

Shoreline Restoration Plan

Shoreline Master Program Update

Asotin, Washington



This SMP Update is being funded by
Washington Department of Ecology
Grant #G1400537
(Deliverable for Task 8)

February 2016

Prepared by

AECOM

111 SW Columbia
Suite 1500
Portland, Oregon 97201
Project# 25698079

With review by

 **KELTIC**
ENGINEERING, INC.

1.	INTRODUCTION	3
1.1	Overview: Shoreline Restoration in the SMP Update Process	3
1.2	Context for the City of Asotin.....	4
1.3	Existing Shoreline Conditions.....	4
1.4	Summary of Limiting Factors	6
1.5	Required Elements of Restoration Planning for SMP Updates	7
2.	RESTORATION GOALS AND SUPPORTING POLICIES.....	7
3.	EXISTING AND POTENTIAL FUTURE RESTORATION PROJECTS AND PROGRAMS.....	8
3.1	Ongoing Projects and Programs that Support Shoreline Restoration	8
3.2	Additional Projects and Programs Needed to Achieve Shoreline Restoration Goals	14
4.	RESTORATION OPPORTUNITIES AND PRIORITIES.....	14
4.1	Restoration Opportunities.....	14
4.2	Restoration Priorities.....	15
4.3	Restoration Approaches	17
5.	IMPLEMENTATION PLAN	20
5.1	Potential Restoration Partners	20
5.2	Potential Sources of Funding.....	22
5.3	Timeline and Benchmarks	24
6.	MONITORING AND MAINTENANCE	25
6.1	Monitoring Plan.....	25
6.2	Maintenance.....	25
7.	REFERENCES	26

Tables

Table 1. Summary of Factors Limiting the Proper Functioning Condition of the Snake River and Asotin Creek in the City of Asotin, WA6

Table 2. Required Elements of Restoration Planning for SMP Updates.....7

Table 3. Existing Restoration Projects and Programs in the Middle Snake River or Asotin Creek 11

Table 4. Shoreline Restoration Opportunities for the City of Asotin 16

Table 5. Native Species Suitable for Shoreline Restoration 18

Table 6. Existing Partnership Opportunities..... 20

Figures

Figure 1 Watershed Vicinity

Figure 2 Shoreline Restoration Opportunities

Appendices

Appendix A Representative Photographs

1. Introduction

1.1 Overview: Shoreline Restoration in the SMP Update Process

Under the Washington State Shoreline Management Act (SMA), each city and county with "shorelines of the state" must adopt a Shoreline Master Program (SMP) based on state laws and rules but tailored to the specific geographic, economic, and environmental needs of the community. One of the primary goals that must be addressed in an SMP update is how to achieve "no net loss of ecological shoreline functions necessary to sustain shoreline natural resources" (Ecology 2004). This shoreline restoration plan describes actions intended to compensate for anticipated future shoreline habitat degradation associated with development and increased land use pressure. Incorporating shoreline restoration planning into the SMP update process allows the City of Asotin (Asotin) to balance anticipated shoreline habitat degradation and enhancement in a manner that maintains the overall existing ecological condition of shorelines.

Within Asotin, Snake River and Asotin Creek fall under the jurisdiction of the SMA. Because they both have a mean annual flow greater than 200 cubic feet per second, they meet the definition of "Shorelines of Statewide Significance." There are no lakes in Asotin that fall under the jurisdiction of the SMA.

Updating the SMP involves several elements, including a baseline inventory of regulated shoreline areas, an assessment of key issues and opportunities for improvement within such areas, and a restoration plan to provide guidance for carrying out restoration in a comprehensive manner. The baseline characterization and the assessment of key issues and opportunities have been completed by AECOM (formerly URS Corporation) in coordination with Keltic Engineering and Asotin's Planning Department.

This restoration plan establishes overall goals and objectives for citywide shoreline restoration efforts. It addresses degraded areas and impaired ecological functions identified in the inventory and analysis report, identifies and prioritizes restoration opportunities, and prescribes generalized treatment options for various restoration scenarios. The plan also identifies current and ongoing programs that can contribute to achieving these goals, as well as additional projects or programs necessary for success. Lastly, this plan seeks to develop a draft implementation strategy, including funding options, proposed timelines, adaptive management, and benchmarks. The plan is based on the inventory and characterization report and a review of other plans and assessments aimed at improving the ecological health of the Snake River and Asotin Creek.

The term "restoration" has many definitions, both scientific and regulatory. For the purpose of this plan, restoration is defined as:

the reestablishment or upgrading of impaired ecological shoreline processes or functions. This may be accomplished through measures including, but not limited to, revegetation, removal of intrusive shoreline structures and removal or treatment of toxic materials.

Restoration does not imply a requirement for returning the shoreline area to aboriginal or pre-European settlement conditions. (Washington Administrative Code [WAC] 173-26-020(27))

Under the SMP, Asotin's role in shoreline restoration includes collaborative planning, regulation, preservation of high quality shoreline areas, and assistance in community efforts to restore degraded portions of Asotin's shorelines.

A well-designed restoration plan can help local governments meet the "no net loss" standard in the SMP Guidelines. Restoration planning must therefore include monitoring to ensure that intended restoration actions are offsetting the expected loss of function that will occur from incremental shoreline impacts sustained over time (Ecology 2010).

1.2 Context for the City of Asotin

Per WAC 173-26-201(2)(f), the process to prepare a restoration plan may vary significantly among local jurisdictions depending on a variety of factors including size of the jurisdiction; extent and condition of shorelines; the availability of grants, volunteer programs, or other tools for restoration; and the nature of the ecological functions to be addressed. Asotin contains a relatively small area of shoreline jurisdiction and, as a small town, has few resources available for implementing and monitoring a shoreline restoration program. Further, the entirety of the Snake River shoreline in Asotin is owned by the U.S. Army Corps of Engineers (USACE); thus, any improvements in this area will be at the discretion of the USACE, unless portions of the shoreline area are reacquired by the City. Given these factors, it is expected that Asotin will approach the balance of degradation and restoration to achieve no net loss of shoreline ecological functions in the following ways:

- Requiring restorative mitigation for shoreline substantial developments
- Coordinating with the USACE to include provisions for enhancement of shoreline habitats in management plans for the Snake River
- Supporting local conservation organizations with local watershed enhancement projects
- Managing stormwater and treated sewer water to improve water quality in receiving waters.
- Educating local residents about water quality issues and the activities that may improve water quality

This restoration plan is focused on identifying restoration opportunities, ranking those opportunities, and identifying partnerships, planning elements, and grant options to implement those opportunities.

1.3 Existing Shoreline Conditions

Asotin spans an approximately 10,000-foot-long portion of the south bank of Snake River and a 3,500-foot-long portion of Asotin Creek. The SMP jurisdiction includes approximately 180 acres of lands along these waterbodies. Existing land use within the shoreline jurisdiction includes a large

open space area and a wildlife mitigation area, which are administered by the USACE; public parks that are leased from the USACE by the City, residential zones; and low- to high-intensity commercial zones. Thus, the shorelines contain both public and private ownership.

Major shoreline modifications along the Snake River include shoreline fill associated with prior development, a constructed side channel (Asotin Slough), a boat ramp and parking area, a breakwater, a dock, a public marina, and wastewater treatment plant infrastructure. Along Asotin Creek, a federally authorized levee has been constructed on the southeast side the creek, and substantial fill has been placed along the west side of the creek for flood hazard reduction. Residential and commercial development has converted much of the protected Asotin Creek floodplain into buildings, landscaping (lawns), public park, or streets. The old mill property located south of Asotin City Park has been filled in for flood protection.

A detailed description of the physical, biological, and ecological shoreline characteristics within the City is included in the *Asotin Shoreline Inventory and Characterization Report* prepared for the Asotin SMP update (URS and Keltic Engineering 2014). Generally, shorelines along both the Snake River and Asotin Creek are highly altered by modifications for flood control. The Snake River banks are overly steep and reinforced with riprap. A system of riprap and earthen dikes line both sides of Asotin Creek. As a result of these alterations, both the Snake River and Asotin Creek lack the hydraulic roughness provided by dense woody vegetation, large woody debris, or boulders. Riparian forest habitat is located at the Asotin Slough Wildlife Management Unit and around the confluence of Asotin Creek and the Snake River at Chief Looking Glass Park. Between these forest patches at either end of town there is a thin band of riparian willow shrubs along the shoreline and, above this, large areas of degraded upland grassland habitat. Asotin Creek supports a thin but continuous band of riparian trees along both banks of the creek through town; however, riparian growth near existing levees is discouraged by levee maintenance practices. Water quality in both the Snake River and Asotin Creek is considered impaired; both waters are listed on the Clean Water Act 303(d) Water Quality Impaired Surface Waters list for several water quality parameters, including temperature, pH, pesticides (Snake River), and fecal coliform bacteria (Asotin Creek). Downstream dams on the Snake River have resulted in excessive sediment accumulation within Asotin's marina in Chief Looking Glass Park; the marina is currently not functional, as alluvial deposition has eliminated the connection to the river.

As mentioned in Section 1.2, the Snake River waterfront in Asotin is owned by the USACE, which acquired most of the land for flood control prior to the construction of the Lower Granite Dam (pers. comm. Alison Needham [USACE], October 17, 2014). Portions of this waterfront are leased back to Asotin for public uses, including sports fields, the water treatment plant, and the marina. In December 2013, the USACE granted the City a 25-year lease extension; the current lease expires in 2046. The City, however, is actively pursuing opportunities to reacquire ownership of the marina, back from the USACE, in order to have more direct management control over what the City sees as an important piece of their local economy.

1.4 Summary of Limiting Factors

Limiting factors are environmental variables whose presence, absence, or abundance restricts the distribution, numbers, or condition of one or more organisms (Webster 2007). These factors impair ecosystem processes and limit the capacity of ecological functions. Restoration activities should be developed to address the cause of these limiting factors, where possible. Table 1 provides a summary of limiting factors for the shoreline ecosystems in Asotin, based on shoreline observations and existing natural resource assessments and watershed plans reviewed while preparing the *Asotin Shoreline Inventory and Characterization Report* (URS and Keltic Engineering 2014).

Table 1. Summary of Factors Limiting the Proper Functioning Condition of the Snake River and Asotin Creek in the City of Asotin, WA

Limiting Factor	Assumed Cause(s)
High summer water temperature (303(d))	Lack of riparian cover, low/restricted flows, irrigation withdrawals, high air temperatures
Lack of riparian cover	Adjacent land management (Hwy 129 corridor right-of-way [ROW] maintenance), levee maintenance (vegetation removal), concentrated pedestrian recreation, non-native species establishment, historical clearing, flood and fire damage
Fecal coliform bacteria (303(d))	Asotin Creek only: Improperly functioning septic systems, livestock, wildlife, stormwater runoff, and upstream regional influences
Low dissolved oxygen (303(d))	Snake River only: Eutrophication due to high nutrient inputs from fertilizer in stormwater runoff, upstream agriculture, and livestock; low flow in slack water portions of river
Contaminants (PCBs, dioxin, pesticides)	Upstream agricultural operations, point/non-point source pollution, stormwater runoff
Erosion/Sedimentation	Snake River: Downstream hydroelectric development Asotin Creek: Upstream land use (fires, grazing, cropland, forestry)
Presence/spread of noxious vegetation that displaces higher functioning native habitat	Prior introductions, upstream seed sources, funding insufficient to treat cause or contain existing populations
Lack of habitat complexity	Bank hardening, disconnection from floodplain, historical riparian clearing, flood and fire damage

Restoration activities that may address these limiting factors include the following:

- implementing agricultural best management practices (BMPs) to reduce erosion
- enhancing and restoring riparian buffers
- managing livestock to exclude access to riparian zones
- implementing stormwater management practices for new development and ongoing stormwater treatment
- supporting streambank restoration projects, including plant installations
- educating local residents about water quality issues and the activities that may improve water quality

1.5 Required Elements of Restoration Planning for SMP Updates

The state guidelines (WAC 173-26-201(2)(f)) provide six necessary elements for a complete shoreline restoration plan. These elements are summarized in Table 2 with reference to the section of this report in which that element is addressed.

Table 2. Required Elements of Restoration Planning for SMP Updates

Shoreline Restoration Plan Elements for SMP Updates	Section in this Report
Identify degraded areas, impaired ecological functions, and sites with potential for ecological restoration.	Section 3: Existing and Ongoing Projects and Programs Section 5: Restoration Opportunities
Establish overall goals and priorities for restoration of degraded areas and impaired ecological functions.	Section 2: Restoration Goals and Supporting Policies Section 4: Prioritization Methodology
Identify existing and ongoing projects and programs currently being implemented that are designed to contribute to local restoration goals.	Section 3: Existing and Ongoing Projects and Programs
Identify additional projects and programs needed to achieve local restoration goals and implementation strategies, including identifying prospective funding sources for those projects and programs.	Section 3: Existing and Ongoing Projects and Programs Section 6: Implementation Plan
Identify timelines and benchmarks for implementing restoration projects and programs and achieving local restoration goals.	Section 6: Implementation Plan
Provide for mechanisms or strategies to (1) ensure that restoration projects and programs will be implemented according to plans and (2) appropriately review the effectiveness of the projects and programs in meeting the overall restoration goals (e.g., monitoring of restoration project sites).	Section 7: Monitoring and Maintenance

2. Restoration Goals and Supporting Policies

The goal and policies of this plan direct the course of Asotin’s shoreline restoration efforts and are intended to support proposed SMP Conservation Goal C1: *“Identify and protect areas of high value shoreline habitat and support ongoing watershed enhancement projects in Asotin and on Asotin Creek to ensure that the net shoreline ecological functions are preserved or enhanced throughout the future shoreline planning period.”*

Restoration Goal 1: **Restore native habitats or natural processes, where degraded, to improve shoreline ecological functions.**

Restoration Plan Policy 1: *Summarize degraded shoreline areas and functions documented by previous assessments.*

This plan documents degraded shoreline functions and identifies potential restoration opportunities.

Restoration Plan Policy 2: *Prioritize restoration opportunities to identify projects with greatest benefit to shoreline areas.*

In order to most effectively proceed with restoration efforts, this plan prioritizes restoration opportunities in terms of overall benefit to the waterway. Restoration priorities are based on an assessment of limiting factors (as summarized in Section 1.4), in combination with the ease of project implementation (e.g., on public land), project size, and available funding. Prioritization methods are described in Section 4.

Restoration Plan Policy 3: *Establish an implementation strategy.*

As directed by WAC 173-26-201(2)(f)(iii-iv), an adequate restoration plan must identify potential restoration partners, potential funding mechanisms, timelines, and benchmarks. Together, these elements comprise an implementation strategy. This plan includes these elements and organizes them to facilitate a workable implementation strategy.

Restoration Plan Policy 4: *Identify existing and prospective projects and programs that are contributing or likely to contribute towards local shoreline restoration efforts.*

This plan includes an assessment of the existing project and programs to determine where gaps exist with regard to achieving the goal of this plan. This plan then describes additional projects and/or programs that have the potential to fill in those gaps.

Restoration Plan Policy 5: *Work with public and private partners to encourage restoration and enhancement of Asotin's shoreline areas.*

Asotin will work to establish partnerships with public and private groups on specific restoration projects and/or programs, as funding allows.

Restoration Plan Policy 6: *Monitor success of restoration activities and adapt strategies based on monitoring results.*

This plan establishes a monitoring protocol to evaluate Asotin's effectiveness to implement the restoration plan and meet the overall restoration goal. Monitoring data may be used to identify successful project designs that serve as examples for future restoration projects; conversely, where monitoring data documents a failed design, the data will be used to modify the strategy for subsequent restoration design projects.

3. Existing and Potential Future Restoration Projects and Programs

3.1 Ongoing Projects and Programs that Support Shoreline Restoration

There are existing and ongoing projects and programs that are contributing or likely to contribute towards local shoreline restoration efforts within the Middle Snake River watershed, which includes Asotin Creek. There are also additional projects and programs that, in combination with

existing projects and programs, would help meet the goals of this plan and address the limiting factors described in Section 1.4.

The following agencies and groups provide resources for stream and terrestrial shoreline habitat restoration. They are described in order from federal, to state, to local organizations. Following this, entities with known restoration projects or programs in the vicinity of Asotin are summarized in Table 3.

Natural Resources Conservation Service

The National Resource Conservation Service (NRCS) regularly works with private landowners to protect water quality by offering advice and incentives for habitat preservation and restoration. The NRCS Service Center in Clarkston can work with landowners along the Snake River or Asotin Creek. The following programs offered by the NRCS may be used to help enhance or restore shoreline ecological functions:

- Watershed Conservation/Habitat Restoration Program
- Agricultural Conservation Easement Program (Wetland Reserve Easement)
- Wetland Reserve Enhancement Partnership
- Environmental Quality Incentives Program (EQIP)
- Watershed Program

Washington State Department of Fish and Wildlife

The Washington Department of Fish and Wildlife (WDFW) is an agency that works to monitor and maintain the health of the state's fish and wildlife populations. The agency has a regulatory role through its hunting and fishing licensing program and its Hydraulic Project Approval permit program. The agency also maintains mapping data to document the location and extent of rare species and sensitive habitats. Money generated through its permit programs is used to fund the following programs, which may incentivize shoreline restoration activities:

- Hydraulic Mitigation Fund
- Aquatic Lands Enhancement Account
- Regional Fisheries Enhancement Groups
- Backyard Wildlife Sanctuary Program
- Landowner Incentive Program
- Watershed Stewardship Program

Washington State Department of Natural Resources

The Washington State Department of Natural Resources (DNR) is the steward of Washington State's natural resources, including state-owned aquatic lands. As part of its stewardship, the agency has implemented an Aquatic Restoration Program that works to restore, enhance, create, and protect healthy ecological conditions in aquatic systems through partnerships with agencies and organizations.

Washington State Department of Ecology

The Eastern Region of the Washington State Department of Ecology (Ecology) is involved in maintaining water quality for the Snake River Watershed (Water Resource Inventory Area [WRIA] 35). Portions of the Snake River do not meet Washington State's water quality standards for temperature, dissolved oxygen, pH, and contaminants, including total polychlorinated biphenyls (PCBs), 2,3,7,8 TCDD (dioxin), and pesticides (Ecology 2014). Asotin Creek, from the mouth to the confluence of the North and South Forks (river mile 14.9), is listed for fecal coliform bacteria, temperature, and pH (Ecology 2014).

Poor water quality is attributed to agriculture, hydroelectric development on the Snake River, stormwater runoff, upstream forestry, and other land uses that may generate erosion or pollution. Ecology can help to address water quality issues within the watershed to establish a Total Maximum Daily Load (TMDL) to set limits and targets for water quality parameters. Ecology can also help develop an implementation plan to identify key projects that will improve water quality within the watershed, which should help improve water quality in Asotin.

Ecology also provides financial assistance for water quality improvement projects through its Centennial Grant Program, Clean Water Act Section 319 Grant Program, Husseman Grants, Floodplains by Design program, and the Clean Water State Revolving Fund Loan Program. These grant programs can be used to help fund stream and riparian restoration projects, as well as clean water infrastructure projects, including wastewater treatment facilities. See Section 6.2 of this plan for more information on grant funding opportunities.

Asotin County

Asotin County can provide technical assistance and tools to help landowners manage and protect land and water resources throughout Asotin County. The County can help spread information and awareness of issues in the watershed and establish future management guidelines on private lands.

Asotin County Conservation District

The Asotin County Conservation District (ACCD) provides technical and financial assistance to landowners and others to protect and improve environmental quality. In 2013, the ACCD (located 6 miles north in Clarkston, WA) received over \$350,000 in funding from the Washington State Conservation Commission to address water quality issues, and over \$400,000 from the Salmon Recovery Funding Board. The ACCD also administers a cost-share program, to partially reimburse landowners for approved conservation projects.

The Asotin Creek Model Watershed Master Plan was completed in 1994 by a landowner steering committee for the ACCD with technical support from various Federal, State and local entities. The plan seeks to improve the Asotin Creek ecosystem using various actions that include: 1) create more pools, 2) increase the amount of large organic debris, 3) increase the riparian buffer zone through tree planting, and 4) increase fencing to limit livestock access. These actions are intended to stabilize the river channel, reduce sediment input, increase the amount of available fish habitat

(adult and juvenile) and protect private property.

Snake River Salmon Recovery Board

In collaboration with various salmon recovery groups and agencies, the Snake River Salmon Recovery Board (SRSRB) implements the Asotin Creek Intensively Monitored Watershed (IMW) project. Asotin Creek was chosen as a site to develop an IMW program, the purpose of which is to implement stream restoration actions in an experimental framework. By intensively monitoring salmon recovery based on pre and post restoration actions, it is expected that the SRSRB will be able to determine causal relationships between specific restoration actions and fish recovery, and that the lessons learned can be applied to other watersheds in the region.

Washington State University Extension Asotin County

The WSU Extension, in in cooperation with state and federal agencies, strives to deliver education and technical assistance to stakeholders in order to improve stewardship and protection of natural resources.

Table 3. Existing Restoration Projects and Programs in the Middle Snake River or Asotin Creek

Responsible Entity	Project/Program	Summary
Snake River Salmon Recovery Board (with support from WDFW, Forest Service, and ACCD).	Asotin Creek Intensively Monitored Watershed (IMW) study	The IMW study began in 2008. It began by installing a variety of aquatic habitat restoration measures in Asotin and Charley Creeks. After installation, multiple stream health indicators, such as temperature and winter steelhead counts, will be monitored for several years. The study will help fishery managers and restoration professionals understand what how effective the various restoration measure were.
Asotin County Conservation District	Conservation Reserve Enhancement Program (CREP)	Administered by USDA Farm Service Agency, CREP targets high-priority agricultural conservation issues. In exchange for removing environmentally sensitive land, such as aquatic habitats, from active agricultural use, and introducing conservation practices, farmers, ranchers, and ag. land owners are paid an annual rental rate. Participation is voluntary and contract period is usually 10-15 years.

	In-stream Restoration	In 2005, 5,115 feet of natural channel design was completed on lower section of George Creek for steelhead passage. Installation of weir, cross vanes, J-hooks, 1730 feet of channel plugs, and 1211 feet of floodplain roughness. Also enrolled in CREP, planted with trees, shrubs, and grass, and fenced.
	Small Acreage Program	ACCD will assist landowners in developing a resource plan to manage small acreage properties. Cost-share program provides financial assistance to eligible landowners.
	WDFW and USFW water monitoring	ACCD is supporting the Asotin Creek IMW study by monitoring four sites on Asotin Creek to monitor restoration projects and understand the creek's sediment regime.
	Information and education	The ACCD provides landowners with information about watershed, conservation practices, and conservation cost-share opportunities. This includes placement of project signs to promote conservation practices, tours to showcase conservation activities in the watershed, and activities such as Envirothon and "Salmon in the Classroom" projects.
WDFW	Spawning Surveys	WDFW is conducting surveys to determine distribution and relative abundance of steelhead redds in Asotin County streams. Electro-fishing and snorkel surveys completed to determine distribution and abundance of salmonids in Asotin Creek. Also monitors spring and summer water temperatures and stream discharge (in coordination with ACCD)
Ecology	Phase IV and WRIA Implementation Grants	Funding at the watershed level through watershed enhancement, water quality, and floodplain

		grants.
	Stormwater Control Measures	Ecology regulates control measures outlined in Stormwater Management Plans to reduce pollutants delivered to stormwater systems through source control activities.
	Asotin Creek Fecal Coliform Study	Ecology has been involved in the monitoring of fecal coliform (FC) in Asotin Creek. Monitoring determined that no significant source of FC in lower reaches of Asotin Creek; but potential anthropogenic source on George Creek. Recommended further monitoring to determine source of FC.
Asotin County Noxious Weed Board	Asotin County Early Detection Project	Funded by Rocky Mountain Elk Foundation, the early detection project seeks to identify and treat noxious weed populations in the county before they spread. The project is cooperative; crews treat populations that cross ownership boundaries (e.g., private, County, USFS, WDFW) for “seamless” treatments in large areas.
USACE	Lower Granite Master Plan	The USACE Resource Management Section manages natural resources associated with the Lower Granite Dam Master Plan. Includes plans for wildlife habitat development, natural resource preservation, vegetation management, and fish and wildlife management.
	Programmatic Sediment Management Plan (PSMP)	In 2014, The final PSMP was authorized to address both system improvements and maintenance measures. The preferred PSMP alternative will address immediate maintenance dredging needs but will also include proactive monitoring and planning to address potential sediment accumulation issues proactively, rather than waiting for them to become a future problem.

3.2 Additional Projects and Programs Needed to Achieve Shoreline Restoration Goals

The following projects and programs could augment ongoing projects and programs to address the limiting factors and, thereby, meet the shoreline restoration goal described in Section 2:

- Encourage landowners along the shoreline to work with Asotin County and the NRCS on restoration or conservation incentives in shoreline areas.
- Coordinate with WDFW to direct wildlife mitigation funds towards shoreline enhancement projects within Asotin and/or develop habitat enhancement strategies to offset impacts associated with proposed projects in shoreline areas.
- Incorporate shoreline restoration into proposed capital improvement projects located in shoreline areas.
- Work with the USACE to develop a reasonable approach to management of sediment along the Asotin waterfront and especially in proximity to the Asotin marina.

Capital improvement projects, such as future sewer treatment facilities and bridges, have the potential to be planned and funded to include an element of shoreline restoration. When discussing justification for the spending of tax dollars on shoreline restoration elements of future capital improvement projects, this plan may be referenced as it describes the role of shoreline restoration under the SMP.

Landowners in Asotin may be able to access funding for implementing conservation practices to protect water quality and reduce soil erosion. Conservation practices allow agricultural producers and landowners to maintain the economic viability of their property. These practices will also help protect soil, air, and water, while improving habitat for fish and wildlife.

4. Restoration Opportunities and Priorities

4.1 Restoration Opportunities

There are limited site-specific opportunities for shoreline restoration within Asotin due to federal ownership and management of the majority of Snake River shoreline and existing levees on Asotin Creek that must be kept clear of woody vegetation to maintain levee certification.

Due to the federal management of the Snake River shoreline, most of the federal shoreline management activities are exempt for SMA jurisdiction. Only activities on those federal lands that are leased back to, or otherwise managed by, Asotin (or eventually deeded back to the City) would need to comply with SMA regulations. Currently, the only federal shorelands managed by the City include Chief Looking Glass Park (including the marina), Asotin City Park, and the water treatment plant. Future park or water treatment plant developments have the potential to incorporate

shoreline restoration actions. Shoreline restoration opportunities also exist throughout the open space managed by the USACE in town. These include weed management, native plantings, and the removal of concrete fill material. However, any shoreline restoration activity along the Snake River would require the coordination and approval of the USACE.

Water quality and habitat conditions in Asotin Creek are affected by upstream watershed conditions. Because of the lack of in-town restoration opportunities, the City's support for upstream watershed restoration efforts may be one of its best options for improving overall habitat conditions in Asotin Creek through town. Upstream enhancements have the potential to improve habitat conditions and reproductive success for salmonids that migrate through town. Upstream habitat enhancements may also decrease water temperatures and stabilize soils that might otherwise erode upstream and deposit in town. Similarly, coordination with the USACE to manage sediment and flows in the Snake River may have the most potential to enhance shoreline ecological functions.

The following restoration opportunities draw directly from watershed restoration plans and direct site observations collected during the shoreline inventory study. These are *opportunities* for shoreline restoration for Asotin's consideration as the plan is implemented. As restoration opportunities identified in this plan are voluntary and subject to available funding, Asotin is not obligated to implement these opportunities directly. However, Asotin should reference these potential projects when reviewing shoreline development proposals, assessing flood hazard mitigation opportunities, or discussing shoreline restoration projects with interested parties. Asotin can incorporate shoreline restoration into prospective projects and track such progress, to document compliance with the shoreline restoration element of the SMP.

4.2 Restoration Priorities

The prioritization methodology described in Table 4 above is based on general estimates of benefit and practicability, given the small city staff size and resources for shoreline restoration. Those opportunities that have the greatest potential to result in enhanced stream or riparian habitat conditions, in town or upriver of town, were given the highest priority score (1 being the highest).

Error! Reference source not found. summarizes restoration opportunities for the City of Asotin. For each opportunity, the cause of degradation, conceptual restoration strategy, and restoration priority are provided. Restoration opportunities within Asotin can be seen on Figure 2.

Table 4. Shoreline Restoration Opportunities for the City of Asotin

Restoration Opportunity	Primary Cause of Degradation	Conceptual Restoration Approach	Priority
Snake River			
Coordinate with USACE to manage sediment deposition around Asotin marina.	Hydroelectric dams have altered Snake River flows resulting in more sedimentation in Asotin’s marina. As a result, periodic dredging is needed to maintain the marina access. Dredging along the shoreline can result in negative direct and indirect effects on salmonids.	Coordinate with USACE to implement and maintain sediment diversion features or other engineered remedies designed to divert sediment from the marina area.	1
Remove and restore informal boat launch access once marina is functional	Due to siltation of the marina, an informal access road has been created around the west side of the marina for boat launches. This has removed riparian vegetation, and increase soil erosion.	In the marina redevelopment plan, include removal of the informal access road and subsequent landscaping with native riparian trees and shrubs.	2
Establish native riparian vegetation where possible	Several gaps in the existing riparian forest cover were noted; likely as a result of historical development, concentrated recreational use, and historical clearing. Non-native and invasive weeds are added stressors in these locations.	Control noxious weeds; plant woody riparian species. See potential sites around Chief Looking Glass Park on Figure 2.	3
Restrict heavy boat traffic near mouth of Asotin Creek during critical salmon migration periods	Excessive recreational boat traffic near the mouth of Asotin Creek can reduce the entry of Summer steelhead migration	Place signs in marina noting requests to give area around mouth of Asotin Creek a buffer during critical summer migration period	4

Asotin Creek			
Restore native riparian vegetation and enhance in-stream habitat conditions where possible along Asotin Creek and upstream tributaries (outside of maintained levee areas)	Non-native and invasive weeds, levee construction, residential and park development, agriculture, concentrated recreational use, historical clearing, flood and fire damage	Coordinate with local conservation groups identified in Section 5.1 to support efforts to Control noxious weeds, plant woody riparian species, enhance stream conditions, and erect riparian fencing to limit/eliminate livestock access to waterways.	1
Look for opportunities to enhance native riparian vegetation in and around levees.	Federal guidelines for levee maintenance require that woody vegetation be cleared on and around levees to prevent levee destabilization. Failure to maintain (clear) vegetation on levees can lead to the loss of affordable floodplain insurance through the Federal Emergency Management Agency (FEMA).	Continue to work with the regional levee roundtable to seek opportunities for riparian plant establishment in or around levees.	2
Minimize pollutant loading to Asotin Creek and upstream tributaries	Agriculture in upper watershed, point/non-point source pollution, stormwater inputs, improperly functioning septic systems	Work with regional TMDL working group to develop TMDL water quality implementation plan; improve stormwater controls; work with landowners to review pesticide and fertilizer use and to implement best management practices; restrict cattle grazing in native conservation portion of shoreline zone.	3

4.3 Restoration Approaches

This section provides generalized restoration information associated with the conceptual approaches, noted above in Table 4, to aid in developing site-specific restoration plans.

Riparian Plantings

Native riparian plantings usually enhance the quality of riparian habitats. The quality of riparian habitat promotes several beneficial functions to both the terrestrial and aquatic habitat components. These include pollutant filtering, wildlife habitat (cover, food, roosting), habitat connectivity, shading/temperature control of water, and input of organic matter (e.g., leaf litter) that provides food web support to aquatic species, including support for benthic invertebrates (Covich et al. 1999). Benthic invertebrates, or insects that live in the river soils, are a primary food source for native fish.

Planning for riparian planting projects must address physical and ecological site conditions such as soil stability, moisture availability, and aspect (amount of sun). Successful riparian plantings require appropriate species selection for a given set of local site conditions. Some species are found more commonly on the north, dry banks of the Snake River and Asotin Creek, while others prefer the less-exposed southern banks. Certain species grow near the river edge while others prefer the elevations slightly above the water but where roots can reach the seasonally low water table. For these reasons, a qualified ecologist with riparian planting experience should assist with developing planting plans for specific areas whenever possible. The riparian species in Table 5 provide a general starting point for a riparian establishment project planning. These native species are adapted to the environmental conditions in the vicinity of Asotin.

Table 5. Native Species Suitable for Shoreline Restoration

Scientific Name	Common Name	Plant Type
<i>Acer glabrum</i>	Rocky Mountain maple	Tree
<i>Alnus tenuifolia</i>	Thinleaf alder	Tree/Shrub
<i>Pinus ponderosa</i>	Ponderosa pine	Tree
<i>Crataegus douglasii</i>	Black hawthorn	Tree/Shrub
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	Black cottonwood	Tree
<i>Populus tremuloides</i>	Quaking aspen	Tree
<i>Physocarpus malvaceus</i>	Mallow ninebark	Shrub
<i>Ribes aureum</i>	Golden currant	Shrub
<i>Rosa woodsii</i>	Woods rose	Shrub
<i>Salix exigua</i>	Coyote willow	Shrub
<i>Salix lasiandra</i>	Pacific willow	Shrub
<i>Salix rigida</i> var. <i>mackenzieana</i>	Mackenzie willow	Shrub
<i>Symphoricarpos albus</i>	Snowberry	Shrub
<i>Agropyron spicatum</i>	Bluebunch wheatgrass	Grass
<i>Bromus carinatus</i>	Mountain brome	Grass
<i>Poa sandberii</i>	Sandberg bluegrass	Grass
<i>Festuca idahoensis</i>	Idaho fescue	Grass
<i>Koeleria cristata</i>	Junegrass	Grass
<i>Sitanion hystrix</i>	Squirrel-tail grass	Grass

Noxious Weed Control

Noxious weed control is an essential component of riparian vegetation maintenance and restoration. Native vegetation in many areas throughout Asotin has the potential to re-establish by itself, but competition from non-native and noxious vegetation in many areas is sufficient to prevent its successful growth.

Establishing native vegetation in areas where weeds are prevalent requires careful site preparation and noxious weed maintenance. Given realistic constraints on long-term site maintenance, the best opportunity to control noxious weeds is to install native plants that can compete against the weed(s), and in the best-case scenario, outcompete (i.e., shade out) weeds. The goal should be to establish a “weed-resistant” plant community to the maximum extent possible. The use of herbicides may be warranted in areas dominated by high densities of noxious weeds, namely yellow starthistle (*Centaurea solstitialis*). An Integrated Pest Management approach to establishing favorable conditions for native plants and controlling invasive plants should be used. Several references are available on weed control, and specialists with the County can likely suggest acceptable control strategies.

Stormwater Runoff Containment

Stormwater runoff impairs local streams in several ways. In urban areas, stormwater transports nutrients from fertilized yards; sediments and pollutants from roads and parking lots; and bacteria from pet wastes. Stormwater, which travels along sun-warmed asphalt roads and other impervious surfaces, also delivers relatively warm water to streams, which is harmful for salmon. Rural stormwater transports nutrients from agricultural fertilizer, bacteria from livestock and wildlife, and sediments from plowed fields. Stormwater runoff also causes local creeks to have erratic flows as rainfall is quickly delivered to streams resulting in short duration, high flows. These types of flow conditions result in higher bank erosion and reduced long-term flow support.

Stormwater runoff is delivered to Snake River and Asotin Creek from both point sources (coming from specific, concentrated input sites) and non-point sources (small amounts coming from multiple, uncontrolled locations). Effective solutions for treating point source inputs include improved treatment design and de-centralization of treatment locations (reduction of concentrations).

Effective solutions for non-point source stormwater treatment includes outreach and education to local landowners (both inside and outside shoreline areas). Incentives (e.g., reduced water bills, stormwater fees, labor, technical support) can also be offered to encourage land owners to infiltrate their stormwater on site, where practical.

Riparian Fencing

Effects of livestock grazing on riparian and stream ecosystems can include reduction or removal of vegetation, introduction of non-native or noxious weed species, increased erosion, and reduced

water quality. Effects to fish habitat include reduction of shade and cover, increases in stream temperature, changes in water quality and stream morphology, and addition of sediment through bank degradation and soil erosion (Armour et al. 1991).

Riparian fencing involves construction of fences along streams and riparian areas to limit or eliminate access by cattle or other livestock.

Sediment Management

As part of its programmatic sediment management plan (PSMP) for the Lower Snake River, in 2012 the USACE issued Appendix F titled “lower Granite Reservoir – Hydrologic and Hydraulic Investigations. This appendix included an assessment of the marina at Chief Looking Glass Park. Per Appendix F, options for reducing the sediment accumulation at the mouth of the marina, which currently blocks access to Snake River, included a spur dike extension and/or a relief channel. Based on this, the City has sought the services of an engineering firm to redesign the boat launch and design a protective jetty, floats, and breakwater.

What will be important moving forward, is that the City continue to coordinate with the USACE to ensure that upstream sources of excessive sediment are controlled and that the USACE continue to assist in the evaluation and management of sediment at the mouth of the marina.

5. Implementation Plan

This section addresses an implementation framework for Asotin’s shoreline restoration planning as per WAC 173-26-201 (2)(f)(vi). An implementation plan must include identified partners, potential funding sources, timelines, and benchmarks.

5.1 Potential Restoration Partners

The following organizations have demonstrated an interest in shoreline protection or restoration in the vicinity of Asotin. These organizations may be contacted when seeking partners for restoration project funding, construction, and/or maintenance and monitoring.

Table 6. Existing Partnership Opportunities

Organization	Summary
Washington Conservation Corps (WCC)	The WCC is an affiliate of the AmeriCorps program administered by Ecology. The WCC provides members the opportunity to develop skills in environmental restoration, trail work, environmental education, and disaster response.
Asotin Public Works	Planning for public facilities should be coordinated with the Asotin Planning involved in planning within Asotin. They may be interested in partnering on projects that conserve water, energy (shade), or enhance habitat.
Inland Northwest Land Conservancy (INLC)	INLC is a local, non-profit, non-political organization with over 450 members. Through easements, acquisitions, and by working with other conservation partners, INLT works to preserve wetlands, shorelines, farmlands, and forests in eastern Washington and

Organization	Summary
	northern Idaho.
Local Academia	Both Washington State University in Pullman, Washington, and the University of Idaho, in Moscow, Idaho, have bachelor’s and master’s degree programs in the Environmental Sciences. By coordinating with professors, Asotin may be able to create mutually beneficial relationships with students in these programs. For example, graduate students studying sediment management or water quality engineering may be invited to conduct a thesis project that provides the City with an improved understanding of options for ecological enhancement.
Sierra Club Upper Columbia River Group	The Sierra Club is a non-profit volunteer organization that has been working to protect the natural environment and communities. The club is one of the largest and most influential grassroots environmental organizations in the United States.
The Lands Council	The Lands Council is a Spokane-area grassroots, non-profit organization dedicated to protecting the quality of life in the Inland Northwest. The Lands Council has protected thousands of acres of public land, and in the process worked to preserve forests, water, and wildlife.
Snake River Salmon Recovery Board	The SRSRB was created through the Salmon Recovery Act of 1998 (RCW 77.85). The purpose of the board is to meet salmon recovery goals within the Snake River region by funding research, planning, and prioritizing regional salmon recovery efforts, and by administering state funding for on-the-ground restoration projects.
Veterans Conservation Corps	<p>The mission of the Veterans Conservation Corps is to assist veterans by providing training and volunteer opportunities that help to restore and protect Washington state’s natural resources. The Southeastern Washington coordinator can help advise on local or regional programs. Volunteer and internship opportunities can include:</p> <ul style="list-style-type: none"> • Stream restoration and monitoring • Revegetation of native plants • Restoration of watersheds, forests, prairies or native grasslands • Environmental or community education • Other protection or restoration activities
WDFW’s Habitat Program, Restoration Division	<p>The Restoration Division leads WDFW’s efforts to restore and protect aquatic ecosystems by providing scientific, engineering, and planning expertise through cooperative partnerships. The division’s focus areas include:</p> <ul style="list-style-type: none"> • Providing near shore ecosystem assessment, strategic planning, and funding assistance to local communities. • Identifying and prioritizing needed projects to remove fish passage barriers. • Providing training and guidance to local restoration project proponents to help communities inventory fish passage and successfully restore habitat. • Supporting aquatic habitat restoration by providing environmental engineering review, design, and technical guidance to public and private landowners and restoration entities.

In addition to the partnership opportunities listed above, others are likely. For example, local schools may be interested in supporting shoreline restoration projects.

5.2 Potential Sources of Funding

There are several sources of potential funding available to Asotin. This section summarizes the most likely and available funding sources.

Environmental Protection Agency:

- Five-Star and Urban Waters Restoration Program – This grant funds community-based wetland restoration having a strong “on-the-ground” component, with long-term ecological, educational, and/or socio-economic benefits to the community. This grant is available to citizen volunteer organizations, corporations, landowners, federal, state, tribal agencies, local government, charitable foundations, and youth groups. Funding levels generally range from \$20,000 to \$50,000, with \$30,000 as the average amount awarded. Each project must involve five or more partners. Apply in February for awards in July. For further information, contact USEPA Wetlands Division, 202-566-1225. Program details are available at <http://www.epa.gov/wetlands/5-star-wetland-and-urban-waters-restoration-grants>.

U.S. Fish and Wildlife Service:

- Habitat Conservation - Partners for Fish and Wildlife Program – This program provides expert technical assistance and cost-share incentives to private landowners to restore fish and wildlife habitats. Any privately owned land is potentially eligible. After signing a cooperative agreement with a minimum duration of 10 years, the landowner works one-on-one with a local USFWS biologist to develop a project plan addressing the goals and objectives of the landowner and the USFWS to benefit fish and wildlife species on his/her land. The landowner is reimbursed after project completion, based on the cost-sharing formula in the agreement. For further information contact Eastern Washington Coordinator, 11103 East Montgomery #2, Spokane, WA 99206, 509-893-8005, [Juliet Barenti@fws.gov](mailto:Juliet.Barenti@fws.gov). Program details are available at <http://www.fws.gov/partners/>.
- Upper Columbia Fish and Wildlife Office Restoration and Recovery Programs – Recovery grants are available to fund restoration, recovery, assessment, or research projects with an emphasis on well-planned “on-the-ground” projects that restore or enhance fish and wildlife and/or their habitats, benefit federally listed/candidate species and their habitats, or improve listed species numbers. Non-profits and private landowners are eligible. There is no match requirement; however, projects with some cost share or in-kind support may be prioritized. Proposals are accepted near the beginning of each fiscal year for restoration or recovery projects to be funded during that fiscal year. For further information visit <http://www.fws.gov/wafwo/promo.cfm?id=177175745>
- Snake River Salmon Recovery Board – The SRSRB has met monthly for the last 10 years to advise, recommend, and approve funding for habitat projects, monitoring programs, and administrative functions to implement the salmon recovery plan. Funding is available to for projects that address habitat conditions or watershed processes that are important to salmon recovery. Funding is available to cities, counties, conservation districts, Native

American tribes, non-profit organizations, private landowners, regional fish enhancement groups, special purpose districts, and state agencies. Application materials and submittal requirements can be found at <http://snakeriverboard.org/wpi/salmon-recovery/grant-applications/>.

Washington State Department of Ecology:

- **Centennial Clean Water Fund** – This program provides funding for activities to reduce nonpoint pollution, comprehensive planning (sewer, storm water, watershed), and/or construction point source facilities. The Fund is available to local governments, tribes, and special purpose districts such as sewer, health, and conservation districts. Funding requires a 25 percent match and is capped at \$250,000 for projects where the match is in the form of in-kind goods and services and \$500,000 for projects with a cash-only match. No match is required for loans, which are capped at \$5,000,000. Funding is awarded annually. Applications are accepted between August and October. Program details are available at www.ecy.wa.gov/programs/wq/funding/funding.html
- **Flood Control Assistance Account Program (FCAAP)** – The FCAAP funds proposals that can demonstrate a propensity for preservation, restoration, or enhancement of Endangered Species Act-listed fishery resources through planning or flood damage reduction projects. Any public entity that belongs to the National Flood Insurance Program, including towns, cities, counties, and eligible Native American tribes throughout the state are eligible. Funding is capped at \$500,000 per county per biennium and requires a 25 percent match in non-state funds for most awards. Due to state budget reductions, Ecology will be unable to offer FCAAP grants through June 30, 2017; however, there are limited funds available on an as-needed basis. Program details are available at <http://www.ecy.wa.gov/programs/sea/grants/fcaap/>.
- **Floodplains By Design Program** – This program is a public/private collaborative partnership integrating flood risk reduction with habitat protection and restoration. The program brings together people with a stake in floodplain management decisions to develop comprehensive solutions for each river with the goal of reducing flood hazards, restoring salmon populations, increasing agricultural viability, improving water quality, and enhancing outdoor recreation. Pre-proposals for can be submitted during the month of January. Pre-proposals must demonstrate flood risk reduction, ecosystem improvements, and a robust stakeholder involvement process. Strong pre-proposals will be invited to submit full applications in March. Program details are available online at: http://www.ecy.wa.gov/programs/sea/floods/planning_grants.html
- **Nonpoint Source Implementation Grant (319) Program** – This fund provides grants to local governments, Native American tribes, state agencies, and nonprofit organizations to address identified nonpoint source pollution and to improve and protect water quality. Grant funds available for each state are determined by an Environmental Protection

Agency-developed allocation formula. Grants are awarded annually. Program details are available at:

<http://www.ecy.wa.gov/programs/wq/funding/FundPrgms/Sec319/oppSec319.html>.

- Washington Coastal Protection Fund – Terry Husseman Water Quality Account – This account is used to fund environmental, recreational, and aesthetic restoration and enhancement projects. Funding is available to local governments, tribes, and state agencies. There is no match requirement and the grant limit is capped at \$50,000. Applications are accepted year-round. Program details are available at <http://www.ecy.wa.gov/programs/sea/grants/cpf/>.

Washington State Recreation and Conservation Office:

- Aquatic Lands Enhancement Account (ALEA) – This grant supports the purchase, improvement, or protection of aquatic lands for public purposes, including improved accessibility. The grant is available to local governments, state agencies, and tribes. Applicants must provide at least 50 percent in matching resources. Projects must be consistent with the local shoreline master program and must be located on lands adjoining a water body that meets the definition of "navigable." Details of this grant are available at: <http://www.rco.wa.gov/grants/alea.shtml>

5.3 Timeline and Benchmarks

As per WAC 173-26-201(c), master programs must “include planning elements that, when implemented, serve to improve the overall condition of habitat and resources within the shoreline area.” To facilitate this policy, the following steps describe a process for implementing this plan.

The first step will be to task a member of Asotin’s government with the role of being the city’s shoreline restoration liaison. This person will create a central shoreline restoration file location and there place all documents associated with efforts to coordinate, implement, or otherwise support shoreline restoration activities.

Once familiar with the goals, policies, and opportunities contained in this plan, this person would begin outreach activities. Outreach is expected to be a minimal time commitment and is likely to include a few discussions with local landowners and local conservation agencies. If landowners express an interest in shoreline conservation or restoration, the restoration liaison can help put them in touch with conservation agencies and associated restoration incentives. Applications for shoreline restoration grants described in Section 5.2 above are greatly enhanced by involving multiple stakeholders. By listing the City as a grant applicant, together with a conservation organization(s), and a private landowner, it is much more likely that a grant will be awarded.

For the shoreline properties within Asotin, the restoration liaison should determine whether landowners, including the USACE, are open to allowing access for volunteer planting efforts. If access is an option, the liaison may contact conservation organizations and volunteer groups to see if there is interest and/or grant funding available for shoreline planting projects.

Benchmarks associated with this plan include the following:

- Assign the task of shoreline restoration liaison and create a central file to track restoration activities within one year of approved SMP.
- Contact local conservation agencies, local landowners, and volunteer organizations to determine interest and availability of resources for restoration opportunities within two years of approved SMP.
- Document all restoration activities occurring within Asotin's SMP jurisdiction by December 31 each year.

6. MONITORING AND MAINTENANCE

6.1 Monitoring Plan

It is important to monitor individual restoration activities so that subsequent restoration projects can be modified based on the particular successes and failures of each completed project. When applying for restoration project funding, Asotin and partners should include funding for follow-up monitoring in the application. Monitoring results can be used to direct beneficial maintenance activities and demonstrate that Asotin is following through on the grant-funded projects. In addition, it can ensure grantors that future grant-funded restoration projects will have the benefit of lessons learned from past projects.

The USACE Ecosystem Management and Restoration Research Program describes a basic five-step monitoring process for riparian restoration projects:

- (1) Setting goals and objectives
- (2) Developing a monitoring protocol
- (3) Designing and implementing data collection
- (4) Analyzing and interpreting monitoring data
- (5) Assessing restoration efforts

This process is helpful for monitoring all shoreline projects described by this plan. Additional detail for each of the five steps is provided in the literature (Guilfoyle and Fischer 2006). In general, at least 5 years of monitoring is recommended when implementing a shoreline restoration project.

6.2 Maintenance

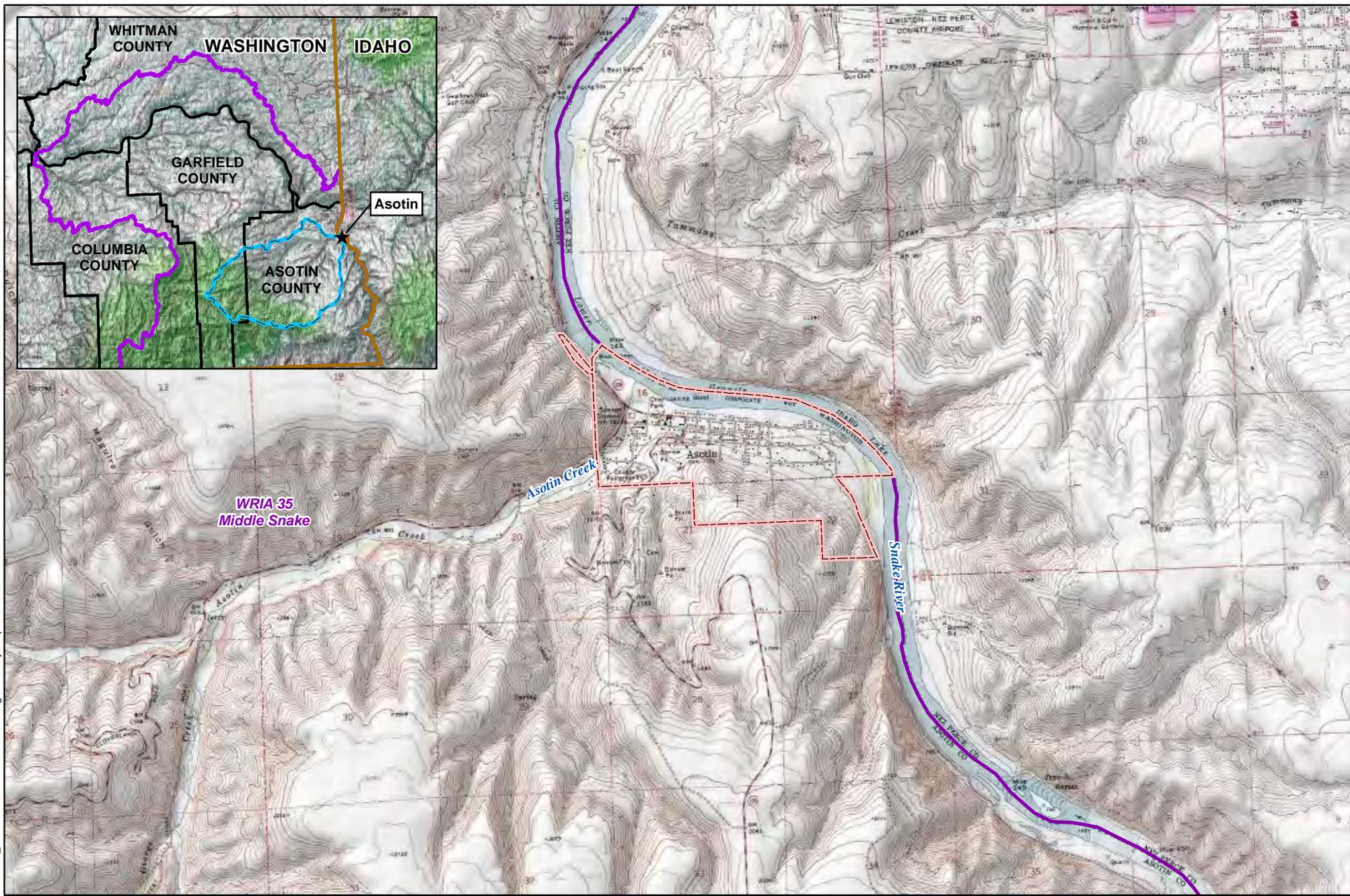
Maintenance responsibilities will depend on the specific project and the dynamics of the partnership between Asotin and its restoration partner(s). Maintenance is an important aspect of project completion. Specific maintenance activities will depend on site conditions and monitoring results. For example, restoration projects proposed at sites with identified noxious vegetation will need to control weed populations annually for several years.

7. REFERENCES

- Armour, C. L., D.A. Duff, and W. Elmore. 1991. The Effects of Livestock Grazing on Riparian and Stream Ecosystems. *Fisheries* 16: 7-11.
- Covich, A.P., M. A. Palmer, and T.A. Crowl. 1999. The Role of Benthic Invertebrate Species in Freshwater Ecosystems. *Bioscience*. Vol. 49, No. 2. February 1999.
- Ecology (Washington Department of Ecology). 2003. Introduction to Washington's Shoreline Management Act (RCW 90.58). Ecology Publication 99-113 (2003). Lacey, Washington 2 pp.
- Ecology. 2004. Restoration Planning and the 2003 Shoreline Management Guidelines. Ecology Publication #04-06-022. Lacey, Washington. 7 pp.
- Ecology. 2010. Shoreline Master Program Handbook. Ecology Publication #11-06-010. Lacey, Washington.
- Ecology. 2014. Water Quality Assessment for Washington Map Viewer. Available at: <https://fortress.wa.gov/ecy/wqamapviewer/default.aspx?res=1280x1024>. Accessed April 21, 2014.
- Guilfoyle, M. P., and R. A. Fischer. 2006. Guidelines for Establishing Monitoring Programs to Assess the Success of Riparian Restoration Efforts in Arid and Semi-Arid Landscapes. US Army Corps of Engineers Ecosystem Management and Restoration Research Program. Technical Note ERDC TN-EMRRP-SR-50
- Hoag, C., and J. Fripp. 2002. Streambank Soil Bioengineering Field Guide for Low Precipitation Areas. Prepared for the Natural Resources Conservation Service (NRCS). USDA NRCS Plant Material Center, Aberdeen, ID.
- Webster. 2007. New Millennium™ Dictionary of English, Preview Edition (v 0.9.7)
Copyright © 2003-2007 Lexico Publishing Group, LLC

Figures

K:\Asotin_SMP\MXD\Restoration Plan\Fig 1 Vicinity Map.mxd



Copyright: © 2013 National Geographic Society, i-cubed
Sources: Esri, DeLorme, USGS, NPS, Asotin County

Legend

- City Limits
- State Boundary
- Water Resource Inventory Area No. 35
- George Creek-Asotin Creek Subbasin (USGS HUC 10)

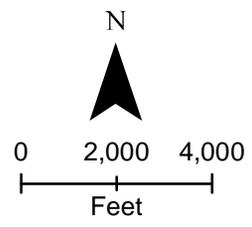


Figure 1: Watershed Vicinity

Shoreline Restoration Plan
Shoreline Master Program Update
City of Asotin, Washington

February 2016



Appendix A

Representative Photographs

Project: City of Asotin SMP Shoreline Restoration Plan		SITE PHOTOS	AECOM Project No. 60409968
Photo No. 1	Date 4/16/2014		
Direction Photo Taken: North			
Description: Looking north at levee along east bank of Asotin Creek from south end of town.			

Photo No. 2	Date: 4/16/2014		
Direction Photo Taken: North			
Description: Eeve along west bank of Asotin Creek. Shrubs likely to be cleared for levee maintenance. Note English ivy in foreground (a noxious weed). The City may continue to coordinate with the regional levee roundtable to seek opportunities for limited riparian enhancements along levees.			

Photo No. 3	Date: 4/16/2014	
Direction Photo Taken: North from beneath bridge over Asotin Creek on 2 nd Street.		
Description: Photograph shows steep banks covered in blackberry brambles (noxious weeds).		

Photo No. 4	Date: 4/16/2014	
Direction Photo Taken: East		
Description: Historical fill material near Snake River shoreline in eastern portion of town. Note that this area is owned and managed by the US Army Corps of Engineers (USACE).		

Photo No. 5	Date: 4/16/2014	
Direction Photo Taken: West		
Description: Typical riparian vegetation along Snake River; willows within seasonally inundated river banks.		

Photo No. 6	Date: 4/16/2014	
Direction Photo Taken: North		
Description: Upland conditions above inner shoreline. Area managed by the USACE as open space. Clearly the area presents opportunities for riparian and upland enhancement within the shoreline zone; however, this would require coordination with and approval by the USACE.		