
**CITY OF ROY SHORELINE MASTER PROGRAM
RESTORATION PLAN**

Muck Creek and Muck Lake Shorelines

**Task 4 Report
Final January 2012**

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TABLE OF CONTENTS

Section	Page No.
1.0 INTRODUCTION	1
2.0 SHORELINE INVENTORY AND CHARACTERIZATION SUMMARY	2
2.1 Shoreline Jurisdiction	2
2.2 Inventory	3
2.3.1 Land Use and Physical Conditions	3
2.3.2 Biological Resources and Critical Areas	5
3.0 RESTORATION GOALS AND OBJECTIVES	7
3.1 Puget Sound Partnership	7
3.2 Water Resource Inventory Area 11 – Nisqually – Systemwide Planning	8
3.2.1 Nisqually Watershed Management Plan	8
3.2.2 WRIA 11 Detailed Implementation Plan	8
3.2.3 Nisqually Watershed Stewardship Plan	9
3.3 City of Roy Restoration Goals and Objectives	10
3.3.1 Restoration Goals	10
3.3.1 Restoration Objectives	10
4.0 LIST OF EXISTING AND ONGOING PROJECTS AND PROGRAMS	11
4.1 WRIA 11 Participation and Other Regional Coordination	12
4.2 Comprehensive Plan Policies	12
4.3 Critical Areas Regulations	12
4.4 Stormwater Management and Planning	13
4.5 Public Involvement and Education	13
5.0 LIST OF ADDITIONAL PROJECTS AND PROGRAMS TO ACHIEVE LOCAL RESTORATION GOALS	13
5.1 Unfunded WRIA 11	14
5.2 Other Recommended Projects	14
5.2.1 Muck Creek	14
5.2.2 Muck Lake	14
6.0 PROPOSED IMPLEMENTATION TARGETS AND MONITORING METHODS	14
7.0 RESTORATION PRIORITIES	16
7.1 Priority 1 – Continue and Increase WRIA 11 Participation	17
7.2 Priority 2 – Improve Water Quality and Reduce Sediment and Pollutant Delivery	17
7.3 Priority 3 – Public Education and Involvement	17
7.4 Priority 4 – Improve Riparian Vegetation, Reduce Impervious Coverage	18
7.5 Priority 5 – Reduce Aquatic Invasive Weeds	18
7.6 Priority 6 – City Zoning, Regulatory, and Planning Policies	18
8.0 REPORT REFERENCES AND BIBLIOGRAPHY	20
9.0 LIST OF ACRONYMS AND ABBREVIATIONS	21

List of Figures

Page No.

Figure 1: Roy City Park, depicting Muck Creek and pedestrian bridge in background. 4
Figure 2: Water bodies in and adjacent to the City. 6
Figure 3: Nisqually River Watershed, WRIA 11, with shaded relief (WDFW, 2010).... 8

List of Tables

Page No.

Table 1: Implementation Schedule and Funding for Restoration Projects, Programs,
and Plans.....15

1.0 INTRODUCTION

In 2009, the City of Roy (City) obtained a grant (G1000053) from the Washington State Department of Ecology (Ecology) to conduct a comprehensive Shoreline Master Program (SMP) update. The 2003 Washington State Legislature established a schedule in Revised Code of Washington (RCW) 90.58.080 for all Washington State cities and counties to update their local SMPs consistent with the Shoreline Management Act (SMA), RCW 90.58, and its implementing guidelines, Washington Administrative Code (WAC) 173-26. The State guidelines establish general procedures, goals, and standards that are adjusted to reflect local conditions by each jurisdiction as they amend their individual SMPs.

The City's SMP applies to activities in its shoreline zone. Activities that have adverse effects on the ecological functions and values of the shoreline must provide mitigation for those impacts. By law, the proponent of that activity is not required to return the subject shoreline to a condition that is better than the baseline level at the time the activity takes place.

Section 173-26-201(2)(f) WAC of the SMP Guidelines states:

Shoreline restoration planning. Consistent with principle WAC 173-26-186 (8)(c), master programs shall include goals, policies and actions for restoration of impaired shoreline ecological functions. These master program provisions should be designed to achieve overall improvements in shoreline ecological functions over time, when compared to the status upon adoption of the master program. The approach to restoration planning may vary significantly among local jurisdictions, depending on:

- The size of the jurisdiction;
- The extent and condition of shorelines in the jurisdiction;
- The availability of grants, volunteer programs or other tools for restoration; and
- The nature of the ecological functions to be addressed by restoration planning.

Master program restoration plans shall consider and address the following subjects:

- (i) Identify degraded areas, impaired ecological functions, and sites with potential for ecological restoration;
- (ii) Establish overall goals and priorities for restoration of degraded areas and impaired ecological functions;
- (iii) Identify existing and ongoing projects and programs that are currently being implemented, or are reasonably assured of being implemented (based on an evaluation of funding likely in the foreseeable future), which are designed to contribute to local restoration goals;
- (iv) Identify additional projects and programs needed to achieve local restoration goals, and implementation strategies including identifying prospective funding sources for those projects and programs;
- (v) Identify timelines and benchmarks for implementing restoration projects and programs and achieving local restoration goals;
- (vi) Provide for mechanisms or strategies to ensure that restoration projects and programs will be implemented according to plans and to appropriately review

the effectiveness of the projects and programs in meeting the overall restoration goals.

As set out in the SMP Guidelines above, the purpose of this Restoration Plan is to improve shorelines over time in areas where baseline conditions are degraded. Degraded shorelines are not just a result of pre-SMP activities, but also of unregulated activities and exempt development. The new SMP Guidelines also require that the City's SMP include regulations ensuring that exempt development taken together will not cause a net loss of ecological functions of the shoreline. While some actions within shoreline jurisdiction are exempt from a permit, the SMP should clearly state that those actions are not exempt from compliance with the SMA or the City's SMP.

Because the shoreline environment is also affected by activities taking place outside of the City's SMP's jurisdiction (e.g., outside of city limits, outside of the shoreline zone within the City), assembly of out-of-jurisdiction actions, programs and policies can be essential for understanding how the City fits into the larger watershed context. The latter is critical when establishing realistic goals and objectives for dynamic and highly inter-connected environments, as well as allowing the City to compensate for its limited resources by working with other partners.

As directed by the Guidelines, this Restoration Plan provides a summary of baseline shoreline conditions, lists restoration goals and objectives, and discusses existing or potential programs and projects that positively affect the shoreline environment. Finally, anticipated scheduling, funding, and monitoring of these various comprehensive restoration elements are provided. In total, implementation of the SMP with mitigation of project-related impacts in combination with this Plan for restoration of lost ecological functions that occurred prior to a specific project should result in a net improvement in the City's shoreline environment in the long term.

In addition to meeting the requirements of the Guidelines, this Restoration Plan is also intended to support the City's or other non-governmental organizations' applications for future grant funding to implement elements of this Restoration Plan. This is especially important for the City, given its small size and limited resources.

2.0 SHORELINE INVENTORY AND CHARACTERIZATION SUMMARY

2.1 Shoreline Jurisdiction

As defined by the SMA of 1971, shorelines include certain Waters of the State plus their associated "shorelands." At a minimum, the water bodies designated as shorelines of the state are streams with mean annual flows of 20 cubic feet per second (c.f.s.) or greater and lakes with areas greater than 20 acres. Shorelands are defined in RCW 90.58.030(d) as:

"...those lands extending landward for two hundred feet in all directions as measured on a horizontal plane from the ordinary high water mark; floodways and contiguous floodplain areas landward two hundred feet from such floodways; and all wetlands and river deltas associated with the streams, lakes, and tidal waters which are subject to the provisions of this chapter; the same to be designated as to location by the department

of ecology. Any county or city may determine that portion of a one-hundred-year-flood plain to be included in its master program as long as such portion includes, as a minimum, the floodway and the adjacent land extending landward two hundred feet therefrom. Any city or county may also include in its master program land necessary for buffers for critical areas, as defined in chapter 36.70A RCW, that occur within shorelines of the state..."

Shoreline jurisdiction within the City includes Muck Creek and Muck Lake, all lands that are located within 200 feet of the floodway edge or ordinary high water mark (OHWM), whichever is further landward, and any associated wetlands. Known associated wetlands within the City's shoreline district include the Muck Lake fringe wetlands and any portion of the undelineated Halverson Marsh or Denton Marsh that may extend into the City. Additionally, the portion of Lacamas Creek located within the 200-foot shoreland area of Muck Lake is subject to the City's SMP regulations.

2.2 Inventory

The City conducted a comprehensive inventory of its shoreline jurisdiction in July 2010 as part of the *City of Roy Shoreline Master Program: Shoreline Inventory and Characterization - Muck Creek and Muck Lake Shorelines*. The purpose of the shoreline inventory was to facilitate the City's compliance with the State of Washington's SMA and updated SMP Guidelines. The inventory describes existing physical and biological conditions in the shoreline zone within City limits, including recommendations for restoration of ecological functions where they are degraded. The full report is included as an appendix to the SMP, and portions of the report are summarized below.

The *Shoreline Inventory and Characterization* is divided into seven main sections: Introduction, Current Regulatory Overview, City of Roy Shoreline Inventory, Nisqually River Watershed Ecosystem Characterization, City of Roy Shoreline Characterization, Shoreline Management Recommendations, and Data Gaps. Portions of the *Shoreline Inventory and Characterization* dealing with land use, physical conditions, biological resources, and critical areas are summarized below.

2.3.1 Land Use and Physical Conditions

1. **Land Use and Zoning:** The City encompasses an area of approximately 0.26 square miles. Current land use in the City includes a mixture of residential, agricultural, commercial, industrial, and public lands. In the City's shoreline jurisdiction along Muck Creek are the Roy City Park, single-family residences, railroad tracks, and road rights-of-way. In the City's shoreline jurisdiction along Muck Lake are plowed fields.

The 2004 Comprehensive Plan land use designation map shows a mixture of single-family residential, multi-family residential, commercial, industrial, planned unit development, park, and rodeo designations in the City. Within the City shoreline jurisdiction for Muck Creek, there are commercial, park, single-family residential and multi-family residential land uses. The area located south of Muck Lake was designated in 2004 as a Planned Unit Development land use.

The City's current zoning ordinance was adopted in July 2009. The current July 2009 City zoning map, adopted by Ordinance #836, identifies seven zoning districts in the City, including single-family residential, traditional residential, multi-family residential, commercial, light industrial, mixed use, and rodeo. Within the City shoreline jurisdiction for Muck Creek are commercial, single-family residential and multi-family residential zones, while the mixed-use zone is in the shoreline jurisdiction for Muck Lake.

2. Parks and Open Space/Public Access: The Roy City Park serves as the main public access site to Muck Creek. The park is located in the northwest corner of the City on both the north and south banks of Muck Creek, with a pedestrian bridge over the stream connecting the two sides of the park. (See Figure 1.) The City provides the public the ability to rent the park for private activities, including the old Roy City Library building, which was moved to the park in 1996. Parking is provided north of Water Street West.

A portion of the Muck Creek channel and floodway is also located within the Water Street West and Warren Street rights-of-way. The Warren Street Bridge crosses the Muck Creek channel and provides passive visual access to Muck Creek.

Publicly owned land does not border Muck Lake, currently preventing public access to the lake from within the City.



Figure 1: Roy City Park, depicting Muck Creek and pedestrian bridge in background.

3. Shoreline Modifications: Impervious surfaces within the City's shoreline jurisdiction of Muck Creek include roads and building footprints. Roads include Water Street West, Ronge Street, James Street, Warren Street, and a small section of Highway 507. There

is also a gravel parking lot north of Water Street West for Roy City Park access, and a railroad grade east of Warren Street.

Four bridges over Muck Creek are located within the City. One is a pedestrian bridge within the City Park, two are road crossings for James and Warren Streets, and one is a railroad crossing. At the time of this plan, the Warren Street Bridge over Muck Creek is in the design phase for future reconstruction. The project, led by Pierce County and identified as CSM 6152, proposes the removal of the existing bridge and construction of a new bridge and approach roadways, which could include both Warren Street and Water Street West. The right-of-way for Water Street West is located within the shoreline jurisdiction, and runs parallel to the south bank of Muck Creek.

There do not appear to be any impervious surfaces within the shoreline jurisdiction of Muck Lake within the City limits.

The full *Shoreline Inventory and Characterization* is included in the City SMP and has a more in-depth of discussion of the above topics, as well as information about transportation and utility facilities.

2.3.2 Biological Resources and Critical Areas

1. SMP Regulated Waters: Outside of the City, Muck Lake is identified as a "Natural" shoreline by Pierce County and is regulated under the County's current SMP. The lake is located at the northernmost City limits, with approximately 1,000 linear feet of lakeshore/wetland located in the City. Pierce County information identifies that the lake and associated wetlands are 25.6 acres in size.

Muck Creek is identified as a shoreline by Pierce County and is regulated under the County's current SMP. Two sections of Muck Creek are located within the City, totaling approximately 1,100 linear feet of stream channel between approximately river mile (RM) 6 and RM 6.5. Additionally, a portion of Lacamas Creek discharges to Muck Lake. The portion of Lacamas Creek that is located within the shoreline jurisdiction of Muck Lake is subject to the City's SMP regulations.

2. SMP Regulated Shorelands:
 - a. Wetlands: According to the National Wetland Inventory and the Pierce County Wetland Inventory, the Muck Lake fringe wetlands, Denton Marsh, and Halverson Marsh are all associated wetlands to the Waters of the State near the City. Of these, only the Muck Lake fringe wetlands are documented within the City. However, as associated wetlands to a Water of the State, the marshes will be afforded the same protections required under the City's Shoreline Regulations, to include all relevant setbacks that may be required by the SMP. Additionally, any currently undocumented wetlands located within or adjacent to the City, and which are associated to the shoreline, would also be subject to the City's SMP regulations.

There are three additional wetlands documented within the City that have been determined to have no direct hydrological connection to any Water of the State,

and thus are not covered under the City's Shoreline Regulations. These wetlands include a large wetland system located southeast of the City and crossing the southeast corner of the City, and two smaller wetlands located southwest of the rodeo grounds.

- b. *Floodways and Floodplains:* According to the Preliminary 1995 Digital Flood Insurance Rate Map, no floodway has been identified for Muck Creek though both Muck Lake and Muck Creek have 100-year floodplain, designated as Zones A and AE, within the City. However, a floodway for Muck Creek within the City has been identified by the Pierce County Flood Risk Assessment, and is to be the regulated floodway under the City SMP.

The SMA allows jurisdictions to extend their shoreline jurisdictional boundaries to the 100-year floodplain boundary, assuming this boundary is at least 200 feet from the ordinary high water mark. However, the City established its shoreline jurisdiction as being only that area within 200 feet of the OHWM or floodway, and those wetlands with hydraulic continuity with the shoreline.



Figure 2: Water bodies in and adjacent to the City. *Muck Lake shown near the center of the photo, Muck Creek discharging at the southwest edge of the lake and traveling through the City, Lacamas Creek discharging to the Lake at the southeast lake edge, and Chambers Lake shown at the northeast corner of the photograph (Google, 2010).*

The full *Shoreline Inventory and Characterization* is included in the City's SMP and has a more in-depth of discussion of the above topics, as well as information about habitat, aquifer recharge areas, and other critical areas.

3.0 RESTORATION GOALS AND OBJECTIVES

3.1 Puget Sound Partnership

In response to the challenges facing the Puget Sound, in 2007 the Legislature created the Puget Sound Partnership (Partnership) to protect and restore Puget Sound and its spectacular diversity of life now and for future generations by 2020. The Partnership developed the following strategic priorities in its 2008 Action Plan; last updated May 27, 2009:

Priority A: Protect the intact ecosystem processes, structures, and functions that sustain Puget Sound. Avoiding problems before they occur is the best and most cost-effective approach to ecosystem health.

Priority B: Restore the ecosystem processes, structures, and functions that sustain Puget Sound. Protecting what we have left is not sufficient, and significant effort at an unprecedented scale is needed to undo past damage.

Priority C: Prevent water pollution at its source. Many of our efforts have focused on cleaning up degraded waters and sediments, but insufficient resources have been devoted to stopping pollutants before they reach our rivers, beaches, and species.

Priority D: Work together as a coordinated system to ensure that activities and funding are focused on the most urgent and important problems facing the region. Many of the programs and laws now used to regulate or support activities in Puget Sound were established on a piecemeal basis to address individual problems. Strategies that will help to address problems more effectively at an ecosystem scale include improved coordination of land use planning, water supply, ecosystem protection, transportation, and species recovery plans. The Action Agenda calls for the reform of environmental regulatory programs as well as improvements to the capacity of local partners to implement actions and compliance efforts across Puget Sound.

Priority E: Build an implementation, monitoring, and accountability management system. This includes:

- Using a performance management system with adaptive management and clear pathways for decision making, coordinated monitoring, accountability for action, and coordinated data management;
- Providing sufficient, stable funding focused on priority actions;
- Implementing a focused scientific program with priorities for research, and developing appropriate measures to improve understanding of the ecosystem and the effectiveness of our actions; and
- Using outreach and education to foster long-term changes in public attitudes and behavior.

3.2 Water Resource Inventory Area 11 – Nisqually – Systemwide Planning

The Water Resource Inventory Area 11 (WRIA 11) – Nisqually covers portions of three counties: Pierce, Thurston, and Lewis. The watershed is comprised mainly of freshwater ecosystems, with a small marine segment at the Nisqually rivers confluence with the Puget Sound. The City is located in the Muck/Murray subbasin in the northwest portion of the watershed.

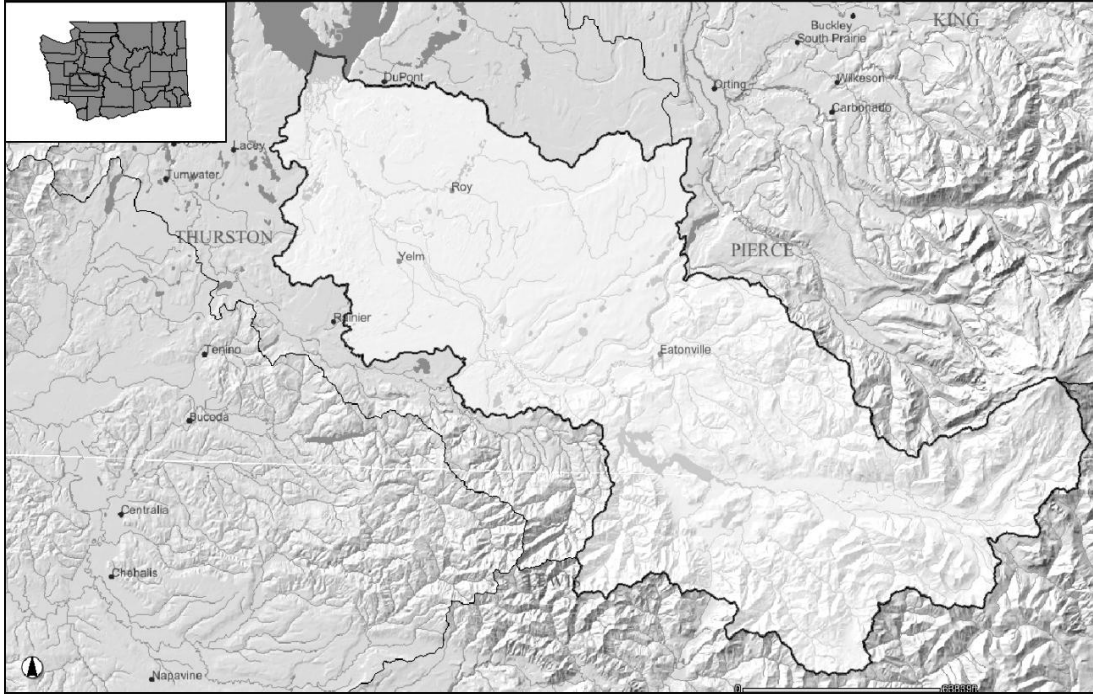


Figure 3: Nisqually River Watershed, WRIA 11, with shaded relief (WDFW, 2010).

3.2.1 Nisqually Watershed Management Plan

The *Nisqually Watershed Management Plan* was adopted at a joint meeting of the Lewis and Thurston County Commissioners and the Pierce County Council in April 2004. The City was included in a revised Nisqually Planning Unit Memorandum of Agreement (MOA) in October of 2004 that increased the number of “Implementing Governments” in the MOA to 14 and established updated roles and responsibilities of each government under the *Nisqually Watershed Management Plan*.

3.2.2 WRIA 11 Detailed Implementation Plan

According to the *WRIA 11 Detailed Implementation Plan*, dated February 2007, which is intended to guide the implementation of the *Nisqually River Watershed Management Plan*, the 720-square-mile Nisqually Watershed is unique in the Puget Sound area because the watershed environment has remained relatively intact and healthy despite its proximity to higher density urban land uses. However, because of anticipated population growth, the watershed will likely experience significant pressure on its natural resources.

3.2.3 Nisqually Watershed Stewardship Plan

The Nisqually River Council updated the *Nisqually Watershed Stewardship Plan* in 2009. It includes a number of goals and objectives. The goals and objectives most relevant to the City's Restoration Plan include the following:

INVOLVED COMMUNITY

2030 Goals

- *The Nisqually community has an established identity with full participation from all sub-areas*

2020 Objectives

- *There are community forums based on the Ohop Forum model in all sub-watersheds*
- *Create tools for integrating incentive-based and regulatory sustainable-community planning*

FISHERIES

2030 Goals

- *All natural populations are self-sustaining*
- *Fully implement the multi-species salmon and trout plan*

2015 Objectives

- *The Chinook Recovery Plan has been fully implemented*

TERRESTRIAL PLANT / HABITAT MANAGEMENT

2030 Goals

- *Native habitat in the main-stem area of the Nisqually watershed has been fully restored*
- *An invasive removal program is in place and additional native plants have been established in the lower watershed*

2020 Objectives

- *Continue restoration of native habitats in the upper Nisqually watershed*
- *Prevent spread of knotweed in the upper watershed and reduce by 20 percent*

AQUATIC MANAGEMENT

2020 Objectives

- *A program to manage invasive aquatic species has been developed*

WILDLIFE MANAGEMENT

2030 Goals

- *Wildlife habitats have been protected and expanded*
- *All actions for the non-game species plan have been implemented*

2020 Objectives

- *Significant progress has been made on habitat needs*

- *Priority actions for game and non-game species have been implemented*

WATER

2030 Goals

- *There is adequate in-stream flow for ecosystem functions*

2015 Objectives

- *A water conservation program for the watershed has been established*
- *Promote and help with Ecology's completed implementation plans for achieving clean water standards*
- *All municipal wastewater treatment facilities will have completed feasibility studies on reuse or tertiary treatment*
- *A plan for correcting failing septic systems has been implemented*
- *Gather data and plan for adequate in-stream flow*
- *Develop and fund a complete surface water monitoring program*
- *Ensure that new construction and development do not degrade water quality*
- *Ensure that all municipal wastewater treatment facilities begin feasibility studies for reuse or tertiary treatment*

3.3 City of Roy Restoration Goals and Objectives

The *Nisqually Watershed Stewardship Plan* goals and the WRIA 11 work in combination with the results of the City's *Shoreline Inventory and Characterization*, and along with the direction of Ecology's SMP Guidelines, are the foundation for the following goals and objectives of the City's restoration strategy.

3.3.1 Restoration Goals

Goal 1 – Maintain, restore, or enhance watershed processes, including sediment, water, wood, light, and nutrient delivery, movement and loss.

Goal 2 – Maintain or enhance fish and wildlife habitat during all life stages and maintain functional corridors linking these habitats.

Goal 3 – Contribute to conservation and recovery of Chinook salmon and other anadromous fish, focusing on preserving, protecting and restoring spawning and rearing habitat in Muck Creek and Muck Lake with the intent to recover listed species, including sustainable, genetically diverse, harvestable populations of naturally spawning Chinook salmon.

3.3.1 Restoration Objectives

Objective 1 – Improve the health of shoreline waterbodies by managing the quality and quantity of stormwater runoff, consistent at a minimum with the latest *Washington State Department of Ecology Stormwater Management Manual for Western Washington*. Make additional efforts to meet and maintain state and county water quality standards in contributing systems.

Objective 2 – Improve tributary stream health by eliminating man-made barriers to anadromous fish passage, preventing the creation of new barriers, and providing for transport of water, sediment and organic matter at all stream crossings.

Objective 3 – Improve tributary stream and lake health by identifying hardened and eroding lakeshores and streambanks, and correcting to the extent feasible with bioengineered stabilization solutions.

Objective 4 – Improve tributary stream and lake health by increasing large woody debris recruitment potential through plantings of trees in the riparian corridors, particularly conifers. Where feasible, install large woody debris to meet short-term needs.

Objective 5 – Increase quality, width and diversity of native vegetation in protected corridors adjacent to stream and lake habitats so as to provide safe migration pathways for fish and wildlife, food, nest sites, shade, perches, and organic debris. Strive to control non-indigenous plants or weeds that are proven harmful to native vegetation or habitats.

Objective 6 – Continue to work collaboratively with other jurisdictions and stakeholders in WRIA 11 to implement the Nisqually Watershed Stewardship Plan.

Objective 7 – Seek funding for various restoration actions and programs from local sources and by working with other WRIA 11 jurisdictions and stakeholders to seek federal, state, grant and other funding opportunities.

Objective 8 – Adopt a public education plan to inform private property owners in the shoreline zone and in the remainder of the City about the effects of land management practices and other unregulated activities (such as vegetation removal, pesticide/herbicide use, car washing) on fish and wildlife habitats.

Objective 9 – Where feasible, protect, enhance, and restore riparian areas surrounding wetlands where functions have been lost or compromised.

Objective 10 – Participate in area-wide efforts to reduce populations of non-native aquatic vegetation in Muck Creek and Muck Lake.

Objective 11 – Pursue restoration activities that also serve to mitigate flooding by removing non-native vegetation from Muck Creek and Muck Lake.

4.0 LIST OF EXISTING AND ONGOING PROJECTS AND PROGRAMS

The following series of existing projects and programs are generally organized from the larger watershed scale to City-scale, including City projects and programs that are active in the City area.

4.1 WRIA 11 Participation and Other Regional Coordination

The City became one of 14 “Implementing Governments” of the WRIA 11 Nisqually Planning Unit in 2004. The City is responsible for helping with the implementation of the *Nisqually Watershed Management Plan* through the *WRIA 11 Detailed Implementation Plan*, which includes a City-specific water-related action item and the *Nisqually Watershed Stewardship Plan*.

The Pierce County Conservation District has undertaken restoration efforts within the Muck Creek Basin that included riparian planting and fencing, removal of reed canarygrass, and reconfiguration of channels to improve spawning habitat for salmon. Fort Lewis has also conducted restoration efforts on federal lands, which included improvements to stream habitat in Muck Creek through a number of projects that include reed canarygrass control, riparian tree planting, and channel enhancements.

4.2 Comprehensive Plan Policies

The City completed a major update to its Comprehensive Plan in 2004 pursuant to Growth Management Act (GMA) requirements. The updated Comprehensive Plan contains a number of general and specific goals and policies that direct the City to permit and condition development in such a way that the natural environment is preserved and enhanced. Specific relevant goals include:

Goal 1 – Preserve the City’s natural environment as far as possible consistent with growth goals.

Goal 4 – Protect the City’s surface waters and prevent flood damage.

Goal 5 – Preserve and enhance fish and wildlife habitat.

Techniques suggested by the various policies to protect the natural environment include restoring environmental quality in cooperation with citizens, land owners and other agencies, managing development to preserve ecological functions, managing surface water to protect water quality, protecting aquatic and riparian habitats for sensitive species, preserving existing native vegetation, educating the public, and mitigating necessary sensitive area impacts, among others.

4.3 Critical Areas Regulations

The City’s critical areas regulations are found in Roy City Code (RCC) Title 10 Chapter 5. The City adopted a Critical Areas Ordinance (CAO) in 2004 consistent with best available science and all other requirements of the GMA to provide a high level of protection to critical areas in the City, particularly for streams and wetlands. Management of the City’s critical areas using these regulations should help insure that ecological functions and values are not degraded, and impacts to critical areas are mitigated. These critical areas regulations are one important tool that will help the City meet its restoration goals. The City’s critical areas regulations are adopted by reference into the SMP to regulate critical areas found within the shoreline zone.

4.4 Stormwater Management and Planning

The City has adopted by reference the Ecology 2005 *Stormwater Management Manual for Western Washington*. The City is currently working on updating its stormwater manual and other efforts related to National Pollutant Discharge Elimination System (NPDES) Phase II stormwater compliance under the Federal Clean Water Act. These efforts will have major positive effects on water quality and water quantity in the shoreline jurisdiction of the City.

4.5 Public Involvement and Education

The City's Comprehensive Plan identifies four policy statements that encourage public involvement and education in the protection of critical areas, including shorelines. These policies help guide City staff and local citizen groups in developing mechanisms to involve and educate the public in protecting and enhancing local environmental resources.

Policy 1-1 – Protect and restore environmental quality, including critical areas and their associated buffers through land use plans, development regulations, and cooperation with citizens, land owners, and other agencies.

Policy 4-2 – Work to ensure in-stream flow and continued fish passage, allow water level fluctuations in wetlands, retain native vegetation with stream corridors, control invasive plant species, and maintain wetland functions.

Policy 5-1 – Whenever possible, expand our collective knowledge of how wildlife uses local habitat, and how critical that habitat is.

Policy 5-3 – Manage habitats so as to maintain their usefulness to fish and wildlife, being especially careful to protect aquatic and riparian habitat.

As part of the City's efforts to abide by these policies, the City supports volunteer efforts and other programs in cooperation with special districts, non-profit groups, and public agencies. According to the City Mayor, on *Make a Difference Day*, there was some pulling of reed canarygrass from Muck Creek. Additionally, the City Public Works and/or Community Service Workers have done additional reed canarygrass removal as time allows. Muck Creek within the City Park does still contain reed canarygrass that can continue to be removed and maintained. The slopes adjacent to Muck Creek within the City Park currently have exposed soils that could be stabilized with native riparian vegetation.

5.0 LIST OF ADDITIONAL PROJECTS AND PROGRAMS TO ACHIEVE LOCAL RESTORATION GOALS

The following series of additional projects and programs are generally organized from the larger watershed scale to City-scale, including City projects and programs.

5.1 Unfunded WRIA 11

Although no specific projects are identified in the WRIA 11 studies within the City, several actions could be taken to achieve broad restoration goals for improvements to habitat and ecological functions.

5.2 Other Recommended Projects

The following is partially developed from a list of opportunity areas identified within the City's *Shoreline Inventory and Characterization*. The list of potential projects was created after assessing field conditions and it is intended to contribute to improvement of impaired functions.

5.2.1. Muck Creek

The portion of Muck Creek within the City could be enhanced on both public and private land by vegetation planting with a buffer of native trees and shrubs, particularly conifer species, as well as placement of large woody debris to enhance in-stream fish habitat. In cooperation with others, the City should pursue grant funding for a demonstration riparian habitat enhancement project to reduce non-native vegetation and increase shade-producing vegetation in the City Park. Such a project could be used as an example for other projects in the shoreline. On privately owned property, restoration activities would need to be voluntary and acceptable to the landowner. Continued preservation and protection of the remaining functions would be appropriate as well. Control and monitoring of aquatic invasive vegetation, specifically canarygrass, should continue.

5.2.2. Muck Lake

As previously mentioned, most of the Muck Lake edge within the City remains in a "natural" (not armored) state and the shoreline of the lake is privately owned, so restoration activities would need to be voluntary and acceptable to the landowner. This shoreline should remain a priority for long-term protection and preservation of shoreline ecological function. Control and monitoring of aquatic invasive vegetation on Muck Lake, specifically canarygrass, should continue.

6.0 PROPOSED IMPLEMENTATION TARGETS AND MONITORING METHODS

As previously noted, the Roy City Park, commercial property, multi-family residences, single-family residences, railroad tracks, road rights-of-way, and plowed fields currently occupy the City's shoreline zones. Therefore, efforts should be made to improve shoreline ecological function through the promotion of restoration and healthy practices at all levels, from City owned property to single-family property owners. Continued improvement of shoreline ecological functions on the shorelines requires a more comprehensive watershed approach.

The following table outlines a possible schedule and funding sources for implementation of a variety of efforts that could improve shoreline ecological function that are described in previous sections of this report.

Table 1: Implementation Schedule and Funding for Restoration Projects, Programs, and Plans.

Restoration Project/Program/Plan	Schedule	Funding Source or Commitment
4.1 WRIA 11 Participation and Other Regional Coordination	Ongoing	The City is an implementing member of the WRIA 11 Nisqually Planning Unit.
4.2 Comprehensive Plan Policies	Updated in 2004	The City commits substantial staff time in the course of project and program reviews to determine consistency and compliance with the updated Comprehensive Plan.
4.3 Critical Areas Regulations	Updated in 2004	The City commits substantial staff time in the course of project and program reviews to determine consistency and compliance with their updated CAO.
4.4 Stormwater Planning	Ongoing, Update in progress	The City currently commits staff time and materials to this effort. The purpose of the update is to create a plan that guides decisions about development and the protection of natural resources in the City as it pertains to surface water. The update is necessary to meet the NPDES Phase II requirements. Some of these changes include the adoption of DOE's Stormwater Management Manual for Western Washington and a greater emphasis on Low Impact Development (LID) in current regulations and recommendations.
4.5 Public Education/ Outreach	Ongoing	Currently, limited staff time and materials are available to develop public education and outreach efforts to educate the public and broaden the interest in protecting and enhancing local environmental resources. On-going and future education efforts should be coordinated with collaborating agencies, such as utilities and Pierce County, and include funding sources such as grant funding, monetary donations, volunteer hours.
5.1 Unfunded WRIA 11 Projects	As funds and opportunity allow	Although no specific projects are identified in the WRIA 11 studies within the City, several actions could be taken to achieve broad restoration goals for improvements to habitat and ecological functions. Projects could be funded by the City, collaborating agencies, and non-profit organizations, and grants as projects and funding opportunities arise.

Restoration Project/Program/Plan	Schedule	Funding Source or Commitment
5.2 Other Recommended Projects	As funds and opportunity allow	Projects identified in this section would likely be implemented either when grant funds are obtained, when partnerships are formed between the City and other agencies or non-profit groups, or as may be required by the CAO and the SMP during project-level reviews by the City. The proposed demonstration riparian habitat enhancement project to reduce non-native vegetation and increase shade-producing vegetation in the City Park would be an appropriate starting point.

The City is required to monitor development under the SMP to ensure no net loss. We recommend that City planning staff track all land use and development activity, including exemptions, within shoreline jurisdiction, and incorporate actions and programs of City departments as well. We recommend that a report be assembled that provides basic project information, including location, permit type issued, project description, impacts, mitigation (if any), and monitoring outcomes as appropriate. Examples of data categories might include square feet of non-native vegetation removed; square feet of native vegetation planted or maintained; reductions in chemical usage to maintain turf; linear feet of eroding stream bank stabilized through plantings; linear feet of shoreline armoring removed; or number of fish passage barriers corrected.

The staff report could be assembled to coincide with Comprehensive Plan updates and, following the goals and objectives of the SMP, the report could be used to determine whether implementation of the SMP is meeting the basic goal of no net loss of ecological functions relative to the baseline condition established in the *Shoreline Inventory and Characterization*.

In the long term, the City should be able to demonstrate a net improvement in its shoreline environment. Based on the results of this assessment, the City may make recommendations for changes to the SMP.

7.0 RESTORATION PRIORITIES

The process of prioritizing actions for restoration of the City's shoreline areas involves balancing ecological goals with a variety of site-specific constraints. Briefly restated, the City's goals include 1) protecting watershed processes, 2) protecting fish and wildlife habitat, and 3) contributing to Chinook conservation efforts. Constraints that are specific to the City include a moderately developed residential shoreline area along Muck Creek. While these areas may already offer reasonable ecological functions, they include opportunities to enhance ecological functions further.

These goals and constraints were used to develop a hierarchy of restoration actions to rank different types of projects or programs associated with shoreline restoration. Programmatic actions, like continuing WRIA 11 involvement and conducting outreach programs to local residents, tend to receive relatively high priority as opposed to restoration actions involving small private landowners. Other factors that influenced the hierarchy are based on scientific

recommendations specific to WRIA 11, potential funding sources, and the projected level of public benefit. These priorities are discussed in the subsections that follow.

Although restoration project/program scheduling is summarized in the previous section in Table 1, the actual order of implementation may not always correspond with the priority level assigned to that project/program. This discrepancy is caused by a variety of obstacles that interfere with efforts to implement projects in the exact order of their perceived priority. Some projects, such as those associated with riparian planting, are relatively inexpensive and easy to permit, and should be implemented over the short and intermediate term, despite the perception of lower priority than projects involving extensive shoreline restoration or large-scale capital improvement projects.

Straightforward projects with available funding should be initiated immediately for the worthwhile benefits they provide. Permitting, design, site access authorization, and funding for the larger, more complicated projects can occur while the smaller projects are under way.

7.1 Priority 1 – Continue and Increase WRIA 11 Participation

Of basic importance is the continuation of implementation of the *Nisqually River Watershed Management Plan*. However, the City should explore ways to increase participation in this regional effort. This may include expanding collaborative work with other jurisdictions and stakeholders in WRIA 11. This process provides an opportunity for the City to keep in touch with its role on a basin-wide scale and to influence habitat conditions beyond its borders, which, in turn, come back to influence water quality and quantity and habitat issues within the City.

7.2 Priority 2 – Improve Water Quality and Reduce Sediment and Pollutant Delivery

Muck Creek and Muck Lake have the potential to provide fish and wildlife habitat. They are also a common receiving body for non-point source pollution, which in turn delivers those contaminants to shoreline waterbodies.

Incentives to consider include education of property owners about the Pierce County current use assessment programs; stormwater fee reduction programs to encourage forest cover and low impact development; and permit streamlining, fee waivers, and zoning flexibility for projects that include restoration. These recommendations also emphasize the use of low impact development techniques, onsite stormwater detention for new and redeveloped projects, development of a community-wide sanitary sewer system, and control of point sources that discharge directly into surface waters. They involve protecting and restoring forest cover, riparian buffers, wetlands, and creek mouths by revising and enforcing the City's CAO and SMP while also providing incentives and flexible development tools.

7.3 Priority 3 – Public Education and Involvement

Public education and involvement should be a high priority in the City. Opportunities for restoration on public property exist along Muck Creek, but are limited along Muck Lake because it is under private ownership. Therefore, in order to achieve the goals and objectives set forth

in this Restoration Plan, the City should focus on balancing restoration on public and private land.

Potential restoration projects that may occur along Muck Creek, such as the a demonstration riparian habitat enhancement project to reduce non-native vegetation and increase shade-producing vegetation in the City Park, as described in Section 5.2 include native vegetation enhancement and installation of large woody debris to increase available fish habitat. Providing education opportunities and involving the public is important to success. This could possibly entail the development of a long-term Public Education and Outreach Plan to gain public support. Voluntary restoration efforts on private property would also benefit from public outreach and education. This could include local workshops to educate shoreline property owners and other shoreline users on maintaining healthy shoreline environments, promoting enhancement and restoration opportunities, and use of low impact development techniques.

7.4 Priority 4 – Improve Riparian Vegetation, Reduce Impervious Coverage

Similar to the priority listed above to improve water quality and reduce sediment and pollutant delivery, this priority emphasizes improving riparian vegetation and reducing impervious surfaces. Section 5.2 above lists areas where improvements to riparian vegetative cover and reductions in impervious surfaces are warranted.

7.5 Priority 5 – Reduce Aquatic Invasive Weeds

Control and monitoring of aquatic invasive weeds from Muck Creek and Muck Lake is emphasized in Section 5.2. The creek and lake have experienced growth of non-native and oftentimes invasive aquatic vegetation. Aquatic weeds tend to reduce dissolved oxygen to lethal levels for fish, hampering foraging opportunities.

7.6 Priority 6 – City Zoning, Regulatory, and Planning Policies

City Zoning, Regulatory, and Planning Policies are listed as being of lower priority because they have been the subject of recent review and updates. Notably, the City's CAO was recently updated in 2004 consistent with the Best Available Science for critical areas, including those within the shoreline zone.

The City is working on receiving its final NPDES Phase II permit from Ecology. The NPDES Phase II permit is required to cover the City's stormwater discharges into regulated lakes and streams. Under the conditions of the permit, it is expected that the City must protect and improve water quality through public education and outreach, detection and elimination of illicit non-stormwater discharges, management and regulation of construction site runoff, management and regulation of runoff from new development and redevelopment, and pollution prevention and maintenance for municipal operations.

The City has adopted Ecology's 2005 *Stormwater Management Manual for Western Washington*, as the NPDES Phase II permit requires. The DOE Manual references the *Low Impact Development: Technical Guidance Manual for Puget Sound* as a viable source of appropriate low impact techniques for drainage control. The City should consider exploring broader code revisions that would encourage, or in some cases possibly require, Low Impact Development

techniques in the shoreline area as detailed in the *Low Impact Development: Technical Guidance Manual for Puget Sound*.

8.0 REPORT REFERENCES AND BIBLIOGRAPHY

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9.0 LIST OF ACRONYMS AND ABBREVIATIONS

- CAO Critical Areas Ordinance
- City..... City of Roy
- C.F.S..... Cubic Feet per Second
- Ecology Washington State Department of Ecology
- GMA Growth Management Act
- NPDES National Pollutant Discharge Elimination System
- Partnership..... Puget Sound Partnership
- RCC Roy City Code
- RCW Revised Code of Washington
- SMA..... Shoreline Management Act
- SMP Shoreline Master Program
- WAC Washington Administrative Code
- WDFW Washington State Department of Fish and Wildlife
- WRIA..... Water Resource Inventory Area

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