basketball courts, picnic shelters, outdoor grills, gazebo, and toddler and youth playground equipment.

Future Public Access

The City's Comprehensive Plan identifies the following future public access opportunities:

- Install a walking bridge between Hayton-Greene Park and Ancel Jeffers Memorial Lions Club Park.
- Have volunteer and civic groups help build and maintain walking trails along the Palouse River.
- Upgrade War Memorial at Hayton-Greene Park.
- Develop a skateboard park in cooperation with volunteer organizations.

Historic and Archeological Sites

There is one historic site and one historic district within the shoreline reaches of the City of Palouse.

6.2.6 City of Pullman

The South Fork of the Palouse River runs through the City of Pullman and is the only Shoreline of the State within the City. The shoreline jurisdiction includes 165 acres along the South Fork Palouse River. The shoreline area flows from the southeast through recreational, residential and commercial areas, lined with the Bill Chipman Palouse Trail before passing under North Grand Avenue (SR 27). It then proceeds through largely industrial and agricultural areas before passing back into the County. Utilities uses are the most common in the City's shorelines (44%). Other major land uses in the City's shoreline jurisdiction include recreational (15%), residential (13%), trade/services (12%), and manufacturing (7%). There are 18.7 acres (11%) of shoreline area classified as undeveloped land.

Land Use Pattern

Existing and Planned Land Uses

The South Fork Palouse River is divided into five reaches within the City of Pullman for this analysis. Existing land use within the City's shoreline jurisdiction is a mix of uses. The most prevalent uses are transportation and utilities based on the presence of roads, the railroad and Pullman Transit property and other City utilities such as the wastewater treatment plant. Manufacturing and industrial uses are common uses west of SR 27. Commercial uses are common from North Grand Avenue east to NE Spring Street. Parks and open space are also a major component of the City's shoreline (see

Public Access below), particularly from North Grand Avenue to the southern city boundary. Residential areas are mapped intermittently throughout the City, although there are limited residences in shoreline jurisdiction. There is a mobile home park along SE Professional Mall Boulevard. The majority of land within shoreline jurisdiction is mapped as privately owned, with slightly more than 11 acres (7%) owned by Washington State University. This data does not include City-owned property, which a substantial portion of the shoreline is within.

Land within shoreline jurisdiction of the South Fork Palouse River is zoned for a variety of uses. The current land use pattern generally follows zoning. The shorelines along the northern portion of the South Fork Palouse are generally zoned Heavy Industrial. Much of the shoreline jurisdiction through the center of town is zoned Central Business District and General Commercial District. The area west of City Playfield is zoned low-density multi-family.

The current shoreline environment designation in Pullman is primarily Urban. However, most of the Parks reach is designated Conservancy. According to the current (1974) Shoreline Management Master Program, the Urban designation is meant to provide "optimum utilization of shorelines within urbanized areas by providing for intensive public use and by managing development so that it enhances and maintains shorelines for a multiplicity of uses." The Conservancy designation is meant "to protect, conserve and manage existing natural resources and valuable historic and cultural areas in order to ensure a continuous flow of recreational benefits to the public and to achieve sustained resource utilization."

Pullman Comprehensive Plan

Pullman last developed and adopted a Comprehensive Plan in 1999. The City is currently beginning a process of updating that plan. The current Comprehensive Plan contains policies for establishing a general land use pattern and sets priorities for future development, housing, and utility and public services delivery.

The Plan recognizes the shorelines as presenting a special opportunity to provide habitat for wildlife and serve as flood water storage areas. The Plan calls for special efforts to protect shorelines or mitigate impacts from development. It also calls for expansion of public access to shorelines. Connections between shoreline and the City's natural areas in the form of trails, riverfront walkways, and open space corridors are noted as part of the City's vision. The City's land use goals and policies related to shorelines include the following:

GOAL LU13: Preserve shoreline areas, while assuring public access to the water.

Policy LU13.1: Protect public access to the shorelines. Review of all private and public developments should consider and provide for public access as close to the water as possible, consistent with protection of environmental resources and water quality.

Policy LU13.2: Protect and enhance public views of the shoreline area from adjacent upland areas, consistent with the need to protect environmental resources (including vegetation).

Policy LU13.3: Preserve the natural character of the shoreline. Ensure that public and private development, including public access and recreational development, minimizes disturbance of environmental resources and shoreline ecosystems.

Policy LU13.4: Encourage the use of native plant materials in restoration of shoreline areas or landscaping development within the shoreline area. Protect areas of native vegetation.

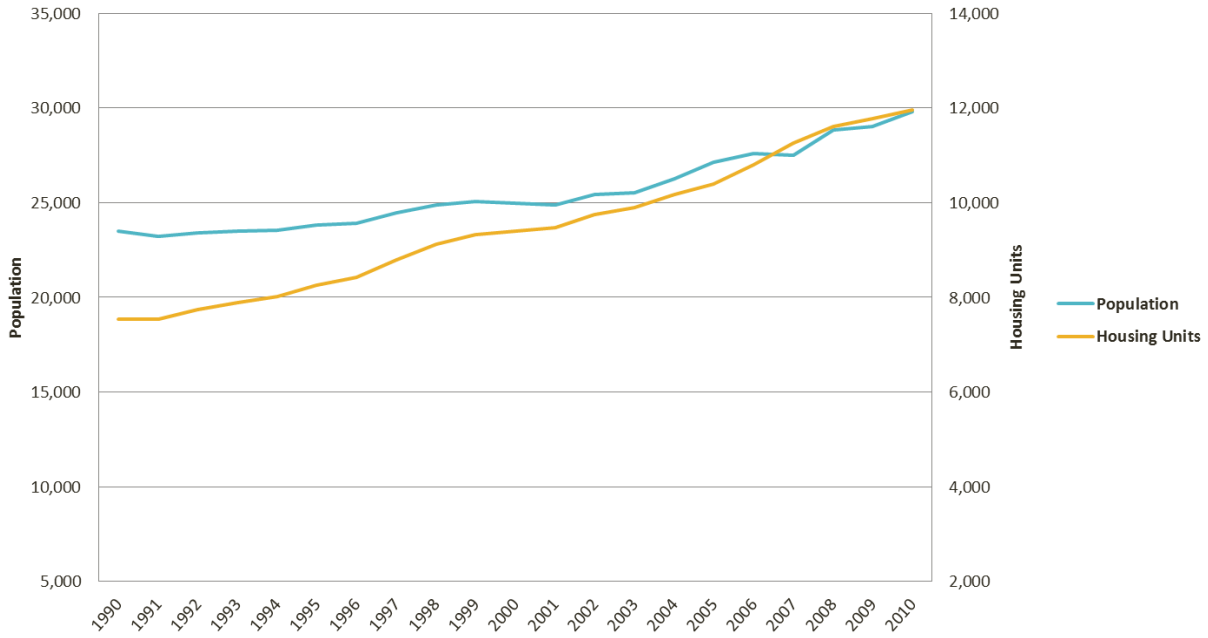
Policy LU13.5: Encourage the design and use of naturally regenerating systems of erosion control and water quality treatment in shoreline areas.

Policy LU13.6: Ensure that all shoreline uses are located, designed, constructed, and maintained to minimize adverse impacts to water quality and fish and wildlife resources.

Policy LU13.7: Encourage development of trails along the city's streams. All trails should be designed to protect environmental resources and minimize adverse effects to water quality.

Potential New Development and Uses

As a means of providing context for a discussion of future shoreline development and use, historic population and housing growth trends are presented for Pullman. The City of Pullman has experienced steady, nearly constant growth since 1990. Housing units have also steadily grown year to year since 1900. The pace of growth for population and housing units in Pullman has quickened since the early 2000s. In 2010, there were 29,799 people living in Pullman and 11,966 housing units. Figure 6-5 compares historical trends for population and housing units for the City of Pullman, years 1990 through 2010.



Source: Washington State OFM, 2014.

Figure 6-5. City of Pullman Population and Housing Units 1990 - 2010

There are approximately 18.7 acres of lands designated as undeveloped in the City's shoreline. Nearly all of it is located in the Pullman – Parks reach. Most of this area is zoned General Commercial District. The undeveloped areas are in two primary locations. The first is near the south end of the City (in the Parks and South Commercial reaches) and currently used as open space. Much of it is likely to remain undeveloped. The second area is much smaller. It is located along the left bank near the north end of the City in a Residential reach, and is zoned Low Density Multi-Family.

Based on conversations with City staff, there are limited likely new developments in shoreline jurisdiction (Pete Dickinson, City of Pullman, personal communication). Those that are possible include a property near the intersection of SE Johnson Road and SE Bishop Boulevard, on the west side of the River, south of the Village Center Cinemas which has been rezoned to commercial and multi-family residential. Development on that property is probable and could include areas in shoreline jurisdiction. There is also a new park being planned at SE Johnson Road and Old Moscow Avenue, as well as several parks upgrades (see Public Access, below).

Water-oriented Uses

Water-oriented uses within Pullman are limited. The South Fork Palouse River is not commercially navigable. Waters are typically too shallow to allow water transportation

or many recreational uses such as swimming or fishing. Industrial uses were historically located along the shoreline because of flat, level terrain.

The most prevalent water-oriented use is public access. There are approximately 25 acres of identified parks and amusements within the City's shorelines (see Public Access below). Water-enjoyment amenities include trails, ball parks, and viewpoints. Some of the commercial uses that are adjacent to the shoreline have windows that face the river or outdoor seating areas.

The City's wastewater treatment plant is considered water-related and its outflow would be considered water-dependent. Other utility outfalls would also be considered water-oriented.

Transportation and Utilities

In general, there is a moderate amount of transportation infrastructure within the shoreline of the City of Pullman. The majority of the infrastructure for transportation is active rail. There are 2.5 miles of rail within shoreline reaches of the City.

There are 2.3 miles of road infrastructure within shoreline reaches of the City of Pullman. The roads are a mix of urban major collector, urban minor collector, and major roads including State Route 27 and State Route 270.

- State Route 27 crosses the South Fork Palouse River in the Pullman – Commercial/Business District reach.
- State Route 270 crosses the South Fork Palouse River in the Pullman – Parks reach and Pullman – Commercial/Business District reach.

There are approximately eight bridges within shoreline jurisdiction, including two bridges on state highways, five minor road bridges, and one active rail bridge.

According to the City's Comprehensive Plan (1999), the City's wastewater treatment plant, located along the South Fork Palouse, in the north of the City, has a peak capacity of 8.6 million gallons per day (mgd), with an average flow of 3.29 mgd. The system includes more than 62 miles of collection pipes.

Pullman's storm drainage system is typical of most cities. It consists of natural and constructed conveyances, including detention ponds and underground settlement vaults, biofiltration swales, ditches, catch basins, pipes, and natural watercourses such as Missouri Flat Creek, Dry Fork Creek, Paradise Creek, and the South Fork of the Palouse River. Storm drain systems are required by the City for all new land use developments.

The design goals for storm water systems in the City are based on current Washington State stormwater handling guidelines that require protection of adjacent properties; limitations on the rate of storm water runoff and the peak runoff volume; and provision of some level of treatment, such as settling in a detention pond or biofiltration in a grassy swale.

Public Access

Current Parks and Public Open Spaces

The City has several parks and open spaces and trails along the South Fork Palouse River. Table 6-5 summarizes the City's public access lands and facilities, which are described in more detail below.

Table 6-5. City of Pullman Open Space and Public Access Summary

Shoreline Reach	Open Space Acres (Percent of Reach)	# of Parks	Campground	Trail (Lineal Feet)	Boat Launches	Moorage
Pullman – Commercial/ Business District	3.0(11.5)	1	0	Grand Avenue Greenway (2,186)	0	0
Pullman – Parks	14.6 (30.5)	4	0	Grand Avenue Greenway (1,295)	0	0
Pullman - Residential	3.7 (13. 8)	1	0	Bill Chipman Palouse Trail (436)	0	0
Pullman – South Commercial	0	0	0	Bill Chipman Palouse Trail (156)	0	0

The following shoreline public access sites and trails are located within Pullman's shoreline jurisdiction:

- **Bill Chipman Palouse Trail** is a 7-mile trail from Pullman to Moscow, Idaho. It is used for biking, in-line skating, and walking.
- **Grand Avenue Greenway** is a segment of the 8-mile Pullman Loop Trail, which circles Pullman's College Hill neighborhood and the Washington State University campus. The trail begins downtown at the Pufferbelly Depot, where three railroad tracks converge, and follows the tracks to NW Terre View Drive. The route provides a view of Missouri Flat Creek and easy access to the Terre View Trail.

- **Spring Street Skate Park** is 2.75 acres. The park includes a skateboard facility, public restrooms, and a link to the Bill Chipman Palouse Trail.
- **City Playfields** are 8.66 acres in size. There are three softball fields, a jogging track, exercise stations, volleyball standards, a batting cage, picnic tables, drinking fountains and restrooms.
- **Reaney Park** is a 1.64-acre park south of NE Morton Street. It contains a public swimming pool and playground. The park is separated from the river by the BNSF railroad.
- **Community P-Patch** is a public 3-acre community garden was founded on the old Koppel Farm estate on SE Derby Street. It has 110 plots that are utilized by members. The garden property is partially within shoreline jurisdiction. (City of Pullman 2014)

Future Public Access

The City's *Parks and Recreation 2014-2018 Five Year Plan* (2014) establishes objectives for the provision of parks and open space in general and for shoreline access in particular. The Plan notes that the "shoreline of the South Fork of the Palouse River holds special significance to the community, and the city should place a priority upon acquiring parcels of land along the shoreline, as they become available." The Parks and Recreation Plan also contains the following goals and policies related to future public access:

> **Policy P2.1:** Pursue funding sources for the acquisition and improvement of shoreline parcels within the city.
>
> **Policy P2.2:** Develop the river park area from City Playfield to Grand Avenue to preserve the shoreline and provide recreational opportunities.
>
> **Policy P2.5:** Require buildings to be set back from stream channels to provide open space for riparian areas.

The City has identified several new parks and park improvements likely to occur in the near future. The City has permitted construction of Mary's Park at the intersection of NE Johnson Road and Old Moscow Road. The site is 5 acres and will have a playground, shelter, parking lot and RV facilities. Most of the infrastructure would be outside of shoreline jurisdiction. The City also plans improvements to Reaney Park. Plans include expanding the pool deck south toward the river during the summer of 2014.

Historic and Archeological Sites

There are two sites on the State Register of Historic Sites within the shoreline reaches of the City of Pullman:

- The Cordova Theater in Pullman is on the National Register of Historic Places. It is a Mission/Spanish Revival style theater built in Pullman in 1927.
- Hutchison Studio was the photo studio of Ralph Raymond Hutchison. As a professional photographer, Hutchison operated studios in Endicott and Pullman, Washington and Moscow, Idaho. He was the photographer for the WSU Yearbook and his collection of photographs, now housed at WSU Libraries, documents the campus of WSU and rural Washington communities between the 1920s and 1950s.

There are 37 structures that are 50 or more years old within the shoreline reaches of the City of Pullman. The structures are concentrated in the Commercial/Business District and the Parks shoreline reaches.

6.2.7 City of Tekoa

Land Use Pattern

Tekoa has a population of 791 and is located at the confluence of Hangman Creek and Little Hangman Creek which enters from the east. Tekoa's shoreline jurisdiction includes approximately 126 acres along both creeks. Most of Tekoa's shoreline jurisdiction contains open space and agriculture. It also contains some residential development along Water Street and some industrial development along South Ramsey Street. Tekoa's wastewater treatment facility is also located in the shoreline, in the northwest section of town. Current land uses along the City's shoreline are as follows:

Undeveloped land	37%
Open space land classified under chapter 84.34 RCW	19%
Recreational activities	16%
Agriculture classified under current use chapter 84.34 RCW	15%
Household, single family units	7%
Utilities	2%
Agriculture related activities	2%
Miscellaneous services	2%
Other retail trade	<1%
Parks	<1%
Retail trade - automotive, marine craft, aircraft, and accessories	<1%

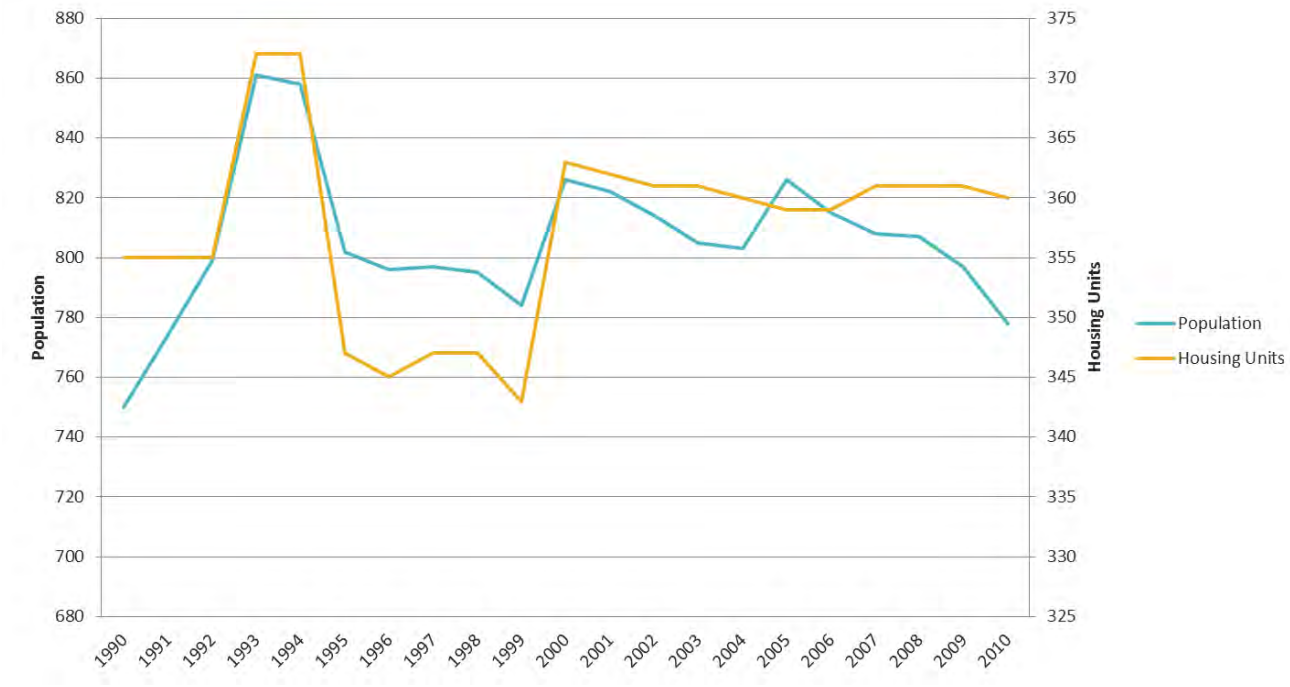
Existing and Planned Land Uses

All land within the shoreline jurisdiction is privately owned. Land within shoreline jurisdiction of Hangman Creek is zoned for a variety of uses. Residential zoning is the most common in shoreline jurisdiction (46%). There is some industrial and commercial zoning (<2%). Nearly half (48%) of the shoreline does not have zoning data; this is a data gap. Ownership data shows no state or federal ownership in shoreline jurisdiction. Appendix D shows the current land use, ownership profile, and available zoning for each shoreline reach.

The current shoreline environment designation is Urban. According to the current (1974) Shoreline Management Master Program, the Urban designation is meant to provide "optimum utilization of shorelines within urbanized areas by providing for intensive public use and by managing development so that it enhances and maintains shorelines for a multiplicity of uses."

Potential New Development and Uses

As a means of providing context for a discussion of future shoreline development and use, historic population and housing growth trends are presented for Tekoa. The City of Tekoa has been declining in population since 2001. There was a significant jump in population from 1993 to 1994, but the population has in general remained between 780 and 820 people. The number of housing units grew rapidly from 1999 to 2000, but has since leveled off. Figure 6-6 compares historical trends for population and housing units for the City of Tekoa, years 1990 through 2010.



Source: Washington State OFM, 2014

Figure 6-6. City of Tekoa Population and Housing Units 1990 - 2010

Based on growth trends, significant new private development is unlikely in the near future. According to City staff, the City is planning for a new truck route that would provide a flatter route through town. The new route would begin at Poplar Street, cross Little Hangman Creek, and proceed through town on a new road to the Ramsey Street Bridge. The new road would be constructed parallel to Crosby Street and would be in shoreline jurisdiction.

The City is also planning a road improvement project on Park Street. The project would likely include widening the road and installing a new sewer line. Some of the work would take place in shoreline jurisdiction. In the future, the City may be replacing sewer lines, some of which are in shoreline jurisdiction, when funding is available.

Water-oriented Use

Water-oriented uses within Tekoa are limited. Hangman Creek is not commercially navigable. Waters are typically too shallow to allow water transportation. Agriculture is present along the City's shorelines. Activities such as fishing or swimming are considered water-oriented as well. The wastewater treatment facility and outfall to the creek are considered water-oriented.

Transportation and Utilities

There is 0.53 mile of abandoned rail within the shoreline reaches of the City of Rosalia. There is 0.22 mile of roads within the shoreline; all roads are classified as rural local access roads. There is one bridge within shoreline jurisdiction on a minor road where West Seventh Street crosses Pine Creek in the Rosalia – Residential/Open Space reach.

Public Access

Current Parks and Public Open Space

While there is undeveloped open space in shoreline jurisdiction, developed public access is limited. There is a picnic shelter along the Creek near Ramsey Street, and Rosalia City Park provides access to Pine Creek. It includes a swimming pool, ball fields and open space. The John Wayne Trail offers visual access to the creek.

Future Public Access

No future public access sites have been identified.

Historic and Archeological Sites

There are 17 structures that are fifty or more years old within the shoreline reaches of the City of Tekoa.

7 SHORELINE MANAGEMENT RECOMMENDATIONS

The following are recommended actions for translating inventory and characterization findings into the draft SMP policies, regulations, environment designations, and restoration strategies for areas within shoreline jurisdiction. In addition to the following analysis-specific recommendations, the updated SMP(s) will incorporate all other requirements of the Shoreline Management Act (RCW 90.58) and the Shoreline Master Program Guidelines (WAC 173-26).

7.1 Environment Designations

As outlined in WAC 173-26-191(1)(d), "Shoreline management must address a wide range of physical conditions and development settings along shoreline areas. Effective shoreline management requires that the shoreline master program prescribe different sets of environmental protection measures, allowable use provisions, and development standards for each of these shoreline segments." In WAC 173-26-211(2)(a), the

Guidelines further direct development and assignment of environment designations based on "existing use pattern, the biological and physical character of the shoreline, and the goals and aspirations of the community as expressed through comprehensive plans…"

The County's current Shoreline Management Master Plan utilizes a system of four environment designations: Natural, Conservancy, Rural, and Urban. Urban is applied to all of the Cities and Towns, except that Pullman also includes some land area designated Conservancy. Urban also applies to the intense Port and park developments on the Snake River. Most of the remainder of the County is in a Rural designation, although there are some Conservancy areas on the Palouse River extending approximately 12 miles upstream of the Snake River, on the Rock Lake system, and a short section of Union Flat Creek. Short sections of Natural are mapped on Rock Lake and on the Palouse River. The shoreline environment designation map has not been modified since it was originally developed in 1974, and thus the environment designation assignments no longer provide the best fit with the existing biological and land use character or the community's vision as expressed in local planning documents and ordinances.

The Guidelines recommend use of six unique environments: Aquatic, Natural, Urban Conservancy, Rural Conservancy, Shoreline Residential, and High Intensity. Urban Conservancy, Shoreline Residential, and High Intensity are each intended by the Guidelines to be applied only in City and Towns, UGAs, and intensely developed rural areas. However, each jurisdiction may use "alternative" environment designations, as appropriate, as long as they provide equal or better protection than the standard.

The findings of this Analysis Report would support development of several alternative designations to supplement the Guidelines system as follows:

- Consider development of a specific "Rural Industrial" or "Port" designation to allow for special consideration of the unique port-related developments on the Snake River.
- Consider development of a "Shoreline Parks" designation that might facilitate implementation of parks and recreation management plans in both the County and the Cities.
- Consider development of a "Flume" designation in Colfax to simplify development of unique standards and allowed uses that may be appropriate in this distinct and highly altered environment.

7.2 General Policies and Regulations

7.2.1 Archaeological and Historic Resources

- The findings of this Shoreline Analysis Report do not suggest a need for additional regulations beyond those mandated by the SMP Guidelines.

7.2.2 Critical Areas

The County and Cities should consider whether their critical areas regulations should be incorporated into the SMP by reference or through direct inclusion. The latter method is generally recommended, particularly when the critical areas regulations have not been updated recently and thus may require considerable revision to meet the most current scientific standards as mandated by WAC 173-26-201(2)(a). Either method of incorporation will require modification of the County's and Cities' critical areas regulations to different degrees as they apply in shoreline jurisdiction to meet SMA criteria. For example:

- Any exceptions, such as reasonable use, will need to be removed as the appropriate SMA process for such action is through the Shoreline Variance.
- The County's critical areas regulations establish recommended buffers for shoreline streams of 250 feet; the City of Pullman's regulations require a buffer of 150 feet on shoreline streams. These regulations will need to be revisited to assess if changes are needed to recognize existing shoreline conditions and to accommodate water-oriented and other preferred uses consistent with no net loss of ecological functions (as required by WAC 173-26-221(2)(a)(ii)). In particular, the existing stream buffers are not environment designation- or waterbody-based, which indicates that they may need to be further customized to accomplish these objectives. For example, development closer than 250 feet is essential (and presently ongoing) at Port properties on the Snake.
- The County's, Pullman's and Palouse's wetlands regulations generally look up-to-date, although they will still need to be reviewed carefully to ensure consistency with the latest Ecology guidance.

7.2.3 Flood Hazard Reduction

- The Cities and Towns have been particularly hard hit by severe floods in the past. Consistent with the WAC provisions in the Guidelines, the SMP(s) should provide flexibility for developing and maintaining flood hazard reduction measures as needed to continue protection of existing uses. Emphasis should be given to maintaining existing ecological functions, at a minimum, through Ecology's no net loss criteria.

7.2.4 Public Access

- Provide policies and regulations that recognize and facilitate implementation of existing County, City and Town parks, recreation, and open space plans.
- Through visioning and other SMP outreach processes, identify other opportunities to improve public access, such as on land in federal ownership, which could add public access over the 20-year planning period (e.g. Rock and Bonnie Lakes).

7.2.5 Shoreline Vegetation Conservation

Build on the existing protections provided in the County's and Cities' critical areas regulations, paying special attention to measures that will promote retention of shoreline vegetation, replacement of invasive vegetation with native vegetation, and development of a well-functioning shoreline which provides both physical and habitat processes.

- Ensure that vegetation provisions allow for appropriate modifications to accommodate preferred uses, particularly important agriculture modifications, water-dependent or –related port developments, other water-oriented uses, and public access and recreation.
- Consider development of County/City-specific, environment designation-specific, and possibly waterbody-specific buffer and/or setback strategies that meet requirements for environmental protection and recognition of local conditions. After environment designations are drafted, recommend sampling parcels' current primary structure setback, functioning vegetation width, and alteration location within the Cities and Port properties in particular to develop and evaluate different options.

7.2.6 Water Quality, Stormwater, and Nonpoint Pollution

- Consider incorporating regulations to facilitate maximum implementation of TMDL plans, and controlling introduction of 303(d)-listed pollutants for which TMDLs have not yet been prepared.

7.3 Shoreline Modification Provisions

7.3.1 Shoreline Stabilization

- Fully implement the intent and principles of the WAC Guidelines. Reference appropriate exemptions found in the WAC related to "normal maintenance and repair" and "construction of the normal bulkhead common to single-family residences." These are not exemptions from the regulations, however; they are exemptions from a Shoreline Substantial Development Permit.

- Give preference to those types of shoreline modifications that have a lesser impact on ecological functions. Policies and regulations should promote "soft" over "hard" shoreline modification measures. Consider requiring a Conditional Use Permit for any new hard shoreline stabilization, at least in certain environment designations.
- Incentives should be included in the SMP that would encourage modification of existing armoring, where feasible, to improve habitat while still maintaining any necessary site use and protection.

7.3.2 Piers and Docks

- There do not appear to be any private residential pier or dock structures in Whitman County. If that is the case, this section may not be needed and all standards for over- and in-water structures could be addressed in Boating Facilities.

7.3.3 Fill

- Restoration fills can benefit shoreline functions and should be encouraged, including improvements to shoreline habitats, material to anchor LWD placements, and as needed to implement shoreline restoration.

7.3.4 Breakwaters, Jetties, Groins and Weirs

- Consider prohibiting new breakwaters, jetties, groins, or weirs except where they are essential to expansion, restoration or maintenance of existing water-dependent uses, consistent with applicable state and federal regulations and potentially subject to a Shoreline Conditional Use Permit.

7.3.5 Dredging and Dredge Material Disposal

- Except for purposes of shoreline restoration, flood hazard reduction, and maintenance of existing legal moorage and navigation, consider prohibiting new dredging activities. Consider limiting upland dredge disposal to industrial areas consistent with state/federal approval.

7.3.6 Shoreline Habitat and Natural Systems Enhancement Projects

- Consider incentives to encourage restoration projects, particularly in areas identified as having lower function. For example, allow modification of impervious surface coverage, density, height, or setback requirements when paired with significant restoration. Emphasize that certain fills, such as streambed gravels or material to anchor logs, can be an important component of some restoration projects.

7.4 Shoreline Uses

7.4.1 Agriculture

- Maintenance of existing agriculture is commercially and culturally important to Whitman County. This should be recognized in shoreline policies.

7.4.2 Aquaculture

- Ensure that any salmon recovery-related aquaculture activities are facilitated in the aquatic and appropriate upland environments along the Snake River.

7.4.3 Boating Facilities

- Whitman County includes a variety of commercial and public boating facilities, including port uses and park boat moorage and launching facilities. Regulations for the over- and in-water components should be developed to provide applicants with as much predictability as possible, while still allowing for an appropriate amount of flexibility based on site-specific conditions and use-specific needs.

7.4.4 Commercial Development

- There is minimal commercial use in unincorporated Whitman County along the shorelines. The County should allow existing commercial uses to continue and identify criteria for where future commercial uses may be appropriate.
- Support the Port of Whitman County in retaining existing and attracting new water-oriented commercial uses in appropriate locations along the shoreline.
- Support the Cities' efforts to provide for commercial development in their centers along the rivers.

7.4.5 Forest Practices

- This use is not found in Whitman County. Recommend prohibiting it.

7.4.6 Industry

- Recognize current industrial uses and consider incentives to attract water-oriented uses in appropriate locations along the shoreline.
- Industrial uses along the Snake River are primarily located at the Port of Whitman County's on-water facilities. The County should support the Port's efforts to retain existing and attract new water-oriented industrial uses in appropriate locations along the Snake River shoreline.
- Recognize and allow existing and new industrial uses, such as grain silos, that serve the County's agriculture industry, provided they are developed and operated

consistent with the State's Shoreline Master Program Guidelines and other County and State requirements.

- Ensure that operation of existing and development of new industrial facilities are consistent with State Shoreline Master Program Guidelines and achieve no net loss of shoreline functions.

7.4.7 In-stream Structural Uses

- Large-scale in-stream structures intended to produce energy and/or moderate flooding are found in Whitman County. There are also a number of irrigation diversion and discharge structures in many waterbodies. Regulations need to accommodate anticipated new diversion structures, and repair/maintenance and possible expansion of existing projects.

7.4.8 Mining

- A single mining operation is found in shoreline jurisdiction at the Port of Central Ferry. Develop regulations that will allow maintaining or expanding this use, or adding new mining uses, in industrial areas. Consider prohibiting all mining waterward of the OHWM.

7.4.9 Recreational Development

- Include provisions for existing and potential recreational uses, including boating, swimming, and fishing.
- Work with local, state and federal parks departments; Army Corps of Engineers; and Port officials to ensure consistency between shoreline policies and regulations and long-term parks management plans.
- Policies and regulations related to parks management should provide clear preferences for shoreline restoration consistent with public access needs and uses.
- Park development and improvement in the Cities and Towns should recognize the importance of shoreline resources and should plan for water-oriented uses in shoreline jurisdiction. Development or improvement plans should balance the provision of developed recreational areas in the shoreline with the need to protect and/or enhance shoreline ecological functions.

7.4.10 Residential Development

- Residential uses are extremely limited in the unincorporated County. Where proposed, residential development should proceed in a manner consistent with the control of pollution and prevention of damage to the shoreline environment.

- In the Cities and Town, recognize current and planned shoreline residential uses with adequate provision of services and utilities as appropriate to allow for shoreline ecological protection.

7.4.11 Transportation and Parking

- Allow for maintenance and improvements to existing roads, railroads and parking areas, and for necessary new roads and parking areas where other locations outside of shoreline jurisdiction are not feasible.
- Promote additional trail connections consistent with local and regional plans.

7.4.12 Utilities

- Allow for new, expanded, and maintained utilities with criteria for location and vegetation restoration as appropriate.

7.5 Restoration Plan

A Restoration Plan document will be prepared at a later phase of the Shoreline Master Program update process, consistent with WAC 173-26-201(2)(f). The Shoreline Restoration Plan will address the following six subjects (WAC 173-26-201(2)(f)(i-vi)) and incorporate findings from this Shoreline Analysis Report:

(i) Identify degraded areas, impaired ecological functions, and sites with potential for ecological restoration;

(ii) Establish overall goals and priorities for restoration of degraded areas and impaired ecological functions;

(iii) Identify existing and ongoing projects and programs that are currently being implemented, or are reasonably assured of being implemented (based on an evaluation of funding likely in the foreseeable future), which are designed to contribute to local restoration goals;

(iv) Identify additional projects and programs needed to achieve local restoration goals, and implementation strategies including identifying prospective funding sources for those projects and programs;

(v) Identify timelines and benchmarks for implementing restoration projects and programs and achieving local restoration goals; and

(vi) Provide for mechanisms or strategies to ensure that restoration projects and programs will be implemented according to plans and to appropriately review the effectiveness of the projects and programs in meeting the overall restoration goals.

The Restoration Plan will "include goals, policies and actions for restoration of impaired shoreline ecological functions [where reasonable and practical]. These master program provisions should be designed to achieve overall improvements in shoreline ecological functions over time, when compared to the status upon adoption of the master program." The Restoration Plan will mesh opportunities identified in this report with additional projects, regional or local efforts, and programs of each jurisdiction, watershed groups, and environmental organizations that contribute or could potentially contribute to improved ecological functions of the shoreline.

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9 LIST OF ACRONYMS AND ABBREVIATIONS

cfs.....Cubic Feet per Second
Corps.....U.S. Army Corps of Engineers
Ecology .....Washington Department of Ecology
ESA.....Endangered Species Act
FEMA.....Federal Emergency Management Agency
GIS.....Geographic information systems
GMA.....Growth Management Act
HPA.....Hydraulic Project Approval
LWD.....Large Woody Debris
NLC.....National Land Cover
NOAA.....National Oceanographic and Atmospheric Administration
NPDES.....National Pollutant Discharge Elimination System
NRCS.....Natural Resources Conservation Service
NWI.....National Wetlands Inventory
OHWM .....Ordinary High Water Mark
PCB.....Polychlorinated biphenyl
PHS.....Priority Habitats and Species
RCW.....Revised Code of Washington
SMA .....Shoreline Management Act
SMP .....Shoreline Master Program
TMDL.....Total Maximum Daily Load
UGA .....Urban Growth Area
USDA .....U.S. Department of Agriculture
USFWS.....U.S. Fish and Wildlife Service
USGS .....U.S. Geological Service
WAC.....Washington Administrative Code
WDFW .....Washington Department of Fish and Wildlife
WDNR .....Washington Department of Natural Resources
WRIA .....Water Resource Inventory Area

APPENDIX A

WHITMAN COUNTY ASSESSMENT OF SHORELINE JURISDICTION

20 March 2014

Jerry Basler
Assistant Planner
Whitman County Public Works, Planning Division
310 N. Main Street
Colfax WA 99111

Re: Proposed Whitman County Shoreline Jurisdiction

Dear Jerry:

The Watershed Company has developed the attached proposed maps of shoreline jurisdiction, illustrating the minimum jurisdiction option and the additional full floodplain option. The wetland buffers option is not illustrated, but is described below. This information is provided to assist the County in selecting its preferred shoreline jurisdiction option.

EXISTING SHORELINE JURISDICTION PER CURRENT SMP

Under the County's current Shoreline Master Program (SMP), the following waterbodies are shorelines of the state:

- Snake River
- Palouse River (mainstem, north and south forks)
- Rock Creek
- Pine Creek
- Latah Creek (Hangman Creek)
- Union Flat Creek
- Across Highway Lake
- Alkali Lake
- Bonnie Lake
- Crooked Knee Lake
- Folsom Lake
- Lavista Lake
- Rock Lake
- Sheep Lake
- Snyder Slough
- Stevens Lake
- Texas Lake
- Tule Lake

Existing shoreline jurisdiction includes the shorelands extending 200 feet from the ordinary high water mark and identified associated wetlands, and includes the floodway and 200 feet of floodway-adjacent floodplain where present. The County's adopted map also does not recognize the expansion of the cities since 1974, or depict the extent of the shorelands.

750 Sixth Street South | Kirkland, WA 98033
p 425.822.5242 | f 425.827.8136 | watershedco.com

PROPOSED SHORELINE JURISDICTION

The first step in updating the map of shoreline jurisdiction is to collect data relevant to the jurisdiction assessment, namely:

1. Waterbodies: National Hydrography Dataset. An overlay of the data with the aerial generally revealed a close match with existing conditions.

2. Shoreline Management Act Suggested Points, Arcs and Polygons: Under contract to Ecology, the United States Geological Survey (USGS) has identified the upstream limits of shoreline streams and rivers based on projected mean annual flow of 20 cubic feet per second (cfs) (Higgins 2003). Ecology also provided a data set of lakes that are 20 acres or greater in size. Data representing lake shorelines was compared to 2013 aerial photos. Verification of the lake size was conducted using a GIS-based area calculator, which confirmed Ecology's suggested list of lakes that meet the shoreline size threshold.

3. Floodways and Floodplains: FEMA Q3 digital data representing floodways and floodplains was collected through Ecology. Investigation of the Q3 data, published in 1980, showed registration issues between it and more recent geospatial data from reliable sources. As suggested in earlier personal communication with data stewards at FEMA regarding issues with the Q3 data, features in the FEMA Q3 dataset were manually realigned to better reflect the published Flood Insurance Rate Maps (FIRMs) and to agree with USDA 2013 NAIP aerial photos and data from other reliable sources. Realignment was conducted by visual assessment of the Q3 data against FIRMs accessed through FEMA's online FIRMETTE application.

4. Wetlands: The U.S. Fish and Wildlife Service National Wetlands Inventory data set was used to identify wetlands that are potentially associated with the shoreline. For mapping purposes, all wetlands are shown as potentially being an element of shoreline jurisdiction if they are in or partially in the area 200 feet upland of the OHWM or are in or partially in the floodway or floodplain. Wetlands that extend up a non-shoreline stream outside the boundaries of the floodplain (such as in Steptoe Canyon) are excluded from shoreline jurisdiction mapping. Wetlands outside those parameters may also be shoreline-associated wetlands, but that assessment would need to be made at the site-specific scale at the time of a development application.

MINIMUM JURISDICTION

The proposed illustration of the minimum shoreline jurisdiction is provided on the *Minimum Shoreline Jurisdiction* exhibit. The basic steps are to illustrate 200 feet upland of OHWM, add floodways and floodplains, and then clip jurisdiction to extend the greater of 200 feet from the OHWM or 200 feet of floodplain upland from the floodway (where present). Shoreline-associated wetlands remain a separate feature on the shoreline jurisdiction map because they have lower accuracy and are more subject to variation based on future site-specific delineation and analysis. The minimum upland shoreline jurisdiction area, including the potentially associated wetlands, is approximately 24,257 acres.

Rivers/Streams

Fourmile and Cottonwood Creeks

Based on the USGS study, portions of Fourmile Creek (a tributary of the South Fork Palouse River) and Cottonwood Creek (a tributary of Rock Creek) have been added to shoreline jurisdiction. Anecdotal information provided by County staff and area property owners suggested that these streams may not meet the minimum flow required. Aerial photo review and the reported margin of error in the USGS study also supported a need for further analysis of these two systems.

On January 24, 2014, Patricia Olson (Ecology's Senior Hydrogeologist) provided additional analysis in a memo (attached) that placed the upstream limit of shoreline jurisdiction substantially farther downstream than the original USGS point.

Latah Creek

The Ecology-suggested shorelines data do not identify the segment of Latah Creek above its confluence with Rock Creek as a Shoreline of the State. However, because this segment of Latah Creek was previously identified by both the County and Ecology as a Shoreline of the State, stream flow data for Latah Creek were reviewed. USGS currently maintains a gaging station (12422990) at the State Line Road bridge, 2.6 miles southeast of Tekoa. The USGS Water-Data Report 2012 (U.S. Geological Survey 2013) was reviewed for mean annual flow at this station. For the period of record (2008-2012), the report states that mean annual flow at this station was 85.4 cfs. As this stream flow is well above the 20 cfs cutoff, we have included the entire length of Latah Creek in the County as a Shoreline of the State even though the period of record is less than 10 years.

Union Flat Creek

Similar to the case of Latah Creek, the Ecology-suggested shorelines data do not identify Union Flat Creek as a Shoreline of the State; however, because this segment of Union Flat Creek was previously identified by both the County and Ecology as a Shoreline of the State, stream flow data for Union Flat Creek were reviewed. Although no known State or federal gaging stations are currently located along Union Flat Creek, a gaging

station (13350500) was formerly maintained by USGS near Colfax from 1953 to 1971. For this period of record, mean annual flow at this gaging station was 37.1 cfs (Higgins 2003). As this stream flow is well above the 20 cfs cutoff, the segment of Union Flat Creek up to the former location of the gaging station near Colfax should clearly be included as a Shoreline of the State. The following parties were contacted in an effort to obtain data or local expert opinion, and limited information relevant to this shoreline jurisdiction determination surfaced:

- Washington Department of Transportation: Tammie Williams (Environmental Manager), Tom Baker (Bridge and Structures Engineer), and Jay Christianson (Hydraulics)
- Washington Department of Fish and Wildlife: Jason Kunz (Area Habitat Biologist) and Paul LaRiviere (Instream Flow Biologist)
- Washington Department of Ecology: Mitch Wallace
- Washington State Water Research Center

A 2007 WDFW memo related to a water right transfer noted that Union Flat Creek flows were "less than five cubic-feet per second mean annual flow." It could not be determined from the memo where this flow characterization applied. Unfortunately, no other known data exist to provide a more precise indication of how much farther upstream the 20 cfs cutoff occurs.

Based on the USGS stream gage record and the lack of any other information, the proposed shoreline jurisdiction maps retain Union Flat Creek in shoreline jurisdiction consistent with the past 40 years of regulation by the County.

Lakes

According to Ecology's shoreline data, there are 12 suggested "waterbodies (lakes, wetlands, etc)" present in the County that are 20 acres or greater. These lakes are identical to those listed in the County's current SMP, with the possible exception of "Across Highway Lake." That lake was not found in the data, nor could it be located in an online search. Ecology's data include Duck Lake, which was not previously listed in the County's SMP. It is possible that the lake has had two different names over time.

OTHER JURISDICTION OPTIONS

The information above describes assembly of the minimum shoreline jurisdiction. The County, Cities and Towns may further elect to expand jurisdiction to include 1) all or

part of the 100-year floodplain, and/or 2) buffers of associated wetlands[1] that would otherwise encompass areas outside of shoreline jurisdiction. Under either of these options, the area of shoreline jurisdiction increases and additional properties or areas of properties would be subject to the SMP and its additional layer of permitting requirements. These options should be considered by each jurisdiction.

Floodplain

The 100-year floodplain option is illustrated by a bright aqua boundary that encompasses the minimum shoreline jurisdiction and the remaining floodplain that is beyond the 200 feet of floodplain adjacent to floodways. The resulting optional jurisdiction is illustrated on the *Minimum Shoreline Jurisdiction* exhibit. This option increases the total area of jurisdiction by 6,607 acres (a 27% increase), most of which is found along Union Flat and Pine Creeks and the Palouse and Snake Rivers.

Use of this option would allow for maximum integration and consistency of the SMP with Whitman County Municipal Code Chapter 19.50: Flood Management Overlay District, and similar codes for each City and Town.

Wetland Buffers

The attached maps do not depict the expansion of shoreline jurisdiction to include wetland buffers. Classification of associated wetlands, which would ultimately determine the regulatory buffer, has not been conducted and would be done on a site-by-site basis at the time of a development application.

RCW 36.70A.480(6) says "If a local jurisdiction's master program does not include land necessary for buffers for critical areas that occur within shorelines of the state, as authorized by RCW 90.58.030(2)(f), then the local jurisdiction shall continue to regulate those critical areas and their required buffers pursuant to RCW 36.70A.060(2)." Ecology's SMP Handbook chapter on Shoreline Jurisdiction explains the implications of this RCW as follows:

> If the local government chooses not to extend its shoreline jurisdiction under *RCW 90.58.030(2)(f)(ii),* the CAO will protect the entire critical area and its buffers (see *RCW 36.70A.480(6)).* The CAO will continue to apply to the entire critical area and its buffers, even after SMP approval. However, the SMP will <u>also</u> apply

[1] The RCW actually allows for expansion of jurisdiction to include *critical area* buffers, not just wetland buffers. However, this generally is limited to wetland buffers in practice. The nature of non-shoreline streams as a mostly perpendicular element to a shoreline waterbody already brings their full buffer into shoreline jurisdiction. Geologically hazardous areas are generally assigned a setback, not a buffer. Critical aquifer recharge areas (CARAs) are not addressed in the SMA or SMP Guidelines, and CARAs further are not assigned a setback or a buffer.

to the portion(s) of the critical area and its buffers that lie within shoreline jurisdiction. This means the subject critical area and some or all of its buffers will have "dual coverage" with regulation by both the SMP and the CAO.

Please call if you have any questions.

Sincerely,

Amy Summe
Environmental Planner

Enclosures

Memo

To: Jeremy Sikes, Shoreline Planner, SEA ERO
Jaime Short, Shoreline Planner, SEA,ERO
From: Patricia L Olson, Senior Hydrogeologist, SEA, HQ
CC: Sara Hunt, ERO SEA Program Manager
Brian Lynn, Coastal Zone and Shorelines Unit Manager, SEA, HQ
Date: January 24, 2014
Re: Jurisdiction determination request for Four-mile and Cottonwood Creeks, Whitman County

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SMP Jurisdiction determination: Fourmile and Cottonwood Creeks, Whitman County

Jeremy Sikes requested assistance in determining if Fourmile and Cottonwood Creeks are in SMP jurisdiction. The most recent USGS study that estimates the upper SMP jurisdiction points (Higgins 2003) identifies Cottonwood Creek and Fourmile Creek as SMP streams. Other questions relate to Union Flat Creek and Latah/Hangman Creek and their status.

Summary

Union Flats and Latah/Hangman Creeks are SMP streams. Union Flats MAF is 37.1 cfs at the gaging station and an estimated 29.6 cfs at the SMP jurisdiction point. The MAF for Latah/Hangman Creek is 76.8 as measured at the USGS gage on Washington side of border between Washington and Idaho (Figure 1). Both are on the SMP_ARC GIS layer which has the streams listed in the SMA. They are not on the suggested SMP stream GIS layer which caused some confusion. During the Phase 1 of SMP updates, the SMP jurisdiction area has to be determined. The communities or their consultants need to be reminded to look at both GIS layers.

Three USGS regression equations developed to estimate mean annual flow (MAF) were initially used in this analysis to estimate MAF for Fourmile and Cottonwood Creek:

1) Determination of upstream boundary points on southeastern Washington streams and rivers under the Requirements of the Shoreline Management Act of 1971 (Higgins 2003)
2) NHDPlus v2, Enhanced Runoff Method (EROM) http://www.horizon-systems.com/nhdplus/NHDPlusV2_documentation.php
3) NHDPlus v2, Vogel http://www.horizon-systems.com/nhdplus/NHDPlusV2_documentation.php

The regression equations' results were compared with long term continuous discharge data from USGS gages (Table 1). The estimates were not consistent. The Higgins (2003) regression equations MAF estimates were closer to MAF from USGS gage data than EROM or Vogel. The latter two regressions appear to overestimate MAF considerably (Table 1).

I used additional analyses because the MAF estimates from the 3 USGS regression methods were not similar enough to support decisions. The additional analyses are described in more detail under the Methods section.

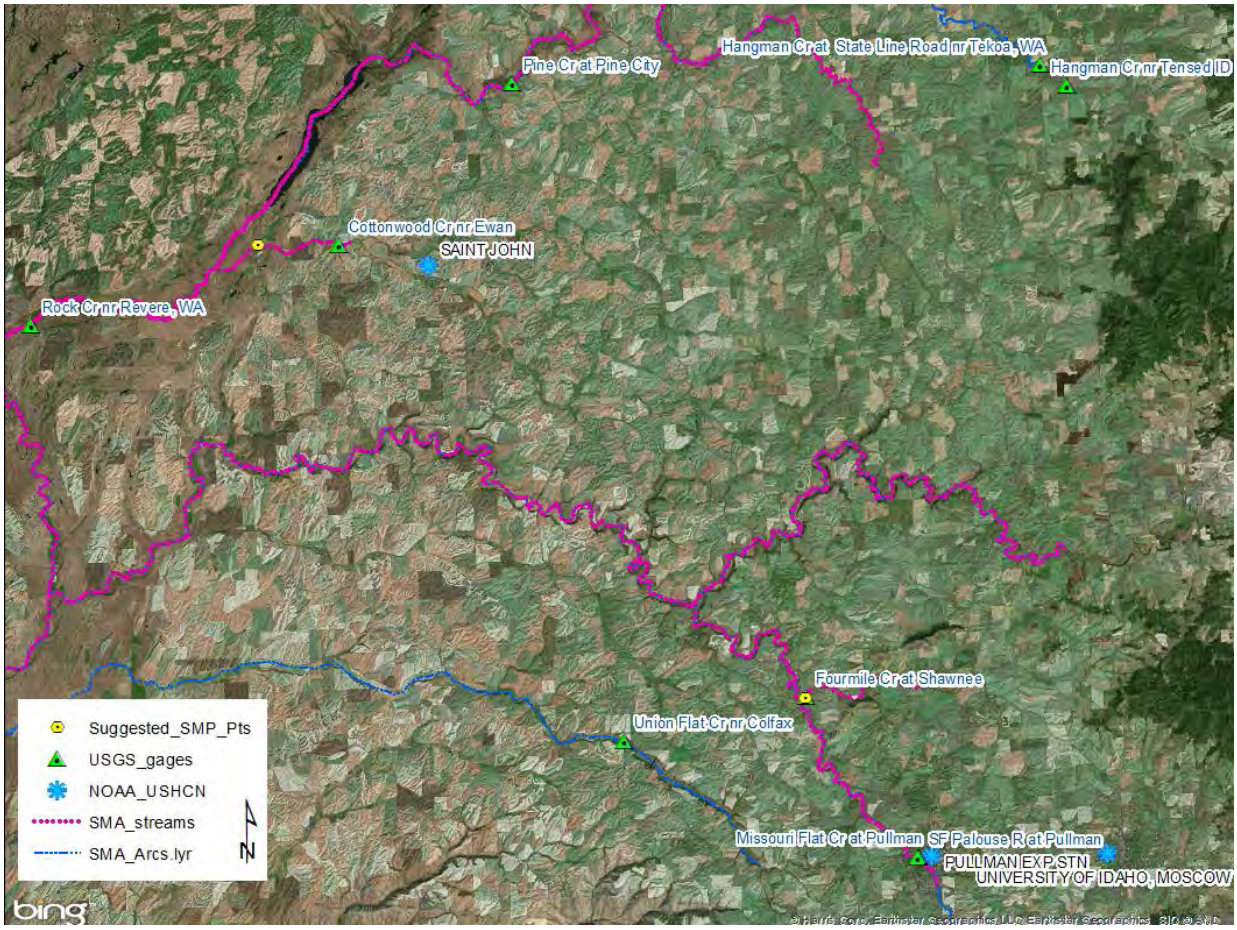


Figure 1: This map shows the USGS gages and NOAA US Historical Climate Network precipitation gages used in the analysis. SMA_streams are the layer that has suggested jurisdiction points and SMA_Arcs are the streams listed in the SMA. Both need to be used to identify jurisdiction. The yellow circles show suggested SMP upstream jurisdiction points based on this analysis.

Three USGS regression equations developed to estimate mean annual flow (MAF) were initially used in this analysis to estimate MAF for Fourmile and Cottonwood Creek:

4) Determination of upstream boundary points on southeastern Washington streams and rivers under the Requirements of the Shoreline Management Act of 1971 (Higgins 2003)
5) NHDPlus v2, Enhanced Runoff Method (EROM) http://www.horizon-systems.com/nhdplus/NHDPlusV2_documentation.php
6) NHDPlus v2, Vogel http://www.horizon-systems.com/nhdplus/NHDPlusV2_documentation.php

The regression equations' results were compared at gaged locations including gages with long term continuous discharge data (Table 1, Figure 1). The estimates were not consistent. The Higgins (2003) regression equations MAF estimates were closer to measured MAF than EROM or Vogel. The latter two regressions appear to overestimate MAF considerably (Table 1).

I used additional analyses because the MAF estimates from the 3 USGS regression methods were not similar enough to support decisions. The additional analyses are described in more detail under the Methods section.

Recommendations

Fourmile Creek likely is a SMP stream but not at the suggested SMP jurisdiction point. The data doesn't supply enough information to know where the point is located. Regression analysis between Fourmile Creek discharge data and SF Palouse discharge data provide additional information to identify the jurisdiction point. The estimates suggest that the lower reach from the confluence to the inactive gage likely meets the criteria (Figure 1, Table 1). In this reach, the streamflow is augmented by groundwater (Sinclair and Kardouni 2009). This flow may not have been measured by the limited gage records because groundwater discharge to Fourmile Creek during dry months (in this case August) occurs just downstream of the gage (K Sinclair personal communication 12/2013).

Cottonwood Creek has very little data. The USGS operated a non-continuous monitoring gage from 11/30/64-1/30/65 for measuring suspended sediment downstream of suggested SMP point on Cottonwood Creek (Figure 1). Since the primary interest was suspended sediment, discrete discharge measurements were mostly measured during higher flow periods The USGS also had a non-continuous gage on Rock Creek (Figure 1). Discrete discharge measurements covered low, normal and high flows. Pine Creek had a continuous USGS gage from 1962-1975 (Figure 1). The Pine Creek and Rock Creek data plus EROM regression equation the MAF at the gage location is 19 cfs (Table 1). The data suggests that the SMP point lies between the USGS gage and the confluence with Kamiche Creek. Since the precipitation station near Cottonwood Creek suggests a downward trend which may affect streamflow I suggest the point to be at the confluence with Kamiche Creek.

Data in for these 2 streams are very limited. The analyses done to estimate upper jurisdiction point are accepted hydrologic methods without doing more intensive hydrologic runoff modeling. However, if there is real current discharge data with adequate years (at least 2 years of dry, 2 years of normal and 2 years of wet conditions but preferably 10 years) then these should be used.

METHODS AND RESULTS

Union Flats Creek and Latah/Hangman Creek

The SMP jurisdiction on these two streams is straightforward. Union Flat and Latah/Hangman Creeks were designated as SMA streams in 1971. The USGS study (Higgins 2003) does not include them because they were already on the SMA list. However, the SMA_Arc_Suggested GIS layer does not have these 2 streams in the database. They are in the SMA_Arc GIS data because they were in the SMA lists. But local communities or their consultants may only use the GIS data for identifying SMP jurisdiction. The SMA_Arc layer and SMA_Arc_Suggested layer should be merged again so there are not missing SMP streams in the SMA_Arc_Suggested database. Also both layers should be consulted in identifying jurisdiction.

The mean annual flow for Union Flat Creek near Colfax is 37.1 cfs (USGS 13350500 Union Flat Creek near Colfax, WA streamflow gage, Figure 1). The USGS gage record is from water year 1954-1971. Three U.S. Historical Climatology Network (USHCN) stations —station WA45678 at Washington State University, Pullman, station ID106152_6675 at the University of Idaho at Moscow, and station WA457267_6208, Saint John's were also consulted (Figure 1). Yearly precipitation at these stations indicates that water years 1954-

71 were greater than the average annual precipitation at Pullman but lower at Moscow and Saint John's stations (Table 1).

Mean annual flow at Latah/Hangman Creek at the state line between Washington and Idaho is 76.8 (USGS 12422990 Hangman Creek at State Line Road near Tekoa, WA). The gage record is from 2007-2013. An upstream gage in Idaho (USGS 12422950 Hangman Creek near Tensed ID) has a mean annual flow of 85.6 cfs for 1982, 1989-90 (Figure 1).

Fourmile Creek

Fourmile Creek is a tributary to the South Fork Palouse River. The USGS study for identifying upper SMP jurisdiction (Higgins 2003) suggests that the SMP jurisdiction point is at river mile 7.1. A USGS gage (USGS 13349000 Fourmile Creek at Shawnee, WA) was located 0.5 miles upstream from the confluence (Figure 1). The gage operated from 4/1/1934-09/30/1940 with 6 concurrent water years (WY—Oct 01-Sept 30). Using only complete water years (WY 1935-40) the mean annual flow (MAF) was 14.9 cfs.

Fourmile Creek hydrologic characteristics, like other streams in this area, are spiky with the ratio of maximum daily flows to MAF >29. Greater than 82% of total flow occurs from January- April 15 (Figure 2). Fourmile Creek average discharge for January- April 15 is 49 cfs. This type of hydrologic regime can be misleading on identifying the location of 20scfs MAF point if only aerial photos (mostly taken during low flow periods) and or on ground observations made between mid April to early January are used. For example, the SF Palouse River at Pullman MAF is 39.1 cfs. However the mean flow for April and December 31 is 14 cfs (Figure 2).

Since Fourmile Creek has only a short gage record other information was used to evaluate the stream's MAF in relation to longer records. Other data include additional USGS regression equations (EROM and Vogel), precipitation, and discharge data from nearby USGS continuous, long term gages. Information from studies related to surface and groundwater interactions in this area were considered. Groundwater discharge to Fourmile Creek has been observed below the inactive gage location. Studies for the SF Palouse TMDL show that the reach by Fourmile Creek just downstream of the gage location is a gaining reach during low flow conditions (Sinclair and Kardouni 2009; personal comm. with K. Sinclair 12/13/2013). The Airborne Thermal Infrared Remote Sensing study (Watershed Sciences 2006) shows that the SF Palouse stream temperature during late July 2005 decreases in the Fourmile confluence reach which is a signal for groundwater discharge.

Precipitation data from two USHCN weather stations—NOAA station ID WA45678_1878 at Washington State University, Pullman and NOAA Station ID106152_6675 at the University of Idaho, Moscow were used to determine if the gage record for Fourmile Creek occurred during a wet, normal or dry period (data from USHCN http://cdiac.ornl.gov/epubs/ndp/ushcn/state_WA.html). The University of Idaho station is approximately 7 miles east of Pullman and is representative of Fourmile Creek's headwater precipitation (Figure 1).

The precipitation data suggests that the Fourmile Creek discharge data were collected during a dry period (Table 1, Figure 3a, b). For example, the Pullman weather station precipitation data based on water year had an average annual precipitation of 17.4 inches for WY 1935-1940. The long term average annual precipitation is 20.6 inches. During WY

1935-1940, the deviation from mean annual precipitation ranged -4.7 to -1.1 inches (Figure 3a).

Because there was not a mix of dry, wet and normal years the Fourmile Creek discharge data is not representative of mean annual flow for SMP jurisdiction purposes. For SF Palouse River and Missouri Flat Creek gages the average discharge during water years 1935-1940 was lower than the long-term MAF by approximately 30% (Table 1). Precipitation records at Pullman don't indicate any trend in precipitation (Figure 3a). However, precipitation records representative of Fourmile Creek headwaters indicate an upward trend in precipitation (Figure 3b, Table 1). An upward trend in precipitation may lead to increased runoff in Fourmile Creek headwaters.

Table 1: Average annual precipitation from the NOAA USHCN gages and MAF at USGS gages are shown for different time periods to identify wet, normal (all years), and dry periods (Figure 1). Three different USGS regression equations were used to estimate MAF (cfs) at the USGS proposed SMP jurisdiction points and at USGS gage locations. The regression estimates are variable between methods but generally Higgins (2003) method is closer to MAF at gages. Cottonwood Creek is separated because it has a somewhat different hydrologic regime that is more like Pine Creek. The acronym <u>na</u> means data not available or not applicable.

	Average Precipitation (in) by WY			MAF (cfs)				
WY	Pullman, WA	Moscow, Id	St John's, WA	SF Palouse	Missouri Flats	Fourmile	Union Flat	Cottonwood
1935-40	17.4	19.7	18.6	28	6	14.9	na	na
1954-1971	22.2	23.1	19.4	36 [1]	7.4 [1]	na	37.1	na
1961-1981	20.1	25.4	19.4	43	9.2	na	na	na
2002-2012	19.9	27.24	18.4	39.6	na	na	na	na
Total record	20.6	23.9	19.7	39.1	8.5	na	37.1	na
Three USGS developed regression estimates for MAF were used to calculate MAF at SMP jurisdiction points								
Higgins 2003				26.9	na	20.0	29.6	26.6
EROM				47	na	27	74.5	17
Vogel				47	na	28	82.5	33
Regression equation estimates at USGS gage locations (Figure 1)								
USGS gage discharge				39.1	8.5	14.9	37.1	na
Higgins 2003				40.6	5.9	20.5	32.7	26.8
EROM				67	12.2	33	78.2	17.3
Vogel				72	13.2	36	78.3	33.5
Regression with SF Palouse				na	na	22.6	na	na
Cottonwood Creek: Median inches of runoff per square mile extrapolated from Pine and Rock Creek data converted to cfs								
Suggested SMP point				na	na	na	na	18.2
USGS gage				na	na	na	na	18.9
Confluence with Kamiche Ck				na	na	na	na	23.4

[1] SF Palouse and Missouri Flats record doesn't include 1952-1960.

Since Fourmile Creek discharge data were collected during a drier precipitation period regression analyses were used to extend the Fourmile Creek data. Two USGS streamflow gaging stations in close proximity to Fourmile Creek were operating during the same period as Fourmile Creek (Figure 1). The 2 stations are USGS 13348000 South Fork Palouse River at Pullman, WA, 40 years of record (1934-02-01 -09/30/42, 01/01/1960-09/30/1981; 05/25/2001 to present); and USGS 13348500 Missouri Flat Creek at Pullman WA, 25 water

years of record (02/01/1934-09/30/42-10/03/1979)daily data and 1934-1980 annual data by water year (WY). The discharge data were normalized by converting cfs to inches of runoff per unit area. Normalization allows comparison between different sized watersheds and provides regression equation(s) that can be applied to any stream point based on drainage area above the point.

Even though the sample size (6 years) to compare Fourmile Creek discharge with the 2 other gages is small both gages have good linear relationships with Fourmile Creek (Figure 4). In order to check if the relationship holds for a larger data set, a linear regression analysis was done between the daily mean flow for Fourmile Creek and SF Palouse. There is a significant linear relationship with an adjusted r^2=0.91, SEE=3.5 (cfs), p<0.001.

SF Palouse River regression relationship with Fourmile Creek was used to estimate mean annual discharge. SF Palouse data were used because the gage is still operating and the gage has a longer discharge record than Missouri Flat Ck. The results of regression analysis are similar for both gages (Figure 4). Runoff estimated by the regression equation between SF Palouse and Fourmile Creek was converted to mean annual discharge for points along Fourmile Creek using watershed area above the point. The mean annual discharge estimates suggest that the SMP upstream jurisdiction point is located at the USGS gage location (Table 1, Figure 1).

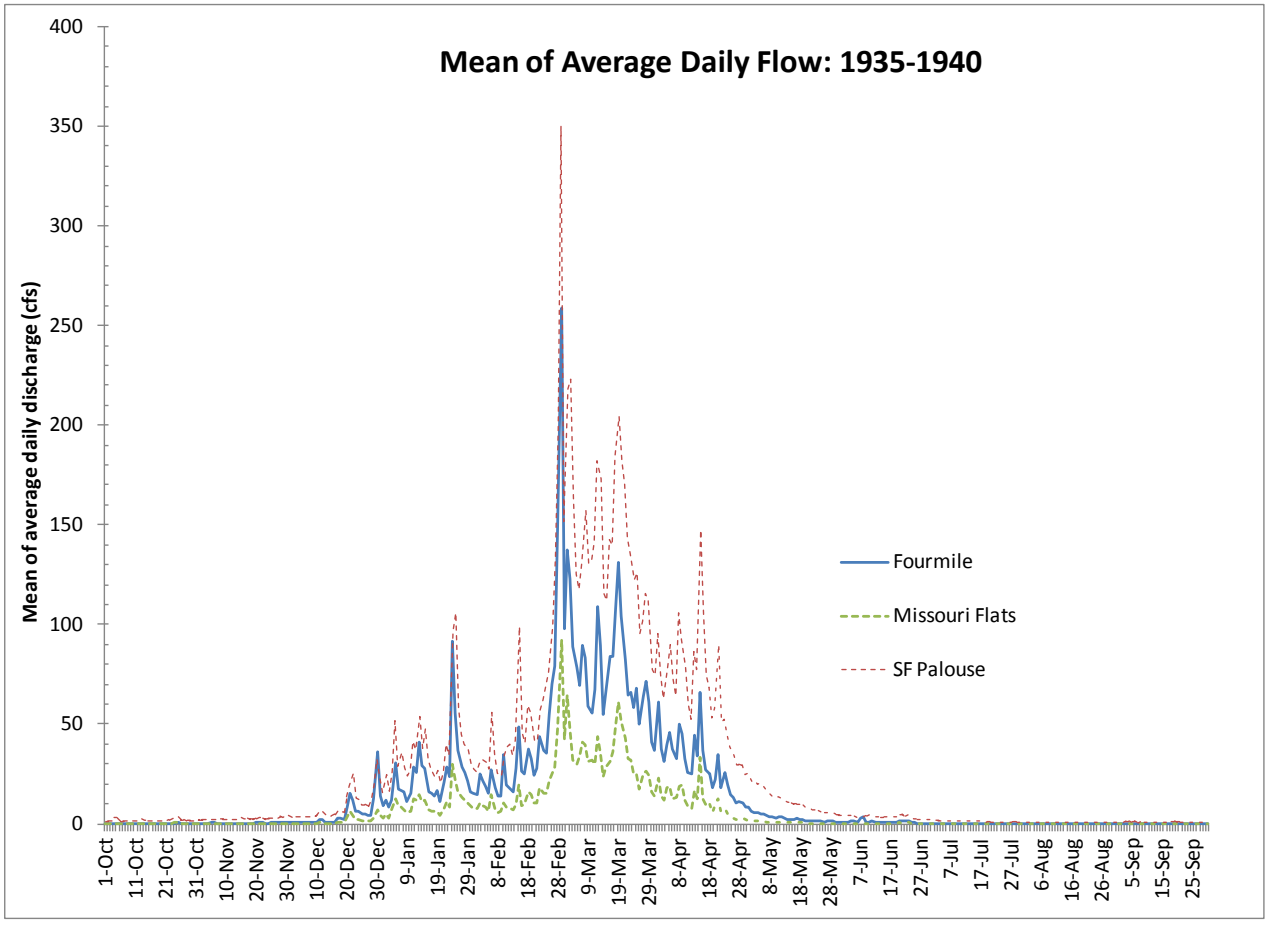
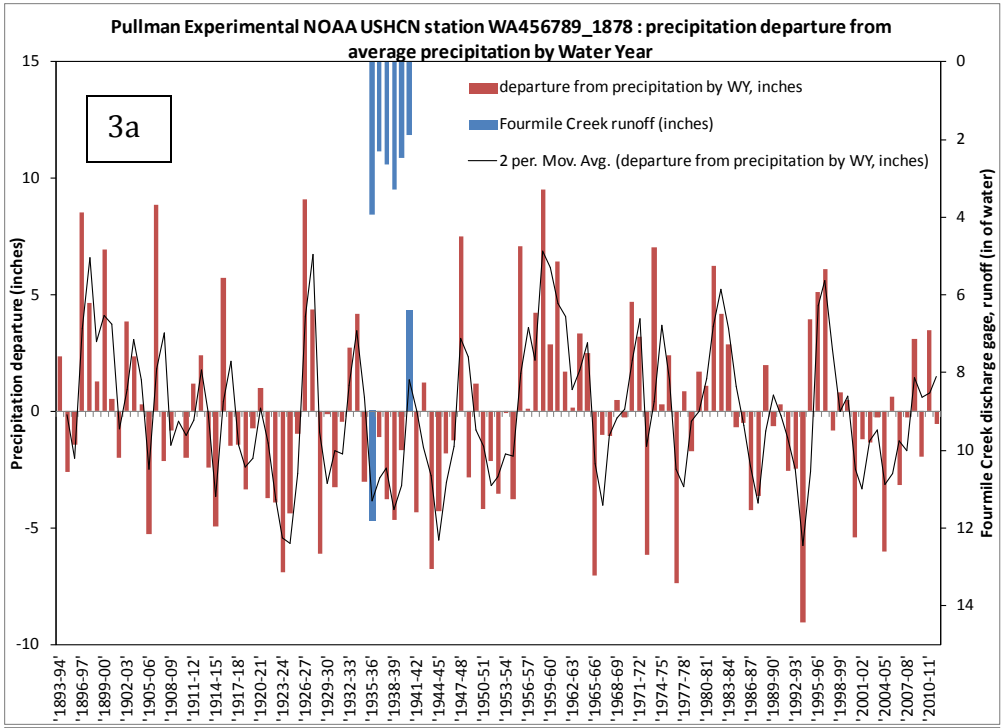
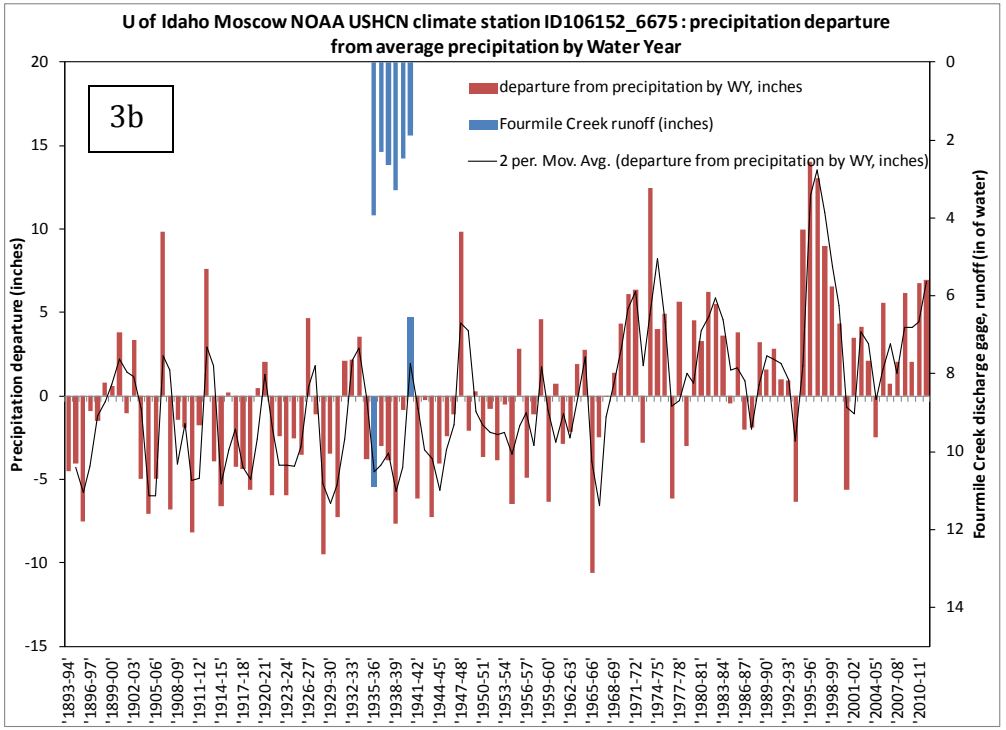


Figure 2: Mean of the average daily discharge at Fourmile Ck (USGS 13349000), Missouri Flats Ck (USGS 13348500) and SF Palouse R (USGS 13348000). The mean values are based on flow from 1935-1940. The hydrographs show that the hydrologic regimes and response to precipitation are similar. Station locations are shown on Figure 1. .





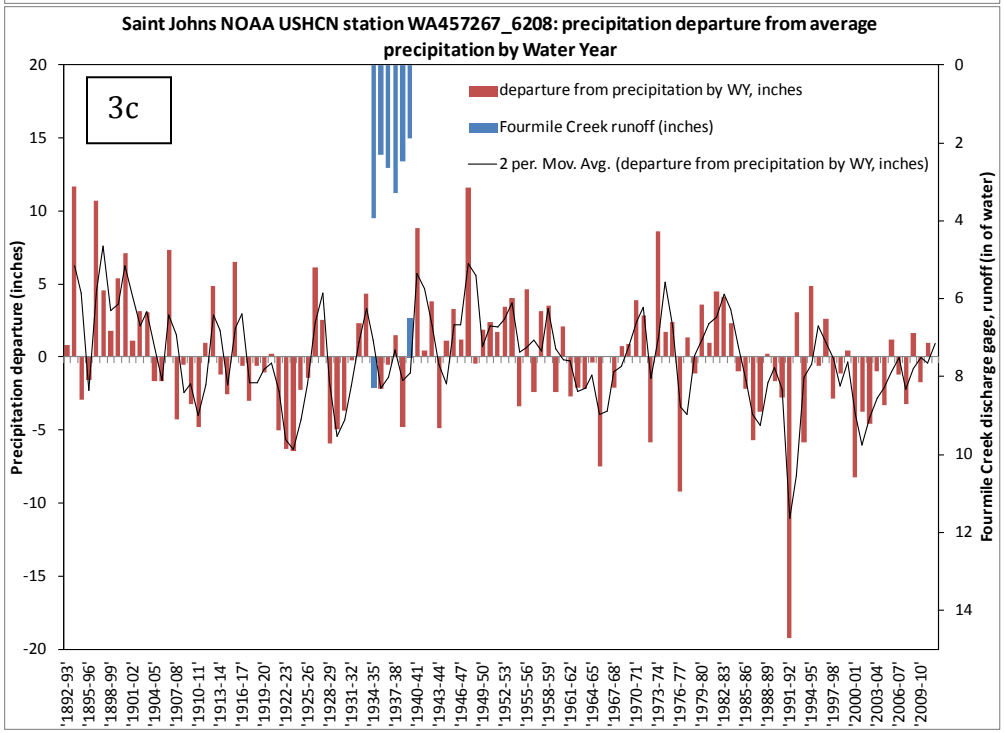


Figure 3: Graphs show annual precipitation departure from the long-term mean annual precipitation for three NOA USHCN climate stations located near Fourmile Creek, 3a and 3b, and Cottonwood Creek 3c. The black lines are 2 period moving average which smoothes some of the variability making dry and wet periods more visible. The top axis (blue bars) is average annual discharge as inches of runoff per unit area. The precipitation departure bars are red except those that coincide with Fourmile Creek discharge record (1935-40). Those are blue. The Pullman Experimental station (3a) and U of Idaho, Moscow station (3b) graphs show that precipitation was less than normal for the Fourmile Creek discharge record. The Pullman precipitation records don't show any downward or upward trend in precipitation. However, the U of Idaho, Moscow Station (3b) indicates an increase in precipitation (upward trend). This station is representative of precipitation in the headwaters of Fourmile Creek. Increasing precipitation may cause an increase in streamflow. The Saint John's station (3c) precipitation is representative of precipitation patterns in lower Cottonwood Creek watershed (Figure 1). There appears to be a slight downward trend in precipitation at this station.

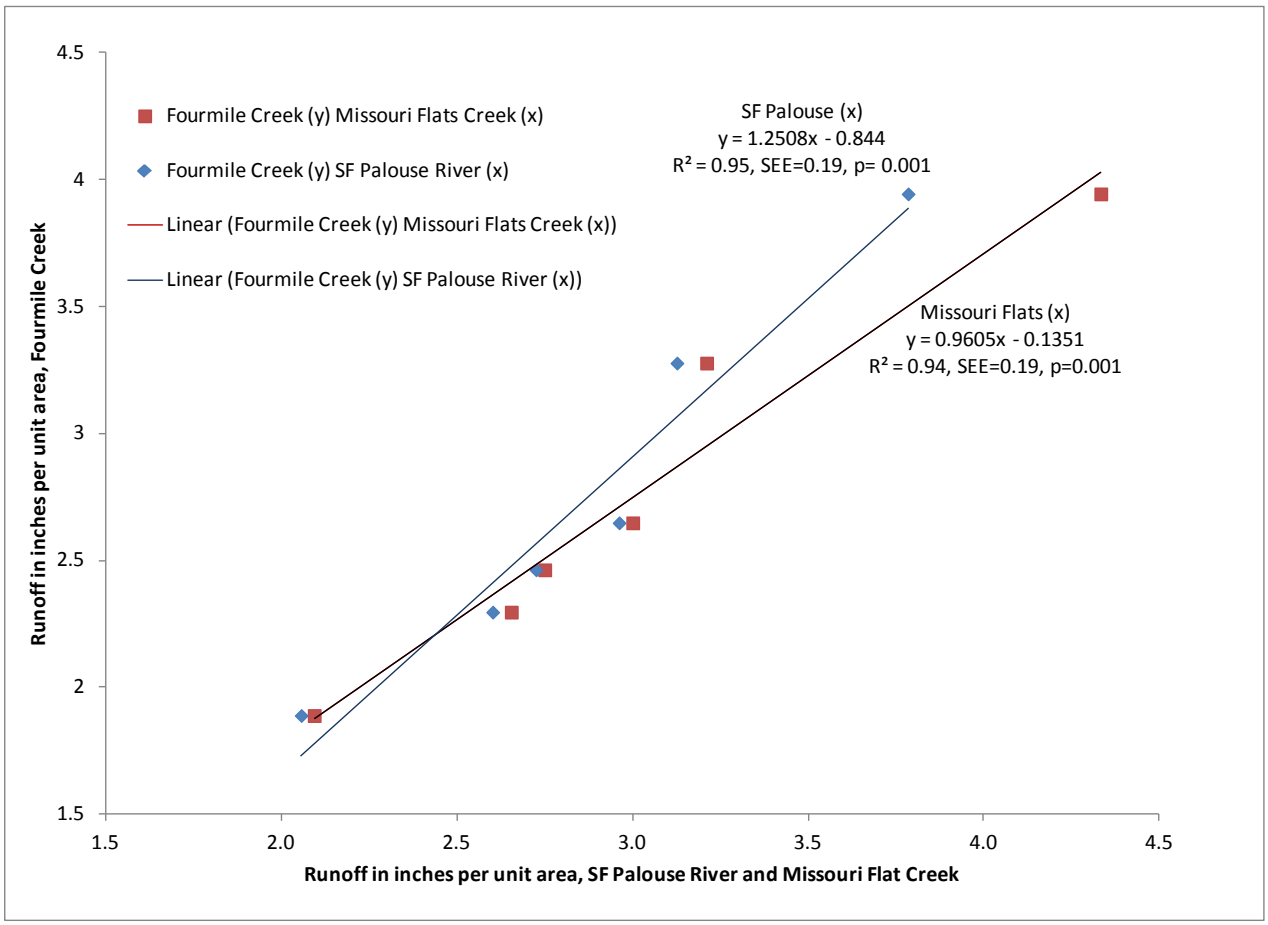


Figure 4: This graph illustrates the strong liner regression relationships between Fourmile Creek and the SF Palouse River and Missouri Flat Creek. SEE is the standard estimate of error for the regression equation in inches of runoff. P is the probability associated with the regression equation. The probability is much less than 0.05 (standard) suggesting that equation is significant. The regression equation results are given in inches of runoff per unit area so that discharge can be calculated given drainage area above a stream point. Conversion of run off to discharge (cfs) is: $\frac{Drainage\ area\ above\ pt\ (sq\ mi)\times 5280\ (ft)^2\times runoff\ (inches)}{(12\ ft\times 3600\ secs\times 24\ minutes\times 365\ days)}$**. The standard error is approximately ± 1 cfs about the mean.**

Cottonwood Creek

There is not much data for Cottonwood Creek. The stream characteristics are more similar to Pine Creek than SF Palouse River. The USGS had a sediment sampling gage on Cottonwood Creek (Figure 1) but only discrete discharge measurements were measured from 11/30/64-3/15/65. The purpose of the gage was to measure sediment load so discharge was mostly measured during high flow. There were some miscellaneous discharge measurements on Rock Creek from 3/20/2001-9/2/2008 (Figure 1). The measurements included low to high flow months. The average flow from this data was 134.2 cfs.

Since there is little data, I extrapolated runoff per unit area from Pine Creek. I used the median runoff value from Pine Creek because the annual precipitation from Saint John's NOAA, USHCN station located near Cottonwood Creek (Figure 1, Figure 3c) appears to have a slight downward trend. Medians are not as sensitive to slight trends as average values. The available discharge data were measured on Pine Creek when precipitation appeared to have no obvious trend (Figure 3c, 1962-1975). The median unit runoff for Pine Creek is 2.31 inches. The average unit runoff for Rock Creek is also 2.31 inches. Since there was

agreement this runoff value was used to estimate a SMP point on Cottonwood Creek (Table 1). The analyses indicate that the 20 cfs point is close to Cottonwood and Kamiche Creek confluence.

REFERENCES

Higgins, J.L., 2003, Determination of upstream boundary points on southeastern Washington streams under the requirements of the Shoreline Management Act of 1971, USGS Water-Resources Investigations Report 03-4042, Tacoma, WA.

Sinclair, K. and J. Kardouni, 2009, Surface-water/groundwater interactions and near-stream groundwater quality along the Palouse River, South Fork Palouse River, and Paradise Creek, Ecology Publication Number 09-03-007 https://fortress.wa.gov/ecy/publications/SummaryPages/0903007.html .

Watershed Sciences, 2006, Airborne Thermal Infrared Remote Sensing Palouse River Basin, WA/ID, *Submitted to:* Washington Department of Ecology Environmental Assessment Program and City of Moscow, Water Department, Moscow, ID.

APPENDIX B

SHORELINE INVENTORY MAP FOLIO (ONLINE AT WWW.WHITMANCOUNTYSMPUPDATE.COM OR ON DVD)

APPENDIX C

SHORELINE INVENTORY DATA SOURCES

Table C-1. Shoreline Inventory Elements and Information Sources.

Inventory Element	Information Gathered	Data Source(s)	Assumptions/Limitations
Physical Setting			
Surficial Geology (Map 12)	Geologic classifications	WA Department of Natural Resources, Division of Geology and Earth Resources, Surface Geology	• Based on broad-scale geologic classifications • Useful for broad-scale assessment of geologic conditions • Not to be used in place of site-specific studies
Soils (Map 13)	Soil types	USDA NRCS (SSURGO)	• Based on broad-scale soil mapping • Useful for broad-scale assessment of soil conditions • Not to be used in place of site-specific studies
Land Use/Development			
Land Use Patterns	Current land use (Map 2)	Washington Department of Ecology	• Gross-scale characterization (e.g., residential, agriculture) • Useful in assessing existing intensity and type of development at broad-scale planning level • Spot-checks of mapped use with the aerial photos showed a high level of accuracy • Data may not be up-to-date
	Future land use (Map 3)	County/City/Town zoning	• Useful to anticipate future land use changes at broad-scale planning level • Some of the original map files provided were PDFs or CAD – converted by TWC to GIS format • Data/map was not made available for Rosalia and Malden
	Water-oriented uses (Map 5)	• County assessor • Port of Whitman County • Aerial photos • County/City/Town and public input	• Map was generated by compiling known Port-owned properties and public access features, as well as shoreline modifications such as dams • Mapping will be further refined as part of analysis
Ownership (Map 4)	Land ownership for parcels within shoreline jurisdiction	• Washington Department of Natural Resources • Port of Whitman County	• Land ownership data from DNR is available for publicly managed lands only. • Limited additional data was available for other areas - data gap.
	• Highways • Railroads	WA Department of Transportation	

Inventory Element	Information Gathered	Data Source(s)	Assumptions/Limitations
Transportation (all maps)	Other Roads	County	
Stormwater/ Sewer facilities	NA	NA	Data not available - data gap
Water Supply	NA	NA	Data not available - data gap
Impervious Surfaces (Map 7)	High-, medium-, and low-intensity land cover areas from USGS land cover map	US Geological Survey National Land Cover Data (NLCD)	• Useful for broad-scale assessment of impervious surfaces only. • Data aggregated to a 30-meter grid
Land Cover (Vegetation) (Map 8)	• Land cover • Vegetation type	US Geological Survey National Land Cover Data (NLCD)	• Data aggregated to a 30-meter grid • Useful for broad-scale assessment of vegetation coverage only • Not useful for accurate characterization of fine-scale data (e.g., parcel level, species composition)
Shoreline Modifications (Map 18)	Levees	WA Department of Ecology	Modifications were made to the levee locations based on aerial photos (USDA NAIP, 2013).
	Overwater structures	WA Department of Natural Resources	• Overwater structures includes piers, bridges, dams • Data may not be up-to-date • Not useful for accurate characterization of fine scale data (e.g., parcel level)

Inventory Element	Information Gathered	Data Source(s)	Assumptions/Limitations
Public Access Areas (Map 6)	• Parks • Open space • Trails • Launches • Campgrounds • Off-highway vehicle areas	• Recreation and Conservation Office (RCO) • County/City/Town maps and plans (including zoning, Whitman County Parks and Recreation Comprehensive Plan 2004-2009) • Washington State Parks • www.traillink.com (digitized by TWC) • Department of Natural Resources • Washington/Oregon Bureau of Land Management	Mapping will be further refined as part of analysis.
Historical/ Archeological/ Cultural Sites (Map 22)	• Historical sites • Archeologically significant sites	WA Department of Archaeology and Historic Preservation	Data represent only known sites; additional, presently unknown sites may exist
Critical Areas/Other Ecological Conditions			
Geologically hazardous areas (Map 14)	Geohazards	• Washington Department of Natural Resources, Geology and Earth Sciences Division • US Geologic Survey	• Useful for broad scale assessment of geologically hazardous areas • Requires site-specific review to verify presence/absence of geohazards
Channel migration zone (CMZ) (Map 21)	Channel Migration Zone data was not available for shorelines within Whitman County. Instead, the 100-year floodplain is being used as a proxy for the CMZ extent, with modifications made by TWC per WAC 173-26-221(3)(b).		
Frequently flooded areas (Map 9)	• Floodplains • Floodways	Federal Emergency Management Agency (FEMA) Q3, 1 May 1980	• Floodplain and floodways based on federally established models • Features in the FEMA Q3 (1981) dataset were manually realigned to better reflect the published Flood Insurance Rate Maps (FIRMs) and to agree with other data

Inventory Element	Information Gathered	Data Source(s)	Assumptions/Limitations
			• May be used at site scale, although further refinement at site scale may also be desired
Wetlands (Map 10)	• Potential wetlands • Hydric soils	• US Fish and Wildlife Service National Wetland Inventory (NWI) • USDA NRCS (SSURGO)	• Useful for broad scale assessment of potential wetlands • Original NWI mapping based on interpretation of multi-spectral imagery and ground truthing • Many wetlands are not identified by NWI; mapped wetlands may not meet wetland criteria • Not to be used in place of site-specific studies
Surface Water System (Map 11)	• Streams, lakes • Seeps, waterfalls, and other hydrologic features • Gages and other monitoring points	• USGS National Hydrography Dataset	• Data may not reflect changes to surface water flow due to modifications of topography surface or other factors. • Data is prepared at large map scale. Features may not be accurately depicted at smaller scales.
WDFW Priority Habitats & Species (Maps 15-17)	• Priority fish • Priority wildlife • Priority habitats	WA Department of Fish and Wildlife	• WDFW maps do not capture every priority species location or habitat, particularly for rare species or species that use shoreline habitats seasonally or intermittently • Absence of mapping information does not indicate absence of a particular species • The number of documented species may reflect the relative amount of past survey efforts • New data will need to be obtained at the time of project application
Other wildlife and habitat areas	• Bird habitat conservation areas • Ecologically important areas	US Bureau of Land Management	• Data is prepared at statewide map scale. Features may not be accurately depicted at smaller scales. • Data may not be up-to-date
Aquifer Recharge Areas	NA	NA	Data not available - data gap

Inventory Element	Information Gathered	Data Source(s)	Assumptions/Limitations
Water quality impairment (Map 19)	303(d) waters and regulated sites	WA Department of Ecology	• Water quality impairments are based on monitoring at specific locations • Impairments may extend beyond the mapped area
Environmental Cleanup Sites (Map 20)	• Cleanup sites • Leaking underground storage tanks	WA Department of Ecology	Data is prepared at statewide map scale. Features may not be accurately depicted at smaller scales.
Restoration opportunities (Future map in Analysis Report and Restoration Plan)	Site-specific and general projects	• Watershed Plans • Subbasin Plans • Tribes • Whitman Conservation District • Palouse Conservation District • Pine Creek Conservation District • Palouse-Rock Lake Conservation District • Palouse-Clearwater Environmental Institute • County/City/Town and public input	

APPENDIX D

SUMMARY OF SHORELINE INVENTORY BY REACH

Appendix D. Summary of Shoreline Inventory by Reach.[1]

Reach	Unit Area (Acres)	Shoreline Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
Alkali Lake	39.6	5,570	Zoning: Agricultural-100 Current Land Use: Agriculture- 100 (not classified under current use law)	Federal-100 (Bureau of Reclamation)	Emergent Herbaceous Wetlands- 23.9 Open Water- 2.9 Shrub/Scrub- 71.2 Woody Wetlands- 1.4	0 OWS, 0% levees	none	Wetlands: 41.0% Priority Habitats and Species: *Regions*- Bald Eagle, 100% Mule Deer, 100% Water Quality Listings: none
Crooked Knee Lake	98.4	13,800	Zoning: Agricultural-100 Current Land Use: Agriculture- 100 (not classified under current use law)	State- 85.9 (Department of Natural Resources- 80.5 Parks and Recreation Commission-5.4)	Developed, Open Space-2.6 Emergent Herbaceous Wetlands- 46.9 Evergreen Forest- 6.5 Open Water- 15.4 Shrub/Scrub- 23.7 Woody Wetlands- 4.8	0 OWS, 0% levees	Floodplain- 24.6	Wetlands: 58.3% Priority Habitats and Species: *Regions*- Prairies and Steppe, 39.5% Waterfowl Concentrations, 60.5% Water Quality Listings: none
Duck Lake	34.1	5,568	Zoning: Agricultural-100 Current Land Use: Agriculture- 100 (not classified under current use law)	No data	Developed, Open Space- 8.2 Emergent Herbaceous Wetlands-36.9 Evergreen Forest- 10.6 Open Water- 4.9 Shrub/Scrub- 39.4	0 OWS, 0% levees	Floodplain-2.4	Wetlands: 34.8% Priority Habitats and Species: *Regions*- Mule Deer, 100% Prairies and Steppe, 100% Water Quality Listings: none
Folsom Lake	130.6	21,284	Zoning: Agricultural-100 Current Land Use: Agriculture- 100 (not classified under current use law)	State-100 (State Parks and Recreation Commission)	Cultivated Crops-14.3 Emergent Herbaceous Wetlands-38.2 Open Water- 3.4 Shrub/Scrub- 44.1	0 OWS, 0% levees	Floodplain- 12.2	Wetlands: 53.3% Priority Habitats and Species: *Regions*- Prairies and Steppe, 89.7% Waterfowl Concentrations, 10.3% Water Quality Listings: none
Lavista Lake	48.8	4,163	Zoning: Agricultural-100 Current Land Use: Agriculture- 100 (not classified under current use law)	No data	Emergent Herbaceous Wetlands-22.7 Evergreen Forest- 46.3 Shrub/Scrub- 28.2 Woody Wetlands- 2.0	0 OWS, 0% levees	Floodplain- 63.1%	Wetlands: 74.1% Priority Habitats and Species: *Regions*- Bald Eagle, 99.5% Mule Deer, 100% Water Quality Listings: none

[1] Data sources, assumptions, and limitations summarized in Appendix C.

Reach	Unit Area (Acres)	Shoreline Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
Rock Lake	466.9	100,330	Zoning: Agricultural-100 Current Land Use: Agriculture- 88.95 not classified under current use law, 5.26 classified under current use chapter 84.34 RCW Open space land classified under chapter 84.34 RCW- 5.80	Federal- 39.4 (Bureau of Reclamation)	Emergent Herbaceous Wetlands- 4.8 Evergreen Forest- 22.4 Herbaceous- 3.5 Open Water-10.9 Shrub/Scrub- 50.1 Woody Wetlands- 1.3	3 OWS, 0% levees	Floodplain- 12.5%	Wetlands: 13.5% Priority Habitats and Species: *Regions-* Bald Eagle, 95.5% Cliffs/Bluffs, 30.6% Mule Deer, 100% Rocky Mountain Elk, 0.9% Waterfowl Concentrations, 13.0% *Occurrences-* Bald eagle, nest (1) Prairie falcon, nest (4) Water Quality Listings: Category 5, Dieldrin
Snyder Slough	139	18,309	Zoning: Agricultural-100 Current Land Use: Agriculture- 100 (not classified under current use law)	No data	Emergent Herbaceous Wetlands, 22.9 Evergreen Forest, 2.1 Open Water, 12.1 Shrub/Scrub, 56.7 Woody Wetlands, 6.3	0 OWS, 0% levees	Floodplain- 18.1%	Wetlands: 69.4% Priority Habitats and Species: *Regions-* Prairies and Steppe, 100% Water Quality Listings: none
Stevens Lake	123.8	8,578	Zoning: Agricultural-100 Current Land Use: Agriculture- 100 (not classified under current use law)	No data	Emergent Herbaceous Wetlands, 28.8 Evergreen Forest, 17.8 Herbaceous, 33.3 Shrub/Scrub, 19.2	0 OWS, 0% levees	Floodplain- 11.0%	Wetlands: 73.3% Priority Habitats and Species: *Regions-* Mule Deer, 100% Prairies and Steppe, 98.5% *Occurrences-* Prairie falcon, nest (1) Water Quality Listings: none
Texas Lake	194.5	6,465	Zoning: Agricultural-100 Current Land Use: Agriculture- 100 (not classified under current use law)	No data	Cultivated Crops, 16.0 Developed, Open Space, 11.8 Emergent Herbaceous Wetlands, 42.0 Evergreen Forest, 5.8 Herbaceous, 1.7 Shrub/Scrub, 22.6	0 OWS, 0% levees	Floodplain- 13.9%	Wetlands: 24.6% Priority Habitats and Species: *Regions-* Mule Deer, 100% Waterfowl Concentrations, 24.3% Water Quality Listings: none

Reach	Unit Area (Acres)	Shoreline Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
Tule Lake	32.2	6,465	Zoning: Agricultural-100 Current Land Use: Agriculture- 26.5 not classified under current use law, 73.5 classified under current use chapter 84.34 RCW	Federal-26.5 (Bureau of Reclamation) State-73.5 (Department of Natural Resources)	Emergent Herbaceous Wetlands, 36.6 Shrub/Scrub, 33.4 Woody Wetlands, 30.0	0 OWS, 0% levees	Floodplain- 23.4%	Wetlands: 55.4% Priority Habitats and Species: *Regions*- Bald Eagle, 100% Mule Deer, 100% Water Quality Listings: none
Bonnie Lake	104.8	13,934	Zoning: Agricultural-100 Current Land Use: Agriculture- 100 (not classified under current use law)	No data	Cultivated Crops, 4.8 Deciduous Forest, 1.3 Evergreen Forest, 32.7 Herbaceous, 46.2 Open Water, 1.2 Shrub/Scrub, 13.5	0 OWS, 0% levees	Floodplain- 44.1%	Wetlands: 55.1% Priority Habitats and Species: *Regions*- Bald Eagle, 46.8% Cliffs/Bluffs, 17.0% Rocky Mountain Elk, 100% Wetlands 46.8% Water Quality Listings: none
Sheep Lake	76.6	9,214	Zoning: Agricultural-100 Current Land Use: Agriculture- 100 (not classified under current use law)	No data	Developed, Open Space, 1.3 Emergent Herbaceous Wetlands, 10.5 Open Water, 10.5 Shrub/Scrub, 77.7	0 OWS, 0% levees	Floodplain- 6.6%	Wetlands: 78.6% Priority Habitats and Species: *Regions*- American White Pelican, 2.9% Prairies and Steppe, 97.1% Waterfowl Concentrations, 2.9% Water Quality Listings: none
Hangman Creek-Agriculture	371.5	39,934	Zoning: Agricultural- 99.7 Current Land Use: Agriculture classified under current use chapter 84.34 RCW - 99.4	State-1.9 (Department of Natural Resources)	Cultivated Crops, 73.1 Developed, Open Space, 10.0 Emergent, Herbaceous Wetlands, 5.7 Evergreen Forest, 10.1	0 OWS, 0% levees	Floodway- 4.2% Floodplain- 75.4%	Wetlands: 2.1% Priority Habitats and Species: none Water Quality Listings: Category 5, dissolved oxygen Category 4a, bacteria and temperature
Pine Creek-Wastewater Lagoons	14.4	1,271	Zoning: Agricultural-100	No data	Cultivated Crops, 56.4 Developed, Low Intensity, 13.0 Developed, Open Space, 1.6 Evergreen Forest, 29.0	0 OWS, 0% levees	Floodway-36.8% Floodplain- 79.6	Wetlands: 20.4% Priority Habitats and Species: none

Reach	Unit Area (Acres)	Shoreline Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
			Current Land Use: Agriculture classified under current use chapter 84.34 RCW – 100					Water Quality Listings: Category 5, bacteria and dissolved oxygen
Pine Creek-Agriculture	1,320.9	140,975	Zoning: Agricultural-100 Current Land Use: Agriculture- 18.41 not classified under current use law, 81.56 classified under current use chapter 84.34 RCW	State-4.3 (Department of Natural Resources-1.8, Parks and Recreation Commission, 2.6)	Cultivated Crops, 78.0 Developed, Open Space, 8.7 Emergent Herbaceous Wetlands, 4.1 Evergreen Forest, 4.6 Hay/Pasture, 1.5 Shrub/Scrub, 1.5	0 OWS, 0% levees	Floodway- 2.4% Floodplain- 78.9%	Wetlands: 7.2% Priority Habitats and Species: *Regions*- Mule Deer, 5.3% Water Quality Listings: Category 5, bacteria and dissolved oxygen
Pine Creek-Scrub/Shrub	369.5	39,429	Zoning: Agricultural-100 Current Land Use: Agriculture- 84.1 not classified under current use law, 16.0 classified under current use chapter 84.34 RCW	No data	Cultivated Crops, 48.6 Developed, Open Space, 4.8 Evergreen Forest, 41.4 Herbaceous, 4.7	0 OWS, 0% levees	Floodplain- 41.3%	Wetlands: 7.0% Priority Habitats and Species: *Regions*- Mule Deer, 62.3% Cliffs/Bluffs, 1.6% Rocky Mountain Elk, 28.6% Water Quality Listings: none
Cottonwood Creek-PAW	665.0	0	Zoning: Agricultural-100 Current Land Use: Agriculture- 82.0 not classified under current use law, 18.0 classified under current use chapter 84.34 RCW	No data	Cultivated Crops, 20.7 Developed, Open Space, 9.8 Emergent Herbaceous Wetlands, 36.4 Evergreen Forest, 10.3 Hay/Pasture, 7.8 Shrub/Scrub, 14.4	0 OWS, 0% levees	Floodplain- 45.6%	Wetlands: 100% Priority Habitats and Species: *Regions*- Mule Deer, 100% Prairies and Steppe, 27.3% Water Quality Listings: none
Cottonwood Creek-Agriculture	123.2	10,800	Zoning: Agricultural- 100 Current Land Use: Agriculture- 100 (not classified under current use law)	No data	Emergent Herbaceous Wetlands, 59.9 Evergreen Forest, 13.8 Shrub/Scrub, 25.6	0 OWS, 0% levees	Floodplain- 76.0%	Wetlands: 86.5% Priority Habitats and Species: *Regions*- Mule Deer, 100% Water Quality Listings: none
Palouse River-Confluence with Snake	50.2	10,995	Zoning: Agricultural-100	Federal-100 (Department of Defense)	Evergreen Forest, 59.5 Open Water, 23.7 Shrub/Scrub, 15.7	0 OWS, 0% levees	Floodplain- 60.0%	Wetlands: 1.4% Priority Habitats and Species: *Regions*-

Reach	Unit Area (Acres)	Shoreline Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
			Current Land Use: Agriculture- 86.3 (not classified under current use law) Water Areas-13.7					Chukar, 50.0% Mule Deer, 50.1% Waterfowl Concentrations, 50.0% *Occurrences-* Prairie falcon, nest Water Quality Listings: none
Palouse River-Canyon	105.6	17,708	Zoning: Agricultural-100 Current Land Use: Agriculture- 35.3 (not classified under current use law) Open space land classified under chapter 84.24 RCW- 64.8	Federal-99.9 (Bureau of Land Manamgnet-30.9, Department of Degense-69.0)	Deciduous Forest, 7.4 Emergent Herbaceous Wetlands, 4.8 Evergreen Forest, 11.6 Open Water, 6.9 Shrub/Scrub, 63.5 Woody Wetlands, 4.9	0 OWS, 0% levees	Floodplain- 84.7%	Wetlands: 65.0% Priority Habitats and Species: *Regions-* Chukar, 1.3% Mule Deer, 100% Ring-necked Pheasant, 48.2% *Occurrences-* Prairie falcon, biotic detection Water Quality Listings: Category 5, pH
Palouse River-Palouse Falls State Park	65.3	14,481	Zoning: Agricultural-100 Current Land Use: Agriculture- 100 (not classified under current use law)	State-100 (Parks and Recreation Commission)	Evergreen Forest, 9.9 Open Water, 20.4 Shrub/Scrub, 69.3	0 OWS, 0% levees	Floodplain- 59.1%	Wetlands: 25.0% Priority Habitats and Species: *Regions-* Mule Deer, 100% *Occurrences-* Peregrine falcon, nest Water Quality Listings: Category 5, pH
Palouse River-Agriculture	1,147.7	244,323	Zoning: Agricultural-100 Current Land Use: Agriculture- 78.03 not classified under current use law, 21.97 classified under current use chapter 84.34 RCW	Federal-8.1 (Bureau of Land Management) State-1.9 (Department of Natural Resources)	Cultivated Crops, 7.4 Developed, Open Space, 3.1 Emergent Herbaceous Wetlands, 9.6 Evergreen Forest, 16.1 Hay/Pasture, 25.9 Herbaceous, 2.2 Open Water, 1.3 Shrub/Scrub, 30.2 Woody Wetlands, 1.7	8 OWS, 0% levees	Floodplain- 68.9%	Wetlands: 24.9% Priority Habitats and Species: *Regions-* Mule Deer, 100% Waterfowl Concentrations, 10.3% Northwest White-tailed Deer, 31.3% Ring-necked Pheasant, 8.2% *Occurrences-* Ferruginous hawk, nest Prairie falcon, nest Water Quality Listings: Category 5- Dissolved oxygen, pH, temperature
	856.8	175,866	Zoning: Agricultural-100		Cultivated Crops, 5.4 Developed, Open Space, 1.7	0 OWS, 0% levees	Floodplain- 68.7%	Wetlands: 56.8%

Reach	Unit Area (Acres)	Shoreline Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
Palouse River-Western Palouse			Current Land Use: Agriculture- 83.6 not classified under current use law, 14.2 classified under current use chapter 84.34 RCW Open space land classified under chapter 84.34 RCW- 2.2	State- 6.2 (Department of Natural Resources)	Emergent Herbaceous Wetlands, 9.7 Evergreen Forest, 12.7 Hay/Pasture, 2.8 Herbaceous, 1.3 Open Water, 2.0 Shrub/Scrub, 62.2 Woody Wetlands, 1.5			Priority Habitats and Species: *Regions-* Mule Deer, 100% Water Quality Listings: none
Palouse River-County Industrial	38.3	2,890	Zoning: Agricultural- 100 Current Land Use: Agriculture- 11.1 classified under current use chapter 84.34 RCW Undeveloped Land- 88.9	No data	Cultivated Crops, 62.9 Developed, Low Intensity, 9.2 Developed, Medium Intensity, 4.6 Developed, Open Space, 8.8 Emergent Herbaceous Wetlands, 2.9 Evergreen Forest, 8.7 Shrub/Scrub, 2.1	0 OWS, 88.4% levees	Floodway- 50.3% Floodplain- 80.4%	Wetlands: 23.2% Priority Habitats and Species: none Water Quality Listings: none
Palouse River-Meanders	1,643.0	204,578	Zoning: Agricultural- 100 Current Land Use: Agriculture- 97.3 classified under current use chapter 84.34 RCW Open space land classified under chapter 84.34 RCW- 2.3	State- 2.3 (Department of Natural Resources)	Cultivated Crops, 38.5 Developed, Open Space, 3.2 Emergent Herbaceous Wetlands, 4.7 Evergreen Forest, 44.7 Herbaceous, 6.4 Shrub/Scrub, 1.5	4 OWS, 0% levees	Floodway- 1.9% Floodplain- 77.1%	Wetlands: 36.5% Priority Habitats and Species: *Regions-* Mule Deer, 23.9% *Occurrences-* Golden eagle, nests (3) Rio Grande wild turkey, biotic detection (2) Water Quality Listings: none
Palouse River-Open Space	5.8	1,189	Zoning: Agricultural-100 Current Land Use: Agriculture- 32.8 classified under current use chapter 84.34 RCW Undeveloped land- 67.2	No data	Developed, Low Intensity, 24.2 Developed, Medium Intensity, 2.2 Developed, Open Space, 67.0 Evergreen Forest, 6.6	1 OWS, 0% levees	Floodway- 63.1% Floodplain- 72.4%	Wetlands: 37.7% Priority Habitats and Species: none Water Quality Listings: Category 5, pH Category 4a- Bacteria
Palouse River-Cliffs	128.9	28,491	Zoning: Agricultural- 100 Current Land Use: Agriculture- 100 (not classified under current use law)	Federal- 58 (Bureau of Land Management- 36.2, Department of Defense-21.8) State- 20.7 (Department of Natural Resources)	Evergreen Forest, 2.5 Open Water, 12.9 Shrub/Scrub, 81.9 Woody Wetlands, 1.4	1 OWS, 0% levees	Floodplain- 5.9%	Wetlands: 8.1% Priority Habitats and Species: *Regions-* Chukar, 15.7% Mule Deer, 99.7% Waterfowl Concentrations, 5.2% *Occurrences-* Prairie falcon, nest Water Quality Listings: none

Reach	Unit Area (Acres)	Shoreline Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
South Fork Palouse River-Commercial	0.9	0	Zoning: Agricultural- 57.2 Unknown- 42.8 Current Land Use: Household, single family units- 42.8 Undeveloped land- 57.2	No data	Cultivated Crops, 75.0 Developed, Low Intensity, 20.3 Developed, Open Space, 4.7	0 OWS, 0% levees	Floodway- 8.6% Floodplain- 86.0%	Wetlands: none Priority Habitats and Species: None Water Quality Listings: none
South Fork Palouse River-South Fork River Road	315.1	33,199	Zoning: Agricultural- 89.5 Unknown- 10.5 Current Land Use: Agriculture- 91.3 classified under current use chapter 84.34 RCW Open space land classified under chapter 84.34 RCW- 8.8	No data	Cultivated Crops, 24.5 Developed, Low Intensity, 1.7 Developed, Open Space, 10.4 Emergent Herbaceous Wetlands, 9.9 Evergreen Forest, 47.1 Herbaceous, 1.3 Shrub/Scrub, 4.5	7 OWS, 0.1% levees	Floodplain- 64.6%	Wetlands: 10.1% Priority Habitats and Species: None Water Quality Listings: Dissolved oxygen, pH, temperature
South Fork Palouse River-Agriculture	598.4	128,313	Zoning: Agricultural- 99.9 Current Land Use: Agriculture- 100, classified under current use chapter 84.34 RCW	State- 4.8 (Washington State University)	Cultivated Crops, 52.4 Deciduous Forest, 1.4 Developed, Low Intensity, 1.0 Developed, Open Space, 8.9 Emergent Herbaceous Wetlands, 10.6 Evergreen Forest, 24.6	14 OWS, 0 % levees	Floodway- 6.3% Floodplain- 58.1%	Wetlands: 1.3% Priority Habitats and Species: None Water Quality Listings: Category 4a- 4,4'-DDE, Ammonia-N, Bacteria, Dieldrin, PCB
South Fork Palouse River-Agriculture/ Residential	33.8	6,915	Zoning: Agricultural- 57.6 Unknown- 42.4 Current Land Use: Agriculture- 43.6 classified under current use chapter 84.34 RCW Household, single family units- 26.0 Undeveloped land- 25.4 Utilities- 4.9	No data	Cultivated Crops, 60.5 Developed, Medium Intensity, 2.0 Developed, Low Intensity, 1.1 Developed, Open Space, 27.3 Evergreen Forest, 9.0	1 OWS, 0% levees	Floodway- 47.0% Floodplain- 83.2%	Wetlands: none Priority Habitats and Species: None Water Quality Listings: Category 5- Dissolved oxygen, temperature Category 4a- Ammonia-N, Bacteria
South Fork Palouse River-Pullman UGA	0.1	0	Zoning: Heavy Industrial District-100 Current Land Use: Undeveloped Land-100	No data	Developed, Open Space- 93.2 Evergreen Forest- 6.8	0 OWS, 0% levees	Floodplain- 1.1%	Wetlands: none Priority Habitats and Species: None Water Quality Listings: None
North Fork Palouse River-Agriculture	1,281.5	275,509	Zoning: Agricultural- 99.3	Whitman County- 6.1	Cultivated Crops, 31.4 Developed, Open Space, 4.5 Emergent Herbaceous Wetlands, 5.3 Evergreen Forest, 56.2	10 OWS, 0.5% levees	Floodway- 0.8% Floodplain- 61.3%	Wetlands: 14.5% Priority Habitats and Species:

Reach	Unit Area (Acres)	Shoreline Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
			Current Land Use: Agriculture- 98.4 classified under current use chapter 84.34 RCW Undeveloped Land- 1.4	State-0.7 (Department of Natural Resources)				None Water Quality Listings: Category 5- Dissolved oxygen, pH, temperature Category 4a- 4,4'-DDE, Bacteria, PCB
Snake River-Industrial	253.5	52,970	Zoning: Heavy Industrial-100 Current Land Use: Agriculture- 38.02 not classified under current use law Food and kindred products-19.13 Miscellaneous manufacturing-23.08 Water areas-19.77	Federal-100 (Corps)	Developed, High Intensity, 2.3 Developed, Low Intensity, 11.9 Developed, Medium Intensity, 5.9 Developed, Open Space, 9.4 Herbaceous, 23.1 Open Water, 9.6 Shrub/Scrub, 37.2	28 OWS, 0% levees	Floodplain- 65.5%	Wetlands: 43.4% (based on hydric soils) Priority Habitats and Species: *Regions*- Chukar, 50.9% Mule Deer, 51.3% Waterfowl Concentrations, 34.2% Water Quality Listings: Category 5- temperature Category 4a-Dioxin, total dissolved gas Category 4c- invasive exotic species
Snake River-Cliffs	81.1	18,641	Zoning: Agricultural-100 Current Land Use: Agriculture- 72.7 not classified under current use law Water areas- 27.3	Federal-100 (Corps)	Open Water- 25.1 Shrub/Scrub- 74.9	1 OWS, 0% levees	Floodplain- 68.2%	Wetlands: 3.3% Priority Habitats and Species: *Regions*- Chukar, 76.0% Mule Deer, 76.3% Waterfowl Concentrations, 24.0% Water Quality Listings: none
Snake River-Steptoe Canyon	11.6	1,015	Zoning: Agricultural-100 Current Land Use: Agriculture- 100 (not classified under current use law)	Federal-100 (Corps)	Herbaceous- 51.5 Open Water-4.5 Shrub/Scrub-44.0	0 OWS, 0% levees	Floodplain- 77.1%	Wetlands: 60.6% Priority Habitats and Species: *Regions*- Chukar, 78.7% Mule Deer, 78.8% Waterfowl Concentrations, 21.3% Water Quality Listings: none
Snake River-Railroad	1,470.7	320,778	Zoning: Agricultural- 98.9	Federal-95.4 (Corps-87.4, Bureau of Land Management-8.0) State-3.5 (Department of	Developed, Low Intensity- 2.5 Herbaceous-11.0 Open Water-20.6 Shrub/Scrub-62.1	36 OWS, 0% levees	Floodplain- 65.4%	Wetlands: 12.0% Priority Habitats and Species: *Regions*- Chukar, 70.0%

Reach	Unit Area (Acres)	Shoreline Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
			Current Land Use: Agriculture- 61.3 (classified under current use chapter 84.3 RCW) Open space land classified under chapter 84.34 RCW- 13.9 Water areas-24.7	Natural Resources-2.3, Washington State Univeristy-1.2)				Mule Deer, 70.2% Waterfowl Concentrations, 30.0% Ring-necked Pheasant 1.0% *Occurrences*- Pacific lamprey, biotic detection (1) Prairie falcon, nest (5) Water Quality Listings: Category 5- 2,3,7,8-TCDD;4,4'-DDE; dieldrin; dioxin; dissolved oxygen; PCB; pH; temperature, total chlordane Category 4a-dioxin, total dissolved gas Category 4c-invasive exotic species
Snake River-Parks/Open Space	398.4	90,451	Zoning: Agricultural-97.7 Current Land Use: Agriculture- 48.9 (not classified under current use law) Open space land classified under chapter 84.34 RCW- 17.5 Food and kindred products-3.8 Miscellaneous manufacturing-2.1 Water areas-30.5	Federal-95.6 (Corps-94.3, Bureau of Land Management-1.3) State-2.1 (Washington State University)	Developed, Low Intensity- 1.5 Developed, Open Space-3.8 Emergent Herbaceous Wetlands-5.5 Evergreen Forest- 4.2 Hay/Pasture- 28.5 Herbaceous- 19.8 Open Water-12.4 Shrub/Scrub-18.6 Woody Wetlands-2.4	44 OWS, 0% levees	Floodplain- 59.4%	Wetlands: 24.6% Priority Habitats and Species: *Regions*- Chukar, 27.6% Mule Deer, 34.0% Waterfowl Concentrations, 64.8% Ring-necked Pheasant, 27.1% *Occurrences*- Bald eagle, nest (1) Great blue heron, colony (1) Western toad, biotic detection (11) Water Quality Listings: Category 5- 2,3,7,8-TCDD;4,4'-DDE; dieldrin; dioxin; dissolved oxygen; PCB; pH; temperature, total chlordane Category 4c-invasive exotic species
Rock Creek-Pine Creek Confluence	294.6	5,105	Zoning: Agricultural-100 Current Land Use: Agriculture- 100 (not classified under current use law)	Federal-15.0 (Bureau of Reclamation)	Cultivated Crops- 22.8 Deciduous Forest-3.2 Developed, Open Space- 1.9 Evergreen Forest- 18.2 Hay/Pasture- 11.2 Herbaceous-5.7 Shrub/Scrub-36.1	0 OWS, 0% levees	Floodplain- 68.9%	Wetlands: 94.3 Priority Habitats and Species: *Regions*- Bald Eagle, 3.6% Cliffs/Bluffs, 2.5% Mule Deer, 81.1% Rocky Mountain Elk, 98.6% Water Quality Listings: none

Reach	Unit Area (Acres)	Shoreline Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
Rock Creek-Lake Outlet	241.8	16,849	Zoning: Agricultural-100 Current Land Use: Agriculture- 100 (not classified under current use law)	Federal-0.1 (Bureau of Land Management)	Emergent Herbaceous Wetlands-26.9 Evergreen Forest-32.8 Herbaceous-9.0 Open Water-7.0 Shrub/Scrub-14.9 Woody Wetlands-8.7	0 OWS, 0% levees	Floodplain- 66.8%	Wetlands:71.4 Priority Habitats and Species: *Regions*- Mule Deer, 100% Water Quality Listings: none
Rock Creek-Cottonwood Confluence/ PAW	584.8	69,268	Zoning: Agricultural- 100 Current Land Use: Agriculture- 99.4 (not classified under current use law)	Federal-37.6 (Bureau of Land Management) State-10.8 (Department of Fish and Wildlife)	Emergent Herbaceous Wetlands-47.2 Evergreen Forest-12.9 Herbaceouse-3.1 Shrub/Scrub-35.6	0 OWS, 0% levees	Floodplain- 57.8%	Wetlands: 80.2% Priority Habitats and Species: *Regions*- Mule Deer, 100% Water Quality Listings: none
Rock Creek-Imbler Creek	302.6	30,038	Zoning: Agricultural-100 Current Land Use: Agriculture- 34.4 (not classified under current use law) Open space land classified under chapter 84.84 RCW- 65.6	Federal-100 (Bureau of Land Management)	Emergent Herbaceous Wetlands-49.2 Evergreen Forest-12.7 Shrub/Scrub-37.3	0 OWS, 0% levees	Floodplain- 70.2%	Wetlands: 15.4 Priority Habitats and Species: *Regions*- Prairies and Steppe, 31.7% Ring-necked Pheasant, 63.3% Mule Deer, 100% *Occurrences*- Western Long-eared bat, biotic detection (2) Yuma myotis, biotic detection (2) Water Quality Listings: none
Rock Creek-Escure Ranch	489.6	68,743	Zoning: Agricultural-100 Current Land Use: Agriculture- 23.4 (not classified under current use law) Open space land classified under chapter 84.84 RCW- 76.6	Federal-100 (Bureau of Land Management)	Emergent Herbaceous Wetlands-26.9 Evergreen Forest-25.8 Herbaceous-7.1 Shrub/Scrub- 39.5	0 OWS, 0% levees	Floodplain- 57.3%	Wetlands: 54.2% Priority Habitats and Species: *Regions*- Mule Deer, 100% *Occurrences*- Little brown myotis, biotic detection (64) Long-legged myotis, biotic detection (42) Prairie falcon, nest (1) Western Long-eared bat, biotic detection (71) Yuma myotis, biotic detection (287) Water Quality Listings: none
Rock Creek-Agriculture			Zoning: Agricultural-100	No data	Developed, Open Space-7.2 Emergent Herbaceous Wetlands- 28.6			Wetlands: 83.6%

Reach	Unit Area (Acres)	Shoreline Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
	423.2	39,502	Current Land Use: Agriculture- 62.2 (not classified under current use law) Agriculture classified under current use chapter 84.81 RCW- 37.8		Evergreen Forest- 13.5 Hay/Pasture- 39.4 Shrub/Scrub-10.3	0 OWS, 0% levees	Floodplain- 41.1%	Priority Habitats and Species: *Regions*- Mule Deer, 100% Water Quality Listings: none
Union Flat Creek- Scablands	404.2	89,648	Zoning: Agricultural-100 Current Land Use: Agriculture- 100 (not classified under current use law)	State-14.4 (Department of Natural Resources)	Cultivated Crops-1.0 Developed, Open Space-2.0 Emergent Herbaceous Wetlands-8.3 Hay/Pasure-6.0 Shrub/Scrub-82.3	0 OWS, 0% levees	Floodplain- 56.9%	Wetlands: 25.8% Priority Habitats and Species: *Regions*- Mule Deer, 100% Water Quality Listings: none
Union Flat Creek- Agriculture	855.6	116,104	Zoning: Agricultural-100 Current Land Use: Agriculture- 2.04 (not classified under current use law) Agriculture classified under chapter 84.84 RCW- 98.0	State-4.2 (Department of Natural Resources)	Cultivated Crops-93.2 Developed, Open Space-4.6 Shrub/Scrub-1.6	0 OWS, 0% levees	Floodplain- 85.5%	Wetlands: 19.8% Priority Habitats and Species: *Regions*- Mule Deer, 59.6% Water Quality Listings: none
Union Flat Creek- Agriculture Riparian	921.6	100,860	Zoning: Agricultural-100 Current Land Use: Agriculture classified under chapter 84.84 RCW- 97.6 Open space land classified under chapter 84.84 RCW- 2. 5	Whitman County- 6.9 State-9.0 (Dept. of Natural Resources)	Cultivated Crops-77.2 Developed, Open Space-6.1 Evergreen Forest-12.4 Herbaceous-2.7	0 OWS, 0% levees	Floodplain- 72.7%	Wetlands: 1.5% Priority Habitats and Species: None Water Quality Listings: none
Fourmile Creek	22.6	2,631	Zoning: Agricultural-100 Current Land Use: Agriculture classified under chapter 84.84 RCW- 100	No data	Cultivated Crops- 85.5 Developed, Open Space- 13.8	0 OWS, 0% levees	Floodplain- 80.8	Wetlands: none Priority Habitats and Species: None Water Quality Listings: none

Appendix D. Summary of Shoreline Inventory Results for the Reaches of the South Fork Palouse River within the City of Albion.[1]

Reach (South Fork Palouse River)	Unit Area (Acres)	Unit Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
Albion Residential	25.7	1,564	Zoning: Proposed Commercial- 9.2 Residential 2- 60.7 Residential 3- 29.4 Current Land Use %: Agriculture classified under current use chapter 84.34 RCW- 44.94 Governmental services- 1.95 Household, single family units- 53.11	No data	Cultivated Crops-18.6 Developed, Low Intensity-16.7 Developed, Open Space-56.8 Evergreen Forest-7.7	1 OWS, 0% levees	Floodway-47.4 Floodplain-93.8	Wetlands: 1.0 Priority Habitats and Species: none Water Quality Listings: Category 4a, bacteria
Albion Agriculture	12.0	1,097	Zoning: No data Current Land Use%: Agriculture classified under current use chapter 84.34 RCW- 99.98	No data	Cultivated Crops-20.4 Developed, Low Intensity-4.7 Developed, Open Sapce-73.6	1 OWS, 0% levees	Floodway-31.4 Floodplain-62.1	Wetlands: none Priority Habitats and Species: none Water Quality Listings: Category 4a, bacteria
Albion Industrial	16.2	2,164	Zoning: Industrial-50.6 Current Land Use %: Agriculture classified under current use chapter 84.34 RCW- 93.67 Household, single family units- 6.18	No data	Cultivated Crops-7.9 Developed, Low Intenisty-3.7 Developed, Open Space-28.5 Evergreen Forest-58.5	0 OWS, 0% levees	Floodway-18.4 Floodplain-58.2	Wetlands: 4.3 Priority Habitats and Species: none Water Quality Listings: Category 4a, bacteria

[1] Data sources, assumptions, and limitations summarized in Appendix C.

Appendix D. Summary of Shoreline Inventory Results for the City of Colfax.[1]

Reach	Unit Area (Acres)	Unit Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
Colfax Agriculture	197.7	40,292	Zoning: Unclassified- 96.1 Residential 1 (R2)- 3.9 Current Land Use: Agriculture classified under current use chapter 84.34 RCW- 96.6 Undeveloped Land- 2.0 Household, Single Family Units- 1.0	State – 1.0 (Dept of Natural Resources)	Cultivated Crops- 44.6 Evergreen Forest- 33.7 Emergent Herbaceous Wetlands- 11.4 Developed, Open Space- 6.2 Mixed Forest- 1.3	0 OWS 1.6% levees	Floodway- 0 Floodplain- 66.0	Wetlands: 30.8% Priority Habitats and Species: none Water Quality Listings: Category 5, pH and temperature Category 4a, bacteria
Colfax Flume, Commercial	39.2	6,016	Zoning: Unclassified- 45.2 Commercial- 26.2 Business- 10.8 Residential 1 (R1)- 10.4 Manufacturing- 5.8 Residential 1 (R2)- 1.6 Current Land Use: Utilities- 41.2 Other Retail Trade- 25.6 Household, Single Family Units- 12.7 Wholesale Trade- 5.7 Open space land classified under chapter 84.34 RCW- 4.5 Miscellaneous Manufacturing- 4.4 Hotels/Motels- 3.6 Undeveloped Land- 1.3 Retail Trade - Building Materials, Hardware, and Farm Equipment- 1.1	No data	Developed, Medium Intensity- 56.8 Developed, Low Intensity- 20.8 Developed, High Intensity- 17.6 Developed, Open Space- 4.6	7 OWS 100% levees	Floodway- 0 Floodplain- 13.4	Wetlands: 0.6% Priority Habitats and Species: none Water Quality Listings: Category 5, dissolved oxygen and pH
Colfax Flume, Residential	12.7	2,653	Zoning: Residential 1 (R1)- 40.2 Unclassified- 37.0 Residential 1 (R2)- 20.1 Business- 2.2 Current Land Use : Household, Single Family Units- 60.3 Utilities- 37.0 Other Retail Trade- 2.7	No data	Developed, Low Intensity- 39.2 Developed, Open Space- 34.6 Developed, Medium Intensity- 25.4	0 OWS 100% levees	Floodway- 0 Floodplain- 31.3	Wetlands: 0 Priority Habitats and Species: none Water Quality Listings: Category 5, dissolved oxygen and pH
Colfax Flume, Undeveloped	4.5	985	Zoning: Unclassified- 71.4 Manufacturing- 18.8 Residential 1 (R1)- 6.3 Business- 3.0	No data	Scrub/Shrub- 44.8 Developed, Open Space- 29.6 Developed, Low Intensity- 25.5	0 OWS 100% levees	Floodway- 0 Floodplain- 34.7	Wetlands: 0 Priority Habitats and Species: none

[1] Data sources, assumptions, and limitations summarized in Appendix C.

Reach	Unit Area (Acres)	Unit Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
			Current Land Use: Utilities- 69.0 Open space land classified under chapter 84.34 RCW- 12.5 Undeveloped Land- 9.9 Household, Single Family Units- 8.6					Water Quality Listings: Category 5, dissolved oxygen and pH
Colfax Industrial/ Commercial	36.3	4,430	Zoning: Unclassified- 65.9 Commercial- 21.9 Residential 2 (R3)- 9.7 Residential 1 (R2)- 2.4 Current Land Use: Miscellaneous Manufacturing- 33.2 Open space land classified under chapter 84.34 RCW- 24.9 Utilities- 23.4 Other Retail Trade- 9.1 Undeveloped Land- 6.1 Agriculture classified under current use chapter 84.34 RCW- 1.8 Household, Single Family Units- 1.7	No data	Developed, Low Intensity- 54.6 Developed, Medium Intensity- 18.2 Developed, Open Space- 17.8 Cultivated Crops- 8.7	4 OWS 97% levees	Floodway- 29.4 Floodplain- 88.6	Wetlands: 15.3% Priority Habitats and Species: none Water Quality Listings: Category 5, pH Category 4a, bacteria
Colfax Open Space	6.5	1,081	Zoning: Manufacturing- 85.8 Unclassified- 14.2 Current Land Use: Wholesale Trade- 47.7 Open space land classified under chapter 84.34 RCW- 29.4 Utilities- 8.7 Undeveloped Land- 8.4 Agriculture classified under current use chapter 84.34 RCW- 5.8	No data	Developed, Open Space- 36.9 Scrub/Shrub- 29.5 Developed, Low Intensity- 23.3 Developed, Medium Intensity- 5.6 Herbaceous- 4.7	0 OWS 26.9% levees	Floodway- 0 Floodplain- 60.1	Wetlands: 0 Priority Habitats and Species: none Water Quality Listings: Category 5, dissolved oxygen and pH
Colfax Parks	19.5	4,283	Zoning: Residential 1 (R2)- 51.7 Unclassified- 48.3 Current Land Use: Recreational Activities- 74.7 Agriculture classified under current use chapter 84.34 RCW- 25.2	No data	Hay/Pasture- 57.7 [mowed grass] Evergreen Forest- 21.4 Developed, Open Space- 10.7 Cultivated Crops- 5.4 Emergent Herbaceous Wetlands- 4.9	0 OWS 0% levees	Floodway- 0 Floodplain- 29.5	Wetlands: 10.8% Priority Habitats and Species: none Water Quality Listings: None
Colfax Residential	48.5	10,241	Zoning: Residential 1 (R2)- 42.1 Unclassified- 17.8 Commercial- 15.1 Residential 2 (R3)- 14.1 Residential 1 (R1)- 10.9	No data	Developed, Low Intensity- 45.2 Developed, Open Space- 25.6 Developed, Medium Intensity- 20.7 Evergreen Forest- 4.6 Cultivated Crops- 3.8	0 OWS 71.3% levees	Floodway- 0 Floodplain- 12.1	Wetlands: 11.3% Priority Habitats and Species: none

Reach	Unit Area (Acres)	Unit Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
			Current Land Use: Utilities- 43.0 Household, Single Family Units- 31.4 Open space land classified under chapter 84.34 RCW- 12.0 Educational Services- 4.5 Recreational Activities- 2.1 Parks- 2.0 Other Retail Trade- 1.8 Undeveloped Land- 1.6					Water Quality Listings: Category 5, pH Category 4a, bacteria
Colfax Scrub Shrub/PAW	2.8	0	Zoning: Unclassified- 84.1 Agricultural- 15.9 Current Land Use: Undeveloped Land- 84.1 Agriculture classified under current use chapter 84.34 RCW- 15.9	No data	Developed, Open Space- 87.8 Evergreen Forest- 11.7	0 OWS 0% levees	Floodway- 66.1 Floodplain- 66.1	Wetlands: 22.1% Priority Habitats and Species: none Water Quality Listings: None

Appendix D. Summary of Shoreline Inventory Results for the Reach of Pine Creek within the City of Malden.[1]

Reach	Unit Area (Acres)	Unit Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
Pine Creek-Malden	58.2	6,180	Zoning: No data Current Land Use %: Agriculture (not classified under current use law)- 45.97 Agriculture classified under chapter 84.84 RCW- 53.27	No data	Cultivated Crops-73.7 Developed, Open Space-4.7 Evergreen Forest-21.5	0 OWS, 0% levees	none	Wetlands: 35.0% Priority Habitats and Species: none Water Quality Listings: none

[1] Data sources, assumptions, and limitations summarized in Appendix C.

Appendix D. Summary of Shoreline Inventory Results for the Reaches of the Palouse River within the City of Palouse.[1]

Reach	Unit Area (Acres)	Unit Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
City of Palouse, Commercial	12.7	1,302	Zoning: Commercial-69.6 Low Density Residential-4.5 Open Space- 25.9 Current Land Use %: Business Services- 6.57 Household, single family units- 10.75 Mobil home parks or courts- 3.09 Other retail trade- 6.23 Parks- 7.51 Retail trade-automotive, marine craft, aircraft, and accessories- 3.67 Undeveloped land- 10.04 Utilities- 48.86 Wholesale trade- 3.30	No data	Developed, Low Intensity-11.6 Developed, Medium Intensity- 71.3 Developed, Open Space-16.1 Evergreen Forest- 1.0	3 OWS, 0% levees	Floodway-17.1 Floodplain-59.6	Wetlands: 3.4 Priority Habitats and Species: none Water Quality Listings: Category 5- dissolved oxygen, pH, temperature Category 4a, bacteria
City of Palouse, Residential	3.1	0	Zoning: Light Industrial- 1.6 Low Density Residential- 98.3 Current Land Use %: Household, single family units-26.44 Parks- 7.78 Utilities- 65.78	No data	Developed, Low Intensity-28.0 Developed, Medium Intensity-29.9 Developed, Open Space-42.1	0 OWS, 0% levees	Floodway-4.2 Floodplain-100	Wetlands: none Priority Habitats and Species: none Water Quality Listings: none
City of Palouse, Agriculture	28.2	3,814	Zoning: Agriculture- 57.7 Open Space- 28.7 Current Land Use %: Agriculture classified under current use chapter 84.34 RCW- 3.8 Undeveloped land- 92.8 Utilities- 3.4	No data	Cultivated Crops-66.4 Developed, Open Space-18.1 Evergreen Forest- 15.6	1 OWS, 0% levees	Floodway-37.5 Floodplain-88.8	Wetlands: 12.6% Priority Habitats and Species: none Water Quality Listings: Category 4a, bacteria
City of Palouse, Industrial	9.3	1,371	Zoning: Commercial-5.7 Light Industrial- 14.0 Low Density Residential- 2.1 Open Space- 20.1 Current Land Use %: Household, single family units- 2.1 Miscellaneous manufacturing- 14.0 Mobil home parks or courts- 5.7 Parks- 9.7 Recreational activities- 10.54 Utilites-58.1	No data	Developed, Low Intensity-37.3 Developed, Medium Intensity- 45.5 Developed, Open Space-15.4 Evergreen Forest- 1.7	1 OWS, 0% levees	Floodway-11.5 Floodplain-51.9	Wetlands: 6.3% Priority Habitats and Species: none Water Quality Listings: Category 4a, bacteria

[1] Data sources, assumptions, and limitations summarized in Appendix C.

Reach	Unit Area (Acres)	Unit Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
City of Palouse, Open Space	62.5	3,884	Zoning: Agriculture- 4.1 Light Industrial- 1.6 Low Density Residential- 9.2 Open Space- 85.1 Current Land Use %: Household, single family units- 4.80 Parks- 10.10 Recreational activities- 4.78 Undeveloped land- 65.22 Utilities- 15.10	No data	Cultivated Crops- 22.5 Developed, Low Intensity-7.8 Developed, Medium Intensity- 1.9 Developed, Open Space-33.0 Emergent Herbaceous Wetlands-1.3 Evergreen Forest- 33.6	0 OWS, 0% levees	Floodway-28.6 Floodplain-50.1	Wetlands: 6.2% Priority Habitats and Species: none Water Quality Listings: Category 5- dissolved oxygen, pH, temperature Category 4a, bacteria

Appendix D. Summary of Shoreline Inventory Results for the City of Pullman.[1]

Reach (South Fork Palouse River)	Unit Area (Acres)	Unit Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
Pullman South Commercial	25.8	2,897	Zoning: General Commercial- 100 Current Land Use: Utilities- 47.5 Amusements- 11.5 Undeveloped Land- 10.2 Professional Services- 8.1 Retail Trade-Eating and Drinking- 7.5 Miscellaneous Services- 6.2 Hotels/Motels- 5.9 Retail Trade-Apparel and Accessories- 2.1	WSU- 8.5	Developed, Medium Intensity- 48.0 Developed, Low Intensity- 27.0 Developed, Open Space- 22.5 Developed, High Intensity- 2.3	1 OWS 0% levees	Floodway- 24.7 Floodplain- 51.4	Wetlands: none Priority Habitats and Species: none Water Quality Listings: Category 5, dissolved oxygen Category 4a, bacteria
Pullman Commercial/ Business District	25.8	4,728	Zoning: Central Business- 85.4 General Commercial- 13.3 High-Density Multi-family Residential- 1.3 Current Land Use: Utilities- 53.2 Other Retail Trade- 15.0 Parks- 11.5 Professional Services- 6.2 Governmental Services- 5.9 Railroad/transit transportation- 3.1 Retail Trade - Building Materials, Hardware, and Farm Equipment- 3.0 Retail Trade – automotive, marine craft, aircraft and accessories- 1.2	No data	Developed, Medium Intensity- 57.5 Developed, Low Intensity- 18.8 Developed, High Intensity- 14.4 Developed, Open Space- 9.4	5 OWS 0% levees	Floodway- 27.2 Floodplain- 66.9	Wetlands: none Priority Habitats and Species: none Water Quality Listings: Category 5, dissolved oxygen and temperature Category 4a, bacteria
Pullman Industrial	39.3	7,046	Zoning: Heavy Industrial- 97.0 General Commercial- 1.6 Current Land Use : Utilities- 67.5 Miscellaneous Manufacturing- 30.6 Household, Single Family Units- 1.6	No data	Developed, Low Intensity- 37.1 Developed, Medium Intensity- 34.3 Developed, Open Space- 24.5 Developed, High Intensity- 3.4	0 OWS 0% levees	Floodway- 41.0 Floodplain- 84.0	Wetlands: none Priority Habitats and Species: none Water Quality Listings: Category 5, dissolved oxygen and temperature Category 4a, bacteria and ammonia-N
Pullman Parks	47.8	9,055	Zoning: General Commercial- 58.0 Low-Density Multi-family Residential- 29.6 High-Density Multi-family Residential- 9.9 Washington State University- 2.5 Current Land Use: Parks- 33.6 Undeveloped Land- 24.3 Utilities- 25.8 Mobile Home Parks or Courts- 15.2	WSU- 15.6	Developed, Open Space- 47.1 Developed, Low Intensity- 32.1 Developed, Medium Intensity- 20.8	5 OWS 0% levees	Floodway- 34.0 Floodplain- 83.6	Wetlands: none Priority Habitats and Species: none Water Quality Listings: Category 5, dissolved oxygen Category 4a, bacteria

[1] Data sources, assumptions, and limitations summarized in Appendix C.

Reach (South Fork Palouse River)	Unit Area (Acres)	Unit Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
Pullman Residential	26.8	1,496	Zoning: Low-Density Multi-family Residential- 43.6 Medium-Density Multi-family Residential- 24.4 Manufactured Home Park Overlay- 20.2 Single Family Residential- 6.7 High-Density Multi-family Residential- 4.1 Heavy Industrial District- 1.0 Current Land Use: Household, Single Family Units- 30.2 Utilities- 19.1 Mobile Home Parks or Courts- 14.4 Undeveloped Land- 13.0 Household, Multi Units- 12.0 Hotels/Motels- 5.9 Parks- 4.0	WSU- 0.7	Developed, Open Space- 44.6 Developed, Medium Intensity- 39.3 Developed, Low Intensity- 12.9 Evergreen Forest- 3.2	2 OWS 0% levees	Floodway- 13.9 Floodplain- 59.4	Wetlands: none Priority Habitats and Species: none Water Quality Listings: Category 5, dissolved oxygen Category 4a, bacteria

Appendix D. Summary of Shoreline Inventory Results for the Reaches of Pine Creek within the City of Rosalia.[1]

Reach	Unit Area (Acres)	Unit Length (Feet)	Dominant Land Use Patterns (% of reach, only categories ≥1% reported)	Ownership (% of reach)	Land Cover (% of reach, only categories ≥1% reported)	Shoreline Modification (# of overwater structures [OWS]/% levees)	Floodplain and Floodway Area (% of reach)	Critical Areas (% of reach or type of occurrence, # of occurrences) & Water Quality (Cat. 4 and 5 listings reported)
Pine Creek-Rosalia Airport	0.2	0	Zoning: No data Current Land Use %: Aircraft Transportation-100	City of Rosalia-100	Cultivated Crops-100	0 OWS 0% levees	none	Wetlands: none Priority Habitats and Species: none Water Quality Listings: none
Pine Creek-Rosalia Residential/Open Space	20.0	1,132	Zoning: No data Current Land Use %: Food and kindred products-1.76 Household, single family units-24.82 Open space classified under chapter 84.34 RCW-73.41	No data	Developed, Low Intensity-19.4 Developed, Medium Intensity-1.6 Developed, Open Space-77.6	0 OWS 0% levees	Floodway-30.7 Floodplain-96.6	Wetlands: none Priority Habitats and Species: none Water Quality Listings: none
Pine Creek-Rosalia City Park	9.5	799	Zoning: No data Current Land Use %: Parks-100	No data	Cultivated Crops-37.5 Developed, Low Intensity-8.9 Developed, Open Space-53.5	0 OWS 0% levees	Floodway-27.9 Floodplain-79.9	Wetlands: none Priority Habitats and Species: none Water Quality Listings: none
Pine Creek-Rosalia Agriculture	17.3	1,741	Zoning: No data Current Land Use %: Agriculture classified under current use chapter 84.34 RCW-90.59 Recreational activities-9.26	No data	Cultivated Crops-45.8 Developed, Medium Intensity-6.3 Developed, Open Space-47.9	0 OWS 0% levees	Floodway-45.1 Floodplain-76.6	Wetlands: none Priority Habitats and Species: none Water Quality Listings: Category 5 for bacteria and dissolved oxygen

[1] Data sources, assumptions, and limitations summarized in Appendix C.