

**Town of Eatonville
Shoreline Master Program Update
Draft Restoration Plan**

**Ecology Grant #G1000029
Phase 4
Deliverable for Task 4.1
June 2011**

DRAFT



TABLE OF CONTENTS

1.0 Introduction	1-1
1.1 Purpose	1-1
1.2 Regulatory Overview	1-1
1.3 Defining Restoration	1-2
1.4 Key Elements of Restoration Planning in the SMP Update Process.....	1-3
2.0 Summary of Existing Shoreline Functions.....	2-1
2.1 Regional and Watershed Overview.....	2-1
2.2 Town of Eatonville Shoreline Planning Area	2-2
2.3 Impairment of Shoreline Ecological Functions.....	2-2
3.0 Existing Restoration Projects and Programs	3-1
3.1 Town of Eatonville.....	3-1
Stormwater Management and Low Impact Development	3-1
Salmon Restoration	3-1
3.2 Nisqually Indian Tribe.....	3-1
3.3 Pierce County	3-2
Nisqually River Basin Plan	3-2
Shoreline Restoration Plan.....	3-2
Conservation Futures	3-4
3.4 Pierce Conservation District.....	3-5
3.5 Pierce County Noxious Weed Control Board	3-5
3.6 Washington State Parks	3-6
3.7 Non-profit Organizations.....	3-6
South Puget Sound Salmon Recovery Group	3-6
Nisqually River Education Project	3-6
Nisqually Stream Stewards.....	3-7
Nisqually Land Trust	3-7
Stewardship Partners	3-7
Cascade Land Conservancy	3-8
Nisqually River Council	3-8
3.8 Cooperative Projects	3-8
Mashel River Restoration Project.....	3-8
Ohop Creek Restoration Project	3-8
Low Impact Development Guidance	3-8
4.0 Restoration Goals and Objectives.....	4-1
5.0 Potential Restoration Programs and Projects.....	5-1
5.1 Programmatic Actions	5-1
5.2 Potential Restoration Areas	5-2
Ohop Creek.....	5-2
Lynch Creek	5-3
Mashel River.....	5-3
Little Mashel River.....	5-3
5.3 Restoration Priorities	5-3
6.0 Implementation Strategies and Potential Funding Sources	6-1
6.1 Potential Funding Sources.....	6-1

6.2 Voluntary Restoration on Private Lands6-6

6.3 Constraints to Implementation6-8

7.0 Timelines, Benchmarks, and Measuring Effectiveness7-1

8.0 References8-1

Appendix A: MapsA-1

Appendix B: Control Methods for Non-native Blackberry Species (Himalayan and Evergreen) AND REED CANARYGRASS..... B-1

DRAFT

1.0 INTRODUCTION

1.1 Purpose

The Town of Eatonville (Town) is conducting a comprehensive Shoreline Master Program (SMP) update with the assistance of a grant administered by the Washington State Department of Ecology (Ecology) (SMA Grant No. G1000029). According to Substitute Senate Bill (SSB) 6012, passed by the 2003 Washington State Legislature, cities and counties are required to update their SMPs consistent with the state Shoreline Management Act (SMA), Revised Code of Washington (RCW) 90.58 and its implementing guidelines, Washington Administrative Code (WAC) 173-26.

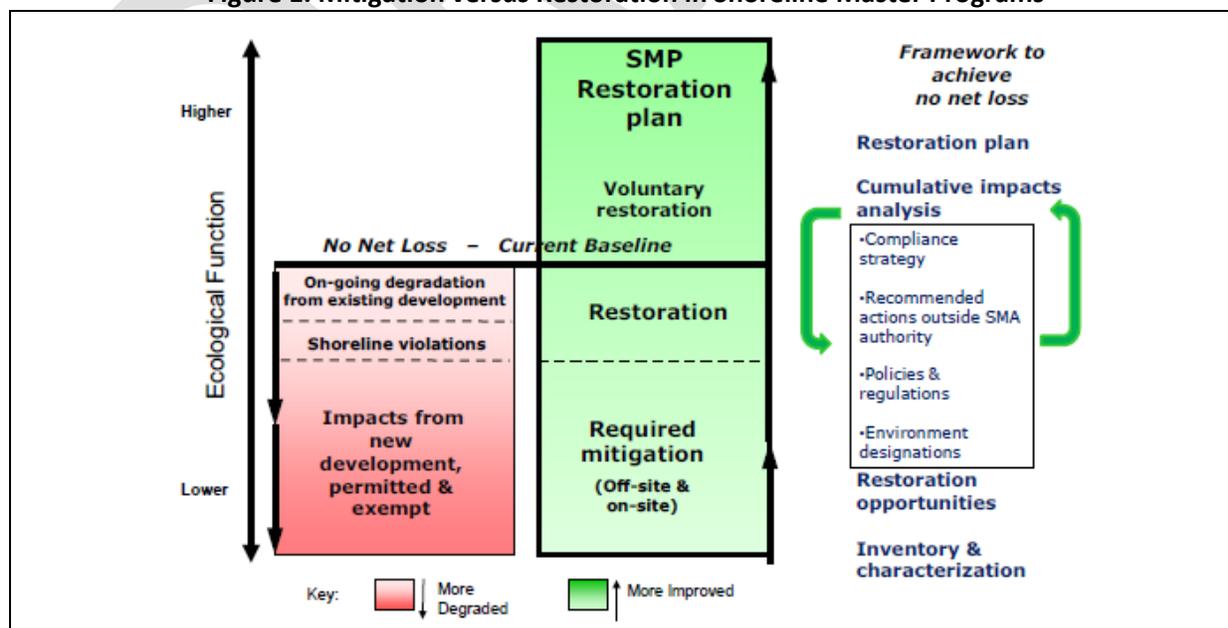
This document addresses the state requirements to prepare a restoration plan for areas under the Town’s shoreline jurisdiction.

1.2 Regulatory Overview

The State has directed local governments to develop SMP provisions “...to achieve overall improvements in shoreline ecological functions over time when compared to the status upon adoption of the master program.” This overarching goal is accomplished primarily through two distinct objectives (Figure 1):

- **Protection** of existing shoreline functions through regulations and mitigation requirements to ensure “no net loss” of ecological functions from baseline environmental conditions; and
- **Restoration** of shoreline ecological functions that have been impaired from past development practices or alterations.

Figure 1. Mitigation versus Restoration in Shoreline Master Programs



The concept of no net loss of shoreline ecological function is embedded in the SMA and in the goals, policies and governing principles of the shoreline guidelines. The State's general policy goals for shorelines of the state include the "protection and restoration of ecological functions of shoreline natural resources." This goal originates in the SMA, which states, "permitted uses in the shoreline shall be designed and conducted in a manner that minimizes insofar as practical, any resultant damage to the ecology and environment of the shoreline area." The governing principles of the guidelines further clarify that protection of shoreline ecological functions is accomplished through the following (WAC 173-26-186):

- Meaningful understanding of the current shoreline ecological conditions;
- Regulations and mitigation standards that ensure that permitted developments do not cause a net loss of ecological functions;
- Regulations that ensure exempt developments in the aggregate do not result in net loss of ecological functions;
- Goals and policies for restoring ecologically impaired shorelines;
- Regulations and programs that fairly allocate the burden of mitigating cumulative impacts among development opportunities; and
- Incentives or voluntary measures designed to restore and protect ecological functions.

The restoration planning component of the SMP is focused on voluntary mechanisms, not regulatory provisions. Restoration planning is focused on incentives, available funding sources, volunteer programs, and other programs that can contribute to a no net loss strategy. However, the restoration framework developed for these non-compensatory mitigation projects can also be applied to compensatory mitigation projects. In this way, all efforts to improve ecosystem functions are coordinated, and designed to work together.

1.3 Defining Restoration

There are numerous definitions for "restoration" in scientific and regulatory publications. Specific elements of these definitions often differ, but the core element of repairing damage to an existing, degraded ecosystem remains consistent. In the SMP context, the WAC defines "restoration" or "ecological restoration" 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" (WAC 173-26-020(27)).

Using the WAC definition of restoration in regard to state shorelines, it is clear the effort should be focused on specific shoreline areas where natural ecological functions have been impaired or degraded. The emphasis in the WAC is to achieve overall improvement in existing shoreline processes or functions, if these functions are impaired. Therefore, the goal is not to restore to historically natural conditions,

but rather to improve on existing, degraded conditions. In this context, restoration can be broadly implemented through a combination of programmatic measures (such as surface water management; water quality improvement; public education) and site-specific projects (such as bulkhead replacement and/or riparian plantings). It is important to note that the guidelines do not state that local programs should or could require individual permittees to restore past damages to an ecosystem as a condition of a permit for new development. For these reasons, restoration planning focuses on the Town's shoreline program as a whole rather than parcel by parcel, or permit by permit.

1.4 Key Elements of Restoration Planning in the SMP Update Process

The State guidelines provide six key elements for shoreline restoration planning as part of a local jurisdiction's master program, as outlined in WAC 173-26-201(2)(f). These elements are summarized in Table 1-1 and provide the organization and content for this report.

Table 1-1. WAC Requirements for Restoration Plans

Key elements for the shoreline restoration planning process WAC 173-26-201(2)(f)	Where addressed in this report
Identify degraded areas, impaired ecological functions, and sites with potential for ecological restoration.	Chapters 2 and 5
Establish overall goals and priorities for restoration of degraded areas and impaired ecological functions.	Chapters 4 and 5
Identify existing and ongoing projects and programs that are currently being implemented which are designed to contribute to local restoration goals.	Chapter 3
Identify timelines and benchmarks for implementing restoration projects and programs and achieving local restoration goals.	Chapter 7
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 (e.g., monitoring of restoration project sites).	Chapter 7
Identify additional projects and programs needed to achieve local restoration goals, and implementation strategies including identifying prospective funding sources for those projects and programs.	Chapters 5 and 6

2.0 SUMMARY OF EXISTING SHORELINE FUNCTIONS

This chapter first provides an overview of the region and watershed, followed by a summary of shoreline functions in Eatonville. Shoreline restoration planning begins with the identification of “degraded areas” or areas with “impaired ecological functions.” The following summary relies on the *Town of Eatonville Shoreline Inventory and Characterization Report* (ESA Adolfson, 2010).

2.1 Regional and Watershed Overview

The Town of Eatonville and all of its shorelines are located within the Nisqually River Watershed, referred to as Water Resource Inventory Area (WRIA) 11 by the State. The watershed encompasses approximately 491,300 acres within Pierce, Thurston and Lewis Counties. The basin’s headwaters originate at Mount Rainier’s Nisqually Glacier (although none of the streams that flow through the Town are glacier-fed), and eventually empty into Puget Sound at the Nisqually National Wildlife Refuge. Medium-gradient rivers in the upper watershed give way to very low-gradient systems in the lowlands. Elevations range from over 14,000 feet above sea level at the summit of Mount Rainier to sea level at the Nisqually River’s mouth. Population is relatively sparse in WRIA 11, with the highest densities occurring around the Towns of Eatonville and Roy. The predominant land uses within WRIA 11 are forest resource and timber harvest.

Climate in WRIA 11, like most of western Washington, is influenced by maritime patterns and is generally characterized by mild, wet fall to spring months, and cool, dry summer months. Precipitation typically occurs as low-intensity, long-duration storms.

Fish and wildlife habitats in WRIA 11 include freshwater wetlands, estuarine habitat (Nisqually River delta), freshwater riparian areas, terrestrial forests, river-cut canyons, glacially eroded canyons, and active glaciers. Notable species include black-tailed deer, elk, black bear, cougars, beavers, raccoons, and many rodents. Many of these terrestrial species rely on shoreline habitats (lakes, rivers and marine shores) for some of their life stage requirements.

Forest land dominates the majority of the eastern portion of Pierce County within the Cascades and foothills. Much of the forest land is in active harvest rotation, but there are significant protected areas, including within Mount Rainier National Park. The eastern portion of the county also includes active glaciers and snowfields on Mount Rainier.

The western portion of the planning area (west of Eatonville) has experienced increasing development pressure and is a mixture of rural residential, open space, and agricultural land uses. The relative distribution of land use is approximately 50% rural residential, between 15% and 30% open space, and between 5% and 10% agricultural. The area generally to the east of Eatonville is more mountainous and less developed. This area is approximately 75% forested and 25% rural residential (ESA Adolfson, 2009).

2.2 Town of Eatonville Shoreline Planning Area

SMA jurisdiction includes all “shorelines of the state” as defined in RCW 90.58.030. In Eatonville, the shoreline area to be regulated by the Town’s SMP includes (**Map 1, Appendix A**):

- The Mashel River, Little Mashel River, Lynch Creek and Ohop Creek within both the Town’s municipal boundary and its Urban Growth Area (UGA);
- The upland area landward 200 feet of the ordinary high water mark (OHWM) of the above-listed waterbodies;
- All associated wetlands;
- Floodways (as defined by RCW 90.58.030(2)(g)) and contiguous floodplain areas 200 feet landward from the floodway.

Associated wetlands, deltas and floodways that are included in the shoreline jurisdiction are those that influence or are influenced by the regulated waters of Puget Sound. In general, a wetland is “associated” if all or a portion of the wetland falls within that area that is 200 feet from the ordinary high water mark. A wetland outside of this area may also be associated if it is in proximity to the shoreline and there is a demonstrated influence between the wetland and the shoreline. Such influence can include hydraulic continuity, such as a surface or groundwater connection. The SMA further designates some shorelines as “shorelines of statewide significance”. There are no “shorelines of statewide significance” located within Eatonville or its UGA.

For permitting purposes, the location of the OHWM and extent of the shoreline jurisdiction must be determined through site-specific investigation. The extent of the shoreline jurisdiction included in the shoreline master program update materials was generated through application of the best available GIS data. It is meant for planning purposes only. For this reason, it is referred to as the shoreline planning area or SPA.

2.3 Impairment of Shoreline Ecological Functions

Ohop Creek

Ohop Creek flows from its headwaters south of Lake Kapowsin south and west to its confluence with the Nisqually River. Slightly more than a mile of the creek flows through the Town of Eatonville and its UGA. Ohop Creek flows from Ohop Lake immediately north of the Town to the eastern Town UGA boundary through the Ohop Valley. Four unnamed tributary creeks enter the mainstem of the creek within this area.

The general land use pattern in the Town’s Ohop Creek shoreline planning area is a mix of rural density residential development, agricultural areas, small-scale commercial uses and open space. Commercial uses are concentrated around SR 161. Structures include mostly one story commercial buildings, homes and agricultural structures.

Ohop Creek supports several species of salmon and trout. While the entire stream provides rearing habitat, spawning habitats are limited to two areas, one of which includes the Town’s SPA. Salmonid habitats are limited by the availability of gravel beds and a lack of large woody debris (LWD).

The following summarizes the key factors affecting ecological functions in the Ohop Creek SPA:

- Historically, riparian vegetation in the Ohop Creek SPA was a dense mix of palustrine forest, scrub shrub, and emergent wetland. Shoreline vegetation is a key factor in properly functioning shorelines. Dense, native, mature vegetation controls stream temperatures by creating shade, is a source of organic inputs, and establishes in-stream habitats by discouraging erosion and acting as a source of LWD. Agricultural and residential development have altered shoreline vegetation. Shoreline vegetation is currently sparse in areas, with stands that are not of an adequate size and density to provide functional wood development. There are also areas with significant encroachment by invasive species.
- There is low dissolved oxygen present throughout Ohop Creek, due in part to the lack of riparian vegetation. Infestation of riparian areas by reed canarygrass (invasive species) has prevented the reestablishment of a native riparian canopy in some areas.
- The Town of Eatonville's stormwater discharge to Lynch Creek has been identified as a source of turbidity in Ohop Creek.
- Downstream of the Town's SPA, the Ohop Creek Restoration Project (ongoing) is currently restoring riparian vegetation and in-channel large wood to a significant portion of the Ohop Creek SPA. While not in the Town, the likely outcome of the project will be an improvement to the system-wide functions and more fish in the Town's portion of Ohop Creek.

Lynch Creek

Lynch Creek is one of two primary tributaries of Ohop Creek (Map 1). The headwaters of the stream originate on a ridge at approximately 3,000 feet in elevation. Lynch Creek has one named tributary stream: Berg Creek, which joins Lynch Creek east of the Town's UGA boundary. Lynch Creek flows into Ohop Creek within the Town's boundary. Approximately 1.9 discontinuous miles of Lynch Creek weave in and out through the Town and the Town's UGA. Roughly 0.68 miles of the creek are actually within the Town.

Land use along the western portion of the Town's Lynch Creek shoreline planning area is a mix of rural density residential development, agricultural areas and undeveloped areas. Land use in the eastern portion of the planning area (east of Lynch Creek Rd E) includes undeveloped lands, Eatonville airport, and the Lynch Creek Quarry.

Lynch Creek supports several species of salmon and trout. A natural falls at RM 1.0 blocks upstream fish habitat, and steep gradients in the lower part of the stream limit spawning. The major problems affecting salmon survival include a high sediment load, reduced channel stability, a lack of habitat diversity, and flashy flows caused by stormwater inputs.

The following summarizes the key factors affecting ecological functions in the Lynch Creek SPA:

- The lack of riparian vegetation along portions of Lynch Creek reduces shading along the stream, potentially resulting in increased stream temperatures and lowered dissolved oxygen. A lack of larger trees along the stream means less wood in the stream channel. In-channel wood is key to creating habitat, and supporting channel morphology similar to natural conditions.

- Removal of native riparian vegetation also increases the opportunity for non-native invasive plants such as reed canarygrass to become established. Reed canarygrass does not provide shade or woody material to the stream, and its aggressive growth prevents native trees and shrubs from becoming re-established in infested areas.
- Most of the Town's stormwater runoff is conveyed to an outfall in Lynch Creek. Stormwater runoff increases turbidity and other pollutants in the stream, as well as increasing peak flows. These impacts degrade water quality and habitat for aquatic life including salmon.

Mashel River

The Mashel River originates on the slopes of Mount Rainier, joining the Nisqually River at RM 39.6. Flow of the river through Eatonville is unregulated except for a diversion for the municipal drinking water system. There are three bridges that influence hydraulic conditions in the river. The Mashel River has the highest overall flows of any of the Nisqually tributaries below the LaGrande Dam. However, it also has very low flows in the summer that are lower than historic summer flows.

The general land use pattern in the Town's Mashel River SPA is a mix of rural density residential development, minor agricultural areas, limited small-scale commercial uses and open space. A significant portion of the Mashel River SPA is publicly owned, or privately owned by the Nisqually Land Trust or Nisqually Tribe and dedicated for restoration and preservation. The Town also owns and operates a water and wastewater facility, both located within the planning area.

The Mashel River supports several species of salmon and trout. The lower four miles of the mainstem Mashel River, including the Town's SPA, is where most of the fall Chinook spawning occurs in the watershed. Upstream of Eatonville, waterfalls present a fish passage barrier. Riparian vegetation and LWD are lacking. Several organizations have been working to install LWD and log jams in the lower Mashel River to restore salmon habitat.

The following summarizes the key factors affecting ecological function in the Mashel River SPA:

- The lack of riparian vegetation along portions of the river reduces shading along the stream, potentially resulting in increased stream temperatures and lowered dissolved oxygen. A lack of larger trees along the stream means less wood in the stream channel. In-channel wood is key to creating habitat structures for fish such as pools. Restoration of native vegetation along the river is important to improving shoreline conditions and functions.
- Armoring of shorelines with riprap can stabilize the banks in the short term, but may result in impacts to other portions of the channel (for example, increased erosion in other areas if there are changes in flow patterns). In addition, riprap does not provide refuge or feeding habitat for salmonids.
- Large amounts of sediment from past logging practices are present in the Mashel River. Much of that sediment still controls the form of the channel seen today. The river is now slowly reworking those deposits, leading to narrowing of the channel and consolidation of gravel (ESA Adolfson, 2009).

- Low flows in the river appear to result from both human actions (such as municipal water withdrawals) and natural conditions (e.g., a naturally porous riverbed substrate). While natural conditions cannot be changed, the human actions should be investigated further.

Little Mashel River

The Little Mashel River flows from its headwaters north of the Nisqually River to its confluence with the Mashel River southwest of the Town of Eatonville. The Little Mashel flows for approximately a quarter mile within the UGA prior to its confluence with the Mashel River. The general land use pattern in the shoreline planning area is low density, single-family residential development.

There are some indications that the creek was channelized at some point in the past, although no other shoreline modifications are present. A railroad bridge used to cross the Little Mashel River. While the railroad is no longer operating, the bridge abutments are still present along the shoreline. The embankments in this area are relatively high and the bridge abutments have increased channel confinement.

The Little Mashel River supports several species of salmon and trout. Fish habitat is limited by a lack of riparian vegetation and channelization in the lower reaches. A waterfall at RM 0.8 (upstream of the Town's UGA) is impassable to salmonids.

The following summarizes the key factors affecting ecological function in the Little Mashel River SPA:

- Riparian vegetation is lacking within the Town's shoreline and improves in the UGA. The lack of riparian vegetation generally reduces shading along the stream, potentially resulting in increased stream temperatures and lowered dissolved oxygen. A lack of larger trees along the stream means less wood in the stream channel. In-channel wood is key to creating habitat structures for fish such as pools.
- Channelization and armoring in the lower reaches have increased channelization and removed the river's natural meander. As a result, hydrology has been altered resulting in channel scour, increased sedimentation, and degraded fish habitat.

3.0 EXISTING RESTORATION PROJECTS AND PROGRAMS

This chapter describes recent and ongoing projects and programs, undertaken by the Town of Eatonville and other entities, to protect and restore aquatic resources in the Nisqually River basin (WRIA 11).

3.1 Town of Eatonville

Stormwater Management and Low Impact Development

The Town is currently developing a new stormwater management plan, with financial assistance from the Nisqually Tribe. Eatonville is also participating in a project with the Stewardship Partners program to install several rain gardens throughout the town. Funded by grants from the National Fish and Wildlife Foundation and the Nisqually Tribe, the rain gardens are planned to be located on both public and private properties. The purpose of the project is to demonstrate how low impact development techniques can be used to sustainably manage stormwater.

Salmon Restoration

The Town of Eatonville has participated in recent projects to restore habitat on the Mashel River. Restoration activities include installing native riparian vegetation and log jams in the river to improve shading and fish habitat.

3.2 Nisqually Indian Tribe

The Nisqually Indian Tribe is the lead agency in watershed planning under the Watershed Planning Process in the Nisqually Watershed (WRIA 11), which was [initiated in 1998 by the “Expanded Initiating Governments”. The Tribe is responsible for facilitating the Planning Unit, which is ...“the committee formed by the Expanded Initiating Governments to gather and analyze water data and to develop and present water resource management policies to the Expanded Initiating Governments”.

The Nisqually Tribal land is located on both sides of the Nisqually River in Pierce County, Washington. The Natural Resources Department consists of several programs, including a Salmon Recovery Program, which is charged with planning for the recovery of Nisqually salmon and restoring salmon habitat (<http://www.nisqually-nsn.gov/naturalresources.html>). Tribal biologists are responsible for studying and monitoring salmon. Stream stewards educate the public about salmon habitat, protection, and restoration. Tribal biologists also operate two hatcheries and a shellfish program.

One of the hallmark projects of the Salmon Recovery Program is the Nisqually Tribe’s collaborative effort in the Nisqually Delta restoration. The Nisqually Tribe has restored over 140 acres of the estuary on the east side of the river since 1996. The Tribe has embarked on a three-year large-scale restoration in the Nisqually Wildlife Refuge to help increase salmon habitat in the Nisqually delta (http://www.nisquallyriver.org/stewards/Yil_Me_Hu_Fall_Winter_08.pdf). The dikes along the pastures are being removed or breached in phases to restore 760 acres of estuary and salmonid

habitat in the delta. The Tribe has worked with the Nisqually Land Trust on the Red Salmon Creek restoration project and is currently collaboration with the Land Trust to restore salmon habitat along the Mashel River (see Section 3.8).

In an effort to develop an appropriate multiple fish species management plan for the Nisqually River Basin, the Nisqually Tribe analyzed fall Chinook salmon using the Ecosystem Diagnosis and Treatment (EDT) model (Nisqually Chinook Recovery Team, 2001). The EDT model ranked the lower 6.3 miles of Ohop Creek, which includes the Town of Eatonville SPA, as among the highest priority tributary reaches in need of restoration for salmonid habitat (Homza et al., 2002).

3.3 Pierce County

Nisqually River Basin Plan

Basin planning is an important component of shoreline restoration in Pierce County. Pierce County Public Works and Utilities – Surface Water Management has developed basin plans for 10 areas within the County. The plans identify and prioritize projects to improve flood management, water quality, and riparian habitat. The first phase of developing a basin plan is to study the existing characteristics of the basin, such as flooding, water quality, and fisheries. This information is used to develop a prioritized list of projects and actions to reduce flood damage and improve water quality and floodplain habitat in the basin. The Nisqually River Basin Plan was issued in 2008.

Shoreline Restoration Plan

Pierce County is currently finalizing its shoreline restoration plan as required by the State Shoreline Management Act (ESA, 2011). The plan includes projects located on the Mashel and Little Mashel Rivers and Ohop Creek (Table 3-1). The projects identified in the County's restoration plan based are on the Pierce County Shoreline Inventory and Characterization Report (ESA Adolfson, 2009), the Nisqually River Basin Plan (Pierce County 2008), the WRIA 11 Lead Entity three-year work plan (2010), and input provided by County staff, the Shoreline Citizens Advisory Committee, state and federal agencies, Tribes, environmental organizations, and the general public.

Table 3-1. Pierce County Restoration Plan (2011) Projects near Eatonville

Basin and Water Body	Reach or Location	Restoration Opportunities
Mashel River	All reaches Mashel River in and near Eatonville	<p><u>Programmatic opportunities:</u></p> <ul style="list-style-type: none"> • Restore forested riparian areas. • Restore LWD to stream • Decommission/resurface timber roads, replace culverts. • Coordinate restoration efforts with Town of Eatonville. <p><u>Site-specific opportunities:</u></p> <ul style="list-style-type: none"> • Acquire river shoreline and adjacent upland properties that are a priority for restoration (Nisqually River Basin Plan CIP20-MAL-AC01 and AC02). • Design and construct next phase of restoration of Mashel River in Eatonville reach, add more logjams and increase off-channel habitat (included in WRIA 11 Lead Entity 2010 Three-year work plan). • Acquire 70 acres at the confluence with the Little Mashel River for permanent habitat protection (included in WRIA 11 Lead Entity 2010 Three-year work plan). • Acquire and protect 313 acres on Mashel River near Boxcar Canyon (included in WRIA 11 Lead Entity 2010 Three-year work plan).
Little Mashel River		<p><u>Programmatic opportunities:</u></p> <ul style="list-style-type: none"> • Restore forested riparian areas. • Protect and restore associated wetlands. • Restore natural channel configuration. • Coordinate restoration efforts with Town of Eatonville. <p><u>Site-specific opportunities:</u></p> <ul style="list-style-type: none"> • Acquire 45 acres of riparian and floodplain habitat near the Little Mashel confluence with the Mashel River (Nisqually Land Trust/Pierce County project listed in 2008 South Puget Sound 3-Year Project List).

Basin and Water Body	Reach or Location	Restoration Opportunities
Ohop Creek	All reaches	<p><u>Programmatic opportunities:</u></p> <ul style="list-style-type: none"> • Restore meanders to the stream, which was historically channelized for agriculture. • Restore riparian forests. • Replace existing culverts where possible to enhance fish passage. • Control invasive reed canarygrass. • Restore floodplain wetlands (Nisqually Indian Tribe, 2008; Nisqually Land Trust, 2006). • Coordinate restoration efforts with Town of Eatonville.
	<p>Upper part of stream)</p> <p>Lower Ohop Valley</p>	<p><u>Site-specific opportunities:</u></p> <ul style="list-style-type: none"> • Acquire upper Ohop Creek shoreline reaches that are accessible to anadromous fish and are a priority for restoration (Nisqually River Basin Plan CIP14-OHU-AC01 and AC02). Acquisition of 180 acres of Ohop Valley included in WRIA 11 Lead Entity 2010 Three-year work plan. • Continue implementation of the Lower Ohop Creek Restoration Project to restore 5 miles of meandering stream channel and connection to floodplain, and revegetate 490 acres of wetlands (Nisqually River Basin Plan CIP14-OHL-RST01, RST02, RST03; also included in WRIA 11 Lead Entity 2010 Three-year work plan). • Acquire 100 acres along one mile of lower Ohop Creek for permanent protection (included in WRIA 11 Lead Entity 2010 Three-year work plan).
	Middle Ohop (RM 4 to Ohop Lake)	<ul style="list-style-type: none"> • Revegetate over two miles of riparian area with native trees and shrubs (included in WRIA 11 Lead Entity 2010 Three-year work plan).

Conservation Futures

The Pierce County Conservation Futures Fund protects threatened open space, timber lands, wetlands, habitat areas, agricultural and farm lands within Pierce County through land purchase and acquisition of development rights. Funding comes from a state-authorized County property tax (<http://www.co.pierce.wa.us/pc/abtus/ourorg/parks/cfutures.htm>). The Pierce County Council enacted the tax and all property taxpayers pay up to six and one-quarter cents per thousand dollars of assessed value of each Pierce County-owned parcel. These monies, identified in the budget as Conservation Futures, are budgeted annually by the Pierce County Council. Any

individual who does not have an interest in the land, non-profit group, city, town, or Pierce County agency who wishes to preserve an eligible property can become a project sponsor and nominate a property for purchase. Property can be the land itself or certain rights associated with the property. The rights may also be given as a gift, grant, bequest, devise (will), or be leased. The seller of the property may retain limited use of the property rights as part of the sale.

Conservation Futures funds have been used to purchase 70 acres along the Mashel River and Ohop Creek; the lands were transferred to the Nisqually Land Trust for salmon restoration (Nisqually Land Trust, 2010).

3.4 Pierce Conservation District

The Pierce Conservation District (PCD) is a non-regulatory branch of state government that works with Pierce County landowners to protect water quality, improve fish and wildlife habitat, and conserve natural resources while maintaining a sustainable agricultural community (<http://www.piercecountycd.org/>).

The PCD works with interested landowners to develop conservation plans that identify current conditions and economically viable alternative and best management practices (BMPs) to improve productivity while protecting soil and water quality. Some of the BMPs incorporated into conservation plans include composting, roof runoff management, pasture planting, sacrifice areas, and filter strips. In addition, the PCD collaborates with the U.S. Fish and Wildlife Service (USFWS), Washington State Department of Fish and Wildlife (WDFW), WSU Cooperative Extension, Washington State Department of Ecology (Ecology), Department of Natural Resources, and Pierce County government to provide technical assistance for landowners in the County. Major projects include animal waste management, stream bank fencing, replanting stream bank areas, pasture management, improving fish and wildlife habitat, and installation of fish ladders and road culverts. The PCD's StreamTeam program specifically educates residents about water quality monitoring and stream restoration plantings in the area.

3.5 Pierce County Noxious Weed Control Board

Washington State requires the control of noxious weeds through the Revised Code of Washington (RCW) Title 17, and Title 16 of the Washington Administrative Code (WAC). State law requires all landowners (private or agency) to manage weeds on their properties (RCW 17.10.140). To implement these requirements, the State established the Washington State Noxious Weed Control Board (Chapter 16-750 WAC). Chapter 17.10 RCW establishes Noxious Weed Control Boards for counties in the state.

Pierce County Code Chapter 8.24 specifically activates the Pierce County Noxious Weed Control Board (PCNWCB). The PCNWCB enforces the state noxious weed control regulations and refines the state noxious weed list to include species present in Pierce County. The PCNWCB provides guidance on weed identification and methods of control, and it has the authority to

cite property owners for failing to comply with weed control requirements.

(<http://piersecountyweedboard.wsu.edu/>)

3.6 Washington State Parks

The new Nisqually State Park is located west of Eatonville. It includes 1,230 acres mostly within unincorporated Pierce County, generally between Ohop Creek, the Nisqually River, and the Mashel River. In March 2010, Washington State Parks adopted plans for the site. Lands within the park are designated for a combination of recreation and resource protection.

(<http://www.parks.wa.gov/plans/nisqually/>)

3.7 Non-profit Organizations

South Puget Sound Salmon Recovery Group

The South Puget Sound Salmon Enhancement Group (SPSSEG) is a 501(c)(3) non-profit organization formed by the Washington State Legislature in 1990 to involve communities, volunteers, and landowners in salmon recovery. Primary sources of funding include \$1 and \$100 surcharges on sport and commercial fishing licenses, respectively. Other sources of funding include revenue from the sale of eggs and carcasses from state hatcheries; grants, membership dues, private donations, and in kind contributions; and cooperative funding from agencies and private companies. (<http://www.spsseg.org/>)

Restoration projects sponsored or co-sponsored by SPSSEG since 1990 have focused on restoring salmonid spawning/rearing habitat; riparian restoration; nearshore restoration and monitoring; and culvert/dam replacements or modifications. The organization has participated in several recent restoration and monitoring projects on the Mashel River and Ohop Creek (described in Section 3.8).

Nisqually River Education Project

The Nisqually River Project (NREP) is a watershed education program with the principal mission of implementing key elements of the Nisqually River Management Plan. The Nisqually River Education Project implements watershed-based education and environmental action projects which engage students and teachers in protecting and enhancing the water quality and salmon habitat of the Nisqually River watershed. By making the involvement of schools possible, the NREP directly supports the efforts of the Nisqually River Council and the Nisqually Tribe in creating a healthier Nisqually River and the preservation of its fisheries and shellfish resources. Each year, the NREP actively involves hundreds of student participants in an on-going water quality monitoring program. These students then engage in problem-solving and action-oriented education projects. For example, some students strive to enhance depressed salmon habitat by working on stream restoration projects at key sites in the Nisqually watershed. Other students create educational outreach presentations and materials about non-point pollution prevention. (<http://www.nisquallyriver.org/edu/edu.html>)

Nisqually Stream Stewards

The Nisqually Stream Stewards are people living in the Nisqually watershed who want to help protect and improve the health of streams. Nisqually Stream Stewards monitor the health of their local streams and help with projects that improve stream health, such as removing invasive grass from stream channels or planting trees along stream banks.

(<http://www.nisquallyriver.org/stewards/index.html>)

Nisqually Land Trust

In 1989, the Nisqually Land Trust was established to protect habitat and wildlife threatened by the effects of urbanization. Currently, the Land Trust is responsible for conserving and restoring approximately 1,700 acres of old-growth forest and salmon habitat in the Nisqually watershed. These properties have been acquired through grants, mitigation funds, donations, and special events including the Trust's annual auction.

The Nisqually Land Trust owns six land complexes in the watershed. The Mount Rainier Gateway Initiative is located near the main entrance to Mount Rainier National Park. Phase one of five has been completed, with a goal of acquiring 4,500 acres of threatened forest in the upper watershed that provide habitat for threatened wildlife species, including spotted owl and marbled murrelet. The Land Trust owns two properties on the Mashel River, the primary salmon-producing tributary along the Nisqually River, totaling approximately 109 acres. Chinook, steelhead, coho, and pink salmon spawn in the Mashel River. The Nisqually Land Trust is collaborating with the Nisqually Tribe to restore salmon habitat along a portion of the river located near the Nisqually-Mashel State Park.

The Land Trust also owns approximately 240 acres in the Ohop Valley, where restoration efforts include removal of old buildings and invasive plants and replanting of a large floodplain. The Land Trust is restoring approximately 360 acres of floodplain habitat at the confluence of Powell Creek and the Nisqually River. Restoration efforts include culvert removal and replanting and enhancement of habitat for spotted owls. The Wilcox Flats complex comprises 150 acres along the Nisqually River located south of Wilcox Farms in Pierce County. The Land Trust has removed debris deposited during flood events, planted native trees, and is now completing a wildlife inventory and long-term restoration and management plan. Finally, Red Salmon and Washburn Creeks represent the most significant of the Land Trust's restoration efforts. The Land Trust combined efforts with the Nisqually Tribe, USFWS, and Washington Conservation Corps to remove invasive vegetation and plant 2,000 native trees and shrubs along the two streams. (<http://www.nisquallylandtrust.org/>)

Stewardship Partners

Stewardship Partners is a 501(c)3 non-profit organization that helps private landowners restore and preserve the natural landscapes of Washington State. Major projects include the Salmon-Safe farm certification program; promotion of low impact development techniques such as rain gardens; and the Nisqually Collaborative Conservation project. Stewardship Partners is working with the Town of Eatonville to install demonstration rain garden projects.

(<http://www.stewardshippartners.org/index.html>)

Cascade Land Conservancy

Cascade Land Conservancy is a non-profit organization working to conserve land in Pierce, King, Mason, Kittitas, and Snohomish Counties. The Conservancy has led the conservation of more than 150,000 acres over the last decade including approximately 20 properties in Pierce County. The Conservancy works with landowners using tools such as land purchase or donation, conservation easements, and stewardship endowments to preserve high-quality ecosystems. (<http://www.cascadeland.org/>).

Nisqually River Council

The Nisqually River Council's mission is to encourage and support sustainability in the Nisqually Watershed. The Council implements the *Nisqually Watershed Stewardship Plan* and is comprised of representatives from Pierce, Thurston and Lewis Counties, WDFW, WDNR, Washington State Parks, the Nisqually Tribe and various citizen stakeholders (<http://nisquallyriver.org/>).

3.8 Cooperative Projects

Mashel River Restoration Project

Over the past decade, the Nisqually Indian Tribe, South Puget Sound Salmon Enhancement Group, Northwest Indian Fisheries Commission, Town of Eatonville, and others have worked together to enhance and monitor salmonid habitat in the Mashel River. Large woody debris and log jams were installed in the lower 1.6 miles of the Mashel River in 2004 to improve instream fish habitat. In 2005, the stream was monitored to determine the success of these habitat structures. Fish surveys conducted in 2005 indicated that a large number of pink salmon and Chinook redds were counted in the lower Mashel River (ESA Adolfson, 2009). The project continued in 2006 and 2007 at which time LWD, engineered logjams (ELJ), and riparian plantings were installed in the vicinity of Smallwood Park. A subsequent phase of the project is underway. In 2009, 11 ELJs were constructed in the area between the former Weyerhaeuser bridge and the SR 161 bridge. Eleven additional ELJs will be constructed downstream of the SR 161 bridge (Herrera, 2010). The locations of the ELJs and riparian plantings are shown in Maps 2 and 3 (Appendix A).

Ohop Creek Restoration Project

The Nisqually Land Trust and partner organizations have begun a large-scale restoration project in the valley to restore meanders to the stream, which was historically channelized for agriculture. The project also includes restoration of floodplain wetlands (Nisqually Indian Tribe, 2008; Nisqually Land Trust, 2006). Phase 1 of the project, completed in 2010, restored natural meanders to 0.6 miles of the stream channel, lengthening it to over 1 mile, and installing 42 ELJs in the channel. Thousands of native trees and shrubs were also installed (Nisqually Land Trust, 2010).

Low Impact Development Guidance

Several of the organizations listed in the previous section have collaborated on publications that provide guidance to landowners on low impact development and "green" building techniques specifically for the Nisqually watershed. Examples include:

- Nisqually Building Guide (<http://nisquallyriver.dreamhosters.com/wp-content/uploads/2010/03/NisquallyBuildingGuide.pdf>)
- Low Impact Development and Architectural Guidelines for the Nisqually Watershed (http://www.stewardshippartners.org/prog_lid.html)

DRAFT

4.0 RESTORATION GOALS AND OBJECTIVES

This restoration plan seeks to establish a basic framework for improving the quality and sustainability of Eatonville's shoreline resources over time. This overarching goal is consistent with the Shoreline Management Act and with WRIA 11 salmon recovery plans.

The Town of Eatonville has the following restoration goals and objectives:

Goal 1: Partner with other agencies and organizations to restore salmonid habitat in the Nisqually River basin.

Objectives:

1. Continue to work with the Nisqually Land Trust, Nisqually Tribe, Pierce County, and other agencies and organizations to implement restoration projects on the Mashel River and Ohop Creek.

Goal 2: Restore riparian and in-stream habitat within the Town's SPA.

Objectives:

1. Control invasive vegetation and replant native species along the Town's shorelines.
2. Remove and replace hard shoreline armoring with bioengineered techniques.
3. Install large woody debris in select areas of the Mashel River and Ohop Creek.
4. Involve citizens and private landowners in restoration activities.

Goal 3: Improve and maintain the water quality and hydrology of the Town's water bodies.

Objectives:

1. Retrofit the Town's stormwater system to reduce water quality and hydrology impacts, particularly on Lynch and Ohop Creeks.
2. Educate property owners on ways to minimize stormwater runoff, erosion, and use of hazardous chemicals.
3. Encourage the use of low impact development techniques.

5.0 POTENTIAL RESTORATION PROGRAMS AND PROJECTS

This chapter presents a list of potential restoration programs and projects for the Town of Eatonville SPA. These programs and projects address the most apparent and significant causes of shoreline degradation and impairment described in Chapter 2, matching them with restoration actions that would have the greatest opportunity for achieving the goals in Chapter 4. The programs and projects are also intended to complement the ongoing work of numerous organizations toward restoring salmonid habitat in the Nisqually River basin.

Additional shoreline restoration opportunities may be present in Eatonville that have not been identified here. Some of the actions identified may prove to be infeasible or impractical based on further analysis. This list should be used as a starting point for future collaboration and planning.

The first section below describes programmatic restoration actions that are applicable to all areas of the Town. The following section describes on-the-ground restoration projects that could be undertaken along each of the four water bodies within the Town's SPA.

5.1 Programmatic Actions

Public Education and Landowner Incentives

- Provide public education to help reduce turbidity and maintain good water quality in Lynch and Ohop Creeks. For example, involve residents in stenciling storm drains with "drains to stream" symbols to remind people not to dispose of toxic materials in the storm system.
- Educate residents and businesses in the Town about methods to reduce erosion and use of chemicals (e.g., fertilizers, pesticides).
- Educate property owners about proper vegetation/landscape maintenance (including preservation of native vegetation along stream/nearshore riparian corridors) to promote shore stabilization and protect water quality.
- Educate private property owners about the negative impacts of shore armoring and encouraging soft shore protection where shore protection is unavoidable.
- Provide incentive programs for shoreline property owners, such as transfer or purchase of development rights and tax incentives, for shoreline restoration and protection.
- Provide information for shoreline property owners through a web page and/or public workshops.

Stormwater Management

- Finalize and adopt an updated stormwater ordinance and stormwater management plan.

- Encourage and provide incentives for low impact development practices for private property owners.
- Retrofit existing public stormwater systems using Low Impact Development (LID) strategies, as funding allows.

5.2 Potential Restoration Areas

This section describes potential restoration areas along Ohop Creek, Lynch Creek, the Mashel River, and the Little Mashel River. Table 5-1 summarizes the types of actions proposed for each water body. Generalized maps of the restoration areas are provided in Appendix A.

Table 5-1. Restoration Action Summary

Water Body	Control Non-native Invasive Vegetation in Riparian Areas	Revegetate Riparian Areas	Install LWD in Channel	Remove/ Replace Shoreline Armoring
Ohop Creek	X	X	X	
Lynch Creek	X	X		
Mashel River	X	X		X
Little Mashel	X	X		

Ohop Creek

Map 4 in Appendix A shows the locations of potential riparian restoration areas within the Ohop Creek SPA. The primary restoration opportunity at these sites is to restore riparian functions by controlling invasive vegetation (mainly non-native blackberry species and reed canarygrass) and replanting with native tree and shrub species. These actions would improve stream shading and sources of future LWD. Recommended methods for control of non-native blackberry species (Himalayan and evergreen blackberry and reed canarygrass) are provided in Appendix B.

Where there is some existing native riparian vegetation, mainly in the north part of the SPA, additional trees and shrubs can be added (interplanted). In the southern part of the reach, the riparian zone is used for pasture, and native trees and shrubs are almost entirely lacking. With the cooperation of the landowner, this area could be enrolled in a Conservation Reserve Program (CRP) and the buffer densely planted with native woody species to shade out reed canarygrass and improve stream shading. See Section 6.1 for information about the CRP.

In addition, placement of large woody debris (LWD) in the channel of Ohop Creek would help to improve fish habitat until the riparian vegetation is large enough to provide a source of LWD in the future. The locations for LWD must be carefully evaluated to achieve the desired benefits to fish habitat (e.g., pool formation) while preventing negative impacts (e.g., bank erosion or flooding of property). The upper

part of Ohop Creek within the Town's SPA appears to have been straightened in the past, and it may benefit the most from addition of LWD to increase habitat complexity in the channel (see Map 4).

Lynch Creek

Map 5 in Appendix A shows the locations of potential restoration areas within the Lynch Creek SPA. As with Ohop Creek, a combination of interplanting with existing native vegetation, and densely planting new trees and shrubs in pasture areas, would help to improve stream shading and provide future sources of LWD. Non-native blackberry species and reed canarygrass can be controlled using the methods outlined in Appendix B.

Mashel River

Map 6 in Appendix A shows the locations of potential restoration areas within the Mashel River SPA. There is an opportunity to continue to support and coordinate restoration effort along the Mashel to remove bank armoring and install bioengineered stabilization between the Alder Road Cutoff bridge and the SR 161 bridge.

Riparian revegetation would also benefit shoreline functions and instream habitat. Some riparian plantings have already occurred in conjunction with installation of log structures beginning in 2006 (Maps 2 and 3). The large areas of the Mashel River shoreline owned by the Town and the Nisqually Land Trust present excellent opportunities for restoration. Where private landowners are willing, riparian vegetation could be installed to enhance sparsely vegetated areas, or widen existing forested buffers along the river. Non-native blackberry species and reed canarygrass can be controlled using the methods outlined in Appendix B.

Little Mashel River

Riparian revegetation could greatly improve stream shading and LWD, particularly downstream of SR 161 where pasture extends to the streambank in some areas. Map 7 in Appendix A shows the locations of potential restoration areas within the Little Mashel River SPA.

5.3 Restoration Priorities

Restoration of the Ohop Creek and Mashel River shorelines is the Town's highest priority for several reasons. First, these streams provide important salmonid habitat in the Nisqually River basin. Second, the ongoing efforts by several organizations to restore habitat on these waterbodies in areas near Eatonville provides an excellent opportunity for the Town to participate in these activities. Lastly, Eatonville owns large parcels along the Mashel River, providing good areas for restoration of public property.

Another high restoration priority is public education, particularly regarding stormwater and low impact development practices. These educational activities fit with the Town's ongoing work to update its stormwater plan and install rain garden demonstration projects.

Restoration along the Little Mashel River and Lynch Creek is also important but a slightly lower priority for the Town. As funds and opportunities become available, projects such as riparian revegetation could be undertaken along these streams in cooperation with private landowners.

DRAFT

6.0 IMPLEMENTATION STRATEGIES AND POTENTIAL FUNDING SOURCES

6.1 Potential Funding Sources

A variety of outside funding sources are available for restoration projects in the Puget Sound basin. Funding opportunities have generally increased since the implementation of Governor Gregoire's Puget Sound Initiative in 2005, though the process by which organizations are able to obtain funds is typically quite competitive. Sources listed here do not represent an exhaustive list of potential funding opportunities, but are meant to provide an overview of the types of opportunities available.

Interagency Committee for Outdoor Recreation

Washington Wildlife Recreation Program

1111 Washington St. SE
PO Box 40917
Olympia, WA 98504
360-902-3000, info@iac.wa.gov

The WWRP provides funds for the acquisition and development of recreation and conservation lands. WWRP funds are administered by account and category. The Habitat Conservation Account includes critical habitat, natural areas, and urban wildlife categories. The Outdoor Recreation Account includes local parks, state parks, trails, and water access categories. Letters of intent are usually due March 1 of each year. Applications are usually due May 1.

Washington State Department of Ecology

P.O. Box 47600
Olympia, Washington 98504-7600
360-407-6300
<http://www.ecy.wa.gov/fap.html>

The Department of Ecology's Water Quality Program administers four major funding programs that provide low-interest loans and grants for projects that protect and improve water quality in Washington State. Ecology acts in partnership with state agencies, local governments, and Native American nations by providing financial and administrative support for their water quality efforts. As much as possible, Ecology manages the four programs as one; there is one funding cycle, application form, and offer list. The four programs are: The Centennial Clean Water Program, The Water Pollution Control Revolving Fund, The Clean Water Section 319 Program, and Stormwater Retrofit and Low Impact Development Grant Program. Local governments, Native American nations, conservation districts, and non-profit groups are eligible for funding. Grants and loans are available for point source and nonpoint source projects; for example, treatment facilities, stormwater control and treatment, stream restoration and protection, and on-site septic repair and replacement.

Washington Department of Fish & Wildlife

600 Capitol Way North
Olympia, WA 98501-1091
360-902-2806.

<http://wdfw.wa.gov/volunter/vol-7.htm>

Aquatic Lands Enhancement Account (ALEA) Volunteer Cooperative Projects Program: The Washington Department of Fish and Wildlife (WDFW) accepts grant applications from individuals and volunteer groups conducting local projects to benefit fish and wildlife. Grants have ranged from \$300 to \$75,000 in past years to help volunteers pay for materials necessary for projects approved by the agency. Funding cannot be used for wages or benefits. Examples of past projects include habitat restoration, improving access to fish and wildlife areas for disabled people, fish and wildlife research, public education and fish-rearing projects that can benefit the public.

Landowner Incentive Program: The Landowner Incentive Program (LIP) is a competitive grant program designed to provide financial assistance to private landowners for the protection, enhancement or restoration of habitat to benefit species at risk on privately owned lands. At risk species depend on specific ecosystems for survival. These ecosystems include riparian areas, wetlands, oak woodlands, prairies and grasslands, shrub steppe and nearshore environments. Through Washington's LIP, individual landowners are eligible to apply for up to \$50,000 in assistance. In addition, \$50,000 is typically set aside for small grants. Any individual applying for these small grant funds may apply for up to \$5,000. A 25% non-federal contribution is required, which may include cash and/or in-kind (labor, machinery, materials) contribution.

National Fish and Wildlife Foundation

1120 Connecticut Avenue, NW, #900
Washington, DC 20036
Kathleen Pickering 202-857-0166
www.nfwf.org

Non-profit organizations, local, state or federal government agencies are eligible to apply for funds for community-based projects that improve and restore native salmon habitat, remove barriers to fish passage, or for the acquisition of land/ conservation easements on private lands where the habitat is critical to salmon species. Specific grant programs are listed below.

- *Bring Back the Natives: A Public-Private Partnership for Restoring Populations of Native Aquatic Species:* The Bring Back the Natives initiative (BBN) funds on-the-ground efforts to restore native aquatic species to their historic range. Projects should involve partnerships between communities, agencies, private landowners, and organizations that seek to rehabilitate streamside and watershed habitats. Projects should focus on habitat needs of species such as fish, invertebrates, and amphibians that originally inhabited the waterways across the country. Twelve to fifteen grants averaging \$60,000 are awarded annually.

- *Five-Star Restoration Matching Grants Program:* The Five-Star Restoration Program provides modest financial assistance on a competitive basis to support community-based wetland, riparian and coastal habitat restoration projects that build diverse partnerships and foster local natural resource stewardship through education, outreach and training activities.
- *The Migratory Bird Conservancy:* The MBC will fund projects that directly address conservation of priority bird habitats in the western hemisphere. Acquisition, restoration, and improved management of habitats are program priorities. Education, research, and monitoring will be considered only as components of actual habitat conservation projects.
- *Community Salmon Fund:* NFWF has established local partnerships throughout Washington State through the Community Salmon Fund program to engage landowners, community groups, tribes, and businesses in stimulating smaller-scale, community-oriented habitat restoration and protection projects to aid in salmon recovery. Grants made under this program are administered by NFWF. There are currently three Community Salmon Fund partnership programs. NFWF has partnered with the Washington State Salmon Recovery Funding Board (SRFB) to administer a statewide Community Salmon Fund program that is coordinated with the individual Lead Entity groups. In addition to this SRFB Community Salmon Fund program, NFWF has partnered with both King and Pierce Counties to administer county-specific Community Salmon Fund programs in those counties.

Salmon Recovery Funding Board (SRFB)

Tara Galuska (Nisqually River Salmon Recovery, WRIA 15)

(360) 902-2953

Barb McIntosh (Pierce County)

(360) 902-3001

<http://www.rco.wa.gov/srfb/board/board.htm>

The Salmon Recovery Funding Board supports salmon recovery by funding habitat protection and restoration projects. It also supports related programs and activities that produce sustainable and measurable benefits for fish and their habitat. SRFB distributes funds through two grant programs: SRFB grants, and Family Forest Fish Passage Program grants. The grants from SRFB range from \$10,000 to nearly \$900,000. They are awarded to organizations in 28 counties for work ranging from planting trees along streams to cool the water for salmon, to replacing culverts that prevent salmon from migrating to spawning habitat, to restoring entire floodplains. Grants are awarded by the SRFB based on a public, competitive process that weighs the merits of proposed projects against established program criteria.

Depending on the grant program, eligible applicants may include municipal subdivisions (cities, towns, counties, and special districts such as port, conservation, utility, park and recreation, and school), tribal governments, state agencies, nonprofit organizations, regional fisheries enhancement groups, and private landowners. To be considered for funding, projects must be

operated and maintained in perpetuity for the purposes for which funding is sought. All projects require lead entity approval and must be a high priority in the lead entity strategy or regional recovery plan.

NOAA Restoration Center
Community-based Restoration Program

Northwest Region

Jennifer Steger, Director

Jennifer.Steger@noaa.gov

<http://www.nmfs.noaa.gov/>

The NOAA Community-based Restoration Program (CRP) is a financial and technical assistance program that helps communities implement restoration projects. Specific opportunities are listed below.

- *NOAA CRP 3-Year Partnership Grants:* These grants fund national and regional habitat restoration partnerships for up to 3 years that provide sub awards for individual grass-roots restoration projects. Typical awards range from \$100,000 to \$2,000,000.
- *NOAA CRP Project Grants:* These grants fund grass-roots marine and coastal habitat restoration projects that will benefit anadromous fish species, commercial and recreational resources, and endangered and threatened species. Typical awards range from \$30,000 to \$250,000.
- *American Sportfishing Association's FishAmerica Foundation Grants:* Since 1998, NOAA CRP has partnered with the FishAmerica Foundation to provide funding for fisheries habitat restoration projects nationwide. Grants will fund marine and anadromous fish habitat restoration projects that benefit recreationally-fished species. Typical awards range from \$5,000 to \$50,000.
- *National Fish & Wildlife Foundation/National Association of Counties Coastal Counties Restoration Initiative:* In partnership with NOAA CRP, this grant program funds innovative, high quality county-led or supported projects that support wetland, riparian and coastal habitat restoration projects. Typical awards range from \$25,000 to \$100,000.

Environmental Protection Agency

Region 10: Pacific Northwest

Grants Administration Unit

Bob Phillips

phillips.bob@epa.gov

(206) 553-6367

The Environmental Protection Agency funds a variety of projects that aim to safeguard the natural environment and protect human health. Potential opportunities specific to watershed protection and restoration are listed below.

- *The Clean Water State Revolving Fund Program:* Under this program, EPA provides grants or “seed money” to all 50 states plus Puerto Rico to capitalize state loan funds. The states, in turn, make loans to communities, individuals, and others for high-priority water-quality activities. Projects funded by the low-interest loans may include wetlands protection and restoration, estuary management efforts and development of riparian buffer zones.
- *Nonpoint Source Implementation Grant (319) Program:* Clean Water Act Section 319(h) funds are provided only to designated state and tribal agencies to implement their approved nonpoint source management programs. State and tribal nonpoint source programs include a variety of components, including technical assistance, financial assistance, education, training, demonstration projects, and regulatory programs. Each year, EPA awards Section 319(h) funds to states in accordance with an allocation formula that EPA has developed.
- *Wetland Protection, Restoration, and Stewardship Discretionary Funding:* This program provides support for studies and activities related to implementation of Section 404 of the Clean Water Act for both wetlands and sediment management. Projects can support regulatory, planning, restoration or outreach issues. Typical grant awards range from \$5,000 to \$20,000.

Trout Unlimited
Embrace-A-Stream
406-543-1192
www.tu.org

Embrace-A-Stream (EAS) is the flagship grant program for funding Trout Unlimited’s conservation efforts to conserve, protect, and restore coldwater fisheries and their watersheds. Trout Unlimited annually raises money from TU members, corporate and agency partners, and foundations to distribute as small grants to local TU projects. The goal of EAS is to conserve coldwater fisheries through innovative grassroots conservation projects. Successful projects are based on sound science, benefit the resource, strengthen the local TU chapter and council, and help build the constituency for protecting trout and salmon. TU volunteers are actively involved in project work and are expected to provide matching funds. An Embrace-A-Stream Committee comprised of TU volunteer representatives and scientific advisors evaluates all proposed projects.

Natural Resources Conservation Service
Conservation Reserve Program
<http://www.nrcs.usda.gov/programs/crp/>

The Conservation Reserve Program (CRP) provides technical and financial assistance to eligible farmers and ranchers to address soil, water, and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. The program provides assistance to farmers and ranchers in complying with federal, state, and tribal environmental

laws, and encourages environmental enhancement. It encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as grasses, wildlife plantings, trees, filterstrips, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. Cost sharing is provided to establish the vegetative cover practices.

6.2 Voluntary Restoration on Private Lands

Portions of the shoreline area in Eatonville lie within private properties; therefore, public outreach and voluntary restoration actions are a key component of the success of this plan. Private property owners often serve as the best stewards for their land and will voluntarily enhance or restore conditions. As stated in Chapter 1, the Shoreline Restoration Plan is a non-regulatory and voluntary program undertaken by the Town and environmental partners willing to improve habitat and existing conditions within the shoreline jurisdiction.

Voluntary actions may include citizens assisting a public agency or stewardship group with plantings, habitat improvement or shoreline ecology on public lands such as parks or open space. Voluntary actions may also include restoration undertaken on private properties by land owners to improve habitat, water quality or stabilize streams. This section addresses the types of actions that a private property owner can undertake to restore conditions in the shoreline jurisdiction.

Voluntary restoration on private properties may range from minor projects that do not require permitting in and of themselves (such as removal of ivy) to larger-scale improvements that require permit approval (such as grading, culvert removal, or streambank stabilization). Expert assistance is required to design and permit large-scale restoration projects on private properties. Expertise needed may include engineering, fisheries biology, wetland or wildlife science or geotechnical. Minor restoration may not require expert assistance and can be accomplished with general information provided by the Town or state government.

The following web sites provide information for shoreline land owners for voluntary restoration actions:

Green Shorelines: Bulkhead Alternatives for a Healthier Lake Washington
(<http://www.ecy.wa.gov/programs/sea/events/greenshorelines.html>)

Water quality – aquatic plants, algae and lakes:
(<http://www.ecy.wa.gov/programs/wq/links/plants.html>)

Protecting Your Stream - Ten Actions for Streamside Property Owners (WSU Extension Office, Clark County, 2008) (available at: <http://clark.wsu.edu/volunteer/ws/fags.html>)

Washington Department of Fish and Wildlife Backyard Wildlife Sanctuary Program
(<http://wdfw.wa.gov/living/backyard/>)

National Wildlife Federation Garden for Wildlife Program (<http://www.nwf.org/Get-Outside/Outdoor-Activities/Garden-for-Wildlife.aspx>)

The top five shoreline preservation or restoration actions easiest to implement on private property are listed below. These actions typically do not require special equipment or expertise but can have significant benefits to shoreline functions, especially if undertaken by a community or group of landowners.

1. Protect and preserve existing native vegetation, especially native trees.

Native trees and shrubs in the shoreline provide shade, shelter and food necessary for both terrestrial and aquatic species. Native vegetation along shoreline lakes and streams also stabilizes banks, reduces erosion and filters pollutants from runoff. Protection of existing vegetation preserves those important habitat functions in the shoreline.

2. Protect and preserve “associated wetlands.”

Wetlands considered “associated” with shorelines provide important flood storage, water detention, pollutant removal, and habitat for waterfowl and wildlife. By protecting and preserving these special wetlands, private landowners may protect the water quality, flood capacity and habitat in the nearby river.

3. Remove invasive non-native plants and install native trees and shrubs.

Invasive non-native plants like Himalayan blackberry, Japanese Knotweed, English ivy, reed canarygrass, morning glory, holly, and butterfly bush can occupy habitat in the riparian zone along rivers, streams and lakes. These plants limit the habitat for native bird and wildlife species which do not typically use these plants. Often, invasive plants are fast-growing and shallow rooted, and make slopes and stream banks susceptible to erosion.

4. Remove debris, refuse and derelict structures from the shoreline.

Removing man-made debris from the shorelines helps keep lakeshores and streams free of harmful substances and materials. Removal of tires and other man-made debris improves the health of the shoreline for fish and wildlife as well as the long-term quality of water. Work within water may require permits.

5. Reduce use of fertilizers and pesticides.

Minimizing use of fertilizers and pesticides within 200 feet of shorelines will improve water quality, reduce the risk of algae and nuisance aquatic plants (especially in lakes) and avoid impacts to downstream habitats.

6.3 Constraints to Implementation

There are a number of potential complicating factors between the preparation of a shoreline restoration plan and on-the-ground implementation of its programs and projects. Some of these challenges are briefly summarized below:

- Lack of funding: Designing, carrying out, and monitoring the success of restoration efforts can be an expensive undertaking, particularly at larger (e.g., watershed or reach) scales. In general, funding for restoration is limited and competition for funds extensive.
- Landowner participation: Restoration opportunities which are located on private property can be more challenging to implement than opportunities located on public property. The Town would need to negotiate with the private property owners to purchase the property or acquire an easement onto the property. The property owners would need to be interested in working with the Town since restoration is not a regulatory requirement. Such voluntary interest may not occur until shoreline landowners are educated on the benefits of restoration projects or meaningful incentives are established.
- Project permitting: Obtaining necessary permits from local, state, and federal regulatory agencies can require substantial time and effort. Although encouraged and allowed by the SMP, complicated restoration projects may take a year or more to permit.
- Scale of issues: Restoration of shoreline functions will involve efforts across the entire Nisqually watershed. To a certain extent, complete solutions to these issues are beyond the control of the Town's SMP. However, as described in Chapter 3, numerous organizations are already undertaking large-scale restoration projects in the watershed, providing opportunities for Eatonville to both participate in and learn from these projects.

7.0 TIMELINES, BENCHMARKS, AND MEASURING EFFECTIVENESS

In the context of the SMP update, restoration planning is a long-term effort. The SMP guidelines include the general goal that local master programs “include planning elements that, when implemented, serve to improve the overall condition of habitat and resources within the shoreline area” (WAC 173-26-201(c)). The guidelines for restoration planning state that local programs should “...appropriately review the effectiveness of the projects and programs in meeting the overall restoration goals” (WAC 173-26-201(2)(f)).

As a long-range policy plan, it is difficult to establish meaningful timelines and measurable benchmarks in the SMP by which to evaluate the effectiveness of restoration planning or actions. Nonetheless, the legislature has provided an overall timeframe for future amendments to the SMP. In 2003, Substitute Senate Bill 6012 amended the Shoreline Management Act (RCW 90.58.080) to establish an amendment schedule for all jurisdictions in the state. Once the Town of Eatonville updates its SMP, the Town is required to review, and amend if necessary, its SMP once every seven years (RCW 90.58.080(4)). During this review period, the Town could document progress toward achieving shoreline restoration goals. The review could include:

- Re-evaluating adopted restoration goals, objectives, and policies;
- Summarizing both planning efforts (including application for and securing grant funds) and on-the-ground actions undertaken in the interim to meet those goals; and
- Revising the SMP restoration planning element to reflect changes in priorities or objectives.

Another mechanism that may serve to establish timelines and benchmarks would be establishment of a shoreline restoration program organized like or integrated with the City’s capital improvement program (CIP). Similar to an infrastructure CIP, a shoreline restoration CIP could be evaluated and updated regularly. The shoreline CIP could be focused on site-specific projects and could be funded through grants or a fee-in-lieu program developed as part of the shoreline permitting process. Further, other CIP projects, such as stormwater facility improvements, could be evaluated to determine if their design and construction would advance shoreline restoration goals.

Specific timelines should be developed according to the general priorities described herein and emphasis should be given to areas with the greatest restoration potential. A suggested timeline for initiating implementation of this plan could be as follows:

Within 2 years of adoption of this plan:

- Identify at least 2 potential projects in partnership with the Nisqually Tribe, Nisqually Land Trust, and/or other organizations, and establish a schedule for obtaining and assigning staff, applying for funding, and initiating steps toward implementation.
- Designate staff and funding for public workshops on low impact development techniques and ways to protect water quality.

Within 5 years of adoption of this plan (assuming funding is available):

- Obtain funding and permits for at least 2 restoration projects.
- Hold at least 3 public workshops on low impact development techniques, ways to protect water quality, and benefits of native shoreline vegetation.

Within 7 years of adoption of this plan:

- Complete at least 2 restoration projects.
- Provide technical assistance and incentives to private landowners to complete at least 2 pilot projects involving low impact development and/or restoration of native riparian vegetation.

Over time, restoration efforts must be evaluated against a set of benchmarks to determine if adequate progress is being made. One way to assess progress would be to track and report the following general benchmarks:

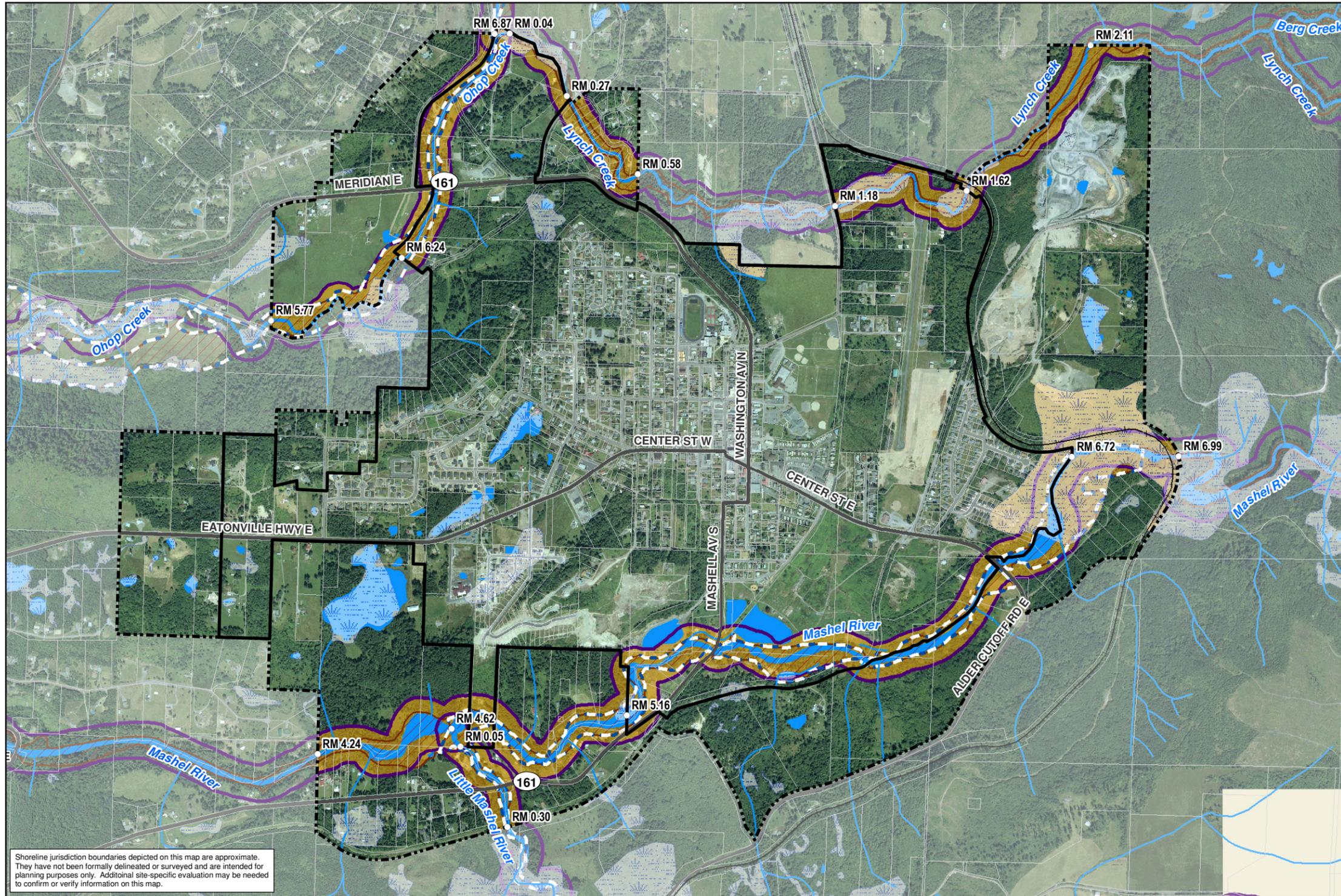
- Number of public workshops held and number of citizens attending;
- Number of low impact development projects installed;
- Number of restoration actions implemented in conjunction with other project partners;
- Acres or linear feet of riparian vegetation enhancement and non-native vegetation control treatments;
- Amount of in-channel LWD installed;
- Linear feet of hardened shoreline armoring replaced with bioengineered techniques;
- Improvement of water quality as measured in the state water quality assessment.

8.0 REFERENCES

- ESA. 2011. Pierce County Shoreline Master Program Update Project: Shoreline Restoration Plan. Prepared for Pierce County Planning and Land Services Department. Pierce County, WA.
- ESA Adolfson. 2009. Pierce County Shoreline Master Program Update Project, Final Shoreline Inventory and Characterization Report. June. Prepared for Pierce County Planning and Land Services Department. Pierce County, WA.
- ESA Adolfson. 2010. *Town of Eatonville Shoreline Inventory and Characterization Report*.
- Herrera Environmental Consultants, inc (Herrera). 2010. Mashel River Restoration Project Reach 4 & 5 Basis of Design Memorandum. February 24, 2010.
- Homza, M., N. Napp, and E. Salminen. 2002. Lower Ohop Creek Enhancement Plan. Prepared for the Nisqually Indian Tribe, Olympia, WA.
- Nisqually Chinook Recovery Team. 2001. Nisqually Chinook Recovery Plan. Nisqually Indian Tribe. Olympia, WA.
- Nisqually Indian Tribe. 2008. Yil-me-hu, The Nisqually Watershed Salmon Recovery Newsletter, Fall/Winter 2008. Available: http://www.nisquallyriver.org/stewards/Yil_Me_Hu_Fall_Winter_08.pdf. Accessed January 2009.
- Nisqually Land Trust. 2006. Nisqually Land Trust - Protected Lands, Ohop Creek. Available: www.nisquallylandtrust.org/ohop_creek.php. Accessed January 2009.
- Nisqually Land Trust. 2010. Summer 2010 newsletter (www.nisquallylandtrust.org).
- Pierce County. 2008. Nisqually River Basin Plan Volume 1 – Public Review Draft. June 2008. Pierce County Public Works and Utilities. Accessed November 2009 at: <http://www.co.pierce.wa.us/pc/services/home/environ/water/ps/basinplans/nisqually.htm>.

APPENDIX A: MAPS

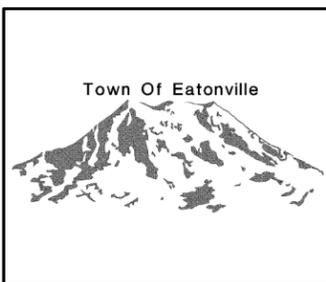
DRAFT



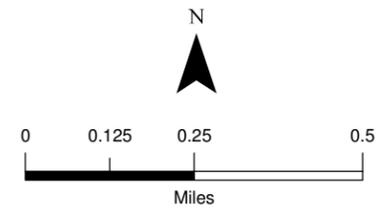
Legend

- Eatonville Town Limits
- UGA Boundary
- Shoreline Planning Area
- Streams
- Wetlands
- Floodway
- 200' Buffer OHWM
- 1% Chance Annual Flood
- Parcels
- Major Roads
- Roads
- Railroads

Shoreline jurisdiction boundaries depicted on this map are approximate. They have not been formally delineated or surveyed and are intended for planning purposes only. Additional site-specific evaluation may be needed to confirm or verify information on this map.

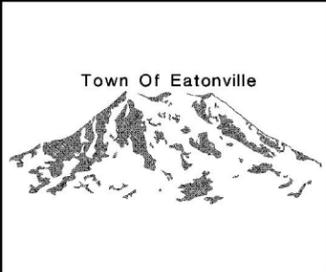
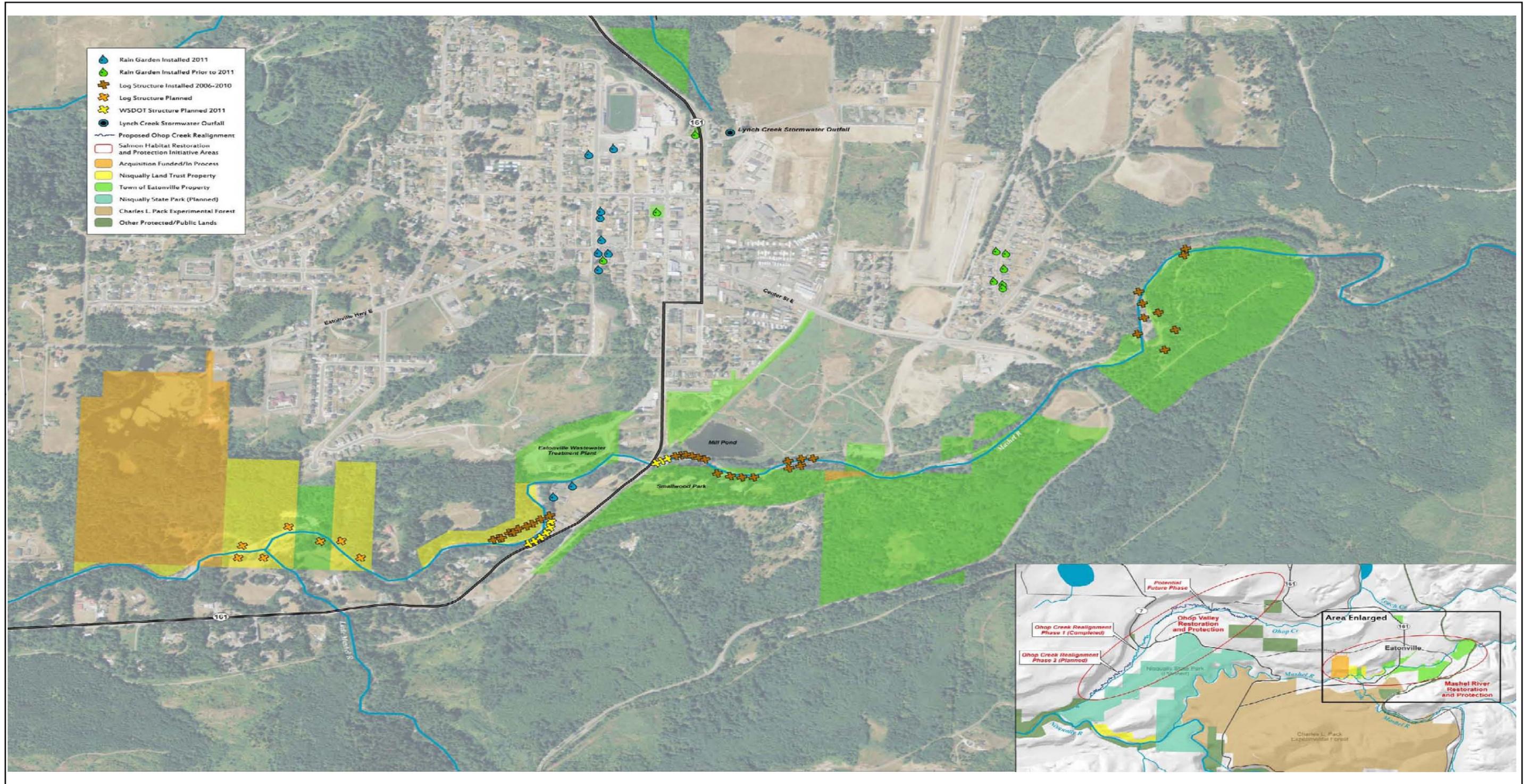


**SHORELINE MASTER PROGRAM UPDATE
TOWN OF EATONVILLE**



MAP 1
Preliminary Shoreline Planning
Area Mapping

SOURCE: Eatonville, 2009; FEMA, 2007; Pierce County, 2005, 2006, 2007; Pierce County, 2005 (Aerial).

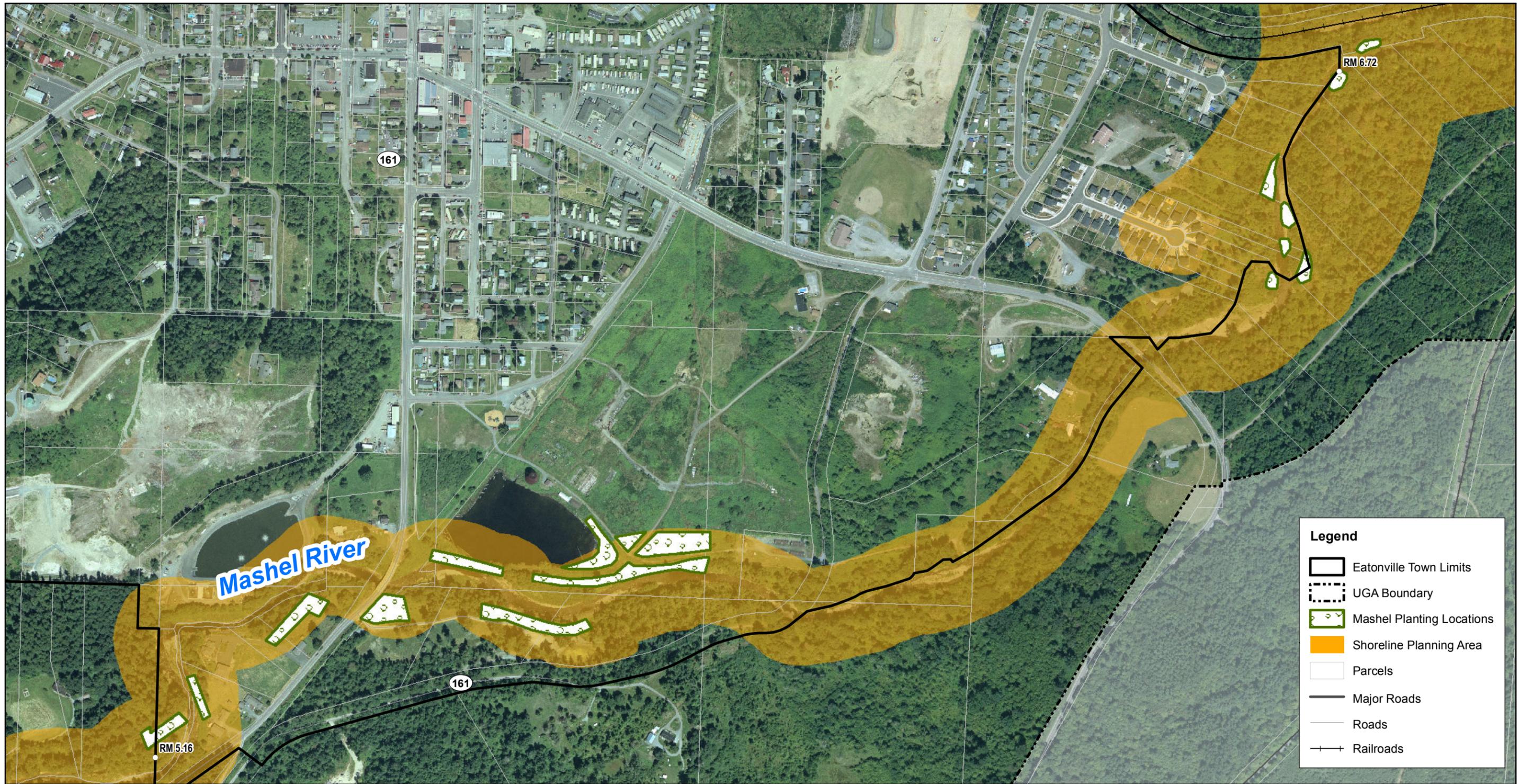


**SHORELINE MASTER PROGRAM UPDATE
TOWN OF EATONVILLE**

NOTE: This map was created by the Nisqually Natural Resources Department.

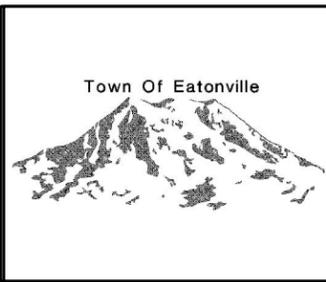
**MAP 2
Eatonville Area Initiatives**

SOURCE: Nisqually Tribe, 2011

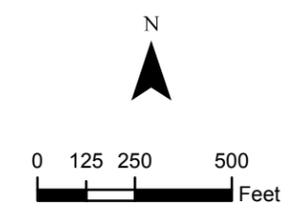


Legend

-  Eatonville Town Limits
-  UGA Boundary
-  Mashel Planting Locations
-  Shoreline Planning Area
-  Parcels
-  Major Roads
-  Roads
-  Railroads

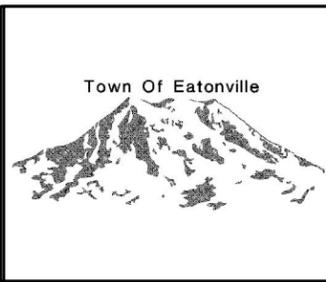
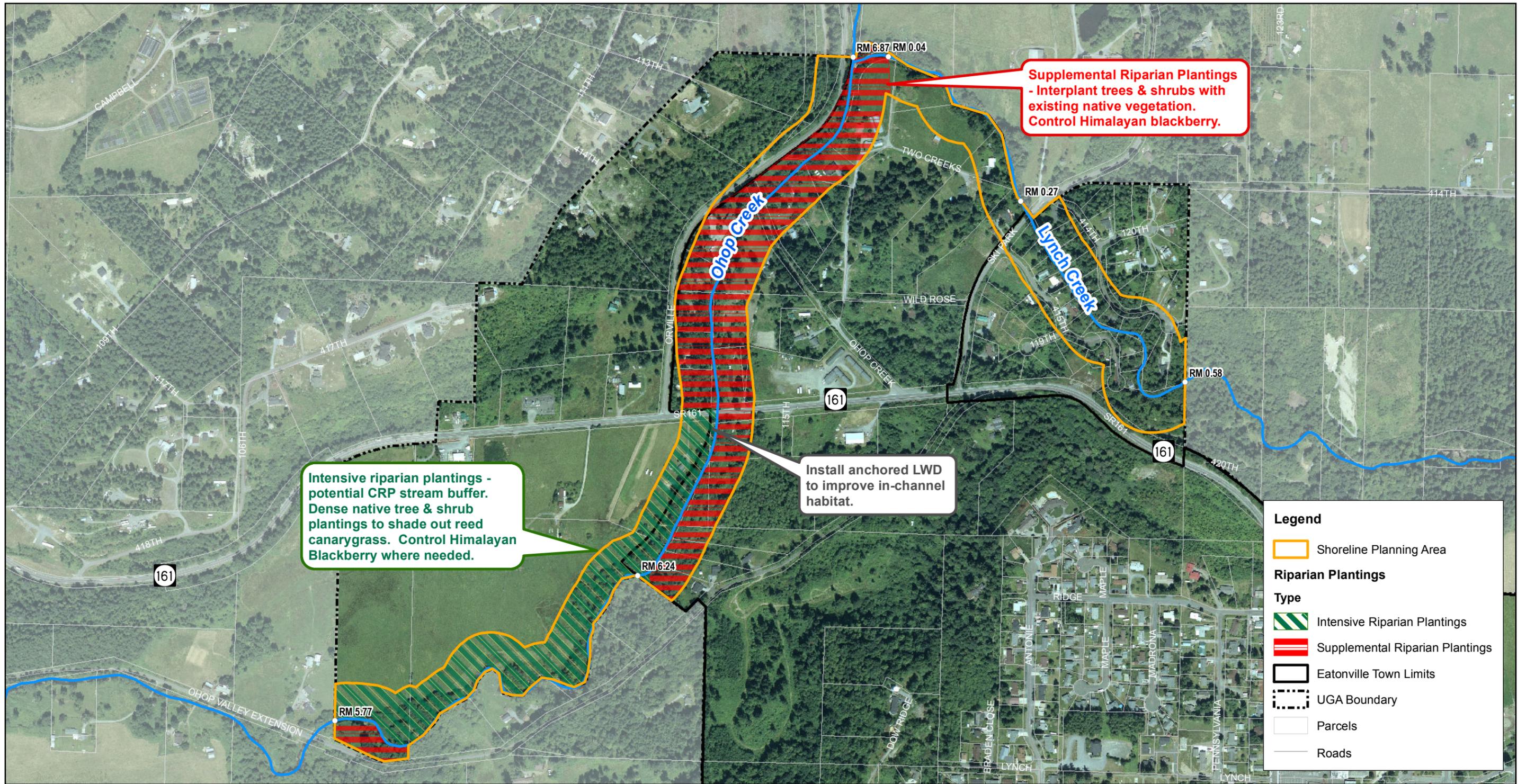


**SHORELINE MASTER PROGRAM UPDATE
TOWN OF EATONVILLE**



MAP 3
Mashel Planting Locations

SOURCE: Eatonville, 2009; FEMA, 2007; Pierce County, 2005, 2006, 2007; Pierce County, 2005 (Aerial).

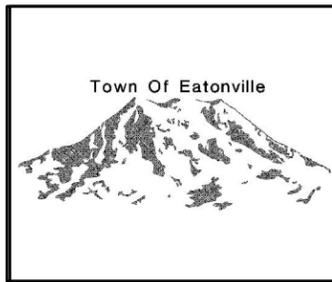
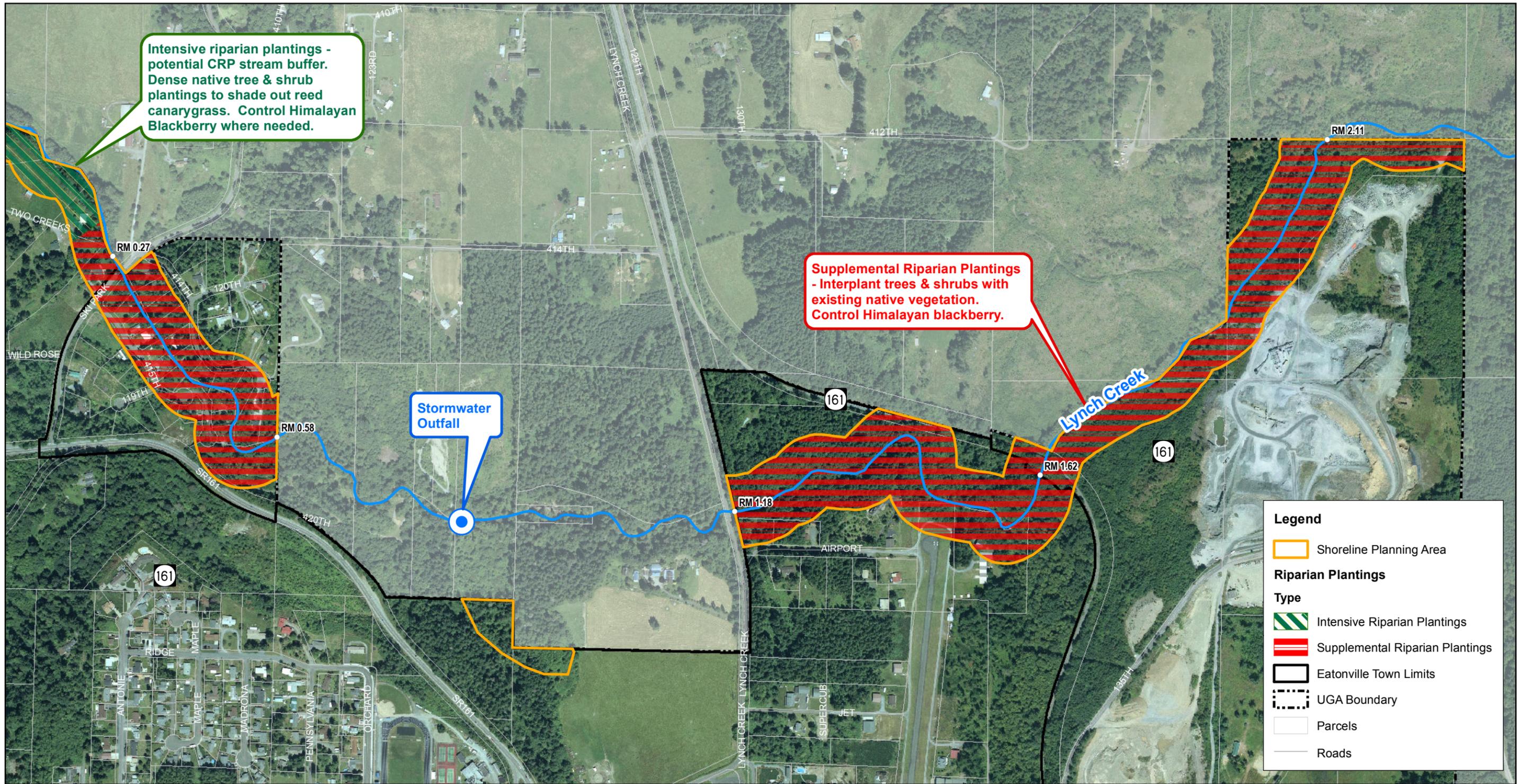


**SHORELINE MASTER PROGRAM UPDATE
TOWN OF EATONVILLE**

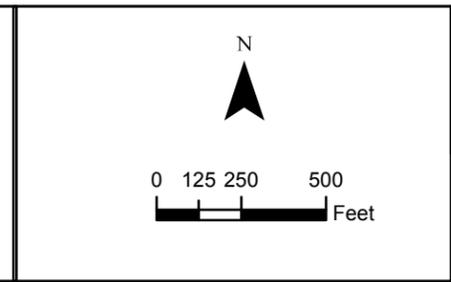


**MAP 4
Ohop Creek Restoration Areas**

SOURCE: Eatonville, 2009; FEMA, 2007; Pierce County, 2005, 2006, 2007; Pierce County, 2005 (Aerial).

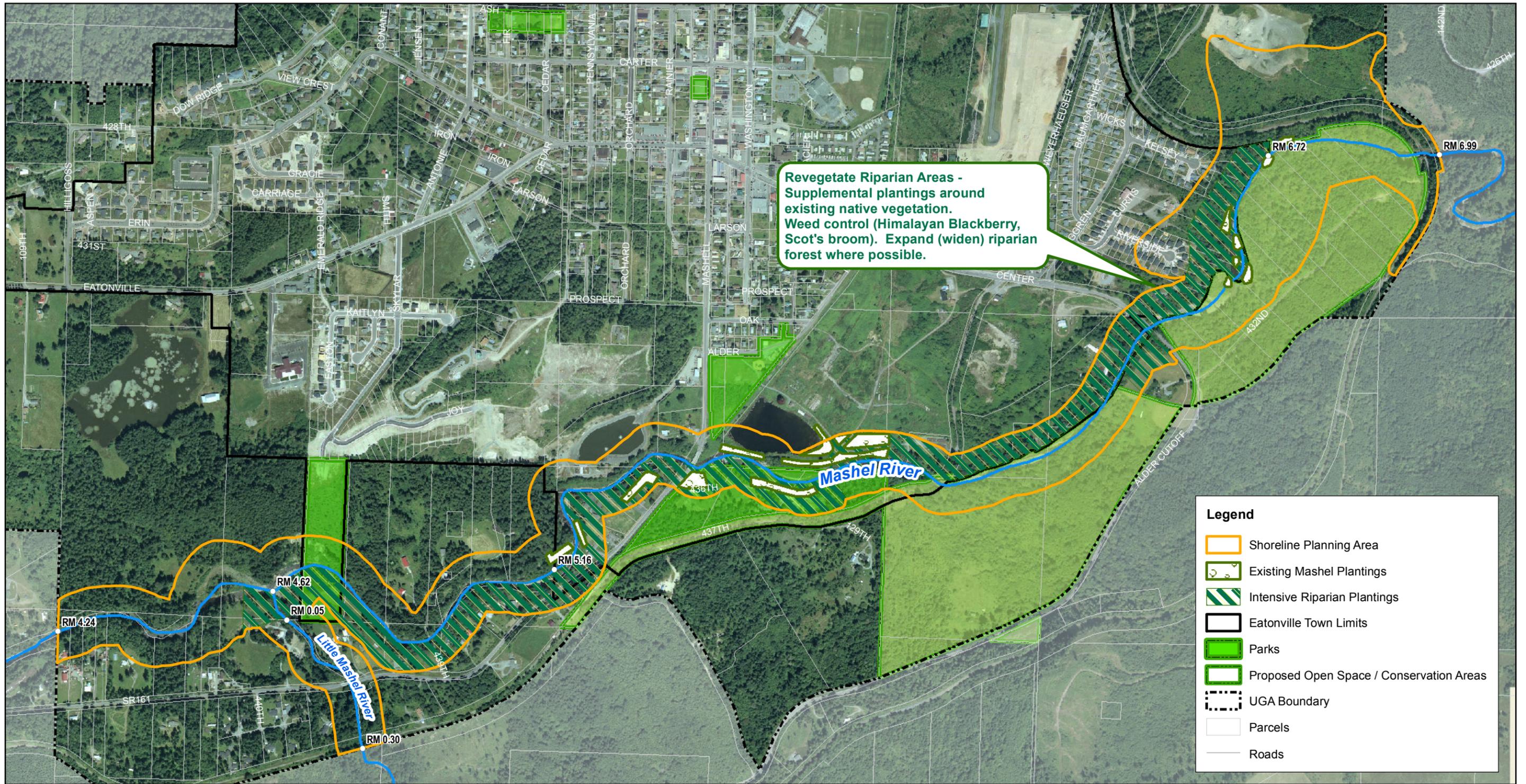


**SHORELINE MASTER PROGRAM UPDATE
TOWN OF EATONVILLE**



MAP 5
Lynch Creek Restoration Areas

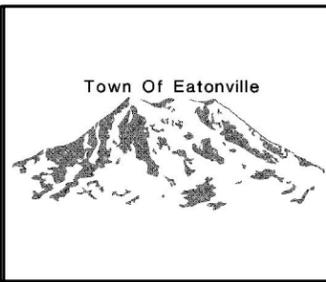
SOURCE: Eatonville, 2009; Pierce County, 2005, 2006, 2007; Pierce County, 2005 (Aerial).



Revegetate Riparian Areas - Supplemental plantings around existing native vegetation. Weed control (Himalayan Blackberry, Scot's broom). Expand (widen) riparian forest where possible.

Legend

- Shoreline Planning Area
- Existing Mashel Plantings
- Intensive Riparian Plantings
- Eatonville Town Limits
- Parks
- Proposed Open Space / Conservation Areas
- UGA Boundary
- Parcels
- Roads

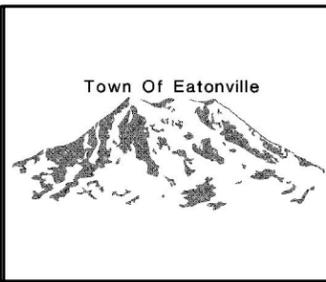
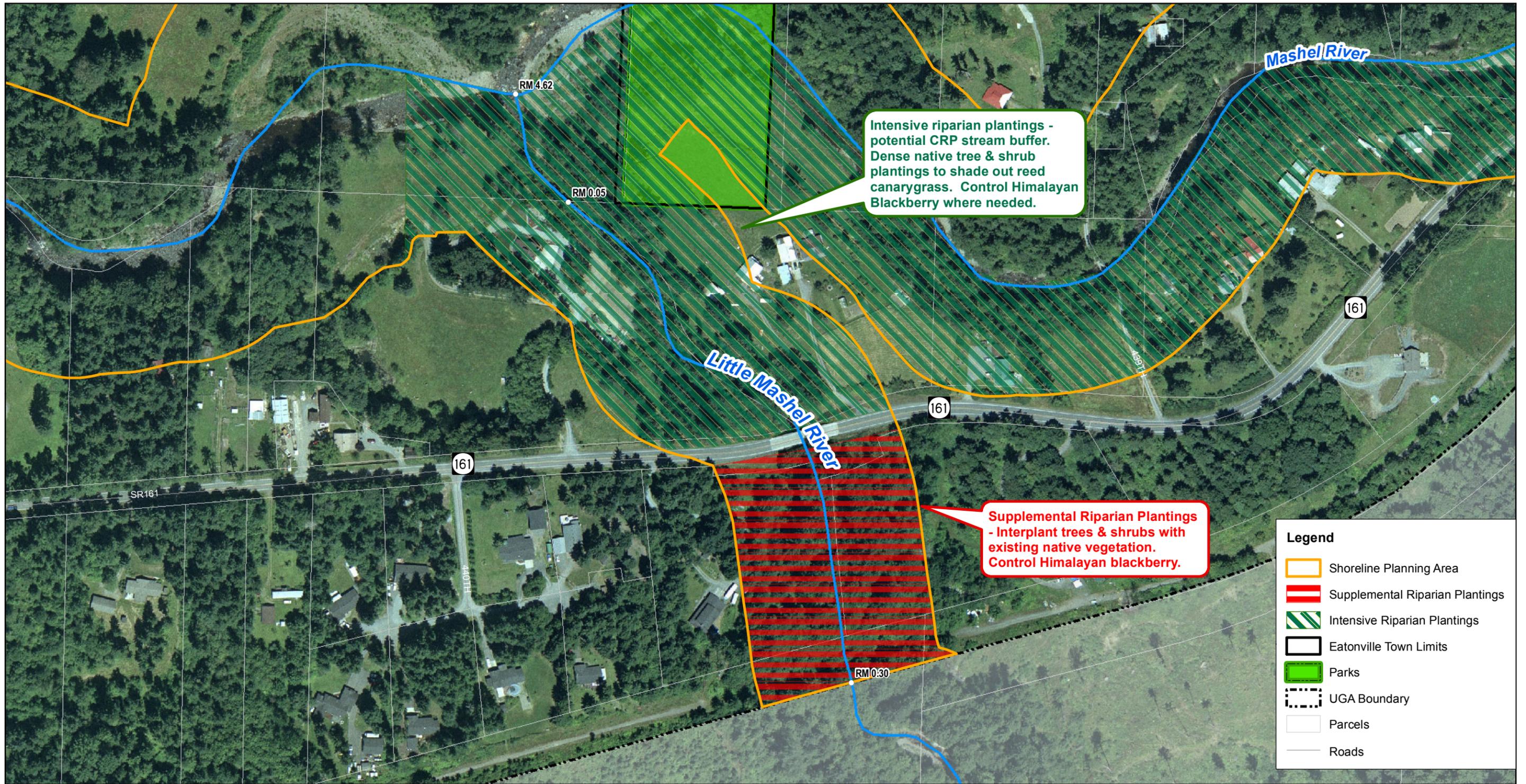


**SHORELINE MASTER PROGRAM UPDATE
TOWN OF EATONVILLE**

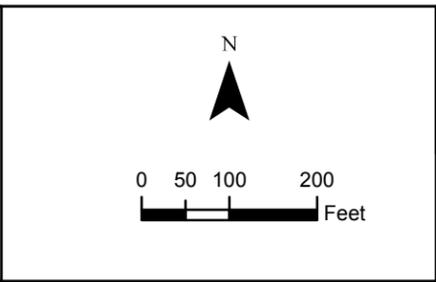


**MAP 6
Mashel River Restoration Areas**

SOURCE: Eatonville, 2009; Pierce County, 2005, 2006, 2007; Pierce County, 2005 (Aerial). Nisqually Tribe, 2011 (Mashel Plantings).



**SHORELINE MASTER PROGRAM UPDATE
TOWN OF EATONVILLE**



MAP 7
Little Mashel River Restoration Areas

SOURCE: Eatonville, 2009; Pierce County, 2005, 2006, 2007; Pierce County, 2005 (Aerial). Nisqually Tribe, 2011 (Mashel Plantings).

APPENDIX B: CONTROL METHODS FOR NON-NATIVE BLACKBERRY SPECIES (HIMALAYAN AND EVERGREEN) AND REED CANARYGRASS

DRAFT

Recommendations for control of Himalayan blackberry (*Rubus armeniacus*) and evergreen blackberry (*Rubus lacinatus*)

Cut and Grub

Himalayan and evergreen blackberry are easily controlled by cutting canes or shoots to the ground and grubbing the remainder of the plant by hand which involves the removal of the entire root ball. Brush cutters or hand loppers are best used for cutting; shovels, pulaskis or pick mattocks are best used for grubbing. This method can be employed any time of year although best when soils are moist and loose, on gentle streambanks and slopes, and at the edges of wetlands. This method causes localized soil disturbance; if steep slopes are present, use best management practices including erosion control techniques such as jute fabric, coir logs, and replanting and applying mulch as soon as possible. Follow-up weeding is often necessary to control re-growth of root fragments and seeds.

Mowing

Mowing can be an effective control method for reducing the above-ground biomass of blackberry but requires multiple visits for several years; mowing does not eliminate roots or the likelihood of reinfestation. Mowing should not be used where soils are highly susceptible to soil compaction, erosion, or in wetlands. Mowing is best used in conjunction with other methods such as hand grubbing or cut-stem herbicide treatment (described below).

Biological

Biological control by the use of grazing livestock such as goats or pigs can be an effective control method, especially on steep slopes and large thickets lacking major native vegetation. Goats can reach areas on slopes that are ordinarily difficult and hazardous for human access. Goats are most effective grazing on young stems and thickets; tending to eat only leaves on mature thickets. This method is best used in conjunction with other methods such as hand grubbing or cut-stem herbicide treatment (described below). If major native vegetation is present an alternative method should be used since goats will eat all vegetation.

Chemical

Herbicide application can be a very effective treatment for blackberries. Broad spectrum Glyphosate is most effectively applied from September to October and followed by re-planting efforts; glyphosate treatments may be needed for several years depending on establishment of infestation. Selective herbicides such as triclopyr, 2,4-D, and metsulfuron are best used in grassy areas. These chemicals require a Washington state pesticide applicator license and, if working in wetlands or riparian areas, an approved aquatic herbicide must be used. Chemical control by either foliar spraying or painting of cut stems reduces the impacts on soil disturbance and erosion issues on steep slopes. Their use should be limited in wetlands and aquatic areas. All label instructions must be closely followed.

Control Methods	Steep Slopes	Streams or stream banks	Wetlands
Cut and Grub		X*	X
Mowing		X*	X
Biological	X	X	X
Chemical	X	X**	X**

* Major cutting, mowing, and grubbing of blackberry along streams or stream banks may have an effect on stream bank erosion and sediment movement especially during the high-flow season. If needed, use best management practices and replant as soon as possible. Jute fabric, coir logs, and mulch should be used in conjunction with replanting in areas at high risk for erosion. **Chemical treatments require a WA state pesticide applicator license and an approved aquatic herbicide.

The following King and Pierce County Weed Control Board links provide additional identification and management information as well as specific requirements for use of chemical herbicides:

<http://your.kingcounty.gov/dnrp/library/water-and-land/weeds/BMPs/blackberry-control.pdf>
<http://piercecountywweedboard.wsu.edu/blackberry.html>

Control methods for reed canarygrass (*Phalaris arundinaceae*)

The following table provides control options for reed canarygrass. The table is excerpted from the *Prairie Landowner Guide for Western Washington*, published by The Nature Conservancy (www.southsoundprairies.org).

Reed Canarygrass Control Options

Phalaris arundinacea

Control Method	Description	Use Where . . .	Timing	Pros	Cons
Herbicide (always read label instructions prior to use)	Foliar spray application of non-specific glyphosate (Round-up or Glyfos) or imazapyr (Habitat or Arsenal) herbicides.	In small or large areas depending on density of grass and permit requirements. Use within 50 feet of aquatic areas or wetlands is regulated and requires a permit and use of an aquatic-safe mixture (Aquamaster, Rodeo, Habitat).	Glyphosate and imazapyr are best applied on early young growth; however these can be applied at any time during active growth. Mowing then spraying regrowth can be an effective method.	If properly applied and used in conjunction with other techniques, can have effective and rapid results.	Use of toxic chemicals; may require the need for a licensed applicator. Potential for damage to desirable native species.
Solarization	Use of large sheets of plastic or fabrics to kill plants by solarization.	Small pastures, yards, or small infestations in larger areas.	For 1-3 consecutive years.	Facilitates sterile soils for seeding or planting of natives.	Materials can be expensive and unattractive. Not desirable when natives are mixed with reed canarygrass, on large sites, or areas with uneven topography.
Grazing	Use of livestock such as goats, cattle, or horses to keep grasses mowed and prevent seed set.	Large or small fields or pastures.	During early to mid-spring or following burns when regrowth is palatable.	Can naturally reduce seed banks, and reduce energy of grasses following or prior to a secondary treatment. Provides feed for livestock.	Not for sites with a significant number of native plants. Can cause significant soil disturbance during wet season.
Mowing	Use of power mowers or weed-whackers to reduce aboveground biomass. Best used in combination with herbicide treatment.	Where burning or herbicide application is not feasible. Large or small areas. Residential areas. Relatively open and even ground.	Before the emergence of seed heads.	Easy and economical over large areas.	Seed heads will mature if they are cut and left lying on the ground. Difficult or unsuitable in uneven topography or if numerous obstacles are present. Remaining reed canarygrass rootmass may impede establishment of native vegetation. Controls but does not eliminate weed population.
Burning and herbicide	Prescribed and permitted burns followed by herbicide application on regrowth. Treat with glyphosate or sethoxydim.	Small or large areas where control barriers such as roads are in place. Not for residential areas. No more than one-third of an area should be burned at a time.	When burn bans are not in effect. In spring when reed canarygrass is growing, but before natives break dormancy.	Removes thatch, revitalizes native grasses and forbs; creates spaces for new plants to germinate; stimulates new growth. Can return the soil to nutrient levels that favor natives over invasive grasses.	Can be costly depending on local regulations. Weather, safety, air quality and permit conditions can prevent burns at the last minute. Special consideration for native or rare invertebrates such as butterflies is needed.
Replanting	Replant with natives to create competition and shade out reed canarygrass.	Anywhere reed canarygrass control is occurring.	Fall or early spring. Spring planting may require additional watering.	Native trees and shrubs can be planted in infested areas to eventually shade out reed canarygrass. Increases biodiversity and wildlife habitat.	Regular weeding and watering is required to ensure establishment of plantings. Prairie grasses and herbs can't compete; reed canarygrass root mass must be eliminated first.

For more information:

http://www.co.thurston.wa.us/tcweeds/weeds/fact-sheets/Reed%20Canary%20Grass_2011.pdf

Wisconsin Reed Canary Grass Management Working Group. 2009. Reed Canary Grass (*Phalaris arundinacea*) Management Guide: Recommendations for Landowners and Restoration Professionals.