

# Muck Creek Basin Plan

## Executive Summary

### ES.1 Introduction and Purpose

The 2003 Muck Creek Basin Plan (Basin Plan) is a comprehensive guide to surface water management in the Muck Creek Basin. The Plan focuses on multiple aspects of surface water management, including water quality, flooding, and habitat issues. This Plan was developed as part of Pierce County's Basin Planning Program to create a more focused approach to watershed management in each of the County's major drainage basins. Previously, the Pierce County Storm Drainage and Surface Water Management Plan (1991 Plan) directed surface water management throughout the county for over a decade. As the Plan addressed all basins in the County, only one chapter in the Plan addressed issues in the Muck Creek Basin. The 1991 Plan has been used as a source of information on pertinent studies, plans, and regulatory mechanisms related to water resources in the Muck Creek Basin. Muck Creek Basin is one of 26 basins in Pierce County Figure S-1, "Watersheds of Pierce County."

The purpose of the Muck Creek Basin Plan is to ensure that limited financial and staff resources are applied to the best capital facility projects and programs. To that end, the Basin Plan strategically identifies and evaluates surface water management issues in the Basin and recommends a comprehensive set of projects and programs to reduce flood hazards and drainage problems and improve water quality and habitat throughout the Basin. Actions contained in the Basin Plan are costed-out over a ten-year period and will guide annually updated work plans for capital improvement projects and programmatic measures. ("Programmatic" refers to non-structural actions, such as changes to regulations, policies, programs, or operations.)

The Basin Plan supports (or furthers) Pierce County's:

- Compliance with its federal Clean Water Act National Pollutant Discharge Elimination System (NPDES) municipal stormwater permit;
- Compliance with the Endangered Species Act (ESA) by eliminating or reducing existing potential habitat issues that could cause "jeopardy" for protected species;
- Upgrade to a Class 4 Community Rating under the Federal Emergency Management Agency's (FEMA) Community Rating System (CRS);
- Hazard Mitigation Planning, as required by FEMA (as a result of congressional action) to retain eligibility for federal disaster relief funds; and
- Submittal to the Washington Department of Fish and Wildlife (WDFW) for a programmatic approval agreement under RCW 77.55.100, which allows for programmatic approval in lieu of project-by-project permitting.

## ES.2 Goals of the Muck Creek Basin Plan

Specific goals of the Muck Creek Basin Plan are listed below. The full list of goals and objectives can be found in “Appendix O.”

- Goal 1) Reduce flood hazards
- Goal 2) Improve water quality
- Goal 3) Improve fish and wildlife habitat
- Goal 4) Coordinated and responsible use of public resources
- Goal 5) Influence location and methods for new development

## ES.3 Description of Basin

Located in southwest Pierce County, the Muck Creek Basin is the largest tributary in size in the Nisqually River Watershed. The Basin includes Muck Creek and three significant tributaries (Figure S-2): Lacamas Creek, the North Fork of Muck Creek and the South Fork of Muck Creek (also known as South Creek). The Muck Creek Basin is approximately 93 square miles in size with elevations ranging from 140 to 960 feet. The topography of the Basin is generally flat to moderately rolling hill terrain. The only substantial relief in the Basin is the hills along the upper portion of the North Fork of Muck Creek and the canyon formed by the lower stretch of the creek as it flows into the Nisqually River. The creek flows across broad natural prairies with native grasses oaks and through local second-growth coniferous and hardwood-forested riparian habitats. The climate of the Muck Creek Basin is mild. It receives around 40 inches of precipitation annually, almost all as rain.

The majority of the Muck Creek Basin is rural in nature. It is characterized by agricultural, forest, pasture and prairie areas with low-density residential development. The largest population center is the unincorporated Graham area in the northeast portion of the Basin. The only incorporated city in the Basin is the City of Roy. Much of the Basin is a patchwork of small (hobby) farms and ranches, interspersed with larger working cattle ranches and timber lots. Fort Lewis occupies a large percentage of the northwestern portion of the basin. Currently, about 24,000 people reside in the Muck Creek Basin. The population is expected to grow, modestly, to 28,000 by 2020.

Much of the stream channel of the South Fork and the main stem of Muck Creek goes dry during the summer and early fall months. This appears to be a natural condition and is primarily due to the highly infiltrative glacial deposits that cover the middle portion of the Basin. The few long-term groundwater records that exist for the Basin show no declining or increasing trend in groundwater levels. Future water use (Year 2030) in the Basin is projected to represent only about 7 percent of the estimated annual groundwater recharge in the Basin. Water use in the Basin is not anticipated to substantially affect either long-term surface flows or groundwater levels.

Muck Creek supports an important chum salmon run, primarily in the lower and middle reaches of the main stem, below State Route 7. Lesser numbers of steelhead and coho have used the stream, although it has been more than a decade since coho have been seen.

# Watersheds of Pierce County

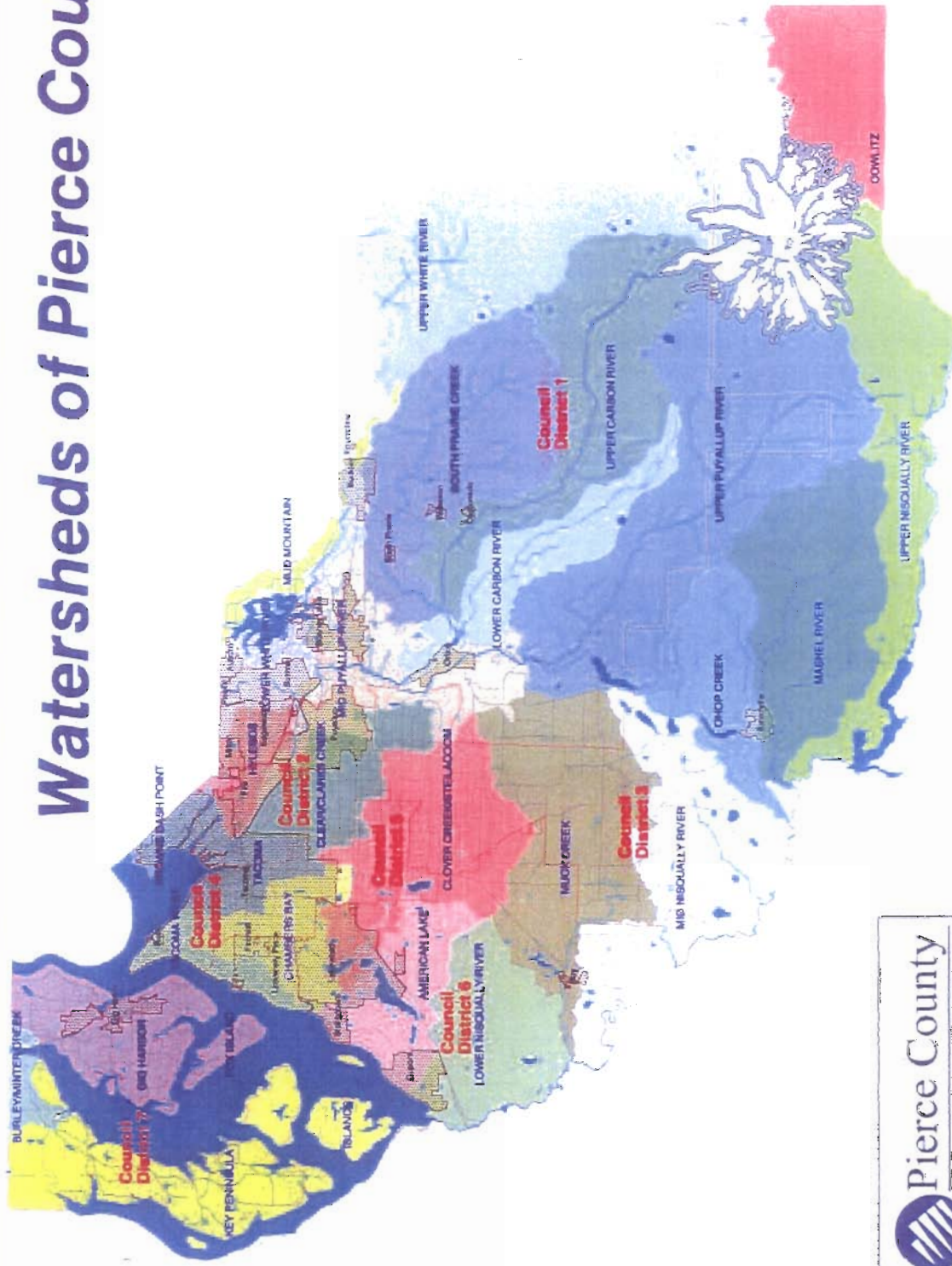


Figure S-1  
Watersheds of  
Pierce County



## ES.4 Stakeholder and Public Involvement

Two public meetings were held in February 2000, early in the study, to describe the basin planning process and to solicit information at the beginning of Phase 1. Two additional public meetings were held near the end of Phase 1, in August 2000, to describe the findings and discuss activities for developing the Basin Plan in Phase 2. In addition, presentations were made at several meetings of the Muck Creek Council and the Nisqually River Council and with the Nisqually Indian Tribe. A more detailed description of stakeholder involvement efforts may be found in Chapter 3.

The Draft Basin Plan and the accompanying Draft Supplemental Environmental Impact Statement were made available to the Pierce Conservation District, Muck Creek Council, Nisqually River Council, Nisqually Tribe, Fort Lewis, City of Roy, and other interested or affected parties as determined by Pierce County Water Programs staff for public comment. The Draft Supplemental Environmental Impact Statement was issued on February 12, 2003 and the comment period ended March 14, 2003. A notice announcing the availability of the Draft Basin Plan/DSEIS was distributed to attendees of previous meetings and other interested residents. Two public meetings were held during the DSEIS review period. One public meeting was held in Roy, Monday, March 3, 2003 at the Roy Library. A second public meeting was held at the Graham Library on March 5, 2003. The draft and final plans were also posted on the Pierce County Water Programs website.

Additional public involvement opportunities will occur annually through the Pierce County Planning Commission and County Council actions on the capital facilities plan.

## ES.5 Problems, Proposed Solutions and Prioritization Process

The results from this study indicate that there are no major flood problems in the Basin. However, road flooding does occur and is attributable to undersized culverts and to ponded runoff which collects in local depressions. Some residences are also impacted by ponded runoff which collects in local depressions after heavy rain events. Compared to many other basins in the Puget Sound area, the water quality of the streams in the Muck Creek Basin is relatively good. However, water temperature and bacteria (i.e., coliforms) levels commonly exceed state water quality standards. Past agricultural development in the Basin has channelized many of the stream reaches and removed riparian vegetation. Direct livestock access to streams has severely eroded the stream channels at a number of locations. As a result, less than 15 percent of the stream reaches in the Basin provide good fish habitat for anadromous fish.

Each of the Basin Plan's capital improvement projects and programmatic recommendations were evaluated using a spreadsheet that assigned points for the project/program's potential for various aspects of flood reduction (approximately 35% of total score), water quality protection or improvement (30%), natural resource improvement (30%), and other factors such as multiple

use, education, and recreation (5%). Each project and program was reviewed and scored using approximately 40 specific criteria.<sup>1</sup>

A scoring summary was prepared for each proposed project and a scoring worksheet for each proposed programmatic measure. These can be found in “Appendix M” of the Basin Plan. Recommended projects and programs were then put in rank order, based on their numeric benefit score, and grouped in descending order. Then, high, medium, or low status was assigned as follows:

- High Priority: 25% of total number of recommendations
- Medium Priority: 50% of total number of recommendations
- Low Priority<sup>2</sup>: 25% of total number of recommendations

After this order was established, projects and programs were ranked within their priority category from lowest cost to highest cost. This was done to direct County financial resources to where they do the most good for the financial resources invested.

## ES.6 Recommended Actions

Twenty-one capital improvement projects are recommended in the Basin Plan. These include two regional infiltration basins, a number of culvert upgrades and improvements to several local drainage systems are proposed. In addition potential areas for stream and riparian restoration projects are identified. In addition to improving potential fish habitat, the riparian restoration projects will help to address the water temperature and bacteria water quality problems. It should be noted that maintenance costs were not included in the cost estimates for the capital improvement projects. Pierce County has an existing maintenance program, but may need to evaluate the ongoing cost of supporting that program as projects are completed.

Programmatic recommendations in the Muck Creek Basin Plan are:

- Conduct a Low Impact Development Pilot
- Adopt updated stormwater management standards
- Increase compliance inspections
- Develop and implement a land acquisition program for riparian and wetland habitat protection and flood hazard reduction
- Develop and implement a program to enhance degraded riparian habitat and water quality

<sup>1</sup> Programmatic measures were eligible for additional points in the rating system to implement Pierce County's policy preference for favoring “non-structural measures” over “structural measures.” This policy preference was stated and adopted in the 1991 Plan and again in the County's Comprehensive Plan.

<sup>2</sup> Note: “low priority” does not mean “no benefit” for flood control, water quality protection, or natural resource protection. All of the recommendations in the Basin Plan provide a net benefit to these objectives. “No benefit” proposals were screened out prior to preparation of the Plan. “Low Priority” means that the proposed project or program scored lower than other projects and programs, based on the net environmental benefits that would occur from the project or program as determined by the score sheet criteria. Some projects that are ranked “medium priority” or “low priority” will be considered for implementation prior to other projects to ensure the full benefits of other projects, such as upstream fish habitat improvements are synchronized with downstream barrier removal.

- Develop and implement an education, outreach, and technical assistance program
- Develop and implement a surface water management monitoring program
- Develop and implement a BMP manual for Pierce County Surface Water Utility maintenance activities
- Develop and implement an invasive species management program

Prioritized measures recommended in the Plan over a ten-year period total \$10.5 million. This includes \$9.9 million for capital improvement projects and \$0.63 million for programmatic recommendations (*Table ES-1*). Of the total amount:

- \$3.5 million is for actions identified as “High Priority”;
- \$6.5 million is for actions identified as “Medium Priority”;
- \$0.54 million is for actions identified as “Low Priority”;

Four studies are also recommended in this Plan. Their combined cost is an additional \$0.43 million.

- Evaluate groundwater migration near the Northeast Muck Creek/Clover Creek Basin boundary
- Identification of flooded depression areas
- Detailed flood study along the South Fork upstream of Mountain Highway
- Identification of significant wetland sites

Once this Basin Plan is adopted, these measures will be added to the County-wide surface and stormwater CIP List, joining the CIP requirements of other basins within Pierce County. The common ranking and cost system used to develop these basin-level CIP lists will aid in the overall ranking of each CIP at the County level.

## ES.7 Implementation Strategy

Implementation of the recommended actions will generally follow the prioritization groupings of high, medium, and low and a logical order of sequencing.

To ensure that the full benefits of all projects are realized, implementation will not follow the exact sequence of the first project to the last project in the “High” category, followed by the first action in the “Medium” category, and so forth.

Several factors exist that will result in implementation of actions that are not in the exact sequence as depicted in the projects and programs prioritized by the benefit and ranked by cost table.

These factors include the following:

- Available funds;
- Contingent projects<sup>3</sup>;
- Available staff and professional service needs;
- Cooperation from private landowners;
- The best implementer may be an agency other than Pierce County Public Works and Utilities; and
- New information, regulations or emerging issues.

### **Economic Development Criteria**

Implementing projects and programs recommended in the Basin Plan is expected to reduce flood hazards, and preserve or protect water quality and floodplain habitat. Collectively and individually, these projects are aimed at protecting Pierce County's quality of life. Projects and programs in the Plan will afford resource protection as the community develops; preserve, enhance or protect natural floodplain functions; balance structural and nonstructural approaches; reduce potential County environmental liabilities; and help achieve environmental compliance and long term sustainability. Collectively, these attributes help make Pierce County a livable community where quality of life issues will provide indirect, passive economic development benefits to businesses and individuals looking to locate or stay in Pierce County.

In addition to the above, Water Programs will consider the following criteria in developing its annual proposed capital facilities plan updates:

- Is the project located in an employment center zone (or handle flow from those zones)?
- Is the project located in another type of commercial zone (or handle flow from those zones)?
- Will the project reduce permitting timelines for industrial/commercial projects?
- Will the project assure access to an employment center via road and /or rail?
- Will the project increase the supply of developable property?
- Will the project reduce overall development costs?
- Are there partners willing to contribute to the development costs of the project?
- Does the project allow / provide for land development?

In light of these and other factors, following action on the Basin Plan, Pierce County will develop an implementation strategy designed to sequence, schedule and assign resources for the various recommended actions. This implementation strategy will be developed in collaboration and coordination with other potential implementers and in consideration with available financial and staff resources. The implementation strategy will include performance measurements and provide for periodic evaluation of progress.

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<sup>3</sup> Contingent projects include projects such as stream restoration projects intended to reduce flood hazards and improve aquatic habitat, and culvert replacement projects intended to improve fish passage. These projects will provide their full benefit after all downstream fish passage barriers are removed, and should be sequenced accordingly.

## **Principle Implementer, Financing Strategy and Timing**

Generally, the implementer responsible for the recommendations contained in this report is Pierce County, principally, Pierce County Water Programs either individually or in partnership with other entities. Funding of these recommendations is mainly through Pierce County's surface water management fees collected within the Basin, but may also include general fund, state and federal grants, and other local funds. Currently, this Plan projects full implementation out over a ten year period beginning in 2003. The actual duration of full implementation and the timing of specific projects and programs are determined through annual budget decisions of the County Council concerning the Capital Facilities Plan and operating budget.

**TABLE ES-1**

**Prioritized List of Proposed Projects – Muck Creek Basin 2003**

Priority	Project Name	CIP Number	Score	Est. Cost	Priority Ranking	Total Costs
1	Adopt updated stormwater mgt. standards	PG00-02	380	\$ 1,000	High	
2	Maintenance BMP Manual	PG00-08	427	\$ 7,000	High	
3	Invasive Species Management	PG00-09	420	\$ 7,000	High	
4	Implement riparian land acquisition pgm.	PG00-04	389	\$ 9,000	High	
5	Implement education/tech. assistance pgm.	PG00-06	397	\$ 111,000	High	
6	Increased inspections	PG00-03	398	\$ 204,000	High	
7	Lacamas Creek Habitat Restoration	CIP12LC-STR01	375	\$ 1,444,000	High	
8	North Fork Habitat Restoration	CIP12NF-STR01	380	\$ 1,748,000	High	
Subtotal						\$3,531,000
9	Implement riparian & WQ enhancement pgm.	PG00-05	325	\$ 34,000	Medium	
10	288th St E Culvert Replacement II	CIP12SF-CUL03	165	\$ 41,000	Medium	
11	Meridian E Culvert Replacement	CIP12SF-CUL05	195	\$ 46,000	Medium	
12	Conduct a low impact development pilot	PG12-01	346	\$ 100,000	Medium	
13	Schudy Rd S Culvert Replacement	CIP12LC-CUL01	175	\$ 100,000	Medium	
14	288th St E Culvert Replacement I	CIP12SF-CUL01	180	\$ 128,000	Medium	
15	288th St E Culvert Replacement III	CIP12SF-CUL04	170	\$ 133,000	Medium	
16	Implement surface water monitoring pgm.	PG00-07	244	\$ 158,000	Medium	
17	252nd St E Conveyance Improvements	CIP12NF-CUL03	155	\$ 179,000	Medium	
18	288th St S Infiltration Pond	CIP12MS-INF01	115	\$ 297,000	Medium	
19	336th St S Grade Change	CIP12LC-RD01	150	\$ 303,000	Medium	
20	Highway 507 Culvert Replacement	CIPLC-CUL02	215	\$ 345,000	Medium	
21	South Fork Habitat Restoration	CIP12SF-STR01	365	\$ 608,000	Medium	
22	Patterson Springs Acquisitions	CIP12NF-ACQ01	265	\$ 1,500,000	Medium	
23	Graham Regional Stormwater Facility	CIP12NF-XXX	200	\$ 2,500,000	Medium	
Subtotal						\$6,472,000
24	238th St E Conveyance Improvements	CIP12NF-RD01	45	\$ 2,000	Low	
25	216th St Conveyance Improvements	CIP12NF-CUL01	45	\$ 4,000	Low	
26	Kapowsin Highway Conveyance Improvements	CIP12SF-CUL02	85	\$ 10,000	Low	
27	47th Ave E Conveyance Improvements	CIP12SF-PIP01	60	\$ 34,000	Low	
28	70th Ave E Culvert Improvements	CIP12NF-CUL02	100	\$ 39,000	Low	
29	242nd St E Infiltration Pond	CIP12NF-INF01	85	\$ 136,000	Low	
30	Mountain Highway Conveyance Improvements	CIP12SF-DIV01	95	\$ 319,000	Low	
Subtotal						\$544,000
31	Graham Groundwater Flow	ST12-01		\$ 205,000	Not Prioritized	
32	Identification of Potholes	ST12-02		\$ 90,000	Not Prioritized	
33	South Fork Flood Study	ST12-03		\$ 60,000	Not Prioritized	
34	Wetland Site Identification	ST12-04		\$ 70,000	Not Prioritized	
Subtotal						\$425,000

**Total Estimated Cost of Plan Implementation**

(Cost changes reflect rounding) **\$10,972,000**