April 10, 2012

Gail Shaloum
Water Environment Services
150 Beavercreek Rd
Oregon City OR 97045

**Re: Preapplication Report**

Dear Gail:

Enclosed is the Preapplication Report Summary from your meeting with the City on March 22, 2012, concerning your proposal for action on property located at 5440 SE Kellogg Creek Dr.

A preapplication conference is required prior to submittal of certain types of land use applications in the City of Milwaukie. Where a preapplication conference is required, please be advised of the following:

- Preapplication conferences are valid for a period of 2 years from the date of the conference. If a land use application or development permit has not been submitted within 2 years of the conference date, the Planning Director may require a new preapplication conference.

- If a development proposal is significantly modified after a preapplication conference occurs, the Planning Director may require a new preapplication conference.

If you have any questions concerning the content of this report, please contact the appropriate City staff.

Sincerely,

Alicia Martin

Alicia Martin
Administrative Specialist

Enclosure

cc: Katie Dunham
Brian Bieger
Claire Maulhardt
Dave Elkin
JoAnn Herrigel
File

# CITY OF MILWAUKIE

**PreApp Project ID #: 12-003PA**

# PRE-APPLICATION CONFERENCE REPORT

**This report is provided as a follow-up to a meeting that was held on 3/22/2012 at 10:00AM**

| | |
|---|---|
| **Applicant Name:** | **Gail Shaloum** |
| **Company:** | **Clackamas County Water Environment Services** |
| **Applicant 'Role':** | Legal Rep |
| **Address Line 1:** | 150 Beavercreek Road |
| **Address Line 2:** | |
| **City, State Zip:** | Oregon City OR 97045 |
| **Project Name:** | **Mt Scott Creek Restoration** |
| **Description:** | |
| **ProjectAddress:** | **5440 SE Kellogg Creek Dr** |
| **Zone:** | R-10, Community Service Use |
| **Occupancy Group:** | |
| **ConstructionType:** | |
| **Use:** | Public park, natural resource restoration |
| **Occupant Load:** | |
| **AppsPresent:** | Gail Shaloum, Katie Dunham, Brian Bieger, Clair Maulhardt, Dave Elkin |
| **Staff Attendance:** | Katie Mangle, Ryan Marquardt, Tom Larsen, JoAnn Herrigel, Brad Albert |

## BUILDING ISSUES

**ADA:**

**Structural:**

**Mechanical:**

**Plumbing:**

**Plumb Site Utilities:**

**Electrical:**

**Notes:** Structural permits required for the bridge and the vieweing area. Must meet slopes for ADA Accessibility. Structural permits required for any retainig walls greater than 4 feet in height or supporting a surcharge. Erosion control permit required.

**Please note all drawings must be individually rolled. If the drawings are small enough to fold they must be individually folded.**

## FIRE MARSHAL ISSUES

**Fire Sprinklers:**

**Fire Alarms:**

**Fire Hydrants:**

**Turn Arounds:**

**Addressing:**

**Fire Protection:**

**Fire Access:**

**Hazardous Mat.:**

**Fire Marshal Notes:** No comment.

## PUBLIC WORKS ISSUES

**Water:** N/A

**Sewer:** N/A

**Storm:** Submission of a storm water management plan by a qualified professional engineer is required as part of the proposed development. The plan shall conform to Section 2 - Stormwater Design Standards of the City of Milwaukie Pubic Works Standards.
The storm water management plan shall demonstrate that the post-development runoff does not exceed the pre-development, including any existing storm water management facilities serving the development property. Also, the plan shall demonstrate compliance with water quality standards. The City of Milwaukie has adopted the City of Portland 2008 Stormwater Management Manual for design of water quality facilities.
All new impervious surfaces, including replacement of impervious surface with new impervious surfaces, are subject to the water quality standards. See City of Milwaukie Public Works Standards for design and construction standards and detailed drawings.

The storm SDC is based on the amount of new impervious surface constructed at the site. One storm SDC unit is the equivalent of 2,706 square feet of impervious surface. The storm SDC is currently $1130.22 per unit. The storm SDC will be assessed and collected at the time the building permits are issued.

**Street:** N/A

**Frontage:** N/A

**Right of Way:** N/A

**Driveways:** N/A

**Erosion Control:** Per Code Section 16.28.020(C), an erosion control permit is required prior to placement of fill, site clearing, or land disturbances, including but not limited to grubbing, clearing or removal of ground vegetation, grading, excavation, or other activities, any of which results in the disturbance or exposure of soils exceeding five hundred square feet.

Code Section 16.28.020(E) states that an erosion control permit is required prior to issuance of building permits or approval of construction plans. Also, Section 16.28.020(B) states that an erosion control plan that meets the requirements of Section 16.28.030 is required prior to any approval of an erosion control permit.

**Traffic Impact Study:** N/A

**PW Notes:** FLOOD PLAIN REQUIREMENTS
The proposed North Clackamas Park improvements shall comply with all requirements of Milwaukie Municipal Code Title 18 – Flood Hazard Regulations. FEMA has issued an appendix (Appendix E – Policy on Fish Enhancement Structures in the Floodway) allowing for a waiver of a full no-rise analysis. Staff has assessed the Policy and agrees that the information provided by the applicant for the enhancement that will be performed will not require a no-rise analysis. In lieu of a no-rise analysis, the applicant shall have a qualified professional provide a feasibility analysis and certification that the project was designed to keep any rise in 100-year flood levels as close to zero as practically possible and that no structures would be impacted by the potential rise as outlined in the Policy. A preliminary analysis is required at the time of land use application.

Bike
Normals

## PLANNING ISSUES

**Setbacks:** Physical components of the restoration work are not structures and do not have applicable setbacks. The proposed bridge is not located anywhere near setback requirements based on the park's property lines. The location of paths and overlook areas in relation to the boundaries of natural resource areas is discussed in the 'Natural resource review' section of these notes.

**Landscape:** The park site exceeds all requirements for landscaping, and the proposed work would have negligible, if any, effect on the overall amount of landscaped area.

**Parking:** The proposed work does not change the use of the site or add any additional floor area, and does not trigger any of the applicability provisions for MMC Chapter 19.600, Off-street Parking and Loading.

**Transportation Review:** The proposed work does not trigger any of the applicability provisions for MMC Chapter 19.700, Public Facility Improvements. A transportation review is not required.

**Application Procedures:** The land use permits required for completing all elements of the proposed work are approval of a Community Service Use application and Natural Resource Review application.

Community Service Use (CSU)
Parks are considered a Community Service Use in all zones in Milwaukie with the exception of the Downtown Open Space zone. Modification or construction of the recreational elements of North Clackamas Park (paths, bridge, overlooks) requires approval of a CSU. Portions of the park covered by the natural resource overlay are not considered to have existing approval as a CSU. It appears that nearly all of the proposed work would occur in these areas. The land use review would treat the installation or modification of park features in these areas as the establishment of a new CSU.

The approval criteria for this application are in MMC 19.904.4. The specific development standards of MMC19.301, Residential zone R10 and for general CSUs in MMC 19.904.9 are also applicable, though few, if any, of the standards are applicable to the proposed work.

Natural resource review (NR)
The proposed work within areas designated as Water Quality Resource (WQR) or Habitat Conservation Area (HCA) requires approval of a Natural Resource application. A single NR application can cover all the proposed work that is subject to the NR regulations.

Staff believes that the elements of the proposed work would be reviewed as follows:

* Overlooks; trails in WQR that are wider than 30" or within 15' from the top of bank of a water body; bridge replacement:
This work is subject to the General Discretionary Review in MMC 19.402.12. These elements are not exempt or otherwise allowed through a lower level of review by the NR regulations. The basic features of the discretionary review are that the applicant identify the impacts of the work; present an analysis of alternatives; and justify that the selected alternative appropriately avoids, minimizes, and mitigates impacts to the NR area.

* Restoration work - placement of woody debris, stream bank stabilization and restoration; trail decommissioning, riparian habitat restoration:
This work should be permissible through the Natural Resource Management Plan procedures in MMC 19.402.10. This work would be reviewed by the approval criteria in MMC 19.402.10 if all aspects of the restoration are approved by or follow best-practice guidelines put forth by agency listed in MMC 19.402.10.A or B. The approval criteria for this work are in MMC 19.402.10.C. If the entire project goes forward as a single proposal, the Planning Commission would make findings on these criteria. If the restoration work proceeds separately from the rest of the project, it would receive either Type I or a Type II, as described in MMC 19.402.10. They key benefit of reviewing this work under MMC 19.402.10 is that the work is given deference and reviewed against a simpler set of criteria than the work permitted under discretionary review.

Staff suggests that the 2009 ODFW assessment of creeks in the north Clackamas area that was mentioned in the Nature in Neighborhoods grant application may be a document that could qualify the restoration work to be reviewed as a Natural Resource Management Plan.

Application Process and Fees

The fees and deposits for the applications would be $2,875, which includes:
Community Service Use - $1,700.00
Natural Resource Review - $1,275.00 (figure represents a discount of 25% for review of a concurrent application)
Fee reduction of $100 as a result of having the preapplication conference.

In addition to the application fee, a deposit of $2,000 for natural resource review would be required at the time a land use application is submitted. This deposit covers the City's cost in hiring an environmental consultant to review the proposed work. Any unused portion of the deposit would be refunded to the applicant after the appeal period for the land use decision expires. It is possible that an additional deposit would be required prior to the city deeming the application complete based on the scope and complexity of the proposal.

Application and Hearing:

The application needs to include the following: Land Use Application form; Submittal Requirements Form; Site Plan Checklist; 5 copies of the project plans; 5 copies of the application narrative that addresses the code sections referenced above for CSU and NR review. The application form needs to be signed by a person that can act as a property owner for the park or a letter from that person authorizing the application needs to be submitted.

Following submission of the application, fees, and deposit, the city will review the application for completeness. The target for this review is 10 working days, although the city has 30 days under state law to make the determination. If the application is incomplete, a letter will be sent that details what items were found incomplete. Once the application is complete, the City will schedule a hearing within about 45-60 days, or possibly later depending on the Planning Commission's agenda. The application will be referred for comments to city departments, other agencies, and Milwaukie Neighborhood District Associations. Notice will be sent to properties within 300 ft of the site, and the applicant is required to post notice of the hearing at the site.

The Planning Commission will hold a public hearing on the land use application. There will be opportunity for testimony from the applicants and from the public prior to the Planning Commission's deliberations on their decision. The decision will be based on the approval criteria identified above for CSU and NR applications. Following the decision, there is a 15-day appeal period during which the decision may be appealed to City Council. The City is obligated to provide a final decision on the application within 120-days of deeming the application complete, unless the applicant provides a waiver for additional time. The final decision period includes time necessary for the City Council to hear the application and issue a decision in the event that an appeal is filed.

If the application is approved, the City can issue permits for the project work to begin following the expiration of the appeal period. Such permits include erosion control, flood hazard regulation review, and other similar reviews. The city is willing to begin review of permits after issuance of a decision and before expiration of the appeal period.

**Natural Resource Review:** See notes in application procedures and notes below.

## Lot Geography:

Not applicable for the proposed work.

## Planning Notes:

1) Natural Resource Restoration Work

An option for consideration by the applicant is that the parts of the project that are only natural resource restoration could proceed on their own and receive a lower level of review. The natural resource parts of the project include the placement of woody debris, stream bank stabilization and restoration; trail decommissioning, riparian habitat restoration. Staff believes that this work, as described, would not require approval of a CSU and could be permitted under the Natural Resource Management Plan provisions of MMC 19.402.10. It could be permitted through a Type I review if all elements of the project have been approved by another natural resource agency, and could be permitted through a Type II review if the work is in accordance with natural resource management practices promulgated by a natural resource agency. The Type I review would have an application fee of $150, and the Type II review would have an application fee of $900. The deposit would probably not be necessary for the Type I review, and probably would be necessary for the Type II review.

2) CSU Review

The CSU review includes discretionary approval criteria for the Planning Commission to use when permitting the use (see MMC 19.904.4). The applicant should be prepared to discuss what alternatives were considered for the overlooks and bridge replacement and why the alternatives shown in the land

use application were selected. In particular, be prepared to address how the public benefits of these portions of the project outweigh the impacts. If the master plan for the park is approved prior to review of a land use application for the restoration project, the inclusion of these features in the plan could be used as one justification for selecting the designs and elements in the land use proposal.

## ADDITIONAL NOTES AND ISSUES

**County Health Notes:**

**Other Notes:**

**This is only preliminary preapplication conference information based on the applicant's proposal and does not cover all possible development scenarios. Other requirements may be added after an applicant submits land use applications or building permits. City policies and code requirements are subject to change. If you have any questions, please contact the City staff that attended the conference (listed on Page 1). Contact numbers for these staff are City staff listed at the end of the report.**

**Sincerely,**

**City of Milwaukie Development Review Team**

**BUILDING DEPARTMENT**

**Tom Larsen - Building Official - 503-786-7611**

**Bonnie Lanz - Permit Specialist - 503-786-7613**

**ENGINEERING DEPARTMENT**

**Gary Parkin - Engineering Director - 503-786-7601**

**Brad Albert - Civil Engineer - 503-786-7609**

**Zach Weigel - Civil Engineer - 503-786-7610**

**Jason Rice - Civil Engineer - 503-786-7605**

**Matt Palmer - Associate Engineer - 503-786-7602**

**COMMUNITY DEVELOPMENT DEPARTMENT**

**Jeanne Garst - Administrative Supervisor - 503-786-7655**

**Marcia Hamley - Admin Specialist - 503-786-7656**

**Blanca Marston -Admin Specialist - 503-786-7600**

**Alicia Martin -Admin Specialist - 503-786-7600**

**PLANNING DEPARTMENT**

**Katie Mangle - Planning Director - 503-786-7652**

**Susan P. Shanks - Senior Planner - 503-786-7653**

**Brett Kelver - Associate Planner - 503-786-7657**

**Ryan Marquardt - Associate Planner - 503-786-7658**

**Li Alligood - Assistant Planner - 503-786-7627**

**CLACKAMAS FIRE DISTRICT**

**Doug Whiteley - Lieutenant Deputy Fire Marshal - 503-742-2692**

# Nature in Neighborhoods Capital Grants
## F-1 Cover Sheet

Metro

**Check one:**
- ☐ Letter of Interest
- X Final Proposal

| | |
|---|---|
| **Project Name** | Mt. Scott Creek Restoration at North Clackamas Park |
| **Contact name** | Leah Johanson - Water Environment Services |
| **Phone** | 503-742-4620 |
| **Address** | 150 Beavercreek Rd., Oregon City, OR 97045 |
| **Email** | LJohanson@co.clackamas.or.us |
| **Public Agency** (if different from applicant) | Clackamas County Water Environment Services |
| **Contact name** | Leah Johanson |
| **Phone** | 503-742-4620 |
| **Site Name** | North Clackamas Park |
| **Address or Location Info** | 5440 SE Kellogg Creek Dr. Milwaukie, OR |
| **Property Owner** | City of Milwaukie |
| **Contact Name** | JoAnn Herrigel |
| **Email** | herrigelj@ci.milwaukie.or.us |
| **Phone** | 503.786.7508 |

**Evaluation criteria:** ☐ ReNature ☐ ReGreen X Both

**Project Summary** (50 words or less)

The Mt Scott Creek Restoration at North Clackamas Park has two overall goals: 1) to improve 550 lf of Mt. Scott Creek and create a 48,000 sf riparian protection zone that enhances ecological functions and diversity; 2) Promote watershed health awareness through community stewardship, educational opportunities, and enhanced access to nature by providing two Mt. Scott Creek overlooks.

**Nature in Neighborhoods Capital Grant funding Request** $ 150,034

**If submitting more than one proposal, please rank this proposal in order of priority.** ☐

**Total project cost** $ 450,222

*We, the undersigned, attest that to the best of our knowledge the information in this application is true and that all signatories have authorization to submit this grant application to Metro's Nature in Neighborhoods Capital Grants Program.*

**Applicant**

**Organization Name** Clackamas County Water Environment Services

**Printed Name** Leah Johanson

**Signature** Leah Johanson **Date** 1-26-11

**Public Agency**

**Organization Name** _____

**Printed Name** _____

**Signature** _____ **Date** _____

# Mt. Scott Creek Restoration
## at North Clackamas Park

Metro Nature In Neighborhoods Capital Grant Application

January 31st, 2011

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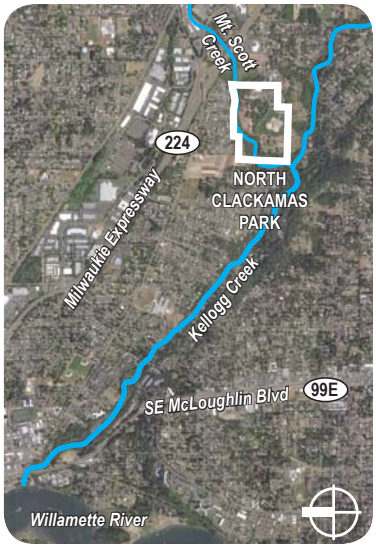
*Mt. Scott Creek Restoration at North Clackamas Park*

# *PROJECT NARRATIVE*




## *A. Project Description*

Water Environment Services (WES) is requesting $149,978 from Metro's Nature in Neighborhoods Capital Grant program to improve instream and riparian areas along lower Mt. Scott Creek within North Clackamas Park. The project will enhance ecological functions and diversity for fish and wildlife. Additional elements of the project will improve watershed health awareness, provide community stewardship opportunities, increase educational opportunities, and enhance access to nature. Specifically, the Mt. Scott Creek Restoration project includes the following elements: (See the following pages for details on each of these elements.)

- 48,000 square feet of restored and protected riparian forest habitat
- 4 large woody debris installations for fish habitat, including approximately 40 logs total
- 320 linear feet of streambank stabilization and restoration (within the total 550 lf section)
- 530 linear feet of decommissioned trail
- 50 linear foot pedestrian bridge for ADA access over wetlands
- 2 unique and sustainably designed creek overlooks with educational interpretive signs
- 1 culvert removal and bank restoration at Camas Creek confluence for fish passage.

This combination of projects was chosen for the following reasons:

- This segment of Mt. Scott Creek has been identified in planning documents as poor quality and high priority for restoration. (See Project Background below for more information on these studies.)
- The project area is entirely within publicly owned, City of Milwaukie property.
- The project includes bank and riparian improvements that will be focused in a single zone of restoration that can be protected from human impact, easily maintained and monitored, and focuses restoration near high quality features including existing wetlands and creek confluences.
- Major portions of the bank stabilization areas are heavily impacted by an existing dirt path that is located along the top of the bank. The planned overlooks will focus users to engaging, educational overlooks where they can view the creek and allow the bank restoration area to be protected.

### Background

Mt. Scott Creek is one of eight major subbasins located within the 10,300 acre Kellogg / Mt. Scott Creek Watershed. The Kellogg / Mt. Scott watershed is a highly developed urban watershed that is approximately 34 percent impervious. The general challenges and concerns are typical for an urban watershed such as this one, and include fish passage issues, lack of riparian vegetation, in-stream erosion, and water quality concerns. Adult salmon, steelhead, and cutthroat trout have been documented in Mt. Scott Creek. The creek flows from the northeast corner of the watershed near Happy Valley, west to its confluence with Kellogg Creek. Our project falls within the lower reach of Mt. Scott Creek. This section of creek collects runoff from approximately 1,622 acres, and is approximately 45 percent impervious. This section of Mt. Scott Creek can be characterized as lacking in overhead canopy, deep pools, large woody debris, and can experience high summer water temperatures.

Just upstream of the confluence of Mt. Scott Creek and Kellogg Creek, is the 47 acre North Clackamas Park. Mt. Scott Creek flows along the northern border of the park. Within the park, Mt. Scott creek is 10 to 20 feet wide. The stream banks are generally low and rise one to two feet above the stream bed. Areas of erosion and undercutting are apparent on the banks. The creek is covered with a riparian forest that includes native species such as Red Alder, Western Red Cedar, Sitka Willow, Douglas Spiraea, and Red-Osier Dogwood. Typical infestations of non-native plant species occur throughout North Clackamas Park such as Himalayan Blackberry and large stands of English Ivy. These plants are especially prevalent within the riparian forest bordering Mt. Scott Creek.

North Clackamas Park is divided into a northern half and southern half by Camas Creek. Camas Creek is a shallow tributary to Mt. Scott Creek that originates in a palustrine emergent wetland in the northeastern portion of the park and meets Mt. Scott Creek in the western portion of the park. The small creek is covered with an Oregon Ash forest located along its banks. There is an existing culvert located at the mouth of Camas Creek as it flows into Mt. Scott Creek.

North Clackamas Park is the largest community park maintained by the North Clackamas Parks and Recreation District (NCPRD). It contains a number of recreation amenities such as multiple baseball / softball fields, equestrian facility, picnic shelters, off-leash dog area, walking trails, and play structures. Previous successful restoration projects have taken place within the park to remove invasive non-native species and restore the creek buffers and riparian forest canopies.

The following describes the six elements that are included in the project. See Supplemental Attachments page 24 for a map locating these elements within the park.

## A Streambank Restoration

Project Type: Restoration
Area: 150 LF of stream bank improvements

The stream bank on the south bank of Mt. Scott Creek, west of the Camas Creek Confluence suffers from habitat deficiencies, including homogeneity, bank erosion, lack of overhanging cover and lack of woody debris. Heavy foot traffic has trampled vegetation and caused bank erosion. Actions should focus on restoring bank conditions and improving habitat opportunities. The series of bank restoration strategies listed below will help to improve fish habitat and protect the bank.

*Existing*

*Proposed*

### Actions

- Provide log stabilized banks and back fill with soil and plants
- Place large woody debris and boulders along stream bank
- Soil remediation to improve compacted soils
- Plant native trees, shrubs, and herbaceous species

## B Riparian Enhancement Area

Project Type: Restoration and Protection
Area: 12,720 SF planting, 445 LF of trail decommissioning, and 670 LF of fence

The riparian area adjacent to the south bank of Mt. Scott Creek, west of the Camas Creek Confluence would benefit from restoration. Habitat deficiencies exist, including homogeneity, lack of overhanging cover and invasive species. Heavy foot traffic has trampled vegetation and caused erosion. Actions should focus on reducing access to the area to decrease human impact. The series of riparian enhancement strategies listed below will help to create high quality and continuous riparian habitat area.

*Existing*

*Proposed*

### Actions

- Decommission trails and add woody debris barriers
- Soil remediation to improve compacted soils
- Plant native trees, shrubs, and herbaceous species
- Add fencing to protect new planting areas

## C

### Log Jam and Overlook

Project Type: Recreation and Education
Area: 225 SF overlook, with 175 LF of new trail

This bend in Mt. Scott Creek offers interesting views of the creek in both directions as well as great habitat and restoration opportunities. The location is easily accessed and visible from the existing open field area. The setting feels as though you are over the creek looking down. By using natural materials, such as vertical snags, peeled log railings and boulders for sitting, the overlook will offer an inviting space to look over the log jam and creek below. The log jam will protect the bank at this bend while creating habitat opportunities for fish.

Actions

- Provide views of the creek habitat and native vegetation
- Use a naturalistic style of construction to blend the overlook into the setting
- Use the log jam to create habitat opportunities in the creek

*Existing*

*Proposed*

## D

### Camas Creek Confluence Overlook

Project Type: Recreation, Education and Restoration
Area: 300 SF overlook, 45 LF of trail

The confluence of Camas Creek and Mt. Scott Creek offers a unique location for viewing the creek and surrounding habitat at a central node. This location is visible from the existing main loop path in the park. The overlook will be adjacent to a major restoration area at the confluence. A raised overlook will create an attraction, helping to focus user impacts while offering visual access to the creek and restoration below. The use of cable wire railing and thin profile decking will make the overlook feel open.

Actions

- Create a raised overlook deck near the confluence
- Take advantage of views up both creeks
- Offer a unique experience that reduces human impact in and around the confluence
- Interpret the restoration story

*Existing*

*Proposed*

## E

### Culvert Removal and Restoration at Camas Creek Confluence

Project Type: Restoration
Area: 20 LF culvert removal, 45 LF trail decommissioning, 150 LF bank stabilization, 5,000 SF of restoration planting

A culvert is currently located near the confluence of Camas Creek and Mt. Scott Creek. It provides access between the two sides of the park, but reduces upstream wildlife passage and water flow. Fish passage improvements could enhance biotic integrity and the production of anadromous fish by opening additional refuge areas meeting juvenile fish passage requirements. Log drops can be installed to hold back the existing sediment deposits in Camas Creek. Boulders, large woody debris, bank regrading, and re-vegetation will make this area a highlight of the project.

Actions

- Remove the culvert, other concrete debris, and asphalt path
- Re-grade confluence stream banks
- Stabilize bank and improve habitat with woody debris and boulders
- Provide 6” maximum drops with logs to stabilize sediment in Camas Creek
- Plant with native riparian trees and shrubs

*Existing*

*Proposed*

## F New ADA Pedestrian Bridge

Project Type: Recreation and Access
Area: 45 LF

*Existing*

*Proposed*

There are currently four crossings of Camas Creek; the gravel maintenance drive, two foot bridges and the existing culvert and path. If the culvert is removed access across Camas Creek on the western side of the site is limited. The footbridge will be designed to connect both sides of the park and reduce flooding and wetland impacts.

### Actions

- Construct a new pedestrian bridge across Camas Creek
- Incorporate the bridge into the existing trail system
- Provide restoration planting in disturbed areas

## Previous Planning Efforts

There are a number of previous planning documents that have lead to the development of the Mt. Scott Creek Restoration at North Clackamas Park Project. Below is a brief description of each of those planning documents and their recommendations for this lower reach of Mt. Scott Creek.

### *Oregon Department of Fish and Wildlife Fish Species Distribution and Abundance Survey and Habitat Assessment of Creeks*

In April of 2009, Oregon Department of Fish and Wildlife (ODFW) completed a fish species distribution and abundance survey and habitat assessment of creeks within Clackamas County Service District No. 1. ODFW characterized the lower reach of Mt. Scott Creek as a high priority for in-stream restoration and riparian enhancement. The study found there were limited complex structures in the riparian area. It was recommended that large woody debris (LWD), boulder clusters, and other measures to be installed to improve habitat quality. The goal of the recommended enhancements is improved in-stream habitat for rearing of coho salmon and steelhead trout.

### *Kellogg-Mt. Scott Creek Watershed Action Plan (WAP)*

In June of 2009, the Clackamas County Service District No.1 (CCSD #1) completed a Watershed Action Plan (WAP) for the Kellogg-Mt. Scott Creek Watershed. The main purpose of the WAP was to prioritize the district's surface water management activities and future investments. A characterization report and watershed assessment was conducted and a summary of the factors limiting health and key stressors in the watershed was produced. More than 30 recommended actions resulted from the WAP. High priority stream reaches were identified based on the watershed health conditions and potential partnering opportunities. The lower reach of Mt. Scott Creek that flows through the North Clackamas Community Park was rated as one of the highest priority areas. The report characterized the lower portion of Mt. Scott Creek in the following way:

> *"The riparian buffer in the Lower Mt. Scott sub-basin is somewhat intact… In a 100-foot buffer on either side of Mt. Scott Creek, approximately 33 percent of the buffer is forested,… This sub-basin is generally lacking in structural stormwater BMP's, deep pools, and LWD (large woody debris). Reaches in this sub-basin also experience high summer temperatures… Hydrologic analysis data ranks in the poor category for the number of structures in the 100-year flood plain and for entrenchment ratio… This reach was also rated as having poor overhead shade in the stream channel by ODFW." (p5-21 WAP)*

The report recommended that the…

> *"…management strategy for this reach is a high level of management that includes in-stream restoration and riparian corridor improvements. In stream restoration could include management to remove japanese knotweed, bamboo and other invasive species and the placement of LWD (large woody debris) and boulders to improve instream structures and the addition of side channels to improve refuge habitat for fish during high flow events. To enhance the riparian corridor and improve water temperature shade could be added along (the lower reach) in North Clackamas Park." (p5-21 WAP) .*

### *North Clackamas Park – North Side Planning Report*

NCPRD and The City of Milwaukie developed a concept plan for the north side of North Clackamas Park. Work on the report and concept plan began in May of 2007 and was concluded with the development of the North Side Planning Report in February of 2008. The concept plan for the north side of the park focused on protecting environmentally significant areas and providing activities in a manner suitable for all users of the park, and to reduce the environmental impact of these uses. Elements of the concept design that are included in this restoration project are the two creek overlooks, interpretive signage, culvert removal at Camas Creek, large woody debris placement, and a new pedestrian bridge over Camas Creek. There is an existing off-leash area on the north side of the park. This area is not part of this grant application. Its location and enhancement are being reviewed by NCPRD and the City of Milwaukie as part of the north side planning report adoption process.

The report states specifically:

> *"The park north of Camas Creek is an opportunity to create a passive recreation setting with an emphasis on environmental enhancement and education to balance the intensively active recreation facility south of Camas Creek. NCPRD desires to build consensus among all interested parties around a common vision for the north side of the park."*
>
> *"The east-west portion of Mt. Scott Creek downstream from the Camas Creek confluence would also benefit from additional shading by planting tall shrubs beneath the existing trees along the south side of the stream.... A few large woody debris placements within the channel might locally diversify flows and vary the sediment distribution."*

## Project Approvals

### *Water Environment Services: Clackamas County Approval*

The project was identified as high priority in Clackamas Counties Watershed Action Plan (WAP) for the Kellogg-Mt. Scott Creek watershed. CCSD #1 has received approval for this restoration project from Clackamas County Water Environment Services' Surface Water Management Steering Committee. They project was included in the FY10-11 Capital Budget that was reviewed and approved by WES' River Health Advisory Board (RHAB), and WES' Director.

### *City of Milwaukee: Property Owner Approval*

The City of Milwaukie Park and Recreation Board "*enthusiastically supports the Mt. Scott Creek restoration project.*" They will continue to be active participants in the planning and have committed staff time and volunteer hours to the project (See Budget.) This project has received approval from the City of Milwaukie Parks Advisory Board. As the project moves forward, it will go through the City of Milwaukie land use and permitting process for approval.

### *North Clackamas Parks and Recreation District: Site Management Agency Approval*

The project has received approval from the North Clackamas Parks and Recreation District Advisory Board. North Clackamas Parks and Recreation District has been and will continue to be an important partner in this project. This project builds on many of the goals they have for the park and its future development. They have completed a thorough public process for the north side concept plan and their results show that implementing the scope outlined in this proposal will be strongly supported by the community.

### *Oregon Department of Fish and Wildlife (ODFW)*

ODFW characterized this particular reach as a high priority for instream restoration based on their fish species distribution and abundance survey and habitat assessment. ODFW recommended this project to improve instream habitat fore rearing Coho salmon and steelhead trout. ODFW has been a stakeholder in the planning and approach for this project.

## *B. Evaluation Criteria*

### Re Nature - Enhance Ecology

1. *Projects that improve the way the physical environment contributes to how well ecological processes contribute to overall ecosystem health.*

   Lower Mt. Scott Creek is classified within Metro's Title 13 program as a high habitat conservation area and class 1 riparian area. Both sensitive native fish species and threatened salmon species have been documented within Mt. Scott Creek. Notes summarizing issues of concern within this stream reach from ODFW's 2008 survey include:

   - Creek is constrained by multiple terraces
   - Degraded riparian with deciduous vegetation dominant
   - Heavily infested with bamboo and other invasive species
   - Small wood present with limited key pieces
   - Moderate fine sediment load
   - Instream habitat limited by lack of complex structures

   The projects' restoration elements will address these factors that are limiting function, value, and watershed health. "Pulling back" streambanks and installing large wood will assist in stabilizing the stream channel, reducing high flow velocities and excessive scour and erosion, and providing low velocity refugia and additional pool/riffle habitat for rearing of juvenile salmonids. Restoring the degraded riparian areas will improve water quality through filtration and canopy, and contribute to better form, function, and value of these sensitive areas. The project will create a 48,000 sf protection area that limits human disturbance by decommisioning trails, restoration planting, and installing fencing.

2. *Multiple benefits – provides ecological benefits beyond the project itself.*

   This project is identified generally within CCSD #1's Watershed Action Plan as well as specifically within ODFW's 2009 Fish Species Distribution and Abundance and Habitat Assessments of Streams in Clackamas County Service District No. 1 (CCSD #1) Final Report. The entire project stream reach is located within public property owned by the City of Milwaukie (North Clackamas Park). Public access is provided for recreational uses including multiple sports fields, play and picnic areas, trails, a off-leash area, equestrian facility, and a 258-space parking lot. The Milwaukie Center is also located within the park. The Milwaukie Center is a multipurpose community center operated by NCPRD. The Center offers a wide array of recreational and support services to meet the interests and needs of adults age 55+ and families in the Milwaukie / North Clackamas area. This project's educational components, including overlooks and interpretive signage, will raise awareness about watershed health issues, promote and advocate for community stewardship, and provide an up-close and personal view into stream function and value, and partnership restoration efforts.

3. *Demonstrates ecological design solutions that are both effective and cost-efficient.*

   Restoration solutions will be designed specifically for the issues of concern listed above, and will be based on state-of-the-art bioengineering construction techniques for enhancing stream ecology. Elements that provide access to the site will be designed to reduce impacts on surrounding restoration areas through; selection of natural and sustainable materials with a proven history of success in riparian environments (eg. wood, boulders, vegetation, matting, and local native cuttings) reducing earth moving and foundation sizes, and eliminating the use of toxic materials that may harm the creek. The project will also leverage a great deal of public funding beyond the 2:1 match with the various partners and volunteers that will participate.

### "Re Green" – Enrich People's Experience of Nature

1. *Enrich people's experience of nature and strengthen a physical connection to the region's ecology.*

   This site is used extensively by the community, especially by the Milwaukie Center's senior citizens and children from local preschools. The project will create a strong connection and improved access to nature that many park users do not currently have. The lookouts will be located, sited, and designed to bring park uses closer to nature, while protecting the resource and sensitive habitats. Interpretive signs will be targeted to address the Kellogg-Mt. Scott Creek watershed, ecological health and restoration elements. "What you can do to protect water resources within the watershed and your own 'backyard'" type questions, photos or graphics, "touch and see" elements, and other proven educational components will be used on the signage. The designs will be targeted to accommodate senior citizens and children and be accessible to those with disabilities. Additionally, the park could become an anchor stop for any new regional trail proposed.

## C. Partnerships

This project is being coordinated with the NIN Small Restoration and Enhancement Grant-Lower Mt. Scott Creek Education and Enhancement Project, which was awarded to North Clackamas Park and Recreation District and North Clackamas Urban Watershed Council in 2010. This project is funding work that will be accomplished within North Clackamas Park (NCP) but also on privately owned lands adjacent to the park. Project elements accomplished within NCP will focus on invasive removal and replanting. All planting during the 2010-2011 winter season has been focused within the Camas Creek area and will not be effected by the proposed grant projects. The remainder of the Lower Mt. Scott Creek Education and Enhancement Project funding awarded for plant purchase (NCP portion) will be utilized to address the "future opportunities" as outlined in the opportunities map. (Figure 9, page 29) This may include wetland and/ or upstream creek side planting.

The following is a list of project partners that are actively engaged and providing financial or in-kind support for this project.

### City of Milwaukie

JoAnn Herrigel

10722 SE Main Street, Milwaukie OR 97222

Phone: (503) 786-7508

Role: Property Owner

Project Commitments: Continued use of the property as a park and natural area; 60 staff hours and 100 volunteer hours for implementation; Continued participation in the planning process

### Friends of Trees

Logan Lauvray

3117 NE M L King Blvd, Portland, OR 97212-3056

Phone: (503) 282-8846

Role: Restoration Planting Support

Project Commitments: Technical expertise in restoration; Coordinate 2 community plantings; Support establishment with 2 to 3 maintenance visits yearly

### North Clackamas Parks and Recreation District

Tonia Burns

150 Beavercreek Road, Oregon City, OR 97045

Phone: (503) 742-4348

Role: Site Management

Project Commitments: Continued management of the site and these improvements; Staff time - 90 volunteer hrs., and funding for implementation; Integration of this project and site concept plans and goals

### North Clackamas Urban Watershed Council

Chris Runyard

1900 SE Milport Rd. Suite C, Milwaukie OR 97222

chair@ncuwc.org

Role: Advocate for Kellogg/Mt. Scott habitat and water quality

Project Commitments: 150 hours of staff time for planning and implementation; Help in leveraging public funds; Assist in community outreach and public involvement

### Oregon Department of Fish and Wildlife

Todd Alsbury - Northwest Region

17330 SE Evelyn St., Clackamas, OR 97015

Phone: (971) 673 -6011

Role: Advisory and Project Oversight

Project Commitments: Continued participation in the planning process; Technical expertise in habitat creation

### Friends of Kellogg and Mt Scott Creeks

Steve Berliner

10824 SE Oak St. #3

Phone: (503) 653-7875

Role: Creek Health Advocate

Project Commitments: Coordinate citizen participation; Invasive plant removal in this stretch of the creek

### Milwaukie Center

Eleanor Johnson

5440 SE Kellogg Creek Dr.

Phone: (503) 653 - 8100

Role: Park Neighbor and Park Steward

Project Commitments: Continued support for older adults using the park and continued stewardship.

### Friends of North Clackamas Parks

Eric and Susan Shawn

P.O. Box 220263, Milwaukie, Oregon 97269

Role: Park support and citizen education

## *D. Project Feasibility*

CCSD #1 staff performed a preliminary survey of the proposed restoration reach within Mt. Scott Creek on June 22, 2010. Streamflow was estimated, and 7 cross sections (measured with and depth) of the stream channel were made. Photos were also obtained and potential restoration locations were identified. A CCSD #1 streamflow gage is present within the lower reach of this proposed project. Technical feasibility, engineering, surveys and design, along with all permitting, will be conducted by a professional consulting team specializing in stream and wetland restoration.

Overall Project Timeline

| | |
|---|---|
| Jan 2011 | Submit Metro Grant Application |
| Feb 2011 | Draft Consultant RFP |
| Mar 2011 | Retain Consultant and provide all survey data |
| June 2011 | Complete Draft/Final Design and Permitting |
| July-Sep 2011 | Install Restoration Measures |
| Oct 2011–Mar 2012 | Conduct Volunteer Restoration Events and continue maintenance activities |
| Apr-May 2012 | Comply with all Capital Grant Reporting Requirements |
| 2011 – 2013 | Design and Install Overlooks and Kiosks |

Leah Johanson will manage the project for WES. She is a Senior Civil Engineer with Clackamas County Water Environment Services. She has over ten years of experiences in environmental and water resources engineering. With a focus on water quality, hydraulic modeling, groundwater modeling and water resources planning, she has completed multiple projects throughout the West. Ms. Johanson is currently the project manager for several large projects at WES including the detention pond retrofit program, several wetland restoration projects, and various TMDL related projects.

CCSD #1 and its multitude of partners have the capacity and experience with local, state, and federal grants, watershed and restoration efforts, and the organization and commitment to successfully complete the project. Capital funds were proposed and targeted for this project. CCSD #1 has a long history and good working relationship with the partners on other restoration and watershed projects. Both the City of Milwaukie owns the park and the NCPRD operates and maintains the park. Easy access can be provided and this project is in alignment and will not interfere with the Concept Plan.

## *E. Evaluation*

WES continues to develop and implement an integrated monitoring program to assess geomorphology, hydrology, and water quality, as recommended in the Watershed Action Plan, to assess our overall stormwater program effectiveness at improving watershed health. WES has a monitoring location for streamflow, water quality and macroinvertebrates near the proposed Mt. Scott Creek Restoration site. WES will continue monitoring this location following completion of the restoration project to help evaluate the success of the proposed restoration activities.

**NATURE IN NEIGHBORHOODS CAPITAL GRANT**
**(F3) PROJECT BUDGET WORKSHEET**

**PROFESSIONAL SERVICES COSTS**

*· Estimate the hours of work directly related to your project for non-profit personnel, agency personnel, volunteers and consultants. You can delete rows that do not apply and/or add more specific descriptors.*
*· Explain the tasks each is expected to complete in the budget narrative (i.e. surveys, design development, contruction documents, plan review, construction management).*
*· Pre-Agreement costs must occur AFTER the Invitation to Submit a Full Application and are not reimbursable.*
*· Agency & non-profit personnel time cannot exceed 10% of the grant request.*
*· Volunteers specifically doing project installation should be included in this section.*

| | financial match | in-kind match | grant request | TOTAL |
|---|---|---|---|---|
| A. Pre-Agreement | | | | |
| 1. Non-profit staff | | | | |
| 2. Agency staff | | $10,015.00 | | |
| 3. Consultants | $35,027.00 | | | |
| 4. Volunteers | | | | |
| B. Post-Agreement Costs | | | | |
| 1. Non-profit staff | | $7,200.00 | | |
| 2. Agency staff | | $30,043.00 | | |
| 3. Consultants | $76,564.00 | | | |
| 4. Volunteers | | $17,930.00 | | |
| **Total for Professional Services** | **$111,591.00** | **$65,188.00** | **$0.00** | **$176,779.00** |

**CONSTRUCTION COSTS**

*Estimate the cost for all work elements of your project.* ***Feel free to change the list****. Specify in the budget narrative which work elements will be completed by volunteers and how you calculated the budget figure.*

| | financial match | in-kind match | grant request | TOTAL |
|---|---|---|---|---|
| A. Site Preparation | | | | |
| 1. Mobilization | $13,672.00 | | | |
| 2. Erosion Control | | | $8,203.00 | |
| 3. Clearing and Grubbing | | | $2,000.00 | |
| 4. Culvert Removal | $1,528.00 | | | |
| 5. Asphalt Trail Removal | | | $1,320.00 | |
| 6. Earth Work | | | $5,000.00 | |
| B. In Stream Work | | | | |
| 1. Diversion | | | $13,672.00 | |
| 2. Bank Stabilization | | | $10,500.00 | |
| 3. LWD, Boulders, and Root Wads | | | $40,000.00 | |
| C. ADA Access and Site Improvements | | | | |
| 1. ADA Pedestrian Bridge | $45,000.00 | | | |
| 2. Overlook at Confluence | $37,500.00 | | | |
| 3. Overlook at Log Jam | $4,500.00 | | | |
| 4. Benches | $3,000.00 | | | |
| 5. Soft Surface Trail | $2,275.00 | | | |
| 5. Asphalt Trail | $900.00 | | | |
| D. Educational Improvements | | | | |
| 1. Interpretive signs (12"x12") | $3,034.00 | | $1,966.00 | |
| 2. Interpretive signs (30"x42") | $12,000.00 | | | |

| | | | | |
|---|---|---|---|---|
| E. Restoration and Protection | | | | |
| 1. Trail Decommissioning | | | $4,900.00 | |
| 2. Amend Existing Soil | | | $3,815.00 | |
| 3. Split Rail Fence | | | $8,040.00 | |
| 4. Restoration Planting | | | $45,060.00 | |
| 5. Native Seeding | | | $2,358.00 | |
| 6. Trees | | | $3,200.00 | |
| G. Design | see above | | | |
| H. Wetland Delineation and Permitting | see above | | | |
| **Total for Construction Costs** | **$123,409.00** | **$0.00** | **$150,034.00** | **$273,443.00** |

| | | | | |
|---|---|---|---|---|
| **OTHER COSTS** | | | | |
| A. Travel (use current State of Oregon rates) | | | | |
| B. Overhead/Indirect costs - these can only be used as match. | | | | |
| **Total for Other Costs** | | | | |

| | | | | |
|---|---|---|---|---|
| **TOTAL PROJECT COSTS** | **$235,000.00** | **$65,188.00** | **$150,034.00** | **$450,222.00** |

## F2 - Nature in Neighborhoods Capital Grants Match Form

Instructions:

1. If utilizing volunteers, indicate this in the "Match Source" and choose the "In Kind" field and estimate the number of hours the volunteers will be contributing to the project. The "Amount" will be those hours multiplied by the hourly rate found at the Independent Sector website: www.independentsector.org/programs/research/volunteer_time.html.

2. If your "Match Source" is a professional or technical service received as "In Kind," use the market average or actual salary or bid for that individual or service. Use the "Notes" field to document your methodology.

| Match Source | Choose One | | Choose One | | Amount | Notes |
|---|---|---|---|---|---|---|
| Water Environment Services | ◉ Financial | ○ In Kind | ○ Pending | ◉ Secured | $ 175,000 | CIP |
| Water Environment Services - Staff | ○ Financial | ◉ In Kind | ○ Pending | ◉ Secured | $ 18,000 | 180 hrs. various staff, hours and rates |
| North Clackamas Parks and Recreation District - CIP | ◉ Financial | ○ In Kind | ○ Pending | ◉ Secured | $ 60,000 | Construction costs towards: culvert removal, bridge, educational signage, access elements |
| North Clackamas Parks and Recreation District - Staff | ○ Financial | ◉ In Kind | ○ Pending | ◉ Secured | $ 19,078 | Various staff hours and rates |
| North Clackamas Parks and Recreation District - Volunteers, trans., supplies | ○ Financial | ◉ In Kind | ◉ Pending | ○ Secured | $ 1,876 | 60 hours at $20.85; $625 of equipment |
| City of Milwaukie - Staff | ○ Financial | ◉ In Kind | ○ Pending | ◉ Secured | $ 2,980 | 40 hrs. at $67.00 and 20 hrs. at $15.00 |
| City of Milwaukie - Volunteers | ○ Financial | ◉ In Kind | ◉ Pending | ○ Secured | $ 2,085 | 100 hrs. at $20.85 |
| North Clackamas Urban Watershed Council- Volunteers | ○ Financial | ◉ In Kind | ◉ Pending | ○ Secured | $ 3,127 | 150 hrs. at $20.85 |

## F2 - Nature in Neighborhoods Capital Grants Match Form

Instructions:

1. If utilizing volunteers, indicate this in the "Match Source" and choose the "In Kind" field and estimate the number of hours the volunteers will be contributing to the project. The "Amount" will be those hours multiplied by the hourly rate found at the Independent Sector website: www.independentsector.org/programs/research/volunteer_time.html.

2. If your "Match Source" is a professional or technical service received as "In Kind," use the market average or actual salary or bid for that individual or service. Use the "Notes" field to document your methodology.

| Match Source | Choose One | | Choose One | | Amount | Notes |
|---|---|---|---|---|---|---|
| Friends of Trees - Staff | ○ Financial | ◉ In Kind | ○ Pending | ◉ Secured | $ 7,200 | 180 hrs. at $40.00 |
| Friends of Trees - Volunteers | ○ Financial | ◉ In Kind | ◉ Pending | ○ Secured | $ 10,842 | 520 hrs. at $20.85 (65 volunteers x 2 events x 4 hours each) |
| | ○ Financial | ◉ In Kind | ○ Pending | ◉ Secured | $ | |
| | ○ Financial | ◉ In Kind | ○ Pending | ◉ Secured | $ | |
| | ○ Financial | ◉ In Kind | ○ Pending | ◉ Secured | $ | |
| | ○ Financial | ◉ In Kind | ○ Pending | ◉ Secured | $ | |
| | ○ Financial | ◉ In Kind | ○ Pending | ◉ Secured | $ | |
| | ○ Financial | ◉ In Kind | ○ Pending | ◉ Secured | $ | |

Total $ 300,188

# *Budget Narrative*

Mt Scott Creek Restoration
**PRELIMINARY PROJECT ESTIMATE**

January 26th, 2011

| ***Project Info*** | | |
|---|---|---|
| *Length of Channel Restoration* | *550* | *LF* |
| *Riparian and Wetland Restoration* | *48,000* | *SF* |
| *Educational Overlooks* | *2* | *EA* |
| *Culvert Removal and Confluence Restoration* | *1* | *EA* |
| *ADA Pedestrian Bridge* | *1* | *EA* |

| ITEM | QTY. | UNIT | UNIT COST | TOTAL | REMARKS |
|---|---|---|---|---|---|
| **SITE PREPARATION & DEMOLITION** | | | | | |
| Mobilization | 1 | LS | 5% | $13,672 | |
| Erosion Control | 1 | LS | 3% | $8,203 | |
| Clearing and Grubbing | 1 | LS | $2,000 | $2,000 | clearing near overlooks and bridge, access to streambank restoration |
| Culvert Removal | 1 | EA | $1,528 | $1,528 | |
| Asphalt Trail Removal | 132 | LF | $10 | $1,320 | 5' wide 6" deep |
| Earth Work | 1 | LS | $5,000 | $5,000 | |
| | | | **Subtotal** | **$31,724** | |
| **IN-STREAM WORK** | | | | | |
| Temporary Coffer Dam | 1 | LS | 5% | $13,672 | |
| Bank Stabilization | 300 | LF | $35.00 | $10,500 | Mt Scott 200 lf Camas 100 lf |
| LWD, Boulders and Root Wads | 40 | EA | $1,000 | $40,000 | |
| | | | **Subtotal** | **$64,172** | |
| **ADA ACCESS AND SITE IMPROVEMENTS** | | | | | |
| ADA Pedestrian Bridge | 1 | EA | $45,000.00 | $45,000 | |
| Overlook at the Confluence | 300 | SF | $125.00 | $37,500 | Decking, Pin Footings, and Railing |
| Overlook at the Log Jam | 225 | SF | $20.00 | $4,500 | Includes cost for fabric, stabilization, base rock and crushed rock surface, logs and edging |
| Benches | 2 | EA | $1,500.00 | $3,000 | |
| Soft Surface Trail | 175 | LF | $13.00 | $2,275 | 4' crushed rock |
| Asphalt Trail | 45 | LF | $20.00 | $900 | 6' asphalt |
| | | | **Subtotal** | **$93,175** | |
| **EDUCATIONAL IMPROVEMENTS** | | | | | |
| Interpretive signs (12"x12") | 5 | EA | $1,000 | $5,000 | Includes design, fabrication and installation |
| Interpretive signs (30"x42") | 3 | EA | $4,000 | $12,000 | Includes design, fabrication and installation |
| | | | **Subtotal** | **$17,000** | |
| **RESTORATION AND PROTECTION** | | | | | |
| Trail Decomissioning | 490 | LF | $10 | $4,900 | clear and grub, rip, add downed wood (planting is included in the number below) |
| Amend Existing Soil | 10900 | SF | $0.35 | $3,815 | |
| Split Rail Fence | 670 | LF | $12 | $8,040 | |
| Restoration Planting | 22,530 | SF | $2.00 | $45,060 | mulch ring, weed barrier, plants, browse protection |
| Native Seeding | 15,720 | SF | $0.15 | $2,358 | Confluence planting area and bank stabilization |
| Trees | 80 | EA | $40 | $3,200 | mulch ring, weed barrier, plants, browse protection |
| | | | **Subtotal** | **$67,373** | |
| | | | **Estimated Construction Cost** | **$273,443** | |

| **Additional Cost Factors:** | | |
|---|---|---|
| Design | 20.0% | $54,689 |
| Wetland Delineation | 2.0% | $5,469 |
| Permitting | 6.0% | $16,407 |
| **Total Project Cost** | | **$350,007** |

## *PROFESSIONAL SERVICES / PROJECT MANAGEMENT / STAFF COSTS*

### *Pre-Agreement Costs*

**A.1. Agency Staff:** $10,015 (personnel)

This includes agency staff time for project support after the invitation to submit full application. Work completed in this phase includes site visits, consultant management, review of schematic design, stakeholder meetings and public involvement.

| | | |
|---|---|---|
| WES Time: $4,500 | | |
| Leah Johanson | 68 hrs. | $66.18 |
| | | |
| NCPRD Time: $4,770 | | |
| Michelle Healy | 7.5 hrs. | $100.61/hr |
| Pam Girtman | 5 hrs. | $97.22/hr |
| Tonia Burns | 37.5 hrs. | $65.54/hr |
| Jeff Lesh | 25 hrs. | $30.27/hr |
| Rose Jessee | 7.5 hrs. | $41.90/ hr |
| | | |
| City of Milwaukie: $745 | | |
| Community Services Director | 7.5 hrs. | $67.00/hr |
| JoAnne Herrigel | | |
| Community Development Intern | 3.75 hrs. | $15.00/hr |

**A.2. Consultants: Site Design:** $35,027 (professional services)

This includes consultant time for GreenWorks PC and Inter-Fluve Environmental to perform analysis and conceptual design services. Tasks included: Background review, base map preparation, site analysis, site visits, current and future opportunities map, stakeholder meeting facilitation, preliminary design concepts, conceptual cost estimate, public meeting facilitation, and preparation of final costs and conceptual text.

| | | |
|---|---|---|
| GreenWorks PC: $30,093 | | |
| Principal | 36 hrs. | $160/hr |
| Project Landscape Architect | 158 hrs | $82/hr |
| Project Staff | 160 hrs. | $71.10/hr |
| | | |
| Inter-Fluve: $4,934 | | |
| Project Manager | 22 hrs. | $132/hr |
| Technical Staff | 20 hrs | $96/hr |
| Clerical | 2 hrs. | $55/hr |

## *Post-Agreement Costs*

### B.1. Non Profit Staff: $7,200 (personnel)

Friend of Trees staff will review planting designs and coordinate 65 volunteers to attend 2 events on site for planting installation.

| | | |
|---|---|---|
| Friend of Trees Staff | 180 hrs | $40/hr |

### B.2. Agency Staff: $30,043 (personnel)

This includes three quarters of all agency staff time for project support after the invitation to submit full application. Work completed in this phase includes design review, consultant management, permitting support, construction management, volunteer coordination.

| | | |
|---|---|---|
| WES Time: $13,500 | | |
| Leah Johanson | 204 | $66.18 |
| | | |
| NCPRD Time: $14,308 | | |
| Michelle Healy | 30 hrs. | $100.61/hr |
| Pam Girtman | 20 hrs. | $97.22/hr |
| Tonia Burns | 150 hrs. | $65.54/hr |
| Jeff Lesh | 100 hrs. | $30.27/hr |
| Rose Jessee | 30 hrs. | $41.90/ hr |
| | | |
| City of Milwaukie: $2,235 | | |
| Community Services Director: | | |
| JoAnne Herrigel | 30hrs. | $67.00/hr |
| Community Development Intern | 15hrs. | $15.00/hr |

### B.3. Consultants: $76,564 Total (professional services)

Final Design: $54,689 (estimated)

This includes consultant time for GreenWorks PC and Inter-Fluve Environmental to perform final design and prepare a bid set for the project. This cost reflects 20% of the Estimated Construction cost of $273,443.

Wetland Delineation: $5,469 (professional services)

An environmental consultant will update and ground truth an existing wetland delineation that was recorded with DSL more than 5 years ago. The wetland delineation will be conducted following the methodology of the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual and the Western Mountains, Valleys, and Coast Interim Regional Supplement to the Corps Manual, used by the Oregon Department of State Lands (DSL) and the U.S. Army Corps of Engineers. Hydrology, soils, and vegetation of the site will be documented on wetland determination data sheets. Sample plot locations and wetland boundaries will be flagged in the field. This task includes conducting a search for previously conducted wetland delineations in the vicinity at DSL. An environmental consultant will prepare a summary report for review by the client prior to submittal to the regulatory agencies. The report will meet the requirements of the Oregon Department of State Lands' January 1, 2008 wetland delineation report rules. This cost reflects 2% of the Estimated Construction cost of $273,443.

*Permitting: $16,407 (professional services)*

This task includes permitting for the associated upgrades to the park. Final permitting needs will be based on the final design. Agencies may include; City of Milwaukie, Division of State Lands and Army Coprs of Engineering. This cost reflects 6% of the Estimated Construction cost of $273,443.

### B.4. Volunteers: $17,930 (volunteers)

Many olunteers will be used to implement site improvements including: restoration planting, seeding, tree planting, and some clearing and grubbing. Many of our partners have offered volunteers and volunteer coordination. These agencies and non-profits have established volunteer recruiting and organization strategies and will be able to engage the local community in stewardship for the creek and the park.

| | | |
|---|---|---|
| NCPRD: Volunteers, transportation and supplies: $1,876 | | |
| 12 Volunteers x 5 hours each | 60 hrs. | $20.85/hr. |
| Equipment (gloves, shovels, other tools) | | $625 |
| | | |
| City of Milwaukie: $2,085 | | |
| 20 Volunteers x 5 hours each | 100 hrs. | $20.85/hr |
| | | |
| North Clackamas Urban Watershed Council: $3,127 | | |
| 30 Volunteers x 5 hours each | 150 hrs. | $20.85/hr |
| | | |
| Friends of Trees: $10,842 | | |
| 65 volunteers, 2 events x 4 hours | 520 hrs. | $20.85/hr |

## *STABILIZATION AND CAPITAL IMPROVEMENT COSTS*

## *A. SITE PREPARATION AND DEMOLITION:* Total $31,724 (total of A.1 through A.6)

### A.1. Mobilization: $13,672

Mobilization costs consist of preparatory work and operations necessary for the movement of personnel, equipment, supplies, and incidentals to and off the project site. This includes establishment and removal of a staging area and for all other work or operations that must be performed or costs incurred when beginning or ending work on the project. This cost reflects 5% of the Estimated Construction cost of $273,443.

### A.2. Erosion Control: $8,203

Erosion control refers to limiting the potential for temporary and permanent degradation to the aquatic and terrestrial habitat by containing sedimant from disturbed areas and preventing pollution. Generally this is estimated at 3% of total construction costs ($273,443). In this particular instance it also includes specific bid items: dust control, coir fabric, and sterile straw bales.

### A.3. Clearing and Grubbing: $2,000

Includes clearing near overlooks and the bridge crossing. Existing foot paths will be used for access to stream bank stabilization areas. All woody debris will be reused on site in restoration areas. Invasive species will be removed and disposed of properly off site. This cost is based on the project area, site observations, and previous experience.

### A.4. Culvert Removal: $1,528

The culvert at the confluence of Camas Creek and Mt. Scott Creek will be removed completely to allow for restoration of the confluence. This cost includes equipment to remove rock and culvert and dispose of it off site. We assumed one dump truck load will include the culvert and asphalt removed from the site.

### A.5. Asphalt Trail Removal: $1,320

The asphalt trail will be removed to limit the access into Camas Creek and the confluence area. The trail currently leads to the culvert that will be removed. The trail is 132 lf x approximately 5' wide. We assumed one dump truck load will include the culvert and asphalt removed from the site.

### A.6. Earth Work: $5,000

There will be a minimal amount of earth work required on the site. Cut and fill will be balanced within the 100 year flood plain. Any excess material will be deposited in an appropriate location on site outside of the 100 year flood plain as directed by the City of Milwaukie and NCPRD.

## *B. IN-STREAM WORK:* Total $64,172 (contracted services)

### B.1. Temporary Coffer Dam: $13,672

A temporary coffer dam will be created on Camas Creek for the removal of the culvert. The sand bag dam will keep sediment and debris from flowing into Mt. Scott Creek during construction. Water will be pumped out from behind the dam to an infiltration area where solids can settle out. Cost estimated at 5% of the total construction cost ($273,443). Source: Inter-Fluve recent project experience.

### B.2. Bank Stabilization: $10,500

Bank stabilization will take place on 300 linear feet of streambank including; 4, 50' long sections along Mt. Scott Creek and 200 lf of Camas Creek around the culvert removal. These areas will receive re-grading as necessary, coir fabric, staking, or other means of stabilization. State of the art bioengineering and soil lifts will be used to create stable yet natural erostion solutions. Banks will also receive planting and native seeding. These costs are reflected below in the Restoration and Protection Section. The cost is based on 300 linear feet of bank stabilization at $35 a linear foot. Source: Inter-Fluve recent project experience.

### B.3. LWD (large woody debris), Root Wads and Boulders: $40,000

There are minimal on site logs, root wads, and boulders that could be used for placement in the creek. To meet project demands additional material will need to be purchased offsite, transported on site, and installed. The cost per log includes; 3' diameter ballast boulders where needed, ½" diameter galvanized cable and drilling for stabilizing the logs, and installation. Imported woody debris, root wads and boulders at $1,000 per piece for 40 logs totaling $40,000. Source: Inter-Fluve recent project experience.

## *C. ADA ACCESS AND SITE IMPROVEMENTS:* Total $93,175 (contracted services)

### C.1. ADA Pedestrian Bridge: $45,000

New ADA Pedestrian Bridge will be installed to cross Camas Creek for improved park accessibility. The removal of the existing culvert will reduce access across Camas Creek. Existing foot bridges are narrow and not ADA accessible. The new pedestrian bridge will be a 6' x 40' girder style bridge that is ADA accessible. Costs include; new bridge, concrete abutments, and bridge installation. Source: Western Wood Structures

### C.2. Overlook at the Confluence: $37,500

This overlook has been designed to reduce the impact of people and pets on the creeks. The elevated position will offer a good view of the creeks and confluence. To keep the structure light and visually unobtrusive, it will be built from fiberglass decking and cable railing. These materials have recycled content, are low maintenance and durable for a wet and shady location. Pin foundations will be used to limit the impact to the surrounding area. Cost at $125 a square foot for 300 square feet.

### C.3. Overlook at the Log Jam: $4,500

This overlook will be a crushed rock at grade gathering space incorporated into the log jam on Mt. Scott Creek. The gathing space and log jam will be designed in a way to allow logs to jut into the gathering space. Some logs will be decorative or border logs to assist in the function of the plaza. The price includes the cost for fabric, stabilization, base rock, crushed rock surface, logs and edging. Overlook at $20 per square foot at 225 square feet. Source: GreenWorks recent similar projects

### C.4. Benches: $3,000

Recycled plastic benches will be added to both of the overlooks. Two benches at $1,500 each.

### C.5. Soft Surface Trail: $2,275

A new 4' crushed rock trail will connect the overlooks to the existing asphalt pathway. Cost $13 per linear foot at 175 linear feet. Source: GreenWorks recent similar projects

### C.6. Aspahlt Trail: $900

New 6' asphalt trail to connect the confluence overlook. Cost $20 per linear foot for 45 linear feet. Source: GreenWorks recent similar projects

## *D. EDUCATIONAL IMPROVEMENTS:* Total $17,000 (contracted services)

### D.1. Interpretive signs, 12"x12": $5,000

Small interpretive signs will be placed along the path and near the overlooks to identify plants and animals that are part of the restoration. The costs include the fabrication, post, hardware, installation and design of the text or graphics. Five small interpretive signs at $1,000 each.

### D.2. Interpretive signs, 30"x42": $12,000

Large interpretive signs will be placed at each overlook and on the bridge to explain elements of the restoration that are visible from the overlook and the types of habitats that are created. The costs include the fabrication, post, hardware, installation and design of the text or graphics. Three large interpretive signs at $4,000 each.

## *E. RESTORATION AND PROTECTION:* Total $67,373

### E.1. Trail Decommissioning: $4,900

Trails will be decommissioned to reduce the impact of humans and pets on the restoration area by closing off easy access points. Existing trails will be used to access the restoration areas and will then be decommissioned. Work includes; Clear and grub, rip compacted earth, add downed wood at existing entrances to paths to deter continued use and plant with dense, tall, rose like native shrubs. This cost does not include planting (see restoration planting below). Cost at $10 per linear foot for 490 linear feet.

### E.2. Amend Exist Soils: $3,815

To maximize the success for native re-vegetation these zones will get additional soil preparation. The cost includes scraping existing lawn, light tilling, weed eradication, and soil amenities as needed. Include 10,900 square feet at $.35 a square foot.

### E.3. Split Rail Fence: $8,040

The fence will be the first level of protection for the restoration area, securing the entirety of the restoration area. There is an existing split rail fence on site that has proven successful at protecting a small section of the bank. Cost at $12 per linear foot at 670 linear feet.

### E.4. Restoration Planting: $45,060

Restoration planting will consist of installation of native riparian plants in key areas including the decommissioned trails, bank stabilization areas, the existing lawn area adjacent to the creek, and the area adjacent to the overlook and log jam. Density and planting type will depend on location on site. Cost includes mulch ring, weed barrier, browse protection, and plants. Cost at $2 per square foot for 22,500 square feet.

### E.5. Native Seeding: $2,358

Native seeding will provide a groundcover in restoration areas and bank stabilization locations. This includes the confluence planting area, bank stabilization zones and 900 sf of staging area reestablishment. The rest of the restoration planting is within an existing matrix and native understory is expected to fill in around new plants.

### E.6. Trees: $3,200

FIGURE 1:
Mt. Scott Creek Area Map

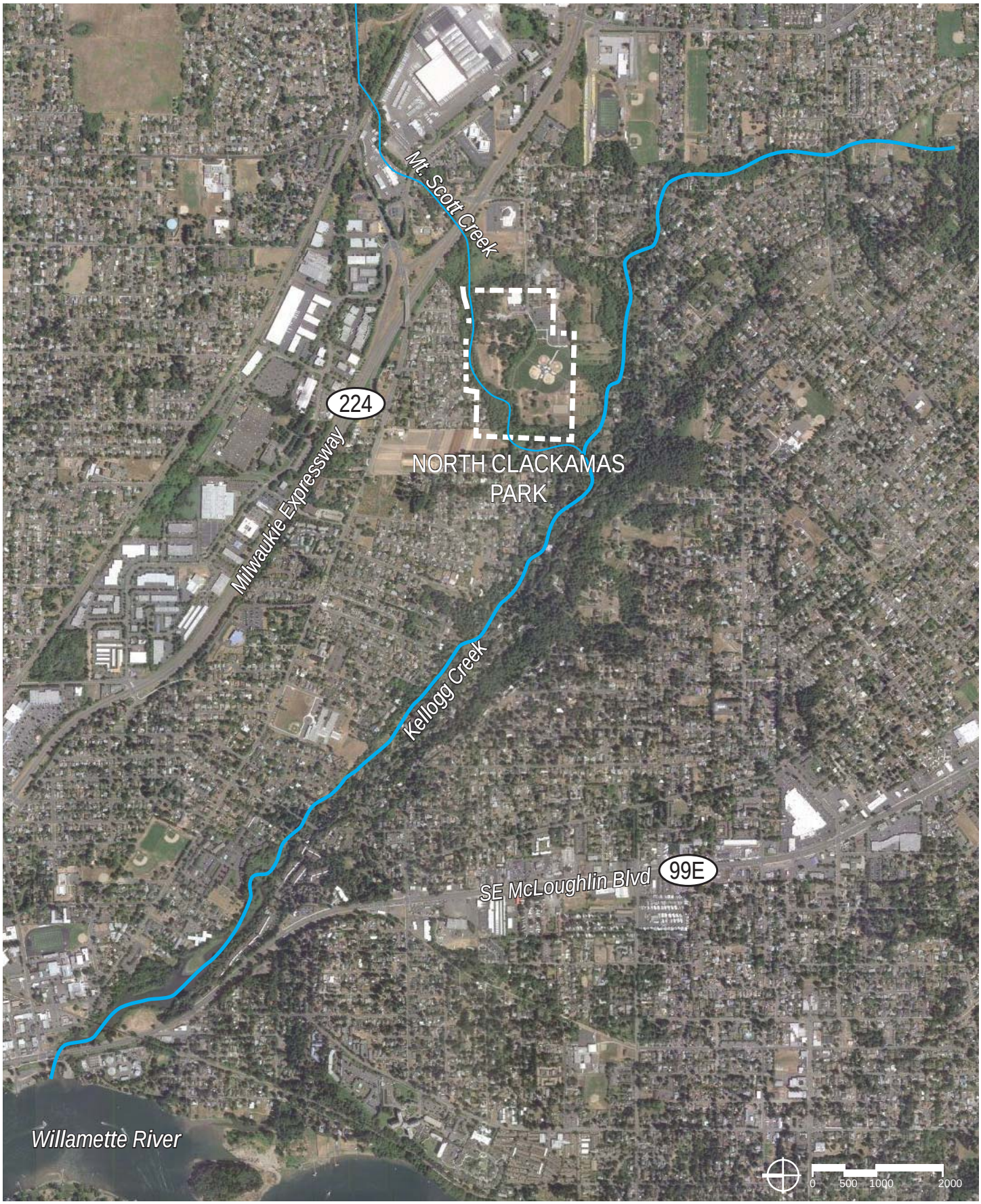
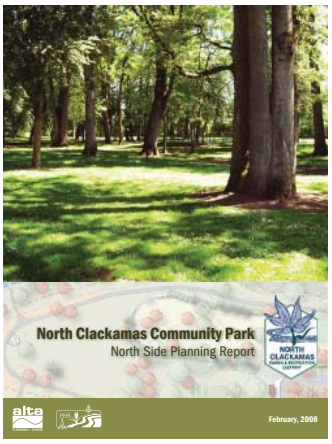


FIGURE 2:
North Clackamas Park - Project Study Boundary

FIGURE 3:
North Clackamas Park: North Side Concept Plan



*NORTH CLACKAMAS PARK CONCEPTUAL PLAN DEVELOPED BY NORTH CLACKAMAS PARKS AND RECREATION DEPARTMENT*

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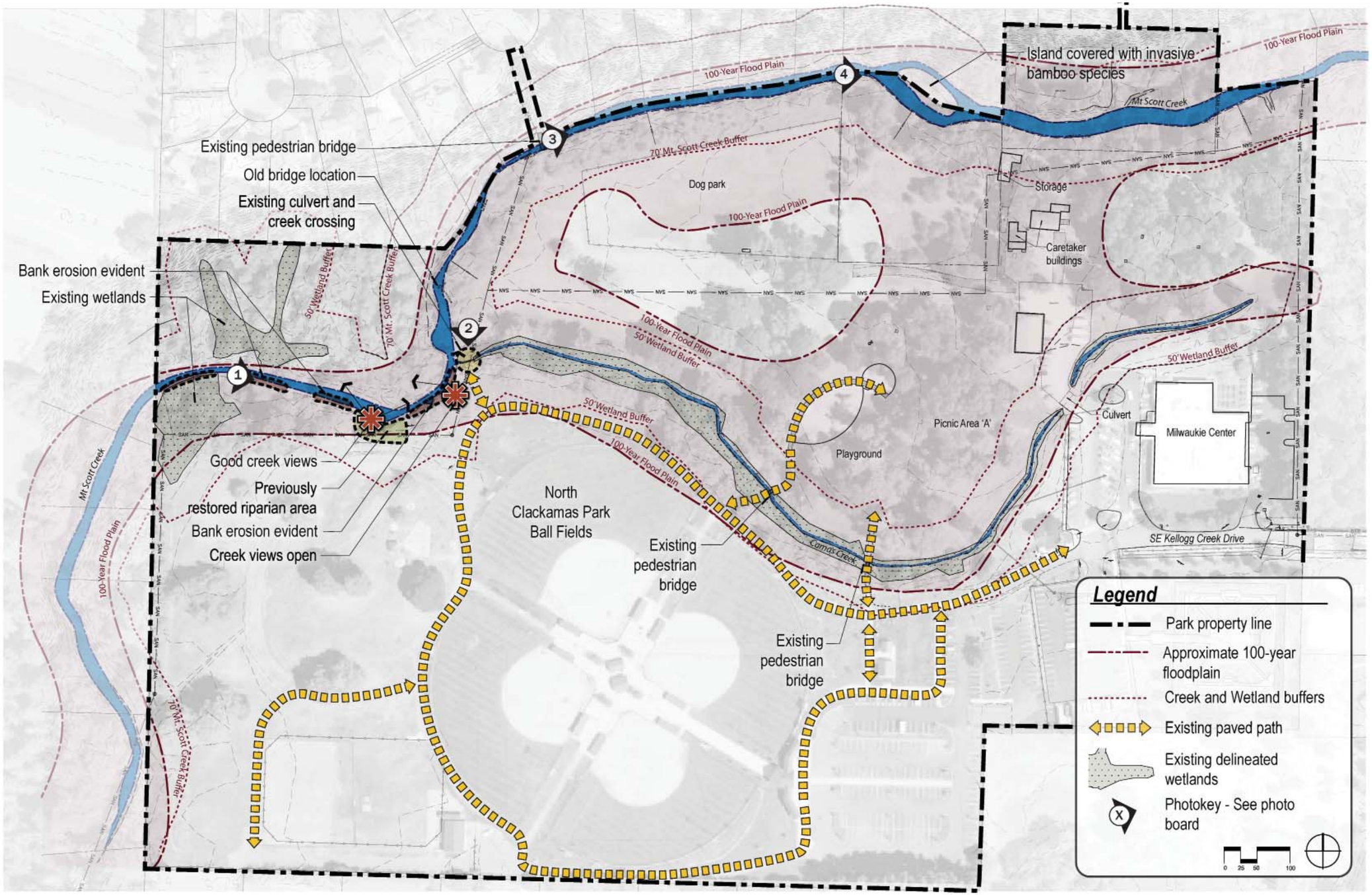
FIGURE 4:
North Clackamas Parks Site Analysis




## Existing Conditions and Site Analysis Map

January 12th, 2011

MT. SCOTT CREEK - Clackamas County Water Environment Services

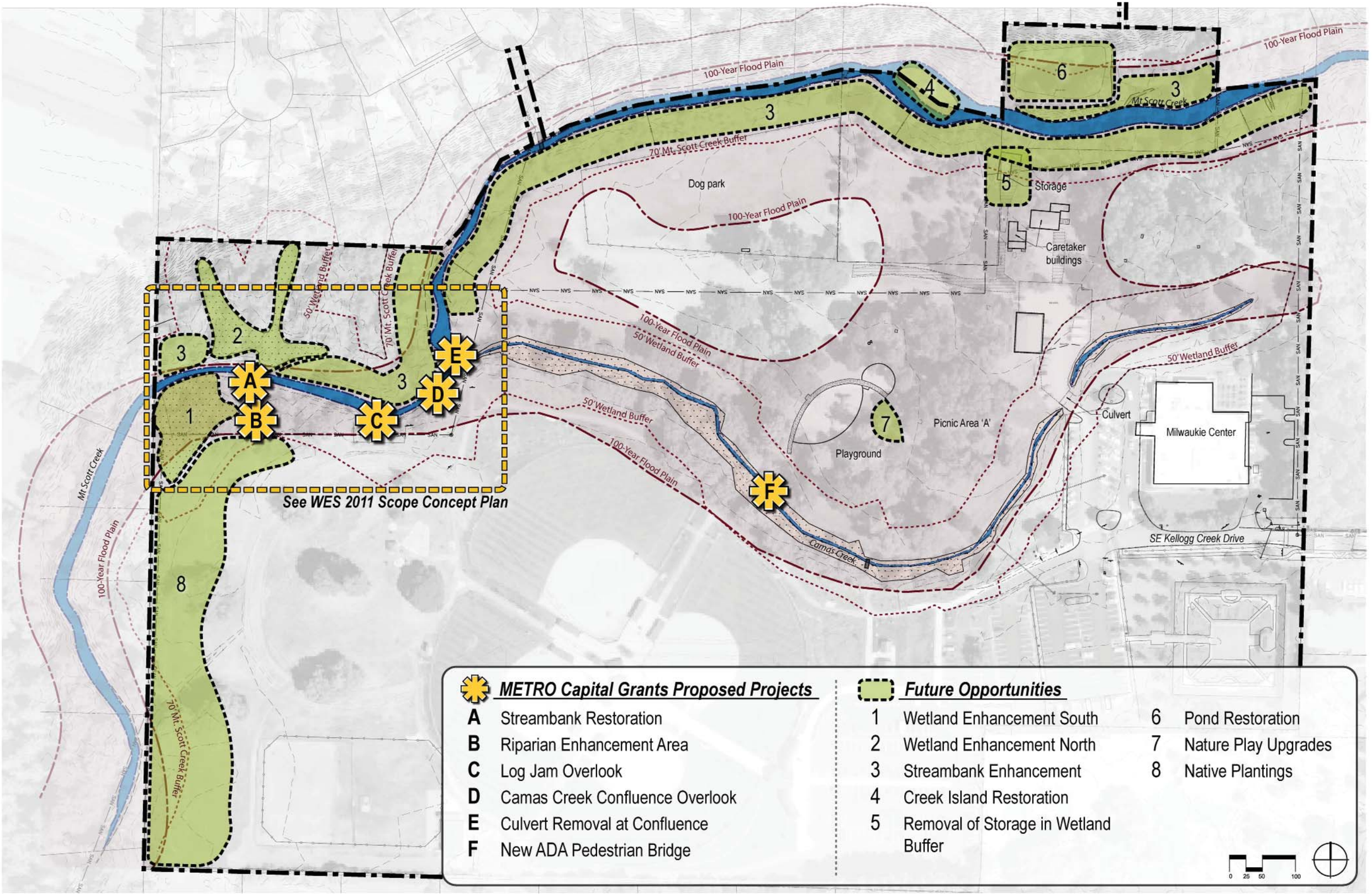
FIGURE 5:
Site Photos

FIGURE 6:
SitePhotos

FIGURE 7:
Site Photos

FIGURE 8:
Site Photos

FIGURE 9:
Site Opprotunities Map

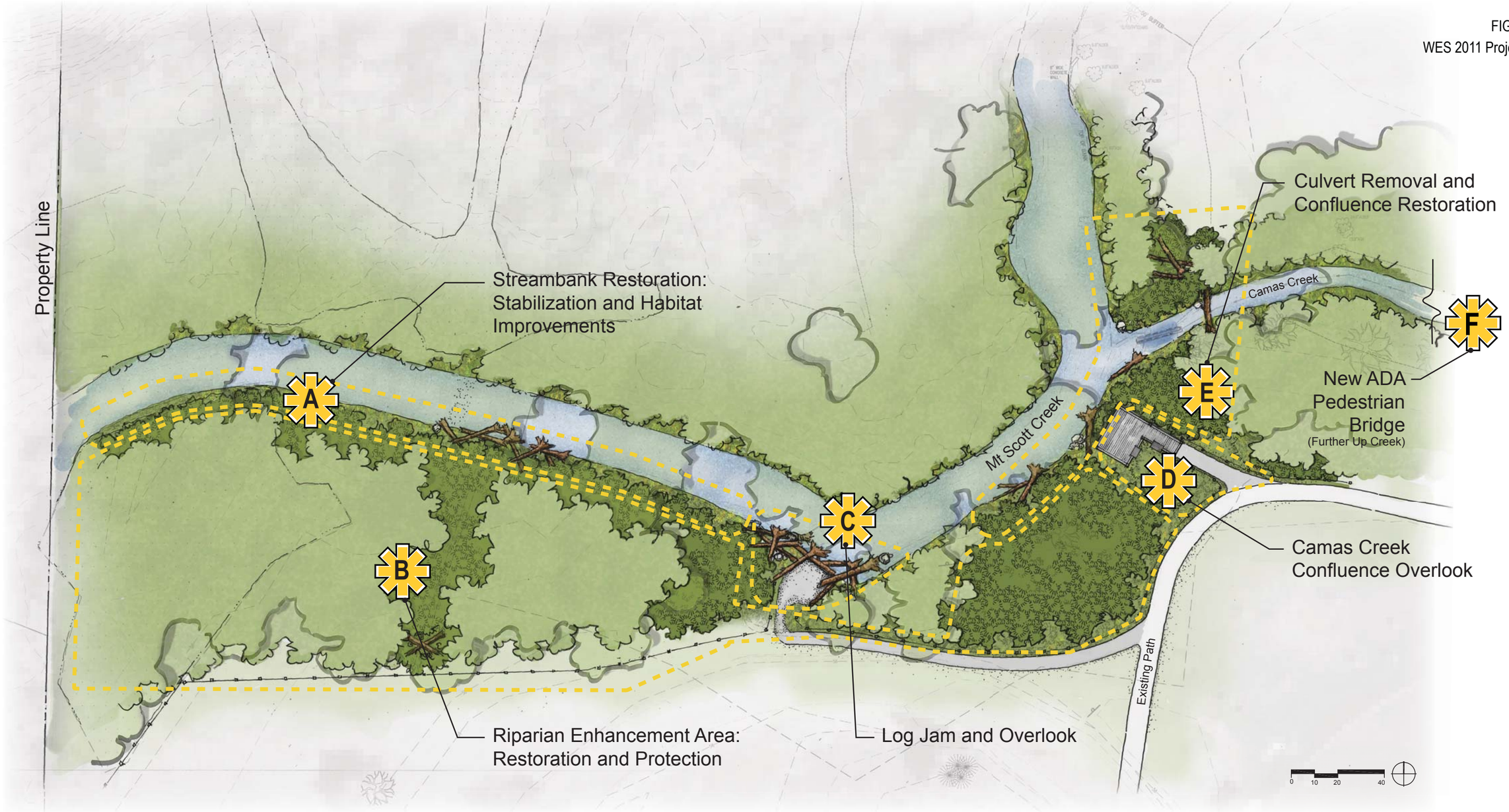



# Site Opportunities Map

January 12th, 2011

MT. SCOTT CREEK - Clackamas County Water Environment Services

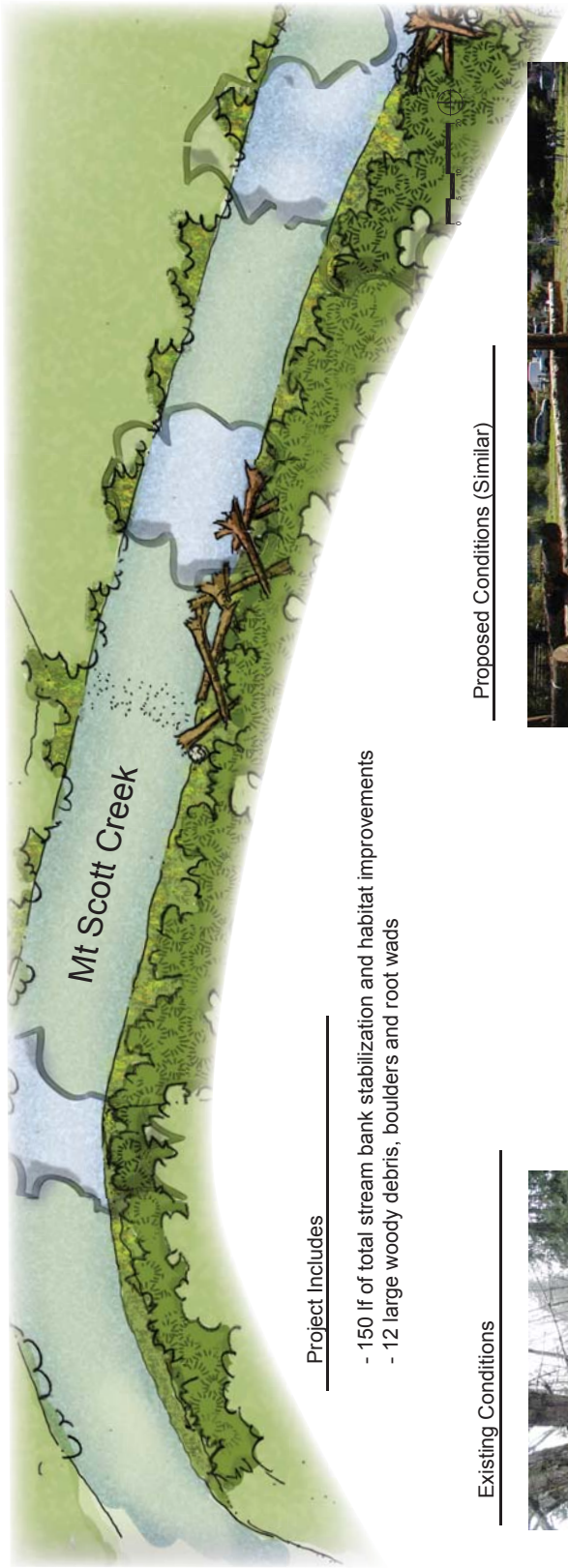
FIGURE 10:
WES 2011 Projects Plan




# *WES 2011 Scope Concept Plan*

*MT. SCOTT CREEK - Clackamas County Water Environment Services*

FIGURE 11:
Area A - Streambank Restoration

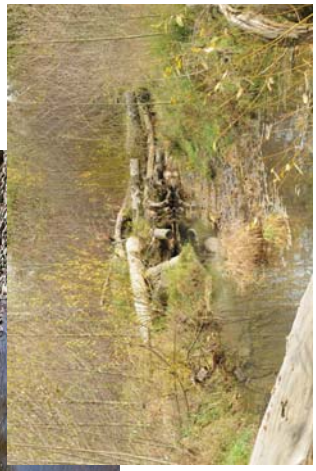



Project Includes

- 150 lf of total stream bank stabilization and habitat improvements
- 12 large woody debris, boulders and root wads

Existing Conditions

Proposed Conditions (Similar)



## A Streambank Restoration

*MT. SCOTT CREEK - Clackamas County Water Environment Services*

FIGURE 12:
Area B - Riparian Enhancement Area

Existing Condition

Proposed Condition (Similar)

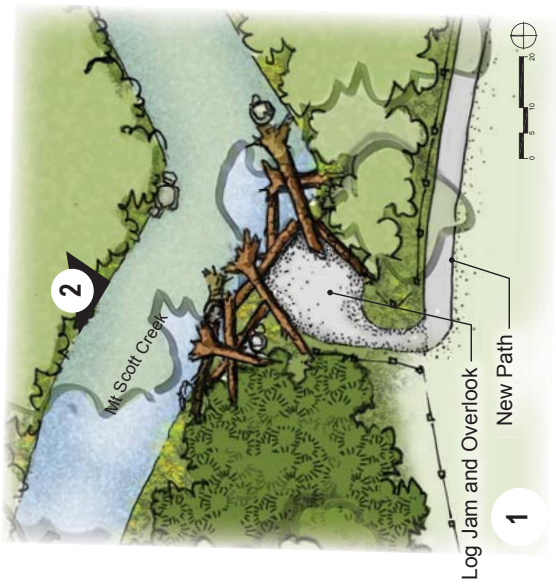
Project Includes

- 445 lf of trail decomissioning (3,920 sf)
- 2 logs at former trail entrance
- 7,400 sf lawn demo and planting prep
- 12,720 sf restoration planting
- 670 lf split rail fence

## B Riparian Enhancement Area

*MT. SCOTT CREEK - Clackamas County Water Environment Services*

FIGURE 13:
Area C - Log Jam and Overlook



Project Includes

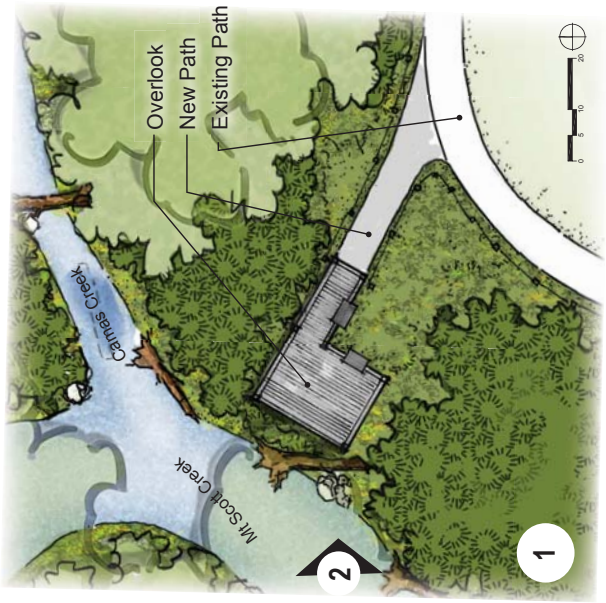
- 14 log log jam
- 225 sf of plaza
- 175 lf of new trail
- educational signage
- bench
- native restoration planting

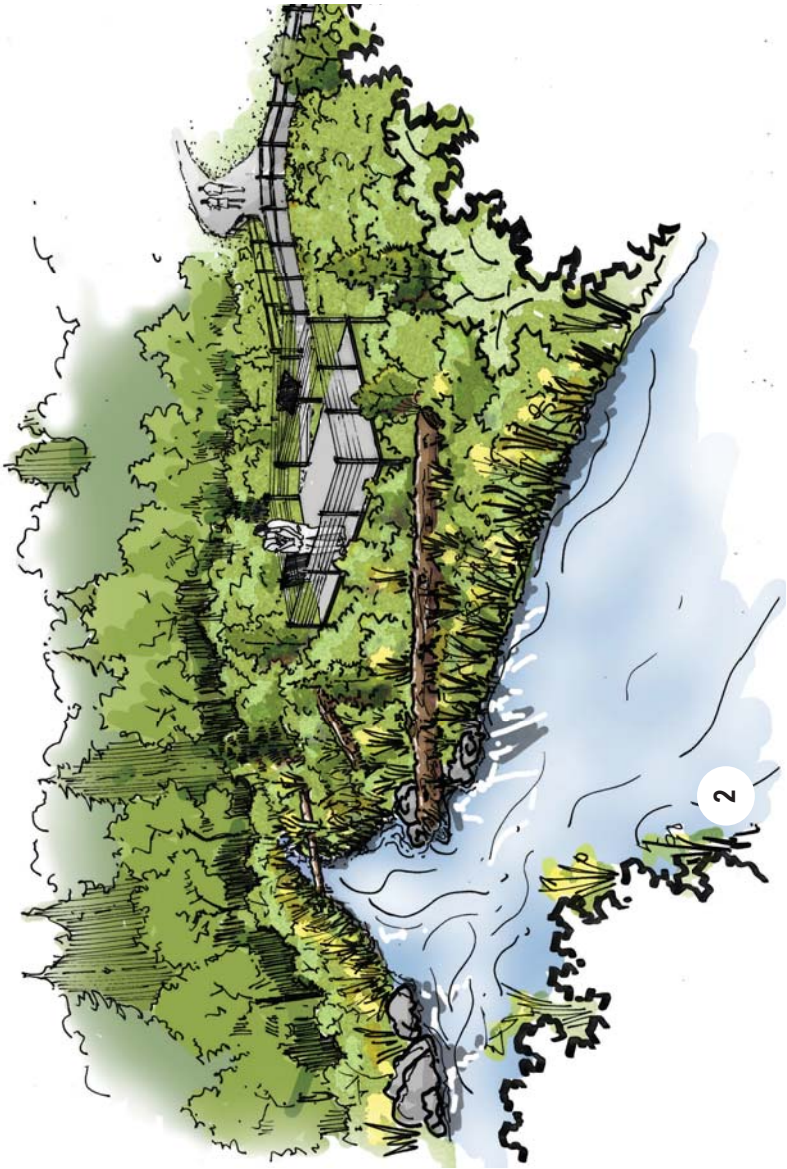
## Log Jam and Overlook

*MT. SCOTT CREEK - Clackamas County Water Environment Services*

FIGURE 14:

Area D - Camas Creek Confluence Overlook




Project Includes:

- 300 sf of raised overlook
- educational signage
- 45 lf of new trail

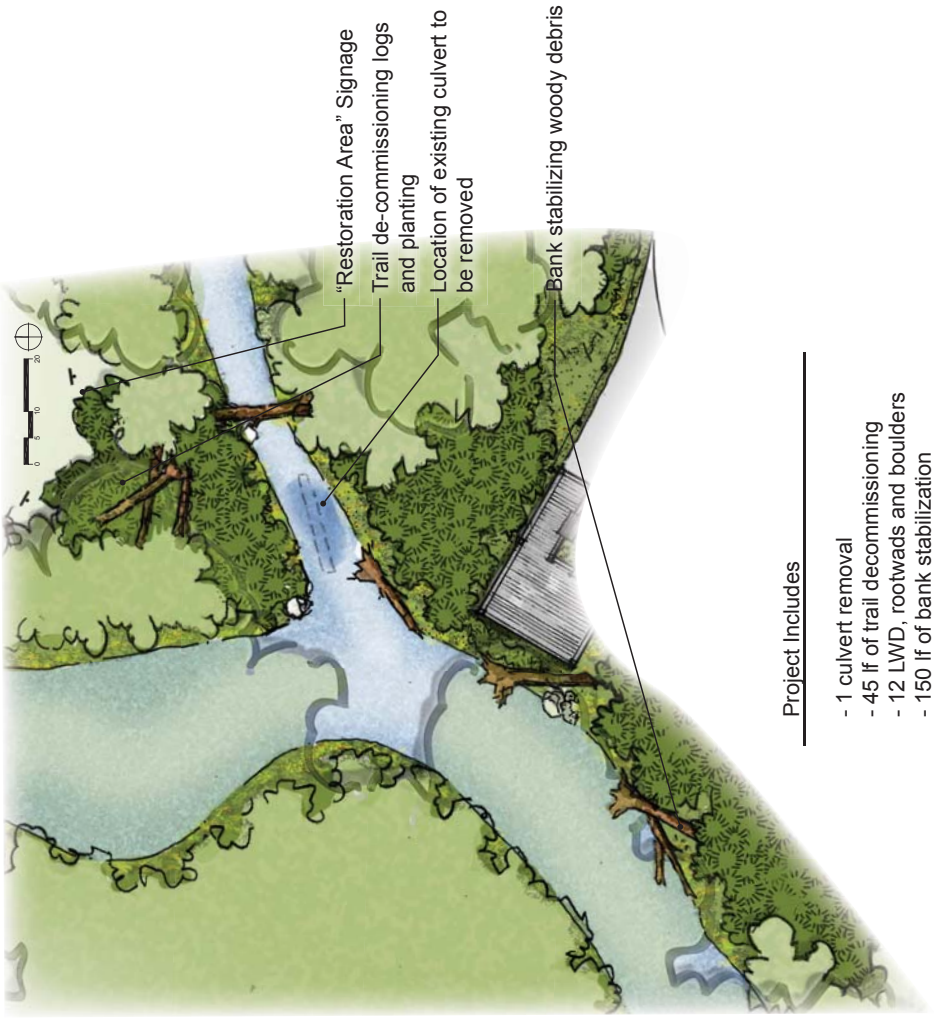
## D Camas Creek Confluence Overlook

*MT. SCOTT CREEK - Clackamas County Water Environment Services*

FIGURE 15:
Area E- Culvert Removal and Confluence Restoration at Camas Creek

Existing Conditions

Proposed Conditions (Similar)




Project Includes

- 1 culvert removal
- 45 lf of trail decommissioning
- 12 LWD, rootwads and boulders
- 150 lf of bank stabilization
- 3,500 sf lawn demo and planting prep
- 5,000 sf restoration planting

## *Culvert Removal and Restoration at Camas Creek Confluence*

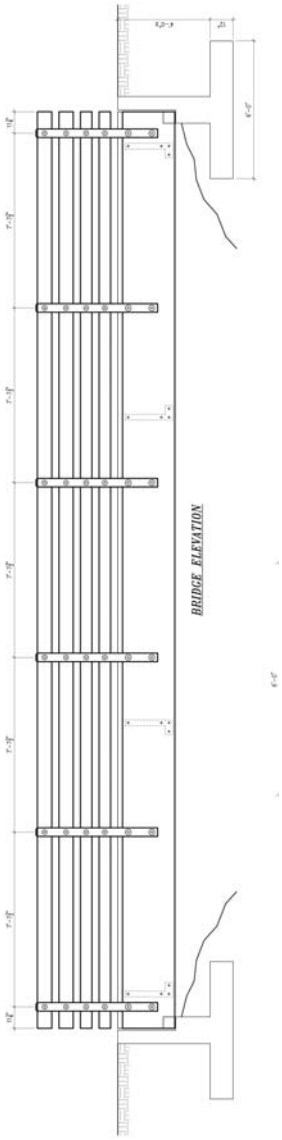
*MT. SCOTT CREEK - Clackamas County Water Environment Services*

FIGURE 16:

Area F - New ADA Pedestrian Bridge

Existing Conditions

Proposed Conditions (Similar)




Project Includes

- 45 lf ADA Pedestrain Bridge
- 15 lf bridge removal
- 30 lf of asphalt trail removal
- restoration planting

## New ADA Pedestrian Bridge

*MT. SCOTT CREEK - Clackamas County Water Environment Services*

Mary Rose Navarro
Metro
600 NE Grand Ave
Portland OR 97232

Dear Mary Rose

The Milwaukie Park and Recreation Board enthusiastically supports the Mt Scott Creek restoration project proposed by Clackamas County Service District #1 (CCSD #1). City staff and members of our Board look forward to actively participating in the selection and guidance of consultants for this project. We will donate between 40 and 60 hours of City staff time and over 100 hours of volunteer time toward this important project.

The City of Milwaukie and our Park Board have long advocated for the enhancement of the north side of North Clackamas Park of which this project is a vital element. We have participated in the development and finalization of the Watershed Action Plan for the Kellogg-Mt Scott Creek and were instrumental in facilitating the formalization of the North Clackamas Urban Watersheds Council (NCUWC). We look forward to continued cooperation with other partners in this project, including CCSD #1, North Clackamas Parks and Recreation District, the Friends of North Clackamas Park and NCUWC.

As the property owner of North Clackamas Park, the City welcomes the project proposed by CCSD#1 and encourages Metro to provide funding for this much needed project.

Sincerely,

JoAnn Herrigel

JoAnn Herrigel
Community Services Director

NORTH CLACKAMAS
PARKS & RECREATION DISTRICT

July 21, 2010

TO: Metro Capital Grant Committee

RE: Mt. Scott Creek Restoration at North Clackamas Community Park

Dear Grant Committee:

North Clackamas Parks and Recreation District (NCPRD) is excited to partner and provide support for the Water and Environment Services (WES) application to the Metro Nature in Neighborhoods Capital Grant for work to be completed in Mt Scott Creek at North Clackamas Park. This project would move forward many goals that have been set forth in the North Clackamas Park-North Side Concept Plan. Enhancement of the Mt Scott Creek natural system for wildlife, and visitor use/education is a key element of this plan. WES' project would not only enhance the Mt Scott Creek riparian system to keep it healthy for wildlife and enhance natural processes, but it would also provide a connection for visitors to experience the creek through the installation of overlooks and through education signage.

As managers of the park NCPRD completed a significant public process to engage the community and ensure that their voice was incorporated into the goals of the plan. The results of the public process show that implementing these elements will be strongly supported by the community.

NCPRD has been working on natural area enhancement projects in the park since 1993 and is committed to continuing this work into the future. At this time NCPRD has limited funding to implement the north side plan, however, efforts are continued through general funding and through community involvement. Yearly, school groups, youth conservation groups and many individuals volunteer their time to help with restoration efforts and community events within the park. We are pleased to leverage our resources by collaborating with WES for this grant that will provide multiple benefits for our community.

This Oregon white oak riparian/floodplain is now a rare habitat type within this high urbanized area of the region. We encourage your support to restore this ecosystem and provide education opportunities to our community. Thank you for considering WES's application.

Sincerely,

Gary Barth
Director of Business and Community Services
Clackamas County

Cc: Bob Storer- Environmental Policy Specialist, Water and Environment Services

**North Clackamas Urban Watersheds Council**
1900 SE Milport Rd, Suite C, Milwaukie, Oregon 97222
www.ncuwc.org

July 26, 2010

TO: Metro Capital Grant Committee
RE: Mt. Scott Creek Restoration at North Clackamas Community Park

Dear Grant Committee:

The North Clackamas Urban Watersheds Council (NCUWC) would like to demonstrate its strong support for the Water and Environment Services (WES) application to the Metro Nature in Neighborhoods Capital Grant program for work to be completed in Mt Scott Creek at North Clackamas Park. Our council was formally recognized by the Clackamas County Board of County Commissioners in June, 2009 to advocate for the protection and enhancement of Kellogg/Mt Scott fish and wildlife habitat and improve water quality through partnership with public and private entities, habitat restoration projects, community education and outreach, and strategic planning. We ardently believe that enhancements proposed by WES have the potential to advance each aspect of this mission by significantly improving key in-stream and riparian areas and fostering stronger community knowledge of watershed health while creating important opportunities for stewardship and education.

The Kellogg and Mt Scott Creeks (KMS) system meanders through a highly urbanized watershed resulting in a level of degradation that seriously impedes the value and function of habitats fish and wildlife depend on. The effective, high-quality enhancement methods proposed by WES directly address specific KMS limiting factors as identified by the Oregon Department of Fish and Wildlife and will restore crucial ecological processes. This, in turn, will result in improved stream function for decades to come.

As a non-governmental agency with strong support from multiple neighborhood groups, public agencies, and non-profit organizations, NCUWC is well positioned to partner with WES to leverage public funding through our partnerships. We foresee contributing to this project through community outreach and education, and by generating public involvement, support, and volunteerism. We are excited to use our outreach methods, skills, and support base to advance the goals of this project.

Finally, this project proposal represents the rising undercurrent of momentum throughout the KMS watershed. From the development of a Natural Resources program at NCPRD, the formation and recent accomplishments of NCUWC, community involvement at Milwaukie Presbyterian, City of Milwaukie planning toward eventual Kellogg dam removal, and increasing interest from the general public, the timing is perfect for investment in KMS. We strongly encourage your support in our KMS ecosystem; its salmon, wildlife, plants, insects, and people.

Sincerely,

Marshall Johnson
Co, Chair, North Clackamas Urban Watersheds Council

Friends of Trees
Growing Healthy Communities

3117 NE ML King Jr. Blvd.
Portland, Oregon 97212
Tel 503-282-8846
Fax 503-282-9471
www.FriendsofTrees.org

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Ed Washington

August 10, 2010

Mary Rose Navarro and Review Committee
Metro, Nature in Neighborhoods
600 NE Grand Ave.
Portland, OR 97232

RE: Mt. Scott Creek Restoration at North Clackamas Community Park

Dear Ms. Navarro:

On behalf of Friends of Trees (FOT), I wish to convey our strong support for Clackamas County Water Environment Services (WES) proposed project: Mt. Scott Creek Restoration at North Clackamas Community Park. FOT has partnered with WES on restoration projects for more then a decade and we are excited about the opportunity to expand our restoration efforts within North Clackamas Community Park. The proposed funding will allow FOT to coordinate two community plantings at the park and support the establishment of these new plants as well as help our outreach efforts to the surrounding community.

FOT has over 15 years of experience working with thousands of volunteers at native plantings in urban natural areas around the Portland Metro area. Every year our Natural Area Restoration projects install and maintain between 12,000 to 20,000+ native trees, shrubs, and herbaceous plants. Our Natural Area Restoration projects are part of our broader efforts within FOT's Green Spaces Initiative which seeks to guide volunteers at weekend projects to restore public green spaces and transportation corridors throughout the Portland-Vancouver metro area and our Neighborhood Trees program.

FOT will provide technical expertise to the native plant restoration plantings, will coordinate two volunteer planting events, will perform two to three maintenance visits each spring or summer, and will perform monitoring in late summer or early fall to determine plant survivability. We will also focus our outreach efforts and volunteer recruitment and coordination on the local community.

Friends of Trees is excited to be part of this project and to offer our support of Clackamas County Water Environment Services application. Please feel free to contact me to discuss any questions you may have at 503-282-8846 ext. 14 or scottf@friendsoftrees.org.

Sincerely,

Scott Fogarty
Executive Director

FSC Mixed Sources
Product group from well-managed forests, controlled sources and recycled wood or fiber
www.fsc.org Cert no. SW-COC-002631
© 1996 Forest Stewardship Council

# Friends of Kellogg & Mt. Scott Creeks Watershed

Jan. 18, 2011

To: The Nature in the Neighborhood Grant Program coordinator;

The Friends of Kellogg & Mt. Scott Creeks Watershed support Clackamas County Water Environment Services (WES), North Clackamas Parks and Recreation District's (NCPRD) and the City of Milwaukie in their application to the Nature in Neighborhoods Grant Program to enhance sensitive riparian corridors within North Clackamas Park (NCP). An approved Grant would also allow the Partners to improve ecosystem health within NCP in the Lower reach of the Mt Scott Creek Watershed. Our Friends Group has participated in many volunteer work parties to remove invasive species and plant natives in the Mt. Scott Creek Watershed. We can help to leverage through citizen participation and Partnerships any funding you can provide the District.

There is never enough funds to do all we would like to see done, from a habitat management standpoint. We support WES and their Partners in their efforts to enhance this reach of Mt Scott Creek, which is an anadromous fish bearing stream, and has potential for supporting salmon and steel head trout in the future. The stream reach located within the bounds of NCP is part of a watershed which historically included spawning grounds for some of these species, either directly in the area of the current park, or else upstream near the headwaters, or perhaps both. To date, progress has been made to control invasive species along this reach, but there is still much left to accomplish. The Grant will help provide improvements to fish habitat and provide watershed educational opportunities.

Implementing restoration enhancement and educational opportunities are essential parts of the conservation of the Mt Scott Creek watershed, and bringing back the numbers of fish that would use it. The fish are here, and just need some human cooperation to coexist. You can help us do this. We encourage your support with a Grant, and thank you for considering WES's Application.

Sincerely,

Richard B. Shook

Richard B. Shook for
Steven B. Berliner, Director,
Friends of Kellogg & Mt. Scott Creeks Watershed

10824 SE OAK ST., #311 MILWAUKIE, OR 97222 TEL.503-653-7875
EMAIL: FORCREEKS@EARTHLINK.NET

NORTH CLACKAMAS PARKS & RECREATION DISTRICT

**Milwaukie Center**

January 24, 2011

To whom it concerns:

The Milwaukie Center/Community Advisory Board is in full support of the Clackamas County Water Environment Services application for a Metro Nature in the Neighborhood Capital Improvement Grant for the North Clackamas Park Restoration Project. This grant would provide much needed work to be done in North Clackamas Park in the area of Mt Scott Creek.

Milwaukie Center has between 400 - 600 visitors on a daily basis, partaking in many programs and services to enhance the lives of older adults in our community. Many Milwaukie Center patrons enjoy the setting of our facility in North Clackamas Park and take advantage of the wonderful walking paths and nature opportunities. We would be delighted to see the increased health of the creek and the riparian areas plus educational support for visitors through overlooks and signage. The park receives significant use throughout the year and needs to have areas preserved for wildlife and to ensure a healthy riparian system.

As the year-around facility located in North Clackamas Park, we see ourselves as stewards of the park. We encourage your support in helping to restore and enhance the critical aspects of North Clackamas Park that are addressed in the grant application.

Thank you very much for your careful consideration of the North Clackamas Park Restoration Project.

Sincerely,

Eleanor Johnson

Eleanor Johnson, Chair Person
Milwaukie Center/Community Advisory Board

# FISH SPECIES DISTRIBUTION AND ABUNDANCE AND HABITAT ASSESSMENT OF STREAMS IN CLACKAMAS COUNTY SERVICE DISTRICT NO. 1 (CCSD NO.1)

**April 15, 2009**

**Alex Neerman**
**Jessica Vogt**

**Oregon Department of Fish and Wildlife**
**North Willamette Watershed District**
**17330 Southeast Evelyn Street**
**Clackamas, Oregon 97015**

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**APPENDIX B**. Fish Collected in Presence/Absence Surveys.

**APPENDIX C.** Fish Collected in Multiple-Pass Removal Surveys.

**APPENDIX D.** Index of Biotic Integrity Metrics.

**APPENDIX E.** Habitat Survey Data Summaries.

**APPENDIX F.** Reach Summaries.

**APPENDIX G.** Temperature Data.

**APPENDIX H.** Fish Habitat Analysis and Action Prioritization.

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# INTRODUCTION

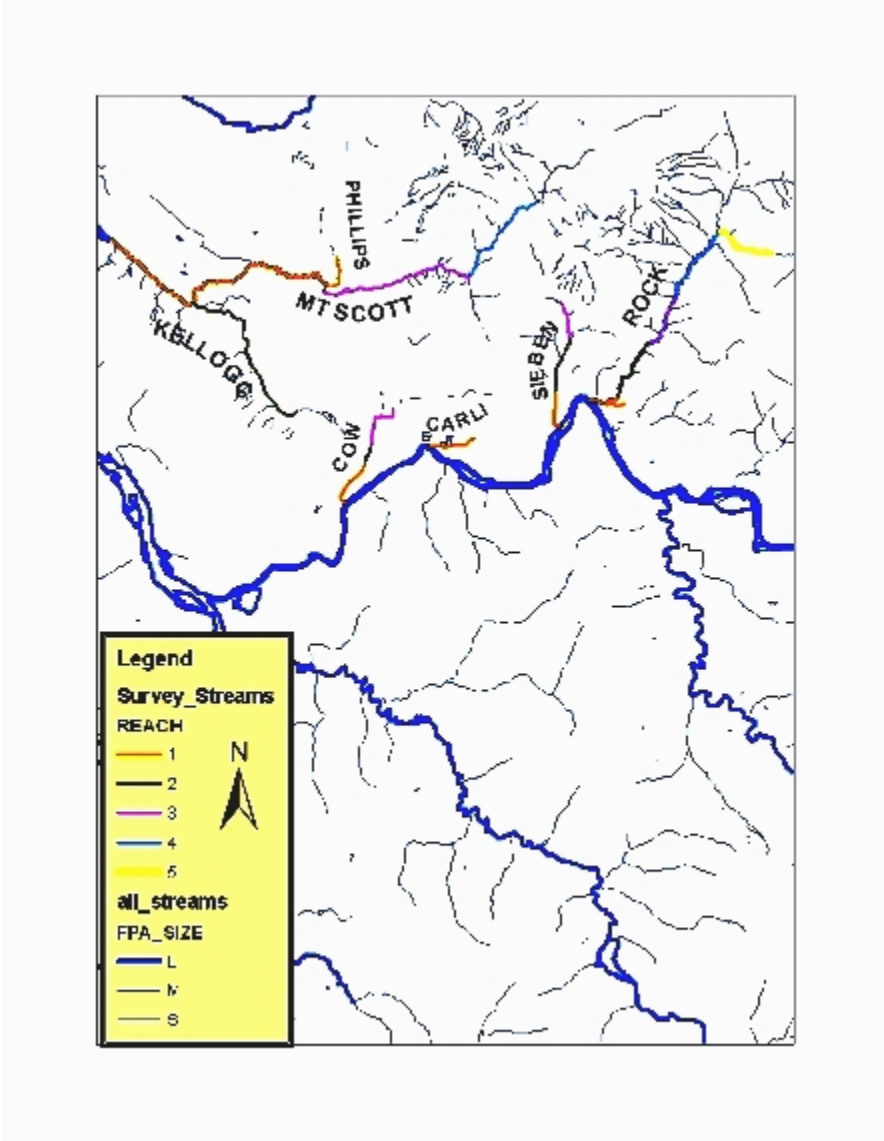
In 1997, the Oregon Department of Fish and Wildlife (ODFW) and Clackamas County Water Environment Services (WES) collaborated to assess the health of aquatic ecosystems in the county's urban streams. The study was conducted in response to anticipated continuation of stress on streams due to population growth and development in the county. Findings and recommendations were published in 1999 (Friesen and Zimmerman, 1999). The initial study recommended that there be subsequent surveying and monitoring. The study was repeated in 2002, with findings and recommendations reported in 2003 (Tinus et al., 2003). A modified version of these studies was conducted in 2008, and this report addresses our findings.

# METHODS

## Study Area

Clackamas County is located in north-central Oregon, just southeast of the city of Portland. The county has an area of 1,879 square miles with approximately one eighth of the area designated as urban (www.co.clackamas.or.us, 2008). Clackamas County staff selected streams of interest and designated stream reaches (Figure 1, Appendix A). Oregon Department of Fish and Wildlife field staff conducted fish and habitat surveys in the spring/summer of 2008 in two areas of urban Clackamas County: (1) streams within the Kellogg Creek watershed, a tributary of the Willamette River, and (2) tributaries to the lower Clackamas River. Streams surveyed in the Kellogg Creek watershed were Kellogg, Mt. Scott, and Phillips creeks. Tributaries to the Clackamas River included Carli, Cow, and Sieben creeks, as well as Rock and Trillium creeks within the Rock Creek watershed.

Figure 1. Map of urban streams surveyed in CCSD No. 1.




## Field Sampling

### Fish Presence/Absence Surveys

Surveys were conducted using a Smith Root LR 24 backpack electrofisher from March to May 2008. Our goal was to survey entire designated stream reaches, though some access was limited by landowner denials and vegetation barriers. Surveys were conducted from the mouth of the stream, or beginning of access, and continued until an access denial,

barrier, or the end of the designated reach. Only one pass of each habitat unit and reach was performed.

Fish netted and collected during surveys were identified to species and examined for anomalies. Fish observed, but not netted, were identified to the level of family only.

Fish presence/absence surveys were not conducted for Trillium Creek and Reach 2 of Mt Scott because these reaches had only approximately 100 meters of surveyable stream. Therefore, only intensive surveys were conducted.

### 100-Meter Intensive Surveys

Intensive fish surveys, also known as Multiple Pass Removal (MPR) surveys, were conducted from March through May 2008. One hundred meters of easily accessible and representative stream were selected from each reach to be intensively sampled using a Smith Root LR 24 backpack electrofisher and two block nets. Nets were placed at each end of the sampling area to prevent fish from entering or leaving the survey area during sampling. Surveys were conducted from the downstream net moving to the upstream net, and fish collected were held in buckets until the end of the sampling pass. If salmonids were collected during the first pass, a second pass was conducted. If salmonids were also observed on the second pass, then a third pass was conducted, with a maximum of three passes done for any one section.

### Habitat Surveys

Habitat surveys were conducted in summer, May through July, using ODFW Aquatic Inventories basin-type protocol for fish habitat surveys (Moore et al., 2007). Surveys were conducted from the beginning of the reach or reach access and continued until the end of the reach or reach access. Habitat units were identified using the ODFW manual Aquatic Inventories Project: Methods for Stream Habitat Surveys 2007. The average amount of shade present was calculated based on a percent of 180 degrees. The length, width, and depth of each unit were measured or estimated to the nearest tenth of a meter. Substrate, erosion, stream shading, woody debris, and riparian transects were all measured or estimated as described in Moore et al., with the exception of riparian

surveys. Surveyors conducted riparian surveys at the end of the given unit rather than the middle of the unit.

Habitat reaches do not correspond with stream/fish survey reaches exactly because much of the habitat survey methodology describes the valley and channel form and separates reaches by changes in these characteristics of geomorphology. Table 1 lists descriptions of stream/fish survey reaches and corresponding habitat reaches.

Table 1. Fish survey reaches and their corresponding habitat reaches.

| Basin, Stream | Stream Reach | Corresponding Habitat Reaches |
|---|---|---|
| Clackamas, | | |
| Carli Creek | 1 | 1 |
| Cow Creek | 1 | 1 |
| Cow Creek | 3 | 2 |
| Rock Creek | 1 | 1,2 |
| Rock Creek | 2 | 3 |
| Rock Creek | 3 | 4 |
| Rock Creek | 4 | 5,6 |
| Rock Creek | 5 | 7 |
| Sieben Creek | 1 | 1,2 |
| Sieben Creek | 2 | 3 |
| Sieben Creek | 3 | 4,5 |
| Trillium Creek | 1 | 1 |
| Kellogg, | | |
| Kellogg Creek | 1 | 1 |
| Kellogg Creek | 2 | 2,3,4 |
| Mt. Scott Creek | 1 | 1,2,3 |
| Mt. Scott Creek | 2 | 4 |
| Mt. Scott Creek | 3 | 5,6,7,8 |
| Mt. Scott Creek | 4 | 9,10,11,12 |
| Phillips Creek | 1 | 1 |

## Temperature Monitoring

HOBO Water Temp Pro and Tidbit temperature loggers were placed in select streams and stream reaches from mid-June to mid-October. Loggers were placed in deeper waters to minimize the chance of air exposure as the creek level decreased. Loggers were monitored periodically and repositioned, if needed.

## Data Analysis

### Index of Biotic Integrity

Data collected from the MPR surveys was used to calculate the Index of Biotic Integrity (IBI) for each stream reach. The IBI is a numerical representation of the condition of a stream as it relates to fish populations (Reynolds et al. 2003). IBI scores are based on a possible maximum score of 100. Streams with an IBI $\leq$ 50 are considered severely impaired, streams scoring 51-74 are marginally impaired, and streams with a score $\geq$ 75 are considered acceptable. IBI scores based on fish information cannot be calculated for streams reaches with no fish.

Project staff used the 12 metrics developed for small urban streams in Tinus et al. 2003, which was adapted from Hughes et al. 1998. Staff generally followed IBI protocol as described in Tinus et al. 2003, whereby "fish collected in the first pass of MPR surveys were used to calculate" IBI's in CCSD # 1. Because we only sampled in the spring and were interested in overall species diversity in the streams, we further adapted the protocol to include fish collected in pass two or three if they were not observed in pass one.

### Habitat

The ODFW Aquatic Inventories' data analysis program was used to evaluate the data collected during habitat surveys. The program produced summaries of habitat units (riffle, rapid, pool), hydrologic dimensions, riparian zones, and boulder and woody debris counts. The analysis includes calculation of mean depth, shading, and regression analysis for unit length and width calibrations for streams with ten or more verified units.

### Salmonid Abundance and Distribution

Project staff used depletion estimate methods as described in Lockwood and Schneider (2000) to analyze data collected from the MPR surveys. The methods are appropriate for abundance estimates in small streams where the population is believed to be less than 2,000 individuals. Separate equations are used for 2-pass and 3-pass surveys and only surveys where the number of fish caught is less with each additional pass qualifies for

analysis using these methods. Lockwood and Schneider also describe other requirements met when using these equations:

1. Emigration and immigration by fish during the sampling period must be negligible;
2. All fish within a specified sample group must be equally vulnerable to capture during a pass;
3. Vulnerability to capture of fish in a specified sample group must remain constant for each pass (e.g., fish do not become more wary of capture);
4. Collection effort and conditions which affect collection efficiency, such as water clarity, must remain constant.

In order to meet the qualifications of the second requirement, individual species were analyzed separately.

## RESULTS

From March 2008 through mid June 2008, field staff sampled eight fish bearing streams in 38 total surveys. Field staff conducted one presence/absence survey and one 100-meter MPR survey per reach. Staff collected and examined over 6,000 individual fish throughout the basin. Among the fish collected, 58% were sculpins, 29% were minnows, 4% were suckers, 8% were salmon and trout, and 1% were lamprey. Field staff identified 17 native species from five families (Table 2). Four alien species were identified from three families, which constituted 0.55% of the total catch. Fish were found in all reaches with the exception of Reach 3 of Sieben Creek.

Table 2. Fish collected during presence/absence (P/A) and the first pass of multiple-pass removal (MPR) surveys in the Clackamas County (CCSD No. 1) streams, spring 2008.

| **Family,** | Catch | | Proportion of Total | |
|---|---|---|---|---|
| **Species** | P/A | MPR | P/A | MPR |
| **Petromyzontidae** | | | | |
| Brook lamprey *Lampetra richardsoni* | 19 | 13 | 0.0040 | 0.0092 |
| Pacific lamprey *Lampetra tridentata* | 0 | 0 | 0.0000 | 0.0000 |
| Unidentified lamprey *Lampetra spp.* | 16 | 8 | 0.0034 | 0.0057 |
| **Cyprinidae** | | | | |
| Goldfish *Carassius auratus*[1] | 0 | 1 | 0.0000 | 0.0007 |
| Northern pikeminnow *Ptychocheilus oregonensis* | 20 | 16 | 0.0042 | 0.0114 |
| Longnose dace *Rhinichthys cataractae* | 5 | 25 | 0.0011 | 0.0178 |
| Speckled dace *Rhinichthys osculus* | 487 | 295 | 0.1025 | 0.2097 |
| Redside shiner *Richardsonius balteatus* | 787 | 191 | 0.1656 | 0.1357 |
| Chiselmouth *Acrocheilus alutaceus* | 1 | 0 | 0.0002 | 0.0000 |
| **Catostomidae** | | | | |
| Largescale sucker *Catostomus macrocheilus* | 20 | 11 | 0.0042 | 0.0078 |
| Unknown sucker *Catostomus spp.* | 125 | 71 | 0.0263 | 0.0505 |
| **Ictaluridae**[1] | | | | |
| Yellow bullhead *Ameiurus nebulosus* | 0 | 0 | 0.0000 | 0.0000 |
| **Salmonidae** | | | | |
| Cutthroat trout *Onchorhynchus clarki* | 129 | 19 | 0.0272 | 0.0135 |
| Coho salmon *Onchorhynchus kisutch* | 19 | 12 | 0.0040 | 0.0085 |
| Rainbow trout *Onchorhynchus mykiss* | 42 | 4 | 0.0088 | 0.0028 |
| Steelhead *Onchorhynchus mykiss* | 25 | 8 | 0.0053 | 0.0057 |

Table 2. Continued.

| **Family,** | Catch | | Proportion of Total | |
|---|---|---|---|---|
| **Species** | P/A | MPR | P/A | MPR |
| Chinook salmon *Onchorhynchus tshawytscha* | 22 | 12 | 0.0046 | 0.0085 |
| Unidentified salmonid *Salmonidae spp.* | 181 | 11 | 0.0381 | 0.0078 |
| Unidentified salmonid fry *Salmonidae spp.* | 2 | 0 | 0.0004 | 0.0000 |
| **Poeciliidae**[1] | | | | |
| Western mosquitofish *Gambusia affinis* | 4 | 3 | 0.0008 | 0.0021 |
| **Gasterosteidae** | | | | |
| Three-spined stickleback *Gasterosteus aculeatus* | 0 | 0 | 0.0000 | 0.0000 |
| **Cottidae** | | | | |
| Prickly sculpin *Cottus asper* | 14 | 31 | 0.0029 | 0.0220 |
| Riffle sculpin *Cottus gulosus* | 404 | 116 | 0.0850 | 0.0824 |
| Reticulate sculpin *Cottus perplexus* | 715 | 352 | 0.1505 | 0.2502 |
| Torrent sculpin *Cottus rhotheus* | 0 | 0 | 0.0000 | 0.0000 |
| Coastrange sculpin *Cottus aleuticus* | 0 | 2 | 0.0000 | 0.0014 |
| Unidentified sculpin *Cottidae spp.* | 1682 | 201 | 0.3540 | 0.1429 |
| **Centrarchidae**[1] | | | | |
| Pumkinseed *Lepomis gibbosus* | 0 | 1 | 0.0000 | 0.0007 |
| Bluegill *Lepomis macrochirus* | 0 | 0 | 0.0000 | 0.0000 |
| Green sunfish *Lepomis cyanellus* | 25 | 0 | 0.0053 | 0.0000 |
| Smallmouth bass *Micropterus dolomieu* | 0 | 0 | 0.0000 | 0.0000 |
| Largemouth bass *Micropterus salmoides* | 0 | 0 | 0.0000 | 0.0000 |
| **Unknown Minnow** | 3 | 0 | 0.0006 | 0.0000 |

[1]Alien families or species

**Fish Presence/Absence**

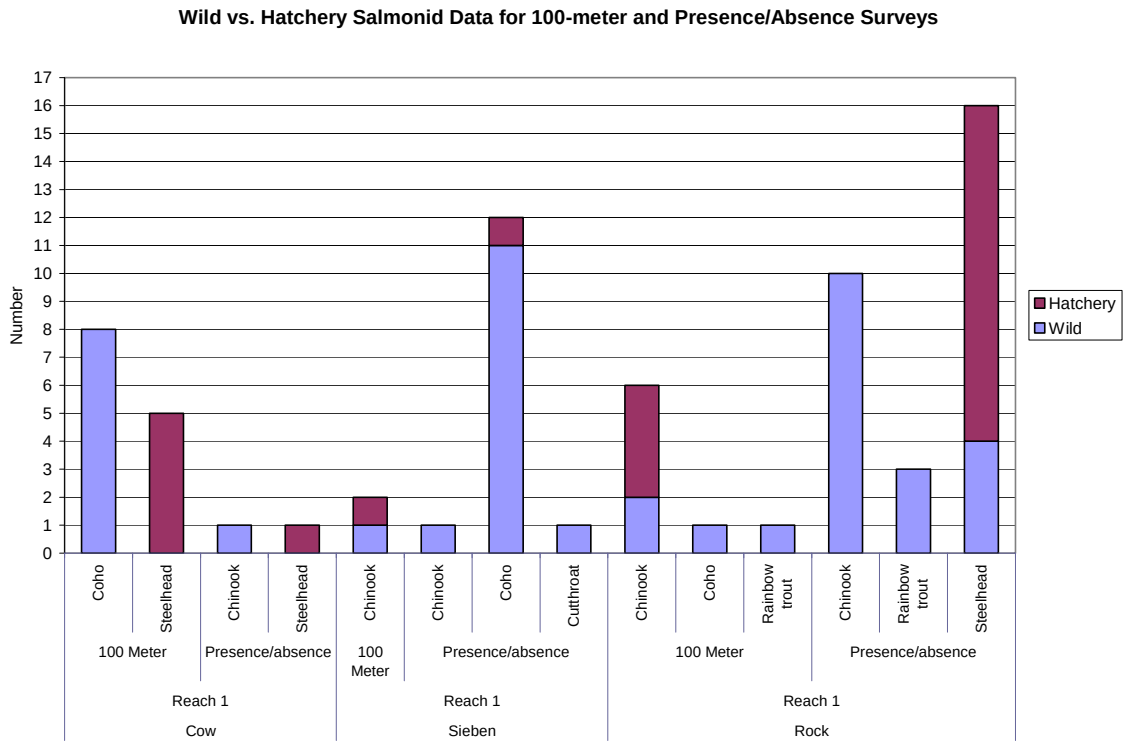
Fish collected in each reach during the presence/absence surveys are listed in Appendix B. Cutthroat trout remain the most common salmonid (Table 2) and were present in 6 out of 8 fish-bearing streams. Cutthroat trout were not observed in Cow, Carli, or Trillium creeks. One cutthroat trout was observed in Reach 2 of Rock Creek. Cutthroat trout were observed throughout most of Mt. Scott Creek, but found only two cutthroat trout in Reach 1 and none in Reach 2 of Kellogg Creek, and none in Phillips Creek.

Rainbow/steelhead trout were observed in four of eight streams, with the vast majority in Mt. Scott Creek (37 of 79) and Rock Creek (33 of 79). No rainbow/steelhead trout were found in Carli, Phillips, and Sieben creeks.

Coho and Chinook salmon were observed in relatively low numbers in all but Phillips and Kellogg creeks, where none were found. All coho and Chinook salmon observed were juveniles, and the majority was found in Reaches 1 and 2 of Rock Creek.

A significant proportion of adipose fin-clipped hatchery fish were observed near the mouth of Cow, Sieben, and Rock creeks during presence absence surveys. In Reach 1 of Cow, Sieben, and Rock creeks, 50% (one steelhead), 7% (one coho), and 24% (12 steelhead), respectively, of all salmonids handled were hatchery fish (Figure 2).

Figure 2. Wild versus hatchery salmonid data for 100 meter and presence/absence surveys.




Sculpin spp. were found in all fish-bearing streams with the exception of Reach 3 of Cow Creek, where the only fish observed were western mosquitofish. The most widely distributed and abundant species was reticulate sculpin, making up 17% (1,067) of the total observed fish (MPR and presence/absence) in the Clackamas basin. Surveyors examined 520 riffle sculpin (8%), 45 prickly sculpin, and 2 coastrange sculpin (<1%). Surveyors also observed 1883 unidentified sculpin, which constituted 31% of fish observed in presence/absence surveys. The two coastrange sculpin were found in Reach 2 of Rock Creek, and are a species not observed in any other surveys in the previous studies. Torrent sculpin were not observed in any surveys.

Additional native species were observed in many streams. Minnows were found in all of the streams surveyed. However, for Rock, Cow, and Mt. Scott creeks, these fish were only observed in the lowest reach. Redside shiners and speckled dace were the most common minnows, representing 16% and 13% of the total number of handled fish, respectively. Staff observed longnose dace in Reach 1 of Rock Creek and Carli Creek,

Reaches 1 and 2 of Sieben Creek, and Reach 1 of Mt. Scott Creek. Largescale suckers were confined to Reach 1 of Rock and Kellogg creeks. Northern pikeminnow were observed in Reach 1 of Rock, Carli, and Cow creeks. Staff found one chiselmouth in Reach 1 of Cow Creek. Unidentified suckers were present in all but Reach 4 of Mt. Scott Creek, Reaches 2-5 of Rock Creek, Trillium Creek, reaches 2 and 3 of Sieben Creek, and Reach 3 of Cow Creek.

Alien species were found throughout Rock Creek, in Reach 2 of Kellogg Creek, and in Cow Creek. Green sunfish were widespread and abundant in reaches 2-4 of Rock Creek, representing 0.41% of the total fish handled during MPR and presence/absence surveys. Staff also found western mosquitofish in Cow Creek, pumpkinseed in Rock Creek, and goldfish in Kellogg Creek. Alien species represented 0.55% of total fish handled throughout surveys.

**MPR surveys**

Fish collected in each reach during the multiple-pass removal surveys are listed in Appendix C. During 100 meter surveys, 50% (4 Chinook salmon), 31% (4 steelhead), and 50% (1 Chinook salmon) of handled salmonids in Reach 1 of Rock, Cow, and Sieben creeks, respectively, were hatchery fish.

Lamprey were observed throughout the Kellogg Creek watershed, as well as in Rock Creek. Lamprey represented approximately 1% of total observed fish during both MPR and presence/absence surveys in the Clackamas basin surveys. In Rock Creek, staff observed four brook lamprey in Reach 2, one in reach 4, and seven in Reach 5; staff also observed three unidentified lamprey in Reach 5 and one unidentified ammocoete in Reach 3. Staff observed five unidentified lamprey and one ammocoete in Kellogg Reach 2, and one brook lamprey and one unidentified ammocoete in Mt. Scott Reach 2. Staff did not positively identify any Pacific Lamprey in our surveys.

## Index of Biotic Integrity

Index of Biotic Integrity scores for all sampling efforts in the Clackamas (CCSD No. 1) fish-bearing streams (19 reaches) ranged from 10 to 96 (Table 3). Overall, 26% (5) were considered severely impaired, 53% (10) marginally impaired, 16% (3) acceptable, and 5% (1) did not receive a score because no fish were observed. With the exception of Mt. Scott Creek, the highest IBI scores were in the lower reaches of the surveys. Three reaches had IBI scores considered acceptable: Reach 1 of Rock Creek, Reach 1 of Sieben Creek, and Reach 3 of Mt. Scott Creek. However, fin-clipped hatchery Chinook salmon represented 66.67% of total Chinook salmon handled in Rock Creek Reach 1 and 50% of the total salmonids observed during the first pass of the MPR survey, making the high IBI score somewhat misleading. Individual metric scores used to calculate the IBI scores are presented in Appendix D.

Table 3. Index of Biotic Integrity (IBI) scores.

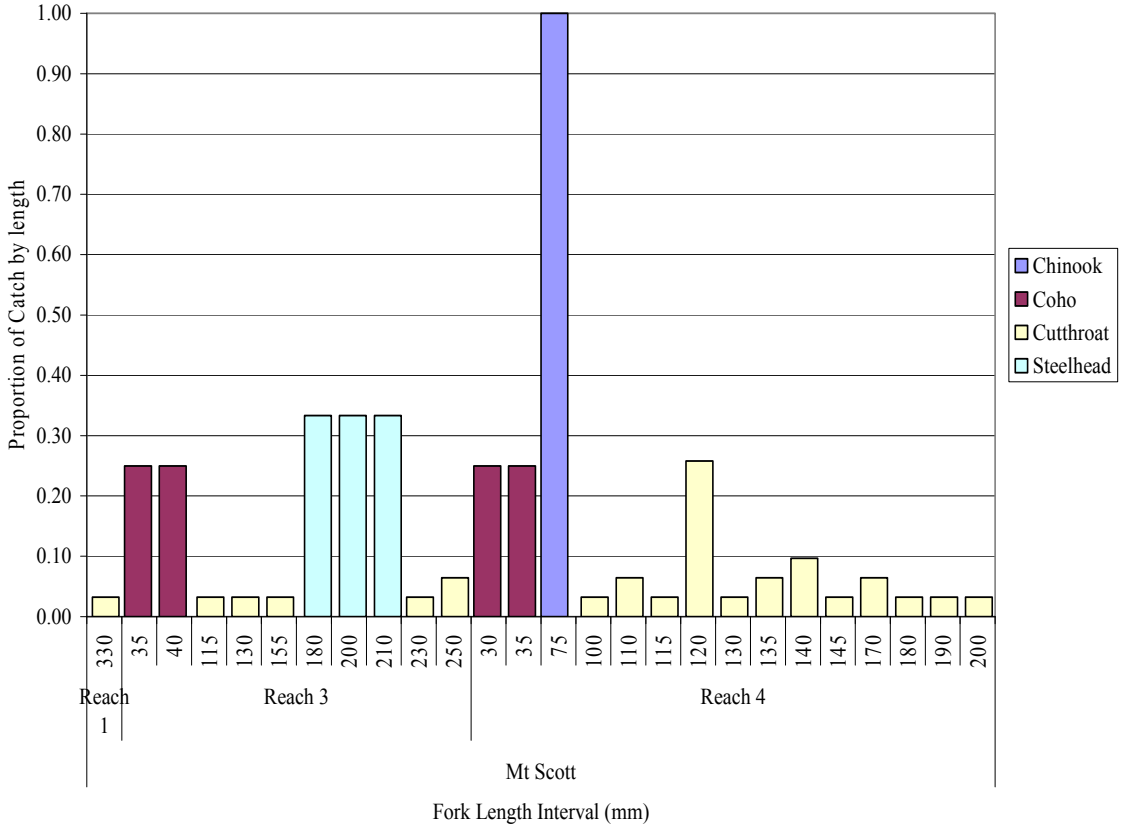
| Basin, Stream | Reach | IBI score | Integrity |
|---|---|---|---|
| Clackamas, | | | |
| Carli Creek | 1 | 73 | Marginally Impaired |
| Cow Creek | 1 | 70 | Marginally Impaired |
| Cow Creek | 2[a] | - | - |
| Cow Creek | 3 | 10 | Severely Impaired |
| Rock Creek | 1 | 96 | Acceptable |
| Rock Creek | 2 | 62 | Marginally Impaired |
| Rock Creek | 3 | 50 | Severely Impaired |
| Rock Creek | 4 | 44 | Severely Impaired |
| Rock Creek | 5 | 56 | Marginally Impaired |
| Sieben Creek | 1 | 76 | Acceptable |
| Sieben Creek | 2 | 44 | Severely Impaired |
| Sieben Creek | 3[b] | - | - |
| Trillium Creek | 1 | 67 | Marginally Impaired |
| Kellogg, | | | |
| Kellogg Creek | 1 | 71 | Marginally Impaired |
| Kellogg Creek | 2 | 57 | Marginally Impaired |
| Mt. Scott Creek | 1 | 64 | Marginally Impaired |
| Mt. Scott Creek | 2 | 61 | Marginally Impaired |
| Mt. Scott Creek | 3 | 80 | Acceptable |
| Mt. Scott Creek | 4 | 68 | Marginally Impaired |
| Phillips Creek | 1 | 47 | Severely Impaired |

[a] Reach was not surveyed.
[b] Reach was surveyed but no fish were observed.

## Life History and Population Dynamics

Various life stages of salmonids were observed in Mt. Scott Creek (Figure 3). Coho salmon fry between 30 mm and 40 mm were observed in Reaches 3 and 4 of Mt. Scott Creek. Staff also observed what appeared to be smolting steelhead in Reach 3 of Mt. Scott Creek. There was one 75 mm Chinook salmon of unknown origin in Reach 4 of Mt. Scott Creek.

Figure 3. Proportion of catch by length for salmonid species in Mt. Scott Creek, spring 2008.




During MPR surveys, juvenile salmonids were present in the lowest portions, and absent in the upper portions of Cow, Sieben, Carli, and Rock creeks (Figure 4.). Sieben Creek had no salmonids above Reach 1 and Rock Creek had no salmonids above Reach 2. Unfortunately, Carli Creek had only one reach, and reach 2 of Cow Creek was not surveyed due to landowner denials. However, western mosquitofish were only observed

in reach 3 of Cow Creek. All salmonid species in Trillium Creek were ≥85 mm, with a total of ten salmonids being observed during three MPR passes.

Figure 4. Proportion of catch by length for salmonid species in Cow, Sieben, Rock, and Trillium creeks per reach.

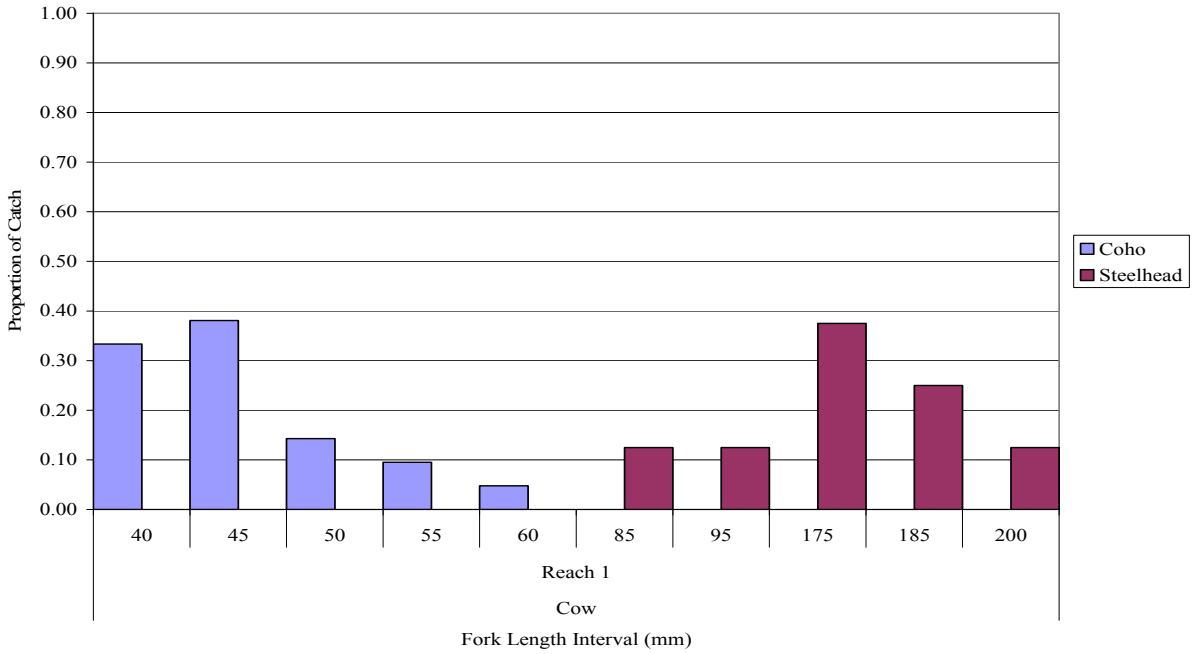
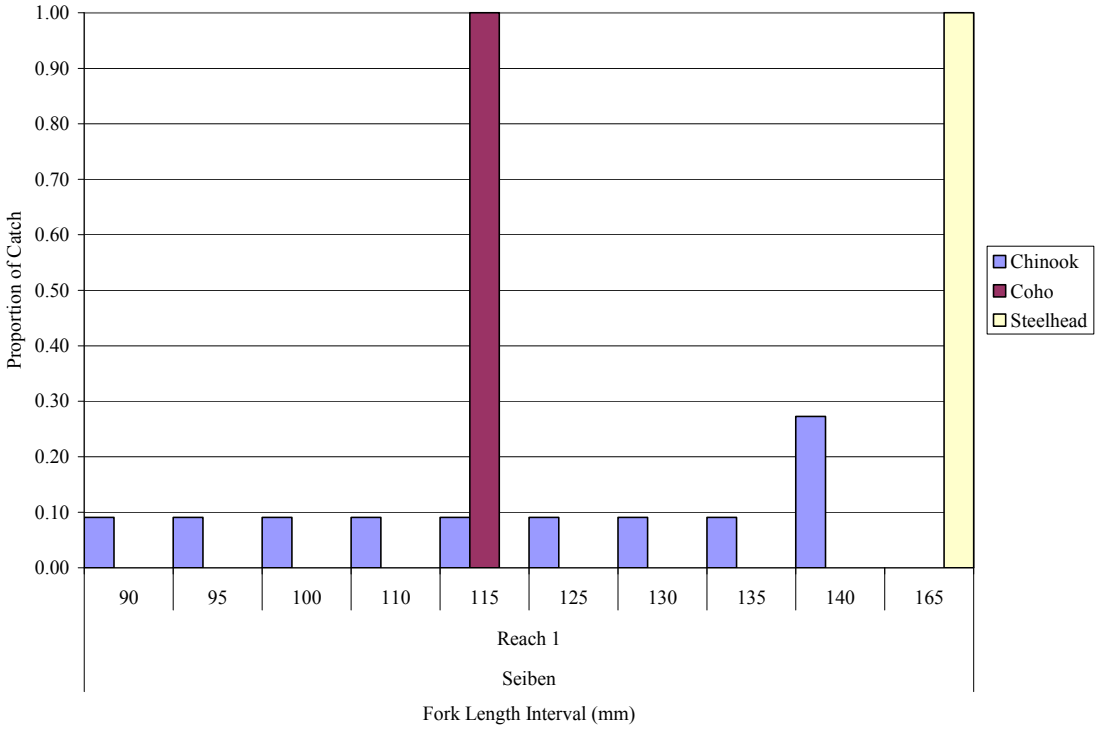


Figure 4. Continued



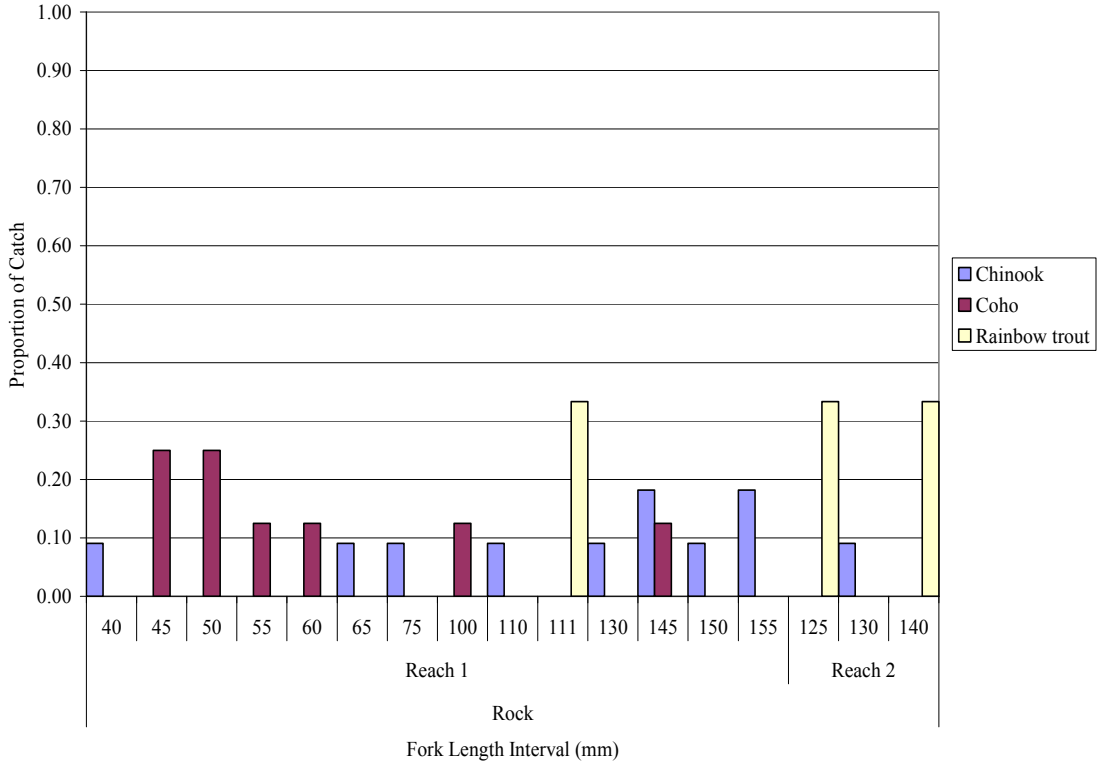
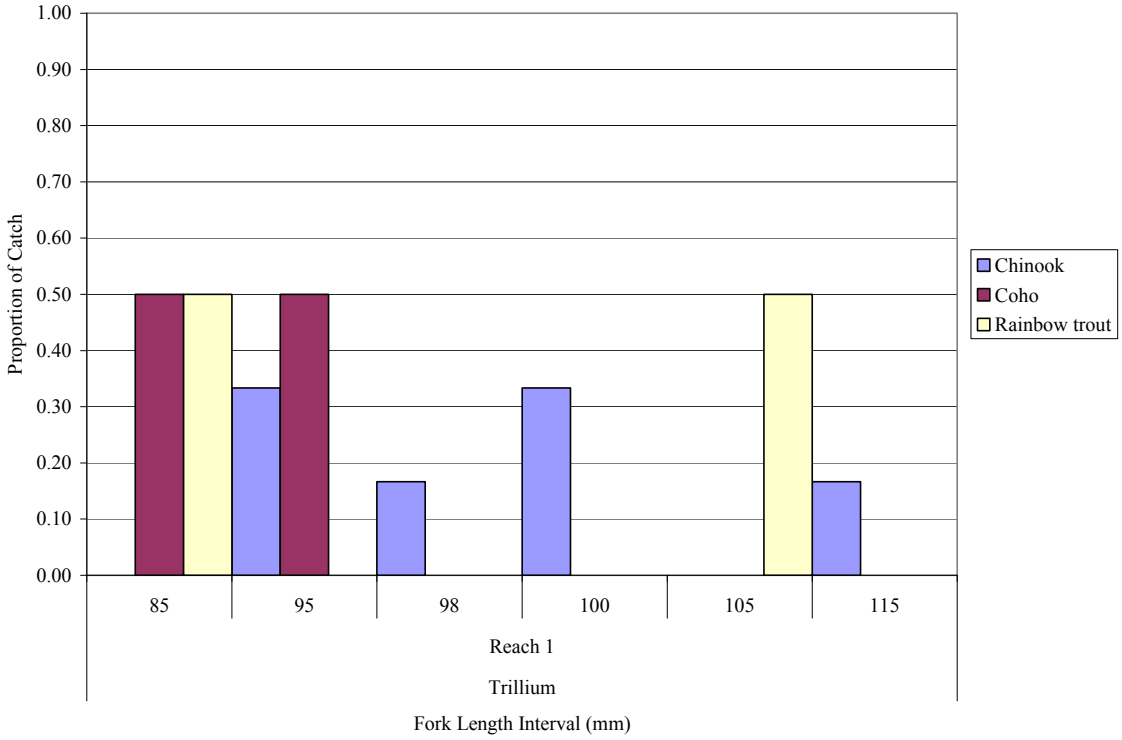



Figure 4. Continued.




## Salmonid Abundance Estimates

Although salmonids were observed in other streams, only Carli Creek Reach 1, Trillium Creek Reach 1, and Mt. Scott Creek Reach 4, met the requirements to use the depletion equations for salmonid abundance estimates (Table 4). Abundance estimates are only for the 100 meters of stream surveyed and are not expanded for the entire reach.

Table 4. Abundance estimates for applicable stream reaches.

| Basin, Stream | Reach | Species | Abundance Estimate | 95% Confidence Interval | Standard Error |
|---|---|---|---|---|---|
| Clackamas, | | | | | |
| Carli Creek | 1 | Coho | 1 | 1-1 | 0 |
| Trillium Creek | 1 | Chinook | 6.15 | 5.1-7.1 | 0.5 |
| Kellogg, | | | | | |
| Mt. Scott Creek | 4 | Cutthroat | 27.7 | 19.5-35.9 | 4.1 |

+

## Habitat

Detailed descriptions of each habitat reach are listed in Appendix E and reach summaries are given in Appendix F. Refer to Table 1 for a list of habitat reach numbers within each corresponding stream reach. Reaches referenced are stream reaches unless noted as habitat reaches.

Rural residential and agriculture are the two most common classifications of land use encountered during habitat surveys, followed by patches of greenways and industrial use. There is a noticeable lack of key pieces of woody debris in the majority of reaches. In fact, the majority of reaches had no key pieces of woody debris at all. Beaver activity is observed in several of the streams. Himalayan blackberry, a nuisance species, was observed within the riparian zone in all reaches of all streams ranging from a small presence to the dominant vegetation. Japanese knotweed, also a nuisance species, is present in several streams.

## Clackamas River Tributaries

Carli and Cow creeks both have agriculture as their primary land use and Himalayan blackberry as their dominant riparian vegetation. Both creeks have a high valley width index (VWI).

### Carli Creek

Carli Creek has an average shade of 26%. Only two of 7 pieces of wood observed qualified as key pieces. Dammed and backwater pools (35%), scour pools (34%), and riffles (23%) make up the preponderance of habitat types. The substrate is divided fairly evenly between silt, sand, gravel, and cobble.

### Cow Creek

Reach 1: Reach 1 of Cow Creek has an average shade of 62%. Woody debris is not present in large numbers, with only 4 pieces being “key pieces”. Dammed and backwater pools represented 88% of habitat, with riffles (7.5%) a distant second. The dominant substrate is sand.

Reach 3: The land use is very industrial, including train tracks, a meat-packing plant, a truck repair shop, and various warehouse facilities close to the creek. The VWI is eight, with the creek being constrained by terraces and the railroad tracks. Average shade is 33%. Scour pools (46%) and glides (40%) were the two dominant habitat types. The dominant substrate is silt/organics.

**Rock Creek**

Reach 1: Riffles and scour pools make up over 90% of the reach, and the dominant substrate is cobble. The dominant land use is conservation area, and the primary vegetation is deciduous trees. Habitat reach 1 starts up from the confluence with Clackamas River and extends to Trillium Creek. The VWI is 11, with the creek being constrained by terraces. The average shade is 29%. There were no key pieces of wood. Habitat reach 2 starts at Trillium Creek and continues 100 meters upstream to a bedrock step just below an access denial. The reach is constrained by terraces with an average shade of 8%. Although there was a large amount of wood collected in a couple of large debris jams, only 1 piece qualified as a key piece. Himalayan blackberry and Japanese knotweed are present in large quantities in this reach.

Reach 2: The primary land use is agricultural. The primary riparian vegetation is conifers with a diameter at breast height (DBH) >50 cm and a secondary of perennial grasses and ferns. The VWI is one, and the creek is constrained by bedrock cliffs. The average shade is 87%. There were five key pieces of wood. Riffles (42%) and scour pools (39%) represented the majority of habitat types. The dominant substrate is gravel along with significant bedrock.

Reach 3: The primary vegetation is conifers with a DBH >30 cm, with the secondary vegetation being perennial grasses and ferns. The VWI is 2.3, with the reach being constrained by alternating terraces and hillslopes. The average shade is 82%. There was only one key piece of wood. Riffles (64%) and scour pools (27%) characterize the

majority of habitat types. The average substrate consists of bedrock (33%), gravel (22%), cobble (20%), sand (13%), silts/organics (12%), and boulders (1%).

Reach 4: Rock Creek Reach 4 has two significant artificial dams, one shortly above Sunnyside Road and the other at Pleasant Valley Golf Course. It has no key pieces of wood. Habitat reach 5 begins at Sunnyside Road and continues upstream to the golf course. The primary land use is rural residential with the secondary use being greenway. The primary riparian vegetation is mixed coniferous and deciduous trees with a DBH >30 cm, and the secondary vegetation consists of perennial grasses. The VWI is four and the creek is constrained by alternating terraces and hillslopes. The average shade is 75%. Scour pools (47%) and riffles (37%) make up the majority of habitat types. Bedrock and cobble are the dominant substrates. Habitat reach 6 begins at the golf course and continues upstream to the 172$^{nd}$ Avenue bridge. The primary land-use is the golf course. The primary riparian vegetation is perennial grasses and the secondary is shrubs. The VWI is 11, with the creek being constrained by alternating terraces and hillslopes. The average shade is 43%. Dammed and backwater pools (68%) represented to majority of habitat types present, with riffles (19%) secondary. The average substrate consists of cobble (25%), silts/organics (21%), gravel (16%), boulders (15%), bedrock (12%), and sand (11%).

Reach 5: The primary land use is rural residential with secondary land-use being agriculture. The primary riparian vegetation is perennial grasses. The VWI is 11, with the creek being constrained by alternating terraces and hillslopes. The average shade is 47%. There were no key pieces of wood. Riffles (51%) and scour pools (35%) are the predominant features. The average substrate consists of cobble (34%), gravel (28%), sand (15%), silts/organics (11%), bedrock (8%), and boulders (3%).

**Sieben Creek**

Reach 1: The creek starts as a greenway and conservation area, being located within the riparian zone of the Clackamas River. No part of Sieben Creek had key pieces of wood. The primary vegetation is deciduous trees averaging >90 cm DBH, with the secondary vegetation being shrubs. The VWI is 11. The average shade is 28%. Scour pools (50%)

and riffles (49%) comprise the bulk of habitat types represented. The dominant substrate is cobble. The valley changes dramatically to a VWI of one and the land-use becomes rural residential with residences located above the creek on high terraces with steep cliff walls on either side. The average shade increases to 61%. The dominant habitat type is riffles (84%). The dominant substrate is cobble.

Reach 2: The dominant land use is rural residential, and the secondary is conservation area due to the stream and portions of its riparian zone being designated a conservation easement by the development company building homes nearby. The primary vegetation is mixed conifer and deciduous trees with an average DBH of >30 cm, with the secondary vegetation being shrubs. The VWI is two, and the creek is constrained by hillslopes. The average shade is 47%. The dominant habitat type is riffles (91%), with the remaining units being scour pools (9%). The dominant substrate is cobble.

Reach 3: The land use is rural residential and the riparian vegetation is dominated by shrubs, much of which is comprised of Himalayan blackberry. The VWI for habitat reach 4 is 3.5, with the creek being constrained by alternating terraces and hillslopes. The average shade is 36%. The dominant habitat type is riffle (80%). The average substrate consists of silts/organics (29%), cobble (28%), gravel (20%), sand (17%), and bedrock (6%). Habitat reach 5 is constrained by hillslopes, with roads surrounding the creek outside the riparian zone. The average shade is 70%. It is important to note that the majority of reach 5 is in the Sunnyside Road culvert and that the small fraction of creek upstream of the culvert has very little shade. The dominant habitat types are culverts (72%), followed by riffles (24%). The dominant substrate is silt/organics.

**Trillium Creek**

The primary land use on Trillium Creek is rural residential, with shrubs being the primary riparian vegetation. The VWI is one, and the creek is constrained by steep bedrock cliffs. The average shade is 77%. Despite its small size and short survey distance, there are three key pieces of wood. Riffles (77%) make up the majority of habitat types. The

average substrate consists of cobble (36%), gravel (25%), sand (17%), bedrock (8%), silts/organics (7%), and boulders (7%).

## Kellogg Creek Basin

The channel morphology of Kellogg Creek and lower Mt. Scott Creek is primarily constrained by land use. This is due to roads and bridges, and in the case of Kellogg Creek, the conversion of stream banks to rock or concrete walls.

### Kellogg Creek

Reach 1: Reach 1 contains habitat reach 1. The primary land use is rural residential, with the primary vegetation being perennial grasses. The VWI is 4.3, and the creek is constrained by alternating terraces and hillslopes. The average shade is 46%. Riffles (45%), glides (25%), and scour pools (22%) characterize the habitat. The average substrate is mostly cobble (32%), gravel (28%), and boulders (22%).

Reach 2: Reach 2 has rural residential land use, a VWI of 10, and perennial grasses, sedges, rushes, and ferns as the primary riparian vegetation. It contains habitat reaches 2, 3, and 4. Mixed conifers and deciduous trees with a DBH >15 cm comprise the secondary riparian vegetation. Habitat reach 2 is constrained by multiple land-use terraces consisting of yards, roads, and riprap. The average shade is 45%. Riffles (56%), scour pools (29%), glides (11%) make up the majority of habitat types. The average substrate consists of sand (34%), gravel (23%), silts/organics (21%), cobble (17%), and boulders (5%). Habitat reach 3 has an average shade of 69%. Riffles (73%) make up the majority of habitat types represented. The average substrate is divided among gravel (36%), sand (27%), silts/organics (19%), cobble (16%), and boulders (2%). Habitat reach 4 represents the upper most section of Kellogg Creek surveyed. It is the most impacted by invasive species (goldfish, nutria, and Himalayan blackberry, etc.) and land use practices. The average shade is 21%. Habitat was significantly less diverse than lower reaches with scour pools (51%) and glides (35%) representing the majority of habitat types. The dominant substrate is silt/organics.

**Mt. Scott Creek**

Reach 1: Reach 1 has a VWI of 10 throughout. Habitat reach 1 is a mix of greenway and rural residential uses. The dominant riparian vegetation consists of deciduous trees with a DBH >15 cm. Blackberries and bamboo are present in significant quantities. The creek is constrained by multiple terraces. The average shade is 51%. Although there was wood present in accumulations and jams, there were no key pieces. Riffles (45%) and scour pools (43%) were the most represented habitat types. The average substrate is mostly cobble (37%) and gravel (36%). Habitat reaches 2 and 3 both have industrial and greenway as the primary land uses and shrubs as the dominant riparian vegetation. Here, the creek is constrained by land-use. The average shade is 69%. No key pieces of wood were observed. Habitat types were limited to scour pools (48%), riffles (33%), and glides (19%). The substrate is predominately gravel (40%) and cobble (35%). Wood debris increases significantly in habitat reach 3, but no key pieces are present. The average shade is 80%. Habitat diversity remained relatively low with scour pools (73%) and riffles (20%) being the most common habitat types. The average substrate consists of silts/organics (38%), gravel (26%), sand (17%), and cobble (17%).

Reach 2: The reach is primarily within a greenway, with the secondary land use being industrial. Deciduous trees with a DBH >30 cm represent the primary riparian vegetation, with shrubs making up the secondary vegetation. The average shade is 100%. Although there are large wood debris accumulations there were no key pieces of wood present. Habitat types represented were far from diverse like Reach 1, with 95% of habitat units being scour pools, with culverts representing the remaining 5%. The average substrate consists of silts/organics (53%), sand (23%), gravel (20%), and cobble (3%).

Reach 3: Habitat reach 5 is dominated by rural residential and industrial land use, with the dominant riparian vegetation being deciduous trees with a DBH >15, and to a lesser extent perennial grasses, sedges, rushes, and ferns. The valley width index is 9.3, and the creek is constrained by land use. The average shade is 65%. The total pieces of large

woody debris (>=3) is 26, none of which are key pieces. Dammed and backwater pools (57%), scour pools (25%), and riffles (10%) make up the majority of habitat types present. A large beaver dam creates a pond that stretches from Costco to the culverts under 84th Avenue and accounts for the dammed pools dominating the habitat.

Habitat reach 6 is primarily a greenway, with industrial uses also being present. The VWI is one, with the creek being constrained by terraces. The dominant riparian vegetation is deciduous trees with a DBH >15 and the secondary consists of perennial grasses. The average shade is 77%. The total pieces of large woody debris (>=3m) is 41, with two of those being key pieces (>=12m). Riffles (53%) and scour pools (39%) are the dominant habitat types represented. The average substrate consists of cobble (30%), gravel (24%), boulders (15%), bedrock (14%), sand (10%), and silts/organics (6%).

Habitat reach 7 has a VWI of 4.2, and is constrained by alternating terraces and hillslopes. The primary land-use is greenway. Deciduous trees >15 cm represent the primary riparian vegetation, with the secondary vegetation being perennial grasses. The average shade is 86%. Large woody debris increased significantly in habitat reach 7, due in part to extensive habitat restoration focusing on large wood placement. Out of 171 total pieces (>=3m), 10 pieces (>=12m) qualified as key pieces. Riffles (61%) and scour pools (30%) comprise the bulk of habitat types present. The average substrate consists of cobble (31%), gravel (27%), sand (12%), bedrock (11%), silts/organics (10%), and boulders (9%).

Habitat reach 8 has a VWI of six, and is constrained by hillslopes. The primary land-use is greenway. Perennial grasses represent the primary riparian vegetation, with deciduous trees >15 cm as the secondary. The average shade is 72%. Large woody debris decreased quite a bit from habitat reach 7 to 8, with only a total of 12 (>=3m) pieces present, one of which was a key piece (>=12m). Scour pools (59%) and riffles (41%) are the only two habitat types represented. The average substrate consists of cobble (33%), gravel (23%), bedrock (15%), sand (14%), silts/organics (10%), and boulders (5%).

Reach 4: Rural residential is the primary land use, with a greenway prominent toward the end of the reach. Habitat reach 9 has a VWI of three, with the creek constrained by alternating terraces and hillslopes. The primary riparian vegetation is deciduous trees with a DBH >15, accompanied by perennial grasses. The average shade is 77%. Large woody debris was present, with 2 out of 16 being key pieces. Rapids (49%) and riffles (35%) are the most prevalent habitat types. The average substrate consists of cobble (31%), gravel (23%), boulders (15%), sand (14%), and bedrock (12%). Habitat reach 10 has a VWI of one, and is constrained by hillslopes. Deciduous trees with a DBH >15 cm are the primary riparian vegetation, and perennial grasses are the secondary. The average shade is 54%. Very little large woody debris was observed, with only six non-key pieces present. Riffles (89%) were by far the most represented habitat type. The average substrate is cobble (42%), boulders (32%), and gravel (16%). Habitat reach 11 has a VWI of three, and is constrained by hillslopes. Mixed conifers/deciduous trees with an average DBH >30 cm are the primary riparian vegetation and perennial grasses and ferns the secondary. The average shade is 83%. There were 22 total pieces of wood, but none were key pieces. Riffles (55%), scour pools (32%), rapids (10%), and culverts (2.5%) are the habitat types represented. The average substrate consists of cobble (36%), gravel (25%), bedrock (12%), sand (11%), boulders (10%), and silts/organics (6%). Habitat reach 12 has a VWI of one, and is constrained by hillslopes. The primary riparian vegetation is the same as habitat reach 11, with a secondary of shrubs. The average shade is 86%. Thirty-one pieces (>=3m) of large woody debris are present, with 3 pieces qualifying as key pieces. Riffles (63%), culverts (15%), rapids (10%), and scour pools (10%) constitute nearly all of the habitat. The average substrate consists of cobble (32%), gravel (29%), sand (14%), boulders (12%), silts/organics (8%), and bedrock (6%).

**Phillips Creek**

The VWI is 10, with the creek being constrained by terraces. The primary land-use is urban, and the primary and secondary riparian vegetation is grasses and deciduous trees with a DBH >15 cm. The average shade is 65%. Out of 18 pieces of wood, only two were considered key pieces. Scour pools (45%) and riffles (40%) compose the majority of habitat units, along with culverts (11%). The average substrate consists of cobble

(33%), gravel (20%), sand (16%), silts/organics (12%), bedrock (12%), and boulders (7%).

### Temperature Monitoring

Temperature data over the course of the study is available in Appendix G.

## DISCUSSION

Despite continued extensive and rapid urban development, some Clackamas County streams still contain a relatively diverse assemblage of native fish species, including salmonids. Though alien species were still present, there was an overall decrease from the previous years' studies. However, staff observed a new alien species in Rock Creek, the green sunfish. Fish assemblages have changed throughout continuing urban development. However, persistence of native species, especially the presence of coho salmon in the upper reaches of Mt. Scott Creek, confirms the benefits and continued need for habitat protection and restoration.

### Index of Biotic Integrity

Altering the IBI protocol in 2008 was a notable change. We felt that it was important to include all species found to best express the true diversity of species in the reach and to override weaknesses in the sampling technique. This became apparent in several reaches where salmonids were found during pass 2 or 3 and not in pass 1 during the survey. Especially of interest was the coho found in Mt. Scott Reach 3, chinook found in Mt. Scott Reach 4, and coho and steelhead found in Sieben Reach 1.

The stream reaches that show a decrease in spring IBI over the course of the three studies done within the CCSD are Sieben Creek Reach 2, Kellogg Creek Reach 2, Phillips Creek, and a slight decrease in Rock Creek Reach 5. Trends could not be determined for many creeks because of lack of data in past surveys.

When comparing results for Rock Creek with those of the 2003 spring MPR surveys (Tinus et al, 2003), it appears that resident trout populations have significantly declined. In 2003, six cutthroat trout were observed in Reach 1 whereas none was observed in 2008. Similarly, 50 cutthroat trout were observed in the Rock Creek Reach 2 surveys of 2003, however none was observed in 2008. What is interesting is that this change is not reflected in IBI scores, which increased for the comparable reaches of Rock Creek in the 2008 surveys (Table 5). Reach 1 had an IBI of 67 in 2003 and 96 in 2008. Reach 2 had a score of 32 in 2003 and 62 in 2008. The IBI score for Reach 1 in 2008 is higher due in part to the presence of a relatively high number of adult largescale suckers. Adult suckers are counted in the "Lunkers" metric, which drives up the score. The IBI for Reach 1 would be 74 if the 11 adult suckers observed were not counted as lunkers. Similarly, Rock Creek Reach 2 has a higher score in 2008 due to the observation of lamprey species and Chinook salmon which were not observed in that reach in 2003, despite the fact that 50 cutthroat were observed in 2003 compared to zero in 2008. This demonstrates the limitations in using IBI scores to quantify stream health and in this study's lack of temporal data.

It is possible that decreases in resident fish numbers say more about year-round stream condition than the presence of anadromous species, particularly in the case of Rock Creek, where anadromous fish move between the stream and the Clackamas River, depending on timing and stream conditions. Resident cutthroat trout spend their entire life history within relatively confined sections of freshwater habitat and do not migrate long distances to forage or possibly escape adverse environmental conditions. This leads to resident cutthroat trout being more susceptible to the freshwater habitat conditions of local streams (i.e. water temperature, pollution, sedimentation). However, because the data is only from spring and not throughout the year, it is difficult to make assumptions on overall population decline. It is also interesting to note that native minnow species were observed only in Reach 1 of Rock Creek, nearer the mouth, in 2003 and 2008 suggesting that these species may not be resident in Rock Creek as well.

Table 5. Comparison of spring IBI scores between three studies conducted in 1999, 2003, and 2008. ND=No Data, NS=Not Surveyed, and NF=No Fish.

| Basin, Stream | Reach | Spring IBI score | | | Trend |
|---|---|---|---|---|---|
| | | 1999 | 2003 | 2008 | |
| Clackamas, | | | | | |
| Carli Creek | 1 | ND | ND | 73 | Undetermined |
| Cow Creek | 1 | 65 | ND | 70 | Increase |
| Cow Creek | 2 | 10 | ND | NS | Undetermined |
| Cow Creek | 3 | NF | ND | 10 | Increase |
| Rock Creek | 1 | 58 | 67 | 96 | Increase |
| Rock Creek | 2 | 59 | 32 | 62 | Overall Increase |
| Rock Creek | 3 | 30 | 30 | 50 | Increase |
| Rock Creek | 4 | 40 | ND | 44 | Increase |
| Rock Creek | 5 | 59 | ND | 56 | Slight Decrease |
| Sieben Creek | 1 | 61 | ND | 76 | Increase |
| Sieben Creek | 2 | 51 | ND | 44 | Decrease |
| Sieben Creek | 3 | NF | ND | NF | No Change |
| Trillium Creek | 1 | ND | 55 | 67 | Increase |
| Kellogg, | | | | | |
| Kellogg Creek | 1 | 38 | 44 | 71 | Increase |
| Kellogg Creek | 2 | 83 | 64 | 57 | Decrease |
| Mt. Scott Creek | 1 | 34 | 36 | 64 | Increase |
| Mt. Scott Creek | 2 | ND | ND | 61 | Undetermined |
| Mt. Scott Creek | 3 | 30 | 41 | 80 | Increase |
| Mt. Scott Creek | 4 | 48 | 46 | 68 | Increase |
| Phillips Creek | 1 | 76 | 62 | 47 | Decrease |

The percentage of hatchery fish observed must also be taken into account when reviewing IBI scores. IBI metrics do not differentiate between naturally produced and hatchery-produced salmonids. Although the presence of hatchery-produced salmonids increases the IBI for a stream, it is unclear whether this presence is truly indicative of the stream's condition and productivity because the fish were not produced in the system. Presence of hatchery fish in streams within the study area coincided with time of release from Clackamas Hatchery near Estacada. It is likely there presence was limited to short duration rearing on their migration to the ocean. All hatchery fish encountered had developed characteristics typical of seaward migrating smolts.

## Life History and Population Dynamics

Due to project timing and funding constraints, time was allotted for spring surveys only. The lack of temporal data makes the ability to assess life history and population dynamics minimal, but spring surveys allowed us to observe fish when they are most widely distributed within each stream. The presence of coho salmon fry in Reaches 3 and 4 of Mt. Scott Creek indicates that coho may be using the creek to spawn. Since the series of steps and bedrock chutes above the I-205 culvert is likely impassible to juveniles, it is our theory that coho are using the upper reaches of Mt. Scott Creek to spawn. Staff also observed what appeared to be smolting steelhead in Reach 3 of Mt. Scott Creek, leading us to the conclusion that steelhead are also using reaches 3 and 4 of Mt. Scott Creek to spawn (Figure 3.). The origin of the juvenile Chinook observed in Reach 4 of Mt. Scott Creek is unknown since Chinook salmon are not known to naturally spawn in Mt. Scott or Kellogg Creek. Juvenile Chinook salmon are known to migrate several miles out of the mainstem Willamette River to rear in tributaries with little or no Chinook spawning habitat and it is possible that the one Chinook found is looking for habitat more suitable than Portland Harbor for late spring/early summer rearing.

## Salmonid Abundance Estimates

Abundance was calculated for a limited number of streams (Table 4). Several streams could not be analyzed for salmonid abundance because the number of fish caught in the second or third pass was not less than the previous or because salmonids were observed in subsequent passes but were not captured. Because the data must be analyzed by species, data for unidentified salmonids cannot be used in abundance estimates.

The only stream reach with abundance calculated in both 2003 and 2008 was for cutthroat trout in Reach 4 of Mt Scott Creek. Abundance was estimated in 2003 as 25 with a 95% confidence interval of 7-43. In 2008, abundance was calculated as 27, which is very similar to the estimate of 2003, but with a smaller confidence interval of 19.5 to 35.9. Based on these numbers, it does not appear that abundance of cutthroat trout in that reach has changed noticeably in the last 5 years.

**Habitat Evaluation**

Surveys conducted in 2003 occurred only in areas of restoration interest, that being the upper part of Mt. Scott Reach 1 and Reach 2, and Phillips Creek. Surveys conducted in 1997 more closely resemble the reaches surveyed for Kellogg, Mt. Scott, Phillips, Sieben, and Rock Creek in 2008 (Table 6).

Table 6. Comparison of key habitat features between 1997 and 2008 surveys.

| Basin, Stream | Reach | % Pool | | % Fast Water | | Culverts | | % Bank Erosion | | % Silt | | Shading (degrees) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1997 | 2008 | 1997 | 2008 | 1997 | 2008 | 1997 | 2008 | 1997 | 2008 | 1997 | 2008 |
| Clackamas, | | | | | | | | | | | | | |
| Rock Creek | 1 | 20 | 47 | 40 | 53 | 0 | 0 | 2 | 4 | 8 | 6 | 50 | 98 |
| Rock Creek | 2 | 24 | 45 | 45 | 48 | 0 | 0 | 11 | 7 | 1 | 9 | 75 | 157 |
| Rock Creek | 3 | 14 | 27 | 47 | 64 | 0 | 1 | 0 | 9 | 0 | 12 | 70 | 148 |
| Rock Creek | 4 | 12 | 69 | 37 | 29 | 1 | 0 | 24 | 7 | 35 | 15 | 62 | 106 |
| Rock Creek | 5 | 12 | 35 | 41 | 51 | 3 | 0 | 79 | 6 | 11 | 11 | 46 | 85 |
| Sieben Creek | 1 | 15 | 28 | 60 | 66 | 1 | 1 | 39 | 17 | 20 | 6 | 157 | 80 |
| Sieben Creek | 2 | 25 | 9 | 62 | 91 | 0 | 0 | 53 | 0 | 33 | 19 | 165 | 85 |
| Sieben Creek | 3 | 12 | 12 | 5 | 52 | 3 | 2 | 31 | 15 | 52 | 45 | 100 | 95 |
| Kellogg, | | | | | | | | | | | | | |
| Kellogg Creek | 1 | 0 | 25 | 25 | 45 | 0 | 0 | 9 | 4 | 15 | 8 | 32 | 83 |
| Kellogg Creek | 2 | 14 | 33 | 25 | 46 | 7 | 5 | 17 | 4 | 55 | 33 | 30 | 81 |
| Mt. Scott Creek | 1 | 0 | 57 | 0 | 58 | 0 | 1 | 17 | 9 | 20 | 20 | 60 | 85 |
| Mt. Scott Creek | 2 | 0 | 95 | 0 | 0 | 0 | 1 | 0 | 9 | 22 | 53 | 46 | 180 |
| Mt. Scott Creek | 3 | 13 | 52 | 33 | 44 | 3 | 2 | 7 | 5 | 12 | 13 | 46 | 135 |
| Mt. Scott Creek | 4 | 14 | 16 | 14 | 79 | 8 | 3 | 11 | 3 | 2 | 6 | 68 | 135 |
| Phillips Creek | 1 | 4 | 45 | 30 | 43 | 4 | 2 | 27 | 3 | 26 | 12 | 120 | 117 |

Unlike the previous studies, staff did not use the percentage of habitat classified as 'glides' in the evaluation of habitat due to the inconsistent nature of that habitat type and lack of agreement among professionals as to its defining characteristics. Instead, staff compared the parameters of silt, culverts, and erosion, in which high numbers generally represent degraded habitat for fish. Staff also compared shade, pools, and fast water, in which high numbers are considered beneficial for fish (Table 6).

As noted in the 1997 and 2003 study, Mt Scott Reach 4 continues to have low levels of silt (6%), particularly when compared to Reach 1, where silt was roughly 20% of the average substrate in 1997, and remains so in 2008. Shade has almost doubled for the whole of Mt Scott Creek since 1997, likely due in part to ongoing restoration efforts throughout the basin.

## RECOMMENDATIONS

ODFW staff developed general recommendations for restoration and protection of priority stream reaches within CCSD#1 area streams which are listed in Appendix H. The actions recommended are based on data gathered through habitat surveys, land-use patterns and expected development, as well as direct communication with habitat survey staff that were in the field observing and recording restoration opportunities as they moved throughout area streams. The actions are not intended to provide specific locations or prescriptions for treatment of factors limiting fish production, but they can provide guidance in determining where actions are needed that will provide direct benefits and support recovery and persistence of native fish species. Data collected through habitat surveys provided the ability to narrow down focal areas for restoration and protection actions and will help ensure the greatest return for any investment in restoration and protection of habitat

**Study Methodology**

- In futures studies, it may be beneficial to have the habitat surveys conducted prior to fish surveys and then correlate the fish survey data to habitat reaches.
- As mentioned in the Discussions section of this report, Indices of Biotic Integrity may not represent certain streams or reaches well, particularly those that are influenced by the presence of hatchery fish.
- It should also be considered for future monitoring, if better and more spatially representative salmonid abundance estimates are desired, that mark-recapture sampling methods may provide better data for estimate calculations and may generate usable data for all streams.
- Assess abundance, distribution, and residence timing of hatchery-reared juvenile salmonids that may compete with native fish species for limited food and space.
- Conduct annual temperature monitoring in CCSD#1 area streams in order to assess trends in temperature from year to year. Annual monitoring will also help determine of riparian restoration/preservation actions are providing the intended benefits.

**Restoration and Protection**

- Actions taken to protect native fish communities should focus on a continued mix of restoration and protection on urban stream reaches. Lower reaches directly connected to the Clackamas River are of particular importance for salmonid spawning and rearing in that basin. Cow, Carli, Sieben, and Rock Creeks all contained some degree of juvenile salmonid use in the lower reaches entering the Clackamas River. Upper sections of Cow, Sieben, and Rock Creek are at various stages of degradation due to conflicting management practices, development, and land-use.

- Continue and encourage increased protection of riparian areas in the upper reaches of all fish bearing tributaries in order to prevent future stream habitat degradation and potential loss of remaining native fish assemblage. Restore

upland processes in upper reaches of all area streams that could lead to negative impacts on downstream fish bearing areas. Fish may not need to be present in a particular area to be affected by poorly planned/designed land use activities

- Kellogg Creek and the lower two reaches of Mt. Scott Creek are also of particular importance for improving fluvial and anadromous access to habitat in Kellogg Creek watershed. These areas would greatly benefit from focused habitat restoration projects (particularly fish passage), increased protection or riparian/floodplain areas, increased public awareness, and outreach related to understanding of watershed health issues. Fish populations would benefit from the removal of the Kellogg Creek dam at it's confluence with the Willamette River which would allow unimpeded access by migratory fish species. Subsequently, it is important that land use regulations that currently protect habitat in the upper three reaches of Mt Scott Creek remain in place with continued efforts to improve areas within these reaches that still need restoration.

- Coordinate with various stakeholders to secure funding and public support to remove Kellogg Creek dam and Kellogg Lake in the city of Milwaukie to improve fish passage and access to the Kellogg Creek watershed.

- Focus should be directed towards urban planning with emphasis not only on restoration and protection of the urban watersheds, but also on smart-growth models that make watershed health a central concern when planning new development and communities.

- Continue to follow recommendations offered as part of the final reports of 1997-99 surveys (Friesen and Zimmerman, 1999) and 2002-2003 (Tinus, Koloszar, and Ward, 2003).

- Implement educational programs aimed at informing landowners of watershed health issues. Topics could include, but are not limited to, native riparian

**ACKNOWLEDGEMETNS**

This project was made possible by funding from Clackamas County's Water Environment Services. The authors wish to thank Ben Walczak of ODFW and Robert Storer of Water Environment Services for their help with field sampling. We also thank the many property owners who allowed access through their property.

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intermediate to a high level of management. The University of Portland is studying options for potential modifications to Leona Lake to improve downstream water quality and Johnson City is cooperating with WES to sample and analyze water quality constituents upstream and downstream of the lake in compliance with a TMDL order by DEQ.

## Lower Mt. Scott Sub-basin

The Lower Mt. Scott sub-basin encompasses approximately 1,621 acres surrounding stream reaches MS1, MS2, MN01, MS4, and a portion of MS5, as shown in Figure 5-3. Reach MN01 stands for Minthorne Creek, which is a contributing stream to Mt. Scott Creek that runs along the north side of Highway 224 in the City of Milwaukie. The land use in the sub-basin includes 34 percent SFR, 22 percent industrial, 6 percent commercial, 3 percent farm and 3 percent MFR. The remaining 32 percent is unknown land use according to the tax designation system and is labeled as tract, miscellaneous, or blank. According to aerial photo analysis of land cover, approximately 45 percent of the sub-basin is urban/impervious, 22 percent is covered by large trees, and 33 percent is covered by shrubs and grass.

Land in the Lower Mt. Scott sub-basin appears to have been developed mostly prior to the mid-1990s, as indicated by the lack of structural stormwater BMPs in this area. However, there are still a few large farm parcels that have not yet been developed.

The riparian buffer in the Lower Mt. Scott sub-basin is somewhat intact. In a 25-foot buffer zone on either side of Mt. Scott Creek, approximately 40 percent of the buffer is forested, 28 percent is grass and shrubs, 31 percent is urbanized, and 1 percent is surface water. In a 100-foot buffer zone on either side of Mt. Scott Creek, approximately 33 percent of the buffer is forested, 29 percent is grass and shrubs, 37 percent is urbanized, and 1 percent is surface water.

This sub-basin is generally lacking in structural stormwater BMPs, deep pools, and LWD. Reaches in this sub-basin also experience high summer water temperatures and exceed nitrate guidance levels.

### Reach MS1

Reach MS1 begins near North Clackamas Park and extends upstream to Highway 224. This reach is in the City of Milwaukie's jurisdiction. The contributing area for MS1 includes mostly low-density residential development, North Clackamas Park, and some farm land.

Reach MS1 includes a benthic macroinvertebrate monitoring site (SD1-M4), a water quality monitoring location (Site #15), and an ODFW fish sampling reach (MS1-F).

Hydrologic analysis data ranks in the poor category for the number of structures in the 100-year floodplain and for entrenchment ratio. Aerial photographs indicate that the structures in the floodplain are homes. This reach was also rated as having poor overhead shade in the stream channel by ODFW.

There is a non-native bamboo stand that extends several hundred feet along Mt. Scott Creek across from North Clackamas Park. The site is currently being pursued for restoration with the Parks Department in conjunction with private landowners and nonprofit restoration groups. Japanese Knotweed also exists in this reach.

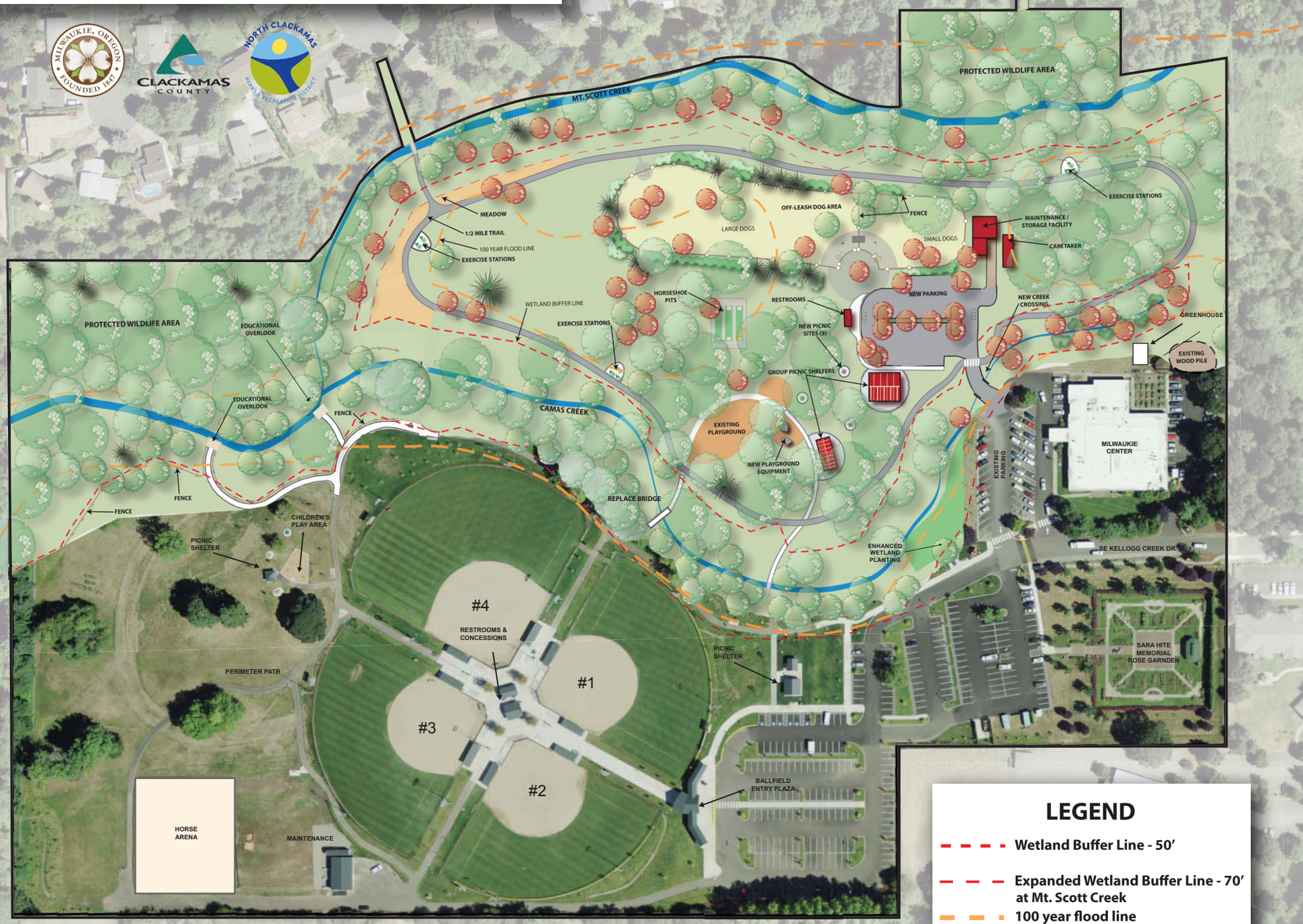
#### *Potential Actions*

The recommended management strategy for this reach is a high level of management that includes in-stream restoration and riparian corridor improvements.

In-stream restoration could include management to remove Japanese Knotweed, bamboo and other invasive species and the placement of LWD and boulders to improve in-stream structure and the addition of side channels to provide refuge habitat for fish during high flow events. To enhance the riparian corridor and improve water temperature shade could be added along MS1 in North Clackamas Park.

# North Clackamas Community Park - Conceptual Park Plan

**City of Milwaukie Planning Commission - 4/10/2012**



Oregon
John A. Kitzhaber, MD, Governor

Department of State Lands
775 Summer Street NE, Suite 100
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Ted Wheeler
State Treasurer

January 24, 2012

Gail Shaloum
Clackamas County Water and Environment Services
150 Beavercreek Road, Suite 430
Oregon City, OR 97045

David Elkin
GreenWorks, PC
24 NW 2nd Ave, Suite 100
Portland, OR 97209

Re: Wetland Delineation Report for the Proposed Mt. Scott Creek Restoration Project, Clackamas County; T 2S R 2E S 6AC Portion of Tax Lot 100; WD #2011-0317

Dear Ms. Shaloum and Mr. Elkin:

The Department of State Lands has reviewed the wetland delineation report prepared by SWCA Environmental Consultants for the site referenced above. Based upon the information presented in the report and additional information submitted upon request, we concur with the wetland and waterway boundaries as mapped in Figure 5 of the report. Within the study area, three wetlands (totaling approximately 0.33 acres) and two waterways, including portions of Mt. Scott and Camas Creeks, were identified. The wetlands and waterways are subject to the permit requirements of the state Removal-Fill Law. Under current regulations, a state permit is required for cumulative fill or annual excavation of 50 cubic yards or more in wetlands or below the ordinary high water line (OHWL) of a waterway (or the 2 year recurrence interval flood elevation if OHWL cannot be determined). However, Mt. Scott Creek is an essential salmonid stream; therefore, fill or removal of any amount of material below its OHWL, or within hydrologically-connected wetlands, may require a state permit.

This concurrence is for purposes of the state Removal-Fill Law only. Federal or local permit requirements may apply as well. The Army Corps of Engineers will review the report and make a determination of jurisdiction for purposes of the Clean Water Act at the time that a permit application is submitted. We recommend that you attach a copy of this concurrence letter to both copies of any subsequent joint permit application to speed application review.

Please be advised that state law establishes a preference for avoidance of wetland impacts. Because measures to avoid and minimize wetland impacts may include reconfiguring parcel layout and size or development design, we recommend that you work with Department staff on appropriate site design before completing the city or county land use approval process.

This concurrence is based on information provided to the agency. The jurisdictional determination is valid for five years from the date of this letter, unless new information necessitates a revision. Circumstances under which the Department may change a determination are found in OAR 141-090-0045 (available on our web site or upon request). In addition, laws enacted by the legislature and/or rules adopted by the Department may result in a change in jurisdiction; individuals and applicants are subject to the regulations that are in effect at the time of the removal-fill activity, or complete permit application. The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within six months of the date of this letter.

Thank you for having the site evaluated. Please phone me at (503) 986-5232 if you have any questions.

Sincerely,

Peter Ryan, PWS
Wetland Specialist

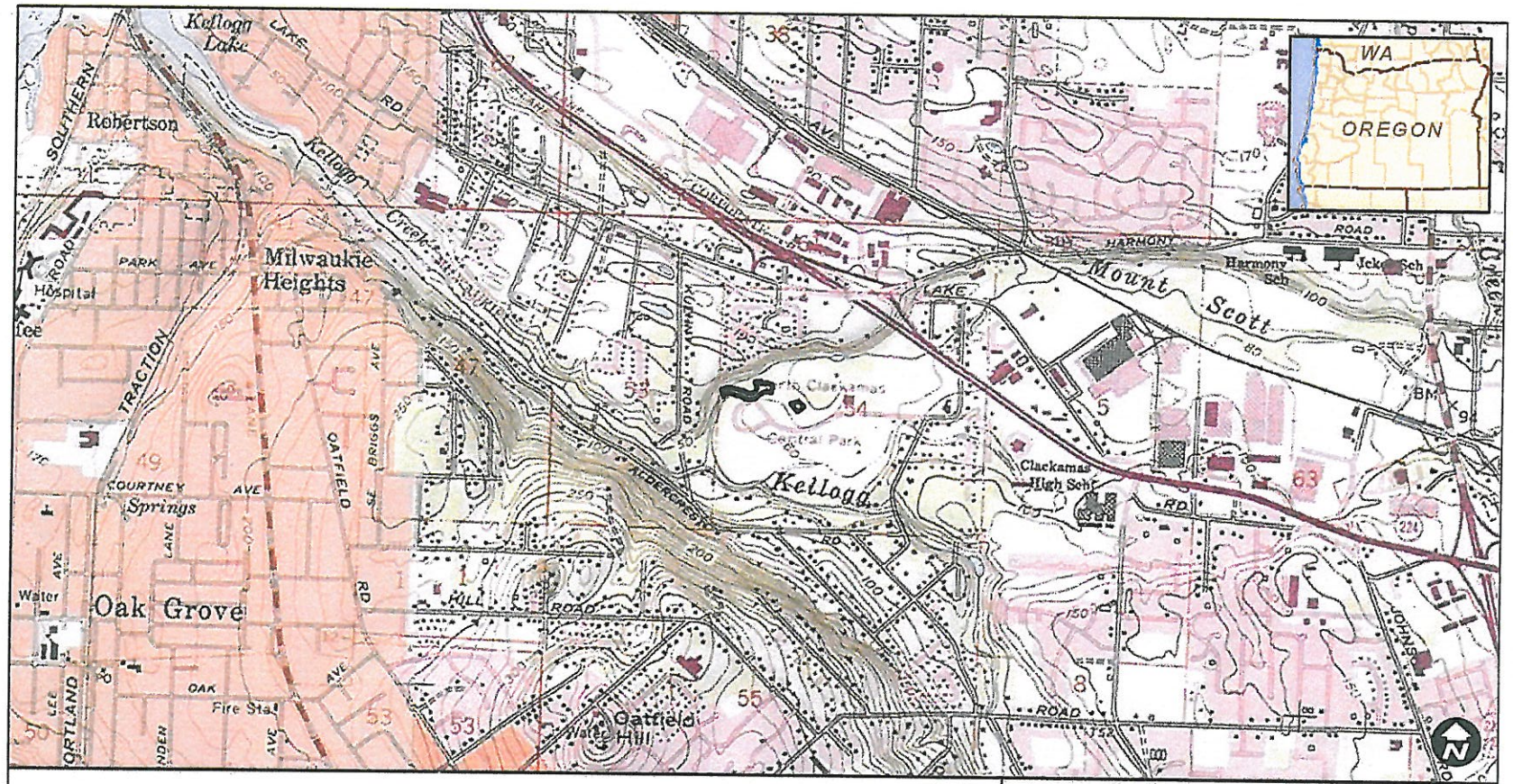
Approved by Anna Buckley
Anna Buckley
Acting Wetlands Program Manager

Enclosures

ec: C. Mirth Walker, SWCA Environmental Consultants
City of Milwaukie Planning Department
Karla Ellis, Corps of Engineers
Anita Huffman, DSL

WD# 11-0317






Legend
Study Area Boundary

0 1,000 2,000 Feet
0 250 500 Meters

North Clackamas Park
Clackamas County, OR

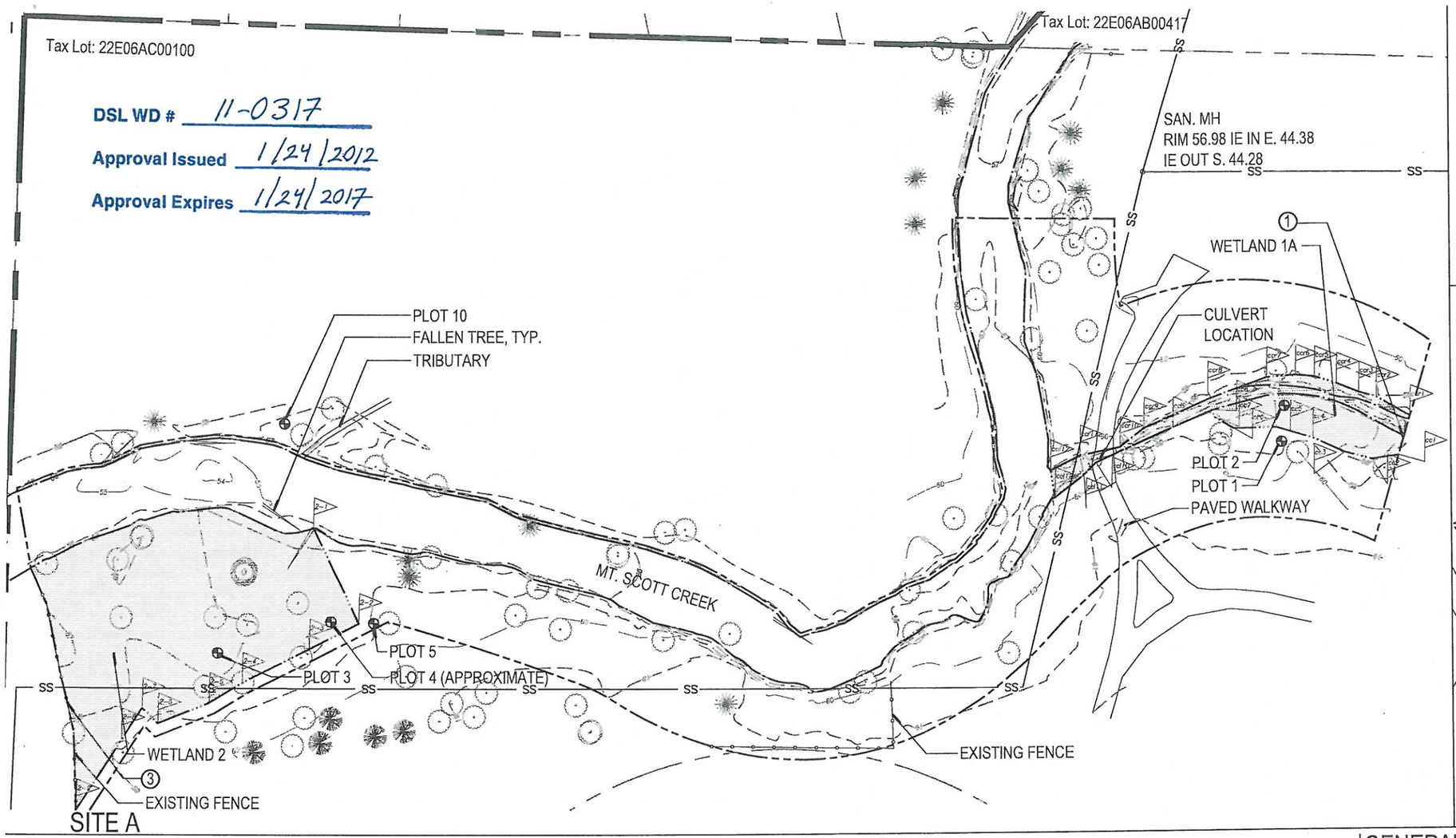
Source:
USGS 7.5' topographic quadrangle: Gladstone, OR (1977).

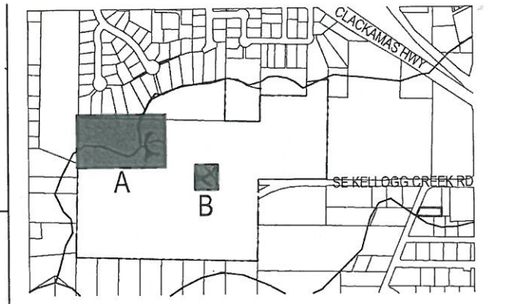
SWCA
ENVIRONMENTAL CONSULTANTS
1220 SW Morrison, Suite 700
Portland, OR 97205-2235
www.swca.com
503.224.0333

Project: 17723

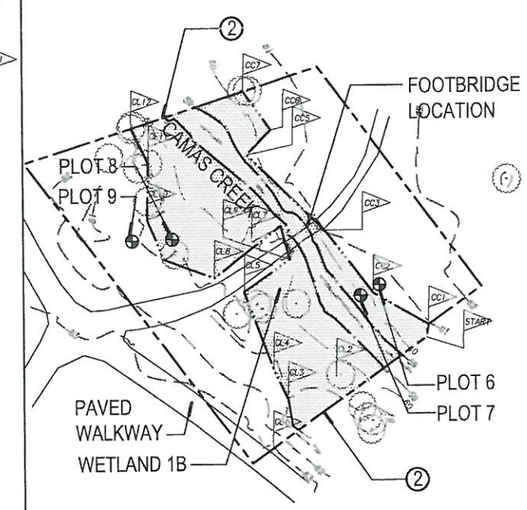
September 20, 2011

**Figure 1.** Site location map.




KEY PLAN




SITE B

## WETLANDS LEGEND

- PARK BOUNDARY
- STUDY AREA BOUNDARY
- TAX LOT LINES
- CREEK OHWL
- SURVEYED WETLAND AREA
- SANITARY LINES

## CALCULATIONS

| | |
|---|---|
| **WETLAND 1A** | |
| LENGTH: | 167 LF |
| WETLAND AREA: | 1091 SF |
| CREEK AREA: | 1200 SF |
| TOTAL AREA (wetland + creek) | 2291 SF |
| **WETLAND 1B** | |
| LENGTH: | 113 LF |
| WETLAND AREA: | 3649 SF |
| CREEK AREA: | 990 SF |
| TOTAL AREA (wetland + creek): | 4639 SF |
| **WETLAND 2** | |
| LENGTH: | 131 LF |
| WETLAND AREA/ TOTAL AREA: | 9433 SF |
| **MT. SCOTT CREEK** | |
| LENGTH: | 615 LF |
| CREEK AREA: | 15540 SF |
| **SITE A** | |
| STUDY AREA BOUNDARY: | 56983 SF |
| **SITE B** | |
| STUDY AREA BOUNDARY: | 11330 SF |

## GENERAL NOTES

1. Wetland and water boundaries and sample plots were professionally surveyed by Ron Bush; delineation by SWCA Environmental Consultants on June 1-2, 2011.

## KEY NOTES

1. Wetland 1A extends East out of SAB
2. Wetland 1B extends East and West out of SAB
3. Wetland 2 extends West out of SAB

0 12.5 25 50

NORTH

# Figure 5: WETLAND AND WATERS DELINEATION MAP

Mt. Scott Creek Restoration at North Clackamas Park

9-15-2011 Revised 1-20-2012

SWCA ENVIRONMENTAL CONSULTANTS

GREENWORKS

# NORTH CLACKAMAS PARK
# MOUNT SCOTT CREEK RESTORATION PROJECT
# WETLAND AND WATERS DELINEATION REPORT
# MILWAUKIE, OREGON
# T2S, R2E, SECTION 6AC, TAX LOT 100 (PORTION)
# CLACKAMAS COUNTY, W.M.

Prepared for

**GreenWorks, PC**
24 NW 2nd Avenue, Suite 100
Portland, Oregon 97209
503-222-5612

Prepared by

SWCA®
ENVIRONMENTAL CONSULTANTS
Sound Science. Creative Solutions.®

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September 2011

SWCA Project No. 17723

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# INTRODUCTION

SWCA Environmental Consultants (SWCA) was contracted by GreenWorks, PC to delineate wetlands and waters within a portion of North Clackamas Park, Milwaukie, Clackamas County, Oregon (Figure 1, Appendix A). GreenWorks, PC is assisting Water Environment Services of Clackamas County to conduct bank restoration and stabilization activities along Mt. Scott Creek, including riparian habitat enhancement and protection, providing overlooks, removing a culvert, and building a new pedestrian bridge over Camas Creek. The project is funded by a Metro Nature in Neighborhoods Capital Grant. The project area includes one approximately 570-foot-long segment along Mt. Scott Creek, including the confluence of Camas Creek (12.93 acres), and one 100-foot-long segment along Camas Creek (0.26 acre), on tax lot 100 of tax map 2 2E 6AC (Figure 2, Appendix A). The total project study area is approximately 13.19 acres.

Pacific Habitat Services (PHS) conducted a wetland and water delineation of the southern portion of the park in 2004 and of the northern portion of the park in 2007 for the North Clackamas Parks and Recreation District (Oregon Department of State Lands (DSL) File Number WD04-0153). Their delineation covered most of the proposed project area for the Mt. Scott Creek Restoration Project. The PHS study delineated four wetlands (referred to as Wetlands 1, 2, 3, and 5) and the ordinary high water line of Mt. Scott Creek. The DSL wetland and water delineation concurrence expired on February 17, 2010.

# A. LANDSCAPE SETTING AND LAND USE

*OAR141-090-0035 (7)(a)*

North Clackamas Park is a 47-acre community park located south of Highway 224 and west of Interstate 205. Mt. Scott Creek flows southwesterly through the northern portion of the park. Mt. Scott Creek is located in the Kellogg/Mt. Scott Creek watershed within the Lower Willamette Subbasin (HUC 17090012) and joins Kellogg Creek south of the park. Kellogg Creek is a tributary to the Willamette River. Camas Creek is a tributary to Mt. Scott Creek and joins Mt. Scott Creek in the western portion of the park. An existing culvert is located at the mouth of Camas Creek as it flows into Mt. Scott Creek.

The park contains mowed lawn areas, forested riparian areas, baseball fields, playgrounds, paved trails, paved parking, an equestrian facility, picnic shelters, and a community building. The topography within the study area is generally flat (less than 3 percent slope). The adjacent land use is residential.

# B. SITE ALTERATIONS

*OAR141-090-0035 (7)(c)*

No site alterations that would have changed the extent of wetlands or waters within the study area were observed.

## C. PRECIPITATION DATA AND ANALYSIS

*OAR141-090-0035 (7)(i)*

The WETS (wetlands climate analysis) Station chosen for this project is the Portland WSFO, Oregon, station. Average annual rainfall according to the WETS table for the Portland WSFO station is 37.07 inches (in comparison, the Oregon City WETS table reports an annual average rainfall of 46.02 inches). Precipitation data were obtained from the Portland, Oregon, weather station via the National Weather Service (NWS). Precipitation data are shown below, and raw data are included in Appendix B. Table 1 shows the monthly precipitation averages according to the WETS Portland WSFO station for the months prior to the June site visits. Table 2 shows the observed precipitation proceeding each field date and the water year-to-date totals according to the NWS Portland station.

**Table 1.** Precipitation Data—Monthly Averages

| Prior Three Months | Average (inches) | 30% Chance Will Have | | Observed Precipitation (inches) | Within Normal Range? |
|---|---|---|---|---|---|
| | | Less Than (inches) | More Than (inches) | | |
| March | 3.71 | 2.85 | 4.31 | 6.43 | Above normal |
| April | 2.64 | 1.93 | 3.10 | 5.04 | Above normal |
| May | 2.38 | 1.44 | 2.88 | 2.92 | Above normal |

**Table 2.** Precipitation Data—Observed

| Field Date | Observed Rainfall on Field Date (inches) | Observed Rainfall Two Weeks Prior to Field Date (inches) | Observed Rainfall for the Water Year-to-Date (inches) | Departure from Normal (inches) |
|---|---|---|---|---|
| June 1, 2011 | 0.34 | 0.83 | 42.59 | +10.34 |
| June 2, 2011 | 0.07 | 1.17 | 42.66 | +10.34 |

According to the WETS table, monthly observed precipitation for Portland was above the normal range for the three months prior to the site visits. In addition, the Portland station had a record daily maximum on May 15 of 0.75 inch. The water year-to-date (which starts October 1) is also above normal by more than 10 inches. The above average precipitation recorded in the months preceding our delineation is unlikely to have affected our determination of the wetland boundaries, but does explain the hydrology observed in our upland plots.

## D. METHODS

*OAR141-090-0035 (7)(d-e), (g-h), (16)(a-b), (f), (d) or (g), (17), and (19-20)*

The methodology used for determining the presence of wetlands and delineating wetland boundaries followed the routine approach of the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (Wakeley et al. 2010) used by both the U.S. Army Corps of Engineers (Corps) and the DSL. Wetland classification

using the hydrogeomorphic (HGM) method was based on Adamus and Field (2001); Cowardin classification was based on Cowardin et al. (1979). This report was prepared to meet the DSL administrative rules for wetland delineation report requirements (DSL 2008). Although outdated, the primary reference used to identify vegetation to the species level is Hitchcock and Cronquist (1973).

The ordinary high water mark (OHWM) of Camas Creek was delineated based on sediment and debris deposits, scour lines, exposed roots, slope breaks, and on the change from unvegetated water to wetland or upland vegetation. The OHWM of Mt. Scott Creek was determined based on field confirmation of the surveyed top of bank elevations.

Fieldwork was conducted on June 1 and 2, 2011, by Mirth Walker and Stacey Reed. Soils, vegetation, and indicators of hydrology were recorded at 10 sample plot locations to document representative site conditions (Appendix C).

Wapato silty clay loam (Unit 84; poorly drained) is mapped throughout the study area according to the Natural Resources Conservation Service (NRCS) Clackamas County Area, Oregon Soil Survey map (Figure 3; Appendix A). Wapato silty clay loam is listed as hydric on the NRCS Clackamas County Area, Oregon hydric soil list. Soil colors were described using X-Rite (2000) Munsell soil color charts.

Representative ground-level site photographs are included in Appendix D. A list of vegetation observed on-site is included in Appendix E. References cited are included in Appendix F, and additional references used to prepare this report (City of Portland 2011; Google 2011; NRCS 2011; Reed 1988; Reed et al. 1993; Schoeneberger et al. 2002) are included in Appendix F.

## E. DESCRIPTION OF ALL WETLANDS AND OTHER NON-WETLAND WATERS

*OAR141-090-0035 (2), (7)(b), and (17)*

The on-site boundaries of three wetland areas (referred to as Wetlands 1A, 1B, and 2), the OHWM for Camas Creek (a tributary to Mt. Scott Creek), and a portion of an unnamed seasonal wetland tributary drainage to Mt. Scott Creek were delineated. All delineated features extend beyond the two study areas.

## WETLANDS

### *Wetland 1A and 1B*

The boundaries of two palustrine forested (PFO) fringe wetlands adjacent to Camas Creek were delineated and referred to as Wetland 1A and 1B, since they connect outside of our limited study area boundaries. Wetland 1A is 1,091 SF and Wetland 1B is 3,649 SF (0.11 acre in the study area). Wetland conditions in the downstream segment (Wetland 1A) extend east of the study area. The upstream segment (Wetland 1B) extends northeast and southeast of the study area adjacent to Camas Creek. Wetland 1A and 1B and Camas Creek were previously designated as Wetland 5 in the PHS delineation. Wetland 1A, located just upstream from the confluence with Mt. Scott Creek, was dominated by Oregon ash, red-osier dogwood, Sitka willow, skunk cabbage, slough sedge, and reed

canarygrass (as documented at Plot 2). An existing paved trail and footbridge cuts through the wetland at both study area segments along Camas Creek (Photo 1). Wetland 1B was dominated by Oregon ash, red-osier dogwood, native hawthorn, reed canarygrass, orange balsam and small-fruited bulrush (Photo 2, Appendix D, documented at Plots 7 and 8). Surface soils documented within Wetland 1 met the Redox Dark Surface (F6) hydric indicator. Soils were saturated to the surface at lower elevation wetland plots and at 8 inches below ground surface at Plot 8, which was located on a slightly higher elevation terrace adjacent to the left bank of Camas Creek in the upstream study area segment.

The wetland boundary was determined by a topographic increase to the adjacent upland along with a change in the vegetation community from Oregon ash/reed canarygrass/slough sedge in the wetland to Himalayan blackberry/vine maple/tall fescue/reed canarygrass in upland (Photo 3, Appendix D). The adjacent upland also lacked surface hydric soil and wetland hydrology indicators (as documented at Plots 6 and 9). Upland Plot 1 documents the conditions near the southern wetland boundary of the downstream segment. This area was dominated by a hydrophytic vegetation community (although the pea-fruit rose appeared to have been planted as part of a past riparian enhancement project), and soils were saturated to the surface during the June 1, 2011, site visit. Soils at Plot 1 did not display any evidence of redoximorphic or other hydric features; therefore, this plot was determined to be upland. Existing riparian enhancement plantings were generally observed adjacent to the northern wetland boundary and included Douglas spirea, rose, Oregon white oak, and vine maple. A water quality bioswale is present adjacent to the southern wetland boundary of the upstream segment; it appears to treat runoff from the adjacent ball fields prior to discharge into Camas Creek.

### *Wetland 2*

Wetland 2 is a PFO wetland dominated by Oregon ash, red-osier dogwood, ladyfern, skunk cabbage, and slough sedge (as documented at Plots 3 and 4; Photo 4, Appendix D). Wetland 2 is located adjacent to, and slopes toward, the left bank of Mt. Scott Creek. This wetland was previously designated by PHS as Wetland 2. Wetland conditions extend northwest of the study area. The extent of Wetland 2 appears similar to the 2004 delineation, and was 9,433 SF, or 0.22 acre. Soils at Plots 3 and 4 met the hydric Redox Dark Surface (F6) indicator and were saturated to the surface during the June 1, 2011, site visit. The wetland is fed by groundwater seeps and drains into Mt. Scott Creek.

The wetland boundary was determined by a topographic rise to the adjacent upland along with a change in the vegetation community from Oregon ash and slough sedge in the wetland to black cottonwood, Himalayan blackberry, Indian plum, and swordfern (as documented at Plot 5; Photo 5, Appendix D). Wetland conditions extend northeast of the study area.

## OTHER WATERS

### *Camas Creek*

Camas Creek is a seasonal (intermittent) channel that flows westerly through Wetland 1 and into Mt. Scott Creek (Photo 6, Appendix D). The creek originates from wetland located off-site to the east and passes through a metal culvert under a gravel footpath prior to joining Mt. Scott Creek in the downstream segment of the study area. A wood footbridge is present in the upstream segment of

the study area. Within the upstream study area, Camas Creek had an approximately 6- to 8-foot-wide channel bed with 6-inch-tall banks. The channel bed was narrower (approximately 4 foot wide) downstream near its confluence with Mt. Scott Creek. Camas Creek covers 0.05 acre within our study area. Approximately 3-inch-deep flow was documented in Camas Creek during the June 2011 site visits. The channel bed consisted of silt loam, with cobbles present at the Mt. Scott confluence. The top of stream banks were delineated as the ordinary high water for Camas Creek. The top of banks indicated where the vegetation changed from being absent to being dominated by either wetland or upland vegetation communities. Riparian restoration plantings were observed adjacent to Camas Creek in the study area.

### *Unnamed Tributary*

The downslope end of a narrow unvegetated drainage channel was delineated in the study area north of Wetland 2 and north of Mt. Scott Creek. The unnamed seasonal tributary flows directly into the right bank of Mt. Scott Creek. The channel bed was approximately 2 foot wide, with 6-inch-tall banks (Photo 7, Appendix D). The substrate was silt loam with cobbles. Approximately 0.25-inch deep flow was documented within the on-site portions of the channel during the June 2, 2011, site visit. The channel drains off-site forested wetland upslope of the study area into Mt. Scott Creek. Hydrology within the channel is likely intermittent. Plot 10 documents the on-site upland conditions adjacent to the channel. This area was mostly dominated by Himalayan blackberry (Oregon ash and red alder trees were likely rooted in adjacent wetland) and lacked hydric soil indicators, and was determined to be upland. The top of the banks were delineated as the OHWM of the drainage, where the vegetation changes from being absent to being dominated by blackberry. Since the drainage is less than 2 feet wide, the centerline is shown on Figure 5, the delineation map.

### *Mt. Scott Creek*

Mt. Scott Creek is a major perennial drainage that flows southerly and westerly through the study area. Within the study area, the channel is approximately 10 feet wide with 7- to 8-foot-tall banks (Photo 8, Appendix D). Mt. Scott Creek covers 0.36 acre within our study area boundary. Bank undercutting and erosion was observed along Mt. Scott Creek within the study area. According to a stream gage located downstream of the Camas Creek confluence, water levels in Mt. Scott Creek were at 4.6 feet on June 1, 2011. Flow within downstream portions of the study area was almost at bankfull stage during the June 2, 2011, site visit.

The riparian corridor was forested with the following species: Oregon ash, Oregon white oak, red alder, Western red cedar, Sitka willow, Douglas spirea, red-osier dogwood, Himalayan blackberry, swordfern and English ivy.

## F. DEVIATION FROM LOCAL OR NATIONAL WETLAND INVENTORY

*OAR141-090-0035 (16)(e)*

Mt. Scott Creek is mapped as a riverine upper perennial open water with an intermittently exposed/permanent water regime (R3OWZ) on the Gladstone, Oregon, National Wetlands Inventory (NWI) map (Figure 4; Appendix A). A palustrine open water, artificial, diked/impounded wetland with an intermittently exposed/permanent water regime (POWKZh) is also mapped along Mt. Scott Creek in the vicinity of Wetland 2 on the Gladstone NWI map. We did not observe the open water

feature in our study area. Our study confirmed the presence of Camas Creek, adjacent wetlands, and forested wetlands adjacent to Mt. Scott Creek. The subject area is not covered by a Local Wetland Inventory.

## G. MAPPING METHOD

*OAR141-090-0035 (7)(f), (11), (12), (13), (18), and (22)*

The on-site boundaries of Wetlands 1 and 2 and the OHWM for Camas Creek were flagged in the field by SWCA and professionally land surveyed by Ron Bush Surveying. We did not re-flag the top of bank/OHWM for Mt. Scott Creek because its condition did not appear to have changed since the 2004 PHS delineation. The wetland and water delineation map is included as Figure 5 in Appendix A.

## H. ADDITIONAL INFORMATION

*OAR141-090-0035 (6)(c), (16)(c), and (21)*

The wetlands and waters delineated in this study are likely to be determined to be jurisdictional by the DSL. Wetlands will also likely be determined jurisdictional by the Corps due to their adjacency and connection to Mt. Scott Creek and connection via Camas Creek. Mt. Scott Creek is a tributary to Kellogg Creek, which is a tributary to the Willamette River.

Mt. Scott Creek is mapped as essential salmonid habitat (ESH) on the DSL Clackamas County ESH map. Therefore, any amount of removal or fill below the OHWM may require a DSL permit.

## I. RESULTS AND CONCLUSIONS

*OAR141-090-0035 (7)(j)*

The on-site boundary of three wetland areas, Camas Creek, an unnamed seasonal tributary to Mt. Scott Creek, and Mt. Scott Creek were delineated in the study area. Wetland 1 and Camas Creek extend off-site to the east and to the west; Wetland 2 extends off-site to the northwest; and the seasonal tributary drainage to Mt. Scott Creek extends north of the study area. Total wetland acreage within the study area is 0.33 acre. Table 3 describes the results of the wetland delineation.

**Table 3.** Summary of Potentially Jurisdictional Features Delineated in the Study Area

| Potentially Jurisdictional Feature | On-site Size (acre) | Cowardin Class | HGM Subclass | Wetland Plot No. | Photo ID No. | Latitude and Longitude for Each Feature |
|---|---|---|---|---|---|---|
| Wetland 1A | 0.03 | PFO | Riverine Flow-Through | 2 | - | 45.4268, −122.610 |
| Wetland 1B | 0.08 | PFO | Riverine Flow-Through | 7, 8 | 2, 3 | 45.4263, −122.608 |
| Wetland 2 | 0.22 | PFO | Slope/Flats | 3, 4 | 4 | 45.4269, −122.610 |
| Camas Creek | 0.05 | PFO | Riverine | | 6 | 45.4264, −122.608 |
| Mt. Scott Creek | 0.36 | POW/UB | Riverine | | 8 | 45.4274, −122.610 |

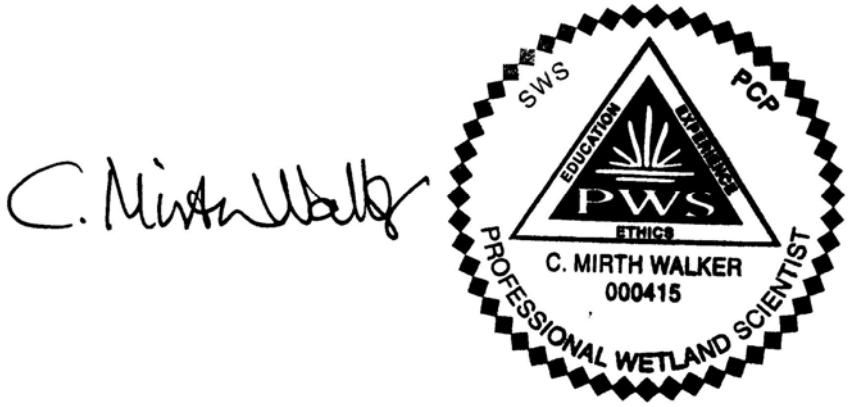
## J. DISCLAIMER

*OAR141-009-0035 (7)(k)*

This report documents the investigation, best professional judgment, and conclusions of the investigators. It is correct and complete to the best of our knowledge. It should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and used at your own risk unless it has been reviewed and approved in writing by the Oregon Department of State Lands in accordance with OAR 141-090-0005 through 141-090-0055.

## K. LIST OF PREPARERS

Stacey Reed
Wetland Scientist
Fieldwork and Report Preparation




C. Mirth Walker, PWS, CWD
Senior Wetland Scientist
Fieldwork and QA/QC

# APPENDIX A

## Maps

Figure 1. Site location map.

Figure 2.0. Tax lot map.

Figure 2.1. Tax lot map enlargement.

Figure 3. Soils map.

Figure 4. National Wetlands Inventory map.

Figure 5. Wetland and waters delineation map.

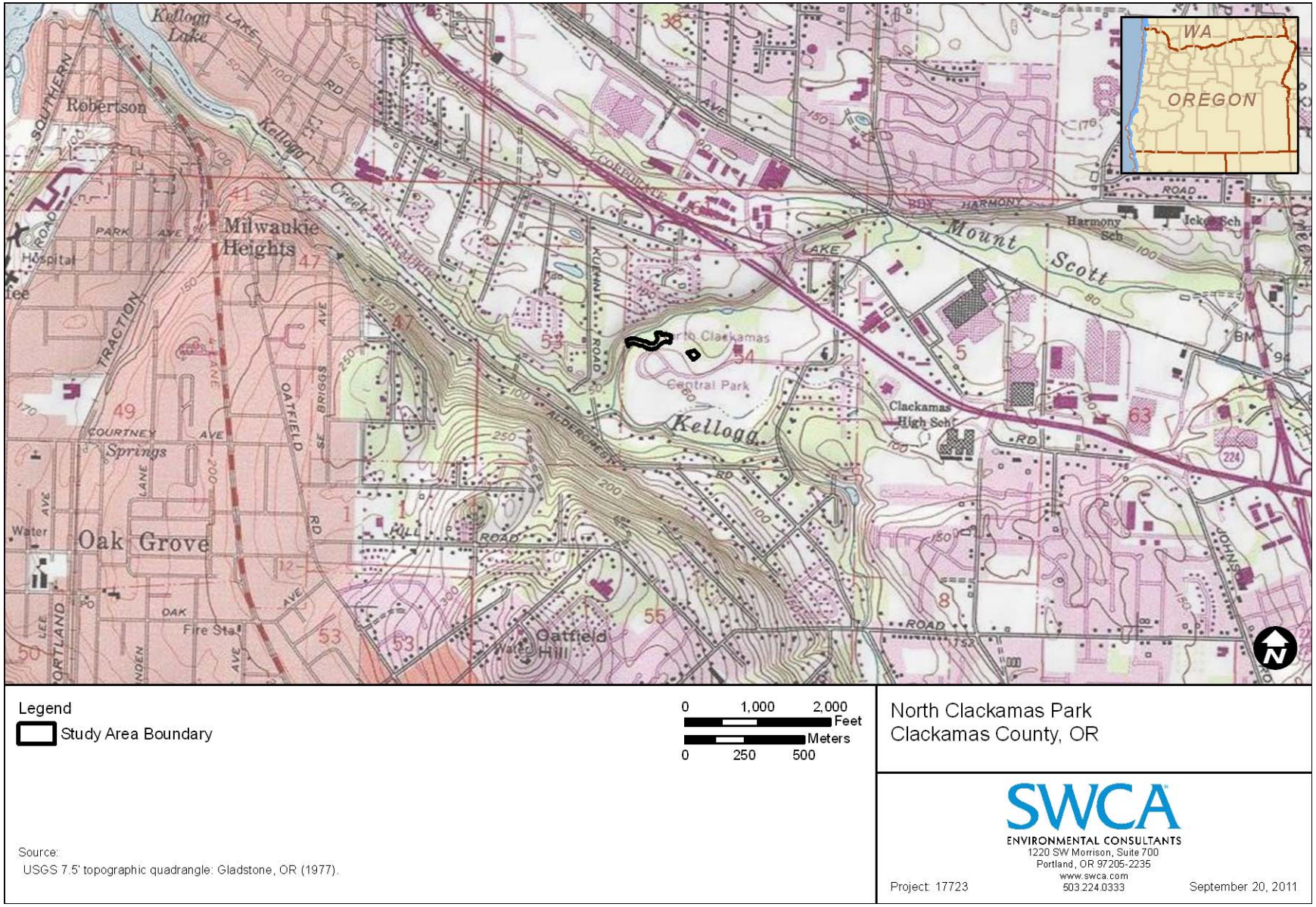



**Figure 1.** Site location map.

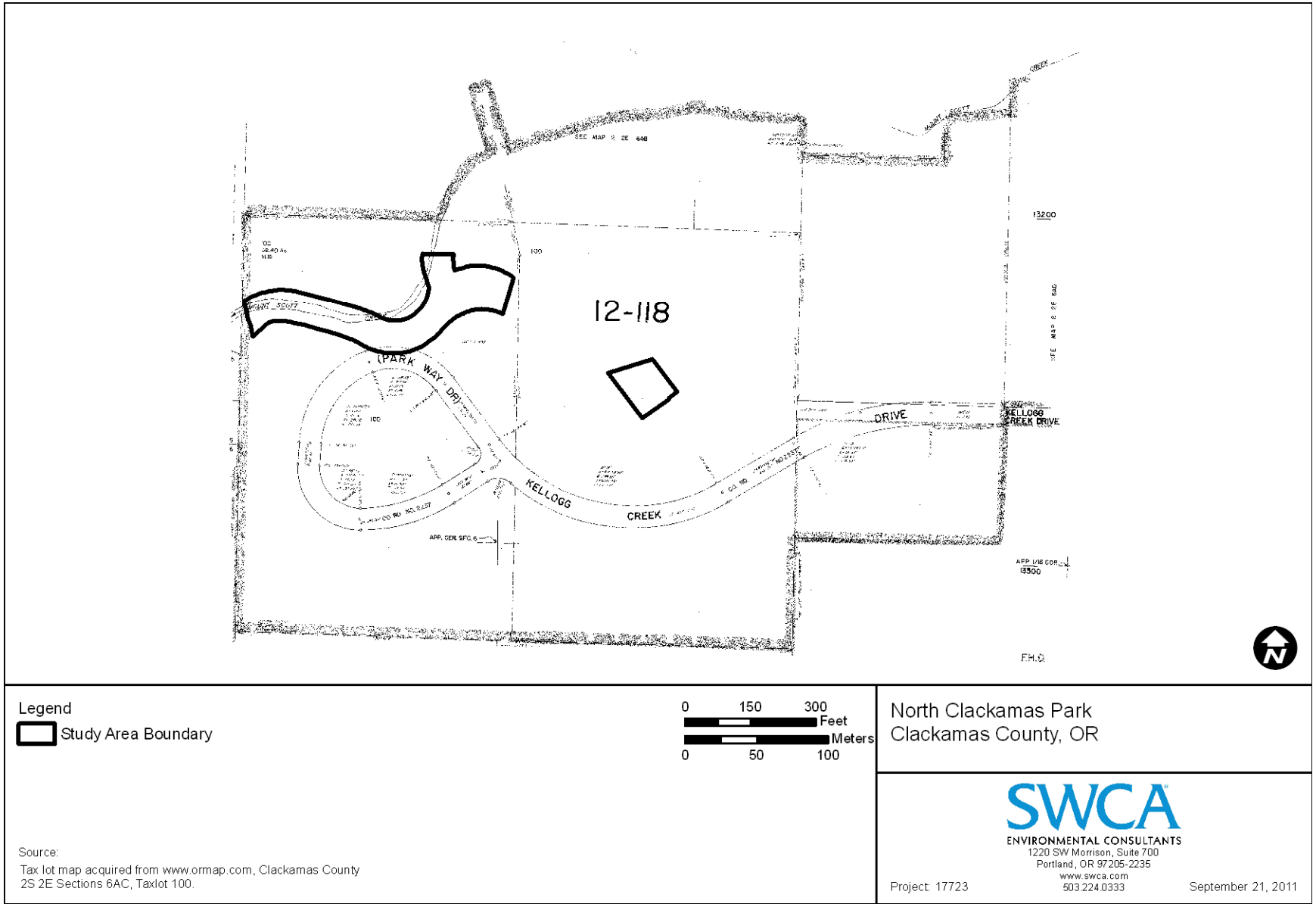



**Figure 2.** Tax lot map.

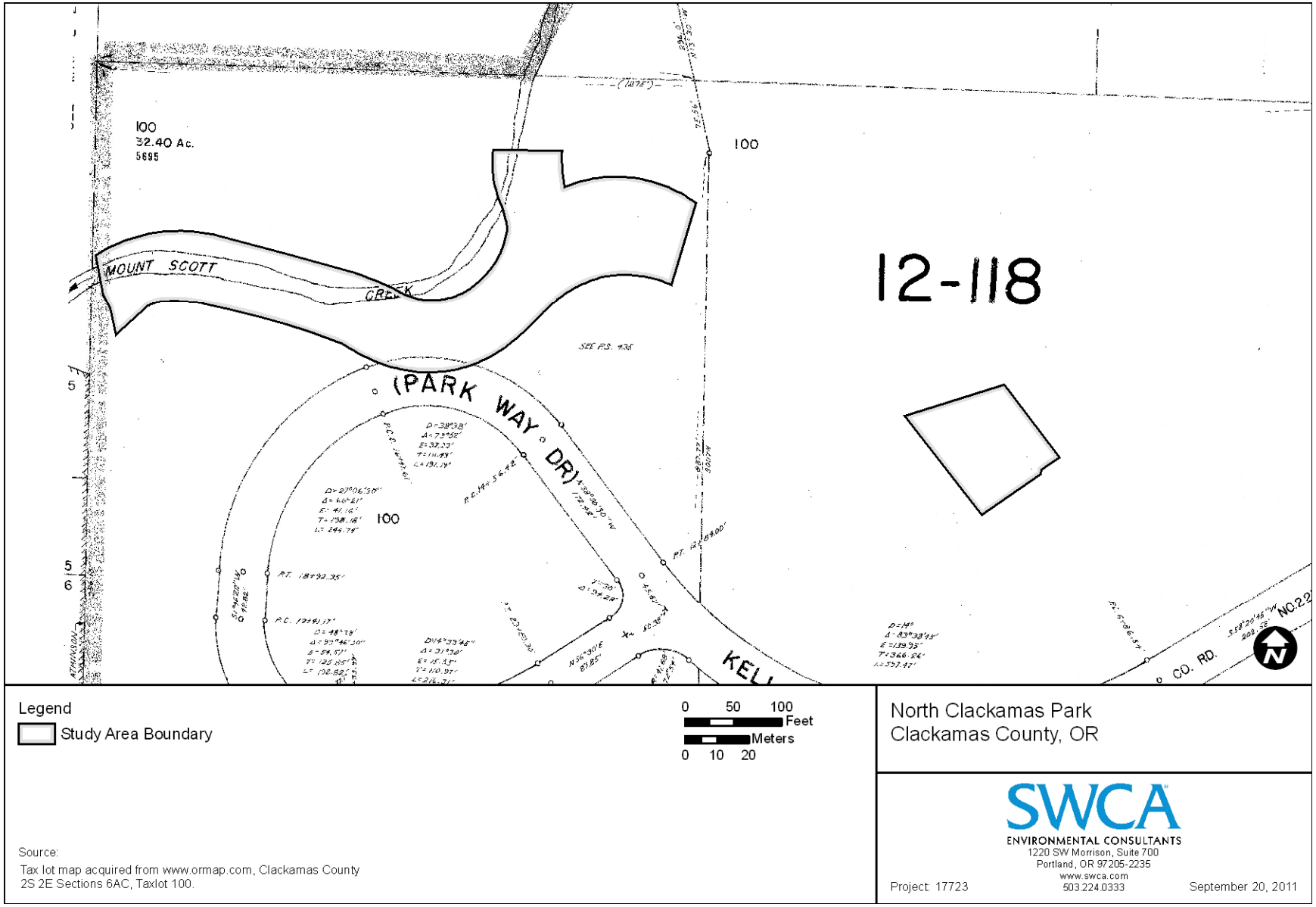



**Figure 2.1.** Tax lot map enlargement.

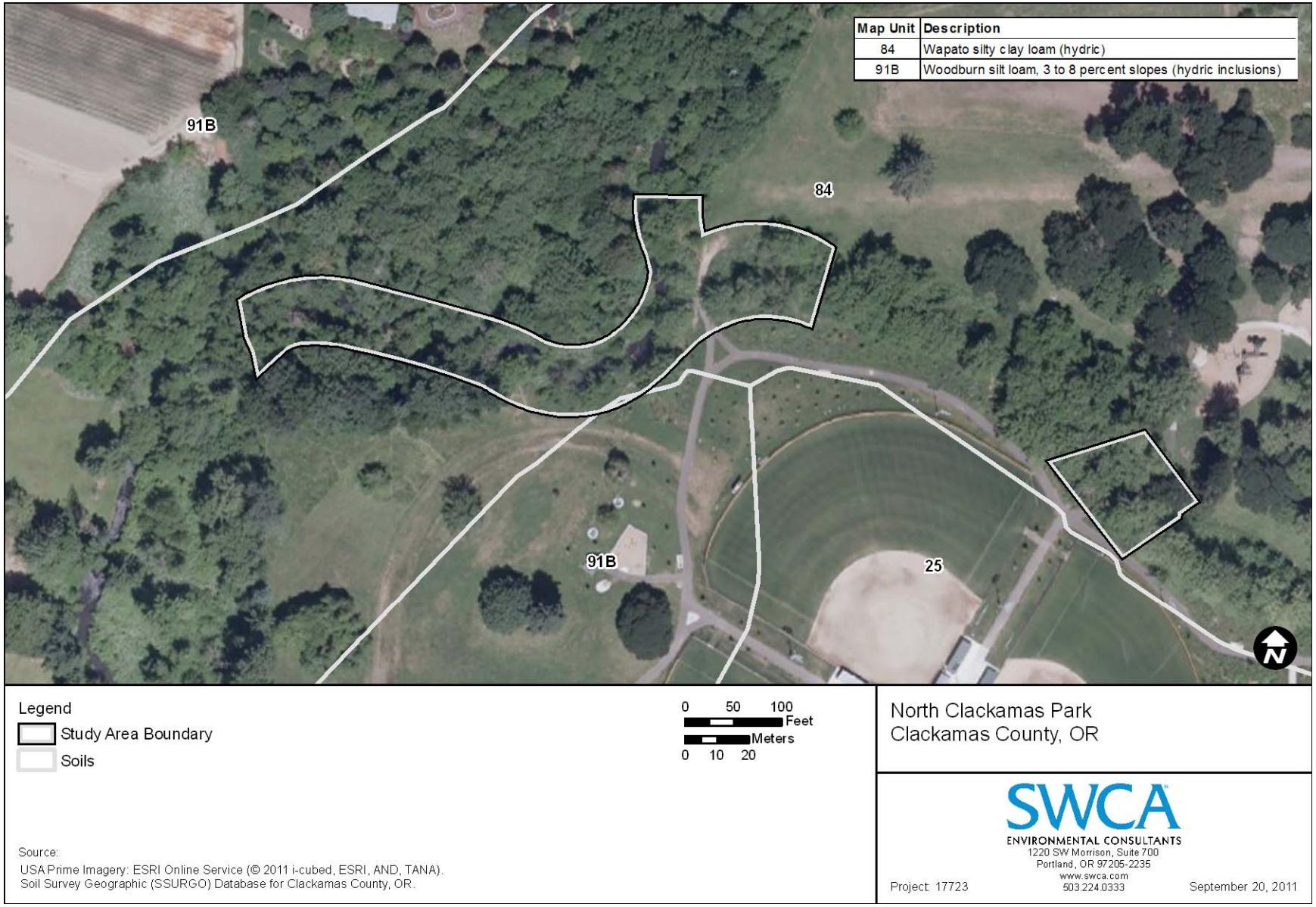



**Figure 3.** Soils map.

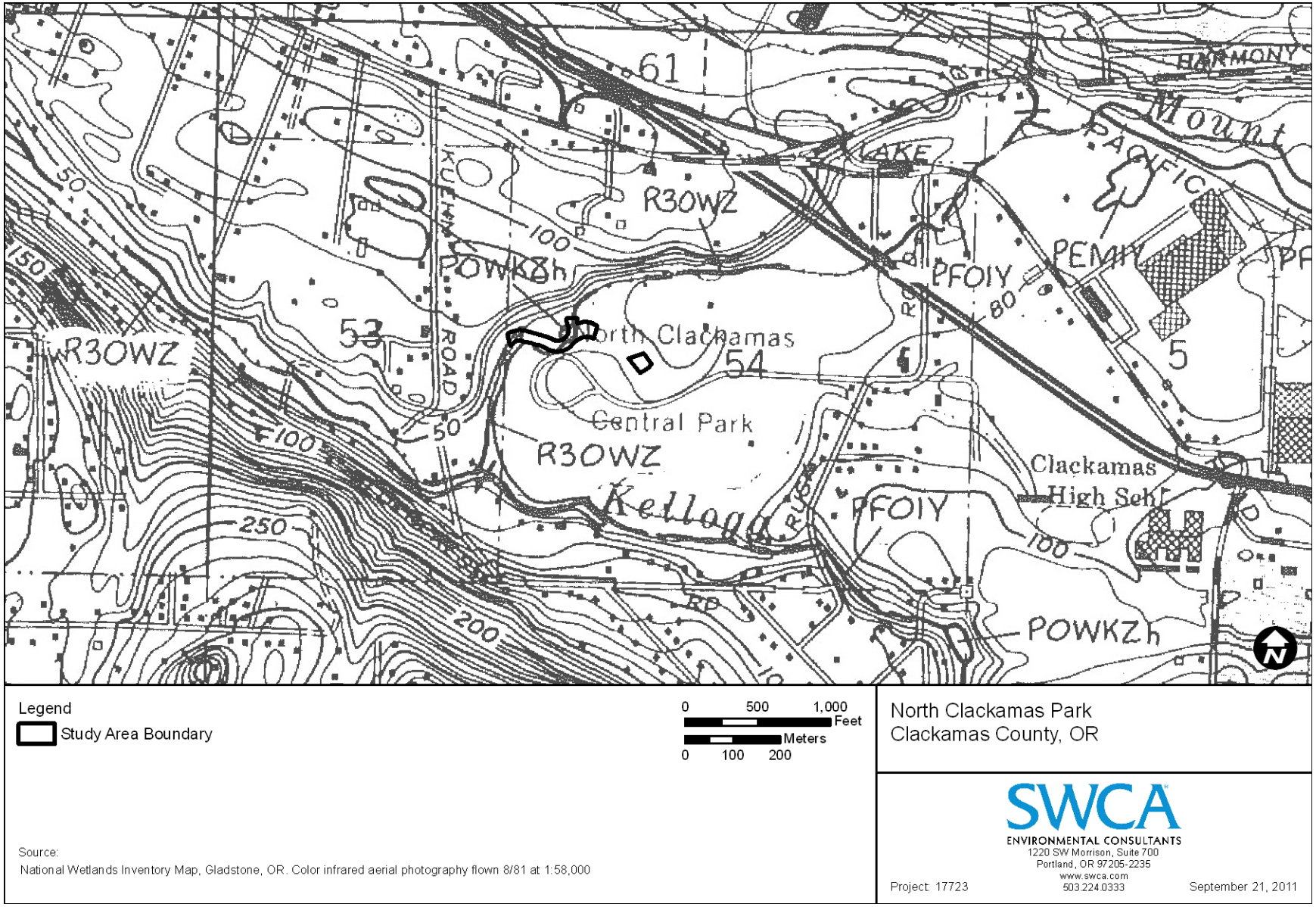
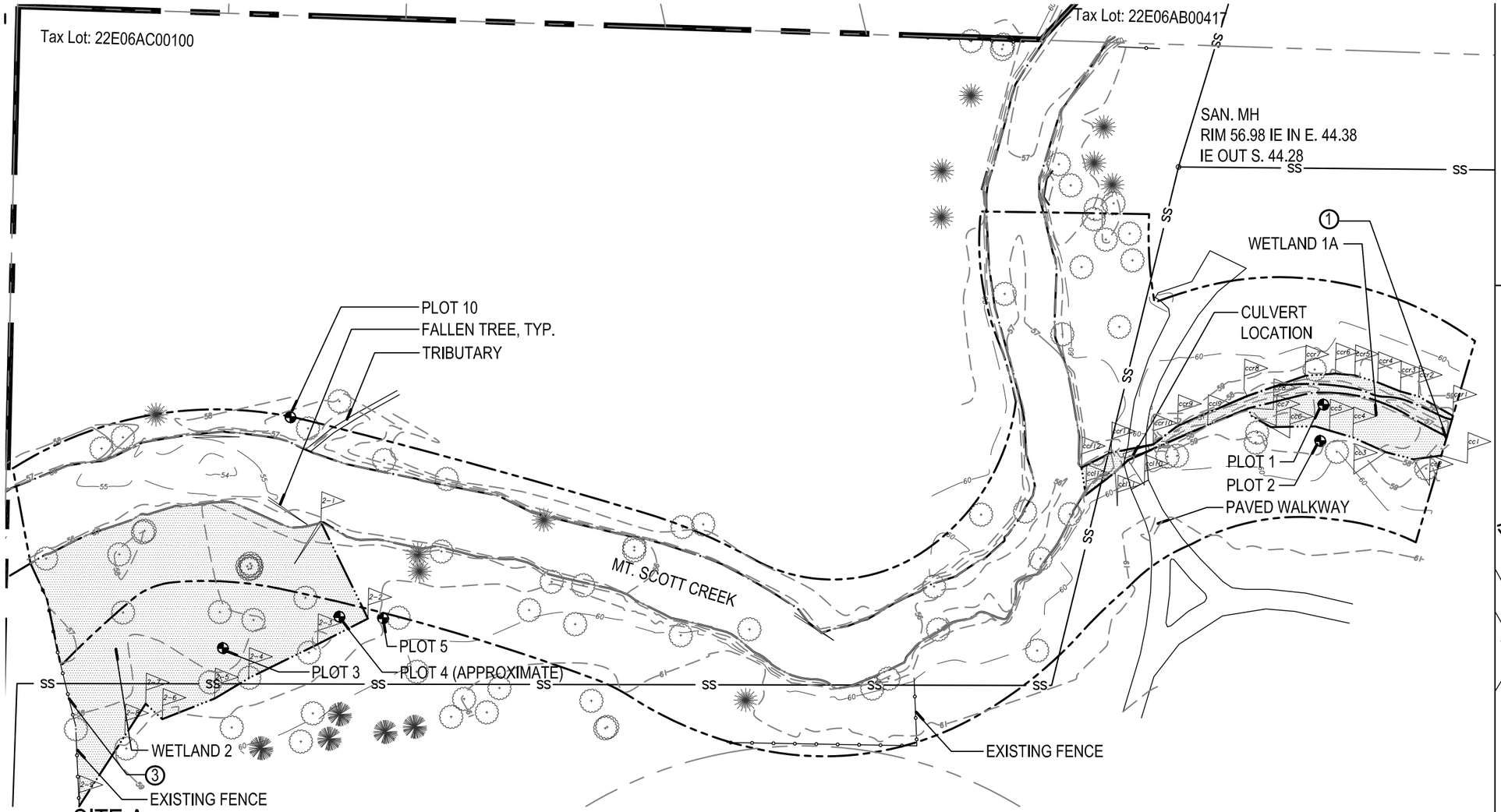
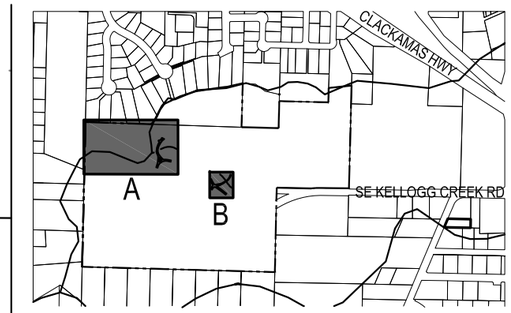
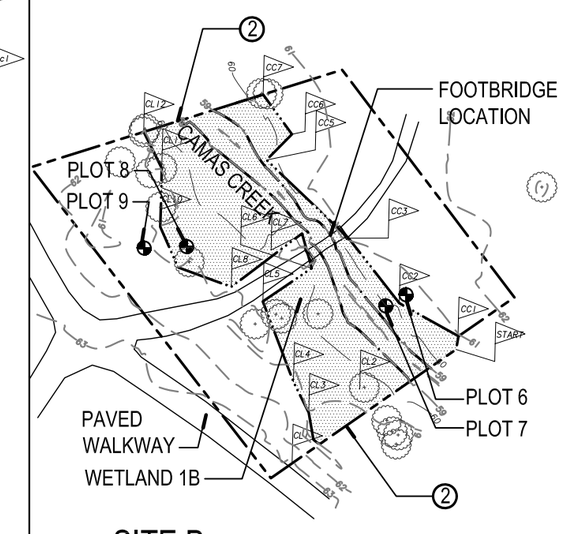



**Figure 4.** National Wetlands Inventory map.




KEY PLAN




## WETLANDS LEGEND

- PARK BOUNDARY
- STUDY AREA BOUNDARY
- TAX LOT LINES
- CREEK OHWL
- SURVEYED WETLAND AREA
- SANITARY LINES

## CALCULATIONS

| | |
|---|---|
| **WETLAND 1A** | |
| LENGTH: | 167 LF |
| WETLAND AREA: | 1091 SF |
| CREEK AREA: | 1200 SF |
| TOTAL AREA (wetland + creek) | 2291 SF |
| **WETLAND 1B** | |
| LENGTH: | 113 LF |
| WETLAND AREA: | 3649 SF |
| CREEK AREA: | 990 SF |
| TOTAL AREA (wetland + creek): | 4639 SF |
| **WETLAND 2** | |
| LENGTH: | 131 LF |
| WETLAND AREA/ TOTAL AREA: | 9433 SF |
| **MT. SCOTT CREEK** | |
| LENGTH: | 615 LF |
| CREEK AREA: | 15540 SF |
| **SITE A** | |
| STUDY AREA BOUNDARY: | 56311 SF |
| **SITE B** | |
| STUDY AREA BOUNDARY: | 11330 SF |

## GENERAL NOTES

1. Wetland and water boundaries and sample plots were professionally surveyed by Ron Bush; delineation by SWCA Environmental Consultants on June 1-2, 2011.

## KEY NOTES

1. Wetland 1A extends East out of SAB
2. Wetland 1B extends East and West out of SAB
3. Wetland 2 extends West out of SAB

0 12.5 25 50

NORTH

# Figure 5: WETLAND AND WATERS DELINEATION MAP

Mt. Scott Creek Restoration at North Clackamas Park

9-15-2011

SWCA ENVIRONMENTAL CONSULTANTS

GREENWORKS

# APPENDIX B

## Precipitation Data

**These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.**

## Climatological Report (Daily)

```
000
CDUS46 KPQR 031143
CLIPDX


CLIMATE REPORT
NATIONAL WEATHER SERVICE PORTLAND OREGON
442 AM PDT FRI JUN 3 2011


.....................................

...THE PORTLAND OR CLIMATE SUMMARY FOR JUNE 2 2011...

CLIMATE NORMAL PERIOD 1971 TO 2000
CLIMATE RECORD PERIOD 1940 TO 2011


WEATHER ITEM   OBSERVED TIME   RECORD YEAR NORMAL DEPARTURE LAST
                VALUE   (LST)  VALUE       VALUE  FROM      YEAR
                                                   NORMAL
.................................................................
TEMPERATURE (F)
 YESTERDAY
  MAXIMUM         61    603 PM  98    1970  70     -9       65
  MINIMUM         46    356 AM  41    1977  50     -4       52
  AVERAGE         54                        60     -6       59

PRECIPITATION (IN)
  YESTERDAY        0.07          0.67 2010   0.07   0.00     0.67
  MONTH TO DATE    0.41                      0.14   0.27     0.89
  SINCE OCT 1     42.66                     32.32  10.34    31.68
  SINCE JAN 1     23.81                     18.12   5.69    19.77

SNOWFALL (IN)
  YESTERDAY       MM
  MONTH TO DATE   MM
  SINCE JUN 1     MM
  SINCE JUL 1      0.0
  SNOW DEPTH       0
```

DEGREE DAYS

| | | | | |
|---|---|---|---|---|
| HEATING | | | | |
| YESTERDAY | 11 | 5 | 6 | 6 |
| MONTH TO DATE | 20 | 10 | 10 | 13 |
| SINCE JUN 1 | 20 | 10 | 10 | 13 |
| SINCE JUL 1 | 4527 | 4314 | 213 | 4149 |
| COOLING | | | | |
| YESTERDAY | 0 | 1 | -1 | 0 |
| MONTH TO DATE | 0 | 2 | -2 | 0 |
| SINCE JUN 1 | 0 | 2 | -2 | 0 |
| SINCE JAN 1 | 0 | 17 | -17 | 0 |

.....

WIND (MPH)

| | | | |
|---|---|---|---|
| HIGHEST WIND SPEED | 21 | HIGHEST WIND DIRECTION | W (250) |
| HIGHEST GUST SPEED | 26 | HIGHEST GUST DIRECTION | W (250) |
| AVERAGE WIND SPEED | 6.7 | | |

SKY COVER

POSSIBLE SUNSHINE MM

AVERAGE SKY COVER 0.8

WEATHER CONDITIONS

THE FOLLOWING WEATHER WAS RECORDED YESTERDAY.

RAIN

RELATIVE HUMIDITY (PERCENT)

| | | |
|---|---|---|
| HIGHEST | 100 | 100 AM |
| LOWEST | 55 | 100 PM |
| AVERAGE | 78 | |

.....

THE PORTLAND OR CLIMATE NORMALS FOR TODAY

| | NORMAL | RECORD | YEAR |
|---|---|---|---|
| MAXIMUM TEMPERATURE (F) | 70 | 91 | 1987 |
| MINIMUM TEMPERATURE (F) | 51 | 42 | 1976 |

SUNRISE AND SUNSET

JUNE 3 2011.....SUNRISE 524 AM PDT SUNSET 854 PM PDT

JUNE 4 2011.....SUNRISE 523 AM PDT SUNSET 855 PM PDT

```
-  INDICATES NEGATIVE NUMBERS.
R  INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T  INDICATES TRACE AMOUNT.
```

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The U.S. Naval Observatory (USNO) computes astronomical data. Therefore, the NWS does not record, certify, or authenticate astronomical data. Computed times of sunrise, sunset, moonrise, moonset; and twilight, moon phases and other astronomical data are available from USNO's Astronomical Applications Department (http://www.usno.navy.mil). See http://www.usno.navy.mil/USNO/astronomical-applications/astronomical-information-center/litigation for information on using these data for legal purposes.

**These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.**

## Climatological Report (Daily)

```
000
CDUS46 KPQR 021142
CLIPDX


CLIMATE REPORT
NATIONAL WEATHER SERVICE PORTLAND OREGON
441 AM PDT THU JUN 2 2011


.....................................

...THE PORTLAND OR CLIMATE SUMMARY FOR JUNE 1 2011...

CLIMATE NORMAL PERIOD 1971 TO 2000
CLIMATE RECORD PERIOD 1940 TO 2011


WEATHER ITEM   OBSERVED TIME   RECORD YEAR NORMAL DEPARTURE LAST
                VALUE   (LST)  VALUE       VALUE  FROM      YEAR
                                                   NORMAL
.................................................................
TEMPERATURE (F)
 YESTERDAY
  MAXIMUM         63    139 PM  94    1970  70     -7       63
  MINIMUM         49   1158 PM  39    1966  50     -1       53
  AVERAGE         56                         60     -4       58

PRECIPITATION (IN)
  YESTERDAY        0.34          0.97 1968   0.07   0.27     0.22
  MONTH TO DATE    0.34                      0.07   0.27     0.22
  SINCE OCT 1     42.59                     32.25  10.34    31.01
  SINCE JAN 1     23.74                     18.05   5.69    19.10

SNOWFALL (IN)
  YESTERDAY       MM
  MONTH TO DATE   MM
  SINCE JUN 1     MM
  SINCE JUL 1      0.0
  SNOW DEPTH       0
```

DEGREE DAYS

| | | | | |
|---|---|---|---|---|
| HEATING | | | | |
| YESTERDAY | 9 | 5 | 4 | 7 |
| MONTH TO DATE | 9 | 5 | 4 | 7 |
| SINCE JUN 1 | 9 | 5 | 4 | 7 |
| SINCE JUL 1 | 4516 | 4309 | 207 | 4143 |
| COOLING | | | | |
| YESTERDAY | 0 | 1 | -1 | 0 |
| MONTH TO DATE | 0 | 1 | -1 | 0 |
| SINCE JUN 1 | 0 | 1 | -1 | 0 |
| SINCE JAN 1 | 0 | 16 | -16 | 0 |

.....

WIND (MPH)

| | | | |
|---|---|---|---|
| HIGHEST WIND SPEED | 16 | HIGHEST WIND DIRECTION | NW (310) |
| HIGHEST GUST SPEED | 21 | HIGHEST GUST DIRECTION | NW (310) |
| AVERAGE WIND SPEED | 4.2 | | |

SKY COVER

POSSIBLE SUNSHINE MM

AVERAGE SKY COVER 0.9

WEATHER CONDITIONS

THE FOLLOWING WEATHER WAS RECORDED YESTERDAY.

RAIN

LIGHT RAIN

FOG

RELATIVE HUMIDITY (PERCENT)

| | | |
|---|---|---|
| HIGHEST | 96 | 300 AM |
| LOWEST | 55 | 200 PM |
| AVERAGE | 76 | |

.....

THE PORTLAND OR CLIMATE NORMALS FOR TODAY

| | NORMAL | RECORD | YEAR |
|---|---|---|---|
| MAXIMUM TEMPERATURE (F) | 70 | 98 | 1970 |
| MINIMUM TEMPERATURE (F) | 50 | 41 | 1977 |

SUNRISE AND SUNSET

JUNE 2 2011.....SUNRISE 524 AM PDT SUNSET 853 PM PDT

JUNE 3 2011.....SUNRISE 524 AM PDT SUNSET 854 PM PDT

Excerpt from Multnomah County Wets Table for Portland WSFO

---

WETS Station : PORTLAND WSFO, OR6751 Creation Date: 09/09/2002
Latitude: 4536 Longitude: 12236 Elevation: 00020
State FIPS/County(FIPS): 41051 County Name: Multnomah
Start yr. - 1971 End yr. - 2000

| Month | Temperature (Degrees F.) avg daily max | avg daily min | avg | Precipitation (Inches) avg | 30% chance will have less than | more than | avg # of days w/.1 or more | avg total snow fall |
|---|---|---|---|---|---|---|---|---|
| January | 46.0 | 34.6 | 40.3 | 5.07 | 2.98 | 6.16 | 11 | 1.1 |
| February | 50.8 | 36.4 | 43.6 | 4.18 | 2.84 | 4.98 | 10 | 1.4 |
| March | 56.4 | 39.3 | 47.8 | 3.71 | 2.85 | 4.31 | 10 | 0.1 |
| April | 61.4 | 42.6 | 52.0 | 2.64 | 1.93 | 3.10 | 7 | 0.0 |
| May | 67.7 | 48.1 | 57.9 | 2.38 | 1.44 | 2.88 | 6 | 0.0 |
| June | 73.6 | 53.2 | 63.4 | 1.59 | 0.94 | 1.93 | 4 | 0.0 |
| July | 80.1 | 57.4 | 68.7 | 0.72 | 0.31 | 0.89 | 1 | 0.0 |
| August | 80.6 | 57.7 | 69.1 | 0.93 | 0.33 | 1.13 | 2 | 0.0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| September | 75.6 | 52.8 | 64.2 | 1.65 | 0.65 | 2.06 | 3 | 0.0 |
| October | 64.3 | 45.4 | 54.8 | 2.88 | 1.57 | 3.52 | 7 | 0.0 |
| November | 52.5 | 40.0 | 46.3 | 5.61 | 3.72 | 6.73 | 12 | 0.6 |
| December | 46.0 | 35.3 | 40.6 | 5.71 | 3.89 | 6.82 | 11 | 1.3 |
| Annual | ----- | ----- | ----- | ------ | 32.85 | 40.58 | -- | ---- |
| Average | 62.9 | 45.2 | 54.1 | ------ | ------ | ------ | -- | ---- |
| Total | ----- | ----- | ----- | 37.07 | ------ | ------ | 84 | 4.4 |

GROWING SEASON DATES

| | Temperature | | |
|---|---|---|---|
| Probability | 24 F or higher | 28 F or higher | 32 F or higher |
| | Beginning and Ending Dates<br>Growing Season Length | | |
| 50 percent * | 1/22 to 12/27<br>340 days | 2/15 to 11/29<br>288 days | 3/22 to 11/13<br>236 days |
| 70 percent * | > 365 days<br>> 365 days | 2/ 6 to 12/ 8<br>306 days | 3/15 to 11/19<br>249 days |

* Percent chance of the growing season occurring between the Beginning and Ending dates.

total 1942-2002 prcp

Station : OR6751, PORTLAND WSFO
------- Unit = inches

| yr | jan | feb | mar | apr | may | jun | jul | aug | sep | oct | nov | dec | annl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 42 | 3.63 | M3.53 | 1.63 | | | | | | | | 11.57 | 9.37 | 29.73 |
| 43 | M5.50 | 3.27 | 5.54 | | | | | | | | M2.20 | 2.70 | 19.21 |
| 44 | 2.81 | 3.11 | 1.93 | | | | | | | | 5.00 | 1.90 | 14.75 |
| 45 | 4.10 | 4.36 | 5.30 | | | | | | | | 8.58 | 5.61 | 27.95 |
| 46 | 5.12 | 4.99 | 4.23 | | | | | | | | 7.57 | 5.47 | 27.38 |
| 47 | 3.72 | 2.77 | 4.11 | | | | | | | | 4.08 | 4.64 | 19.32 |
| 48 | 5.87 | 5.02 | 4.24 | | | | | | 3.28 | 2.39 | M6.64 | M7.84 | 35.28 |
| 49 | 1.02 | 9.46 | 2.78 | 0.72 | M2.12 | 0.68 | 0.91 | 0.24 | 1.66 | 2.35 | 5.56 | 4.86 | 32.36 |
| 50 | 10.10 | 5.77 | 4.76 | 2.74 | 0.57 | M2.31 | 0.50 | 0.72 | M1.45 | M6.29 | M8.55 | 6.31 | 50.07 |
| 51 | 7.71 | M4.29 | 3.86 | 1.14 | 1.75 | 0.03 | 0.28 | 0.02 | 2.55 | 6.81 | 5.31 | 5.06 | 38.81 |
| 52 | 4.40 | 3.59 | 3.82 | M2.55 | 0.78 | 2.23 | M0.00 | 0.18 | 0.33 | 0.72 | M1.25 | 6.76 | 26.61 |
| 53 | 12.78 | 3.71 | M3.81 | 1.89 | M3.41 | 2.04 | 0.03 | 1.79 | 1.16 | 3.56 | 6.46 | M7.84 | 48.48 |
| 54 | M8.85 | 4.57 | 2.55 | 2.54 | 1.83 | 3.58 | M1.23 | 1.92 | 0.85 | 3.40 | 5.09 | 5.01 | 41.42 |
| 55 | M2.03 | M3.26 | 3.06 | 4.72 | 1.24 | M1.78 | 0.89 | 0.00 | 2.86 | M6.53 | 7.34 | 10.14 | 43.85 |
| 56 | 11.66 | 2.04 | M3.93 | 0.53 | M2.22 | 2.03 | 0.01 | 2.56 | M0.73 | 5.10 | 1.47 | 3.64 | 35.92 |
| 57 | M2.14 | 4.14 | 7.52 | 1.84 | 1.97 | 0.73 | 0.19 | 0.69 | 0.49 | 3.53 | M2.79 | 6.15 | 32.18 |
| 58 | 6.56 | 5.13 | 2.20 | 3.33 | 1.35 | 3.04 | 0.00 | 0.02 | 1.05 | 1.49 | 6.39 | 5.06 | 35.62 |
| 59 | 7.57 | 4.18 | 3.22 | 0.92 | 2.89 | 2.38 | 0.56 | M0.09 | 2.81 | 3.51 | 3.30 | 3.08 | 34.51 |
| 60 | 3.93 | 4.00 | 4.77 | 3.33 | 3.37 | 0.52 | 0.00 | 1.00 | 1.37 | 2.39 | 8.63 | 2.61 | 35.92 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 61 | 4.50 | M6.86 | M5.32 | 3.59 | 2.80 | 0.47 | 0.42 | 1.07 | 0.64 | 2.89 | 4.67 | 5.94 | 39.17 |
| 62 | 1.58 | 3.43 | 4.25 | 3.15 | 2.56 | 0.78 | 0.06 | 1.49 | 1.66 | M3.03 | 9.32 | 2.59 | 33.90 |
| 63 | 2.27 | 3.48 | 4.69 | 3.78 | 2.74 | 1.71 | 1.17 | 0.87 | 0.75 | 3.04 | 5.64 | 3.60 | 33.74 |
| 64 | 9.51 | 0.78 | 2.28 | 1.56 | 1.04 | 1.96 | 0.68 | 0.90 | 1.61 | 0.84 | 6.78 | 9.92 | 37.86 |
| 65 | 7.44 | 2.22 | 1.10 | 2.20 | 1.31 | 0.83 | 0.44 | 0.73 | 0.01 | 2.03 | 5.64 | 7.34 | 31.29 |
| 66 | 5.74 | 1.70 | 4.71 | 0.85 | 0.91 | 1.02 | 1.19 | 0.59 | 1.70 | 3.06 | 5.50 | 6.89 | 33.86 |
| 67 | 6.21 | 2.02 | 4.31 | 2.17 | 1.02 | 1.01 | 0.00 | 0.00 | 0.76 | 4.72 | 2.27 | 4.75 | 29.24 |
| 68 | 4.58 | 6.64 | 2.68 | 1.91 | 3.63 | 2.20 | 0.14 | 4.53 | 2.20 | 5.03 | 6.23 | 11.12 | 50.89 |
| 69 | 7.61 | 3.14 | 1.13 | 2.28 | 1.61 | 2.99 | 0.14 | 0.04 | 3.86 | 3.02 | 3.18 | 8.12 | 37.12 |
| 70 | 11.81 | 4.77 | 2.58 | 2.94 | 1.55 | 0.49 | 0.05 | 0.00 | 1.10 | 2.85 | 5.72 | 7.49 | 41.35 |
| 71 | 7.09 | 3.36 | 4.87 | 2.72 | 1.00 | 1.76 | 0.26 | 0.95 | 3.53 | 2.37 | 5.76 | 8.05 | 41.72 |
| 72 | 5.71 | 4.08 | 5.41 | 2.98 | 2.23 | 0.68 | 0.56 | 0.67 | 3.06 | 0.87 | 3.78 | 8.79 | 38.82 |
| 73 | 3.69 | 1.94 | 2.45 | 1.33 | 1.43 | 1.45 | 0.06 | 1.41 | 3.29 | 3.14 | 11.55 | 9.93 | 41.67 |
| 74 | 8.51 | 4.61 | 5.65 | 1.76 | 1.74 | 0.80 | 2.01 | 0.07 | 0.21 | 2.14 | 6.73 | 6.05 | 40.28 |
| 75 | 8.43 | 4.75 | 3.45 | 1.88 | 1.35 | 1.13 | 0.43 | 2.10 | 0.00 | 4.76 | 4.10 | 6.68 | 39.06 |
| 76 | 5.14 | 4.92 | 2.93 | 2.34 | 2.29 | 0.78 | 0.66 | 3.29 | 0.73 | 1.48 | 0.77 | 1.38 | 26.71 |
| 77 | 1.07 | 2.49 | 3.50 | 1.04 | 4.30 | 0.83 | 0.39 | 3.26 | 3.33 | 2.28 | 5.56 | 8.98 | 37.03 |
| 78 | 4.85 | 3.28 | 1.49 | 3.96 | 3.17 | 1.69 | 1.36 | 2.05 | 2.07 | 0.36 | 3.83 | 2.51 | 30.62 |
| 79 | 2.59 | 6.53 | 2.51 | 2.47 | 2.41 | 0.64 | 0.25 | 1.18 | 1.75 | 4.85 | 3.38 | 7.23 | 35.79 |
| 80 | 8.51 | 4.01 | 3.11 | 2.58 | 2.19 | 2.50 | 0.19 | 0.39 | 1.56 | 1.18 | 6.47 | 9.72 | 42.41 |
| 81 | 1.47 | 3.86 | 2.33 | 1.79 | 2.25 | 3.23 | 0.24 | 0.15 | 1.86 | 4.12 | 4.62 | 8.37 | 34.29 |
| 82 | 6.31 | 5.98 | 2.38 | 3.56 | 0.46 | 1.66 | 0.94 | 1.66 | 3.98 | 4.44 | 3.51 | 8.16 | 43.04 |
| 83 | 6.23 | 7.78 | 6.80 | 1.87 | 1.30 | 1.95 | 2.68 | 2.29 | 0.39 | 1.95 | 8.65 | 5.30 | 47.19 |
| 84 | 2.01 | 3.93 | 3.19 | 3.20 | 3.41 | 4.06 | 0.00 | 0.09 | 1.46 | 3.85 | 9.74 | 2.56 | 37.50 |
| 85 | 0.06 | 1.79 | 3.08 | 1.07 | 1.52 | 2.34 | 0.55 | 0.48 | 2.76 | 2.75 | 3.89 | 2.19 | 22.48 |
| 86 | 4.65 | 5.31 | 2.60 | 1.91 | 2.19 | 0.23 | 1.20 | 0.10 | 4.30 | 1.99 | 6.26 | 4.30 | 35.04 |
| 87 | 6.93 | 2.45 | 4.91 | 1.94 | 1.63 | 0.14 | 1.03 | 0.35 | 0.30 | 0.27 | 1.96 | 8.00 | 29.91 |
| 88 | 4.95 | 1.17 | 3.13 | 4.57 | 2.53 | 2.34 | 0.69 | 0.10 | 1.76 | 0.19 | 7.92 | 2.37 | 31.72 |
| 89 | 3.30 | 2.84 | 6.73 | 2.08 | 2.87 | 0.78 | 0.91 | 1.07 | 1.48 | 1.73 | 3.18 | 3.08 | 30.05 |
| 90 | 7.95 | 3.43 | 2.52 | 2.31 | 2.37 | 1.94 | 0.32 | 0.95 | 0.34 | 4.65 | 3.68 | 2.40 | 32.86 |
| 91 | 2.56 | 3.65 | 4.64 | 4.05 | 3.34 | 2.31 | 0.07 | 0.70 | 0.02 | 1.51 | 6.36 | 4.34 | 33.55 |
| 92 | 4.31 | 4.12 | 1.87 | 3.82 | 0.10 | 0.60 | 0.67 | 0.49 | 1.12 | 2.87 | 4.55 | 4.98 | 29.50 |
| 93 | 3.06 | 0.72 | 4.39 | 5.26 | 4.36 | 1.69 | 2.41 | 0.37 | 0.00 | 1.59 | 1.50 | 5.01 | 30.36 |
| 94 | 3.56 | 4.92 | 1.84 | 1.91 | 0.56 | 1.67 | 0.07 | 0.13 | 1.13 | 8.41 | 5.91 | 4.85 | 34.96 |
| 95 | 5.56 | 3.19 | 3.82 | 3.49 | 1.65 | 2.62 | 1.23 | 0.81 | 1.31 | 3.15 | 10.74 | 5.91 | 43.48 |
| 96 | 7.15 | 10.03 | 3.24 | 5.12 | 4.88 | 0.44 | 0.73 | 0.25 | 3.05 | 5.38 | 9.58 | 13.35 | 63.20 |
| 97 | 7.32 | 1.63 | 7.14 | 3.73 | 3.63 | 2.83 | 0.52 | 1.58 | 1.98 | 6.40 | 4.02 | 3.03 | 43.81 |
| 98 | 6.77 | 5.27 | 4.06 | 1.04 | 5.55 | 1.73 | 0.59 | 0.00 | 1.09 | 2.16 | 11.02 | 6.74 | 46.02 |
| 99 | 6.63 | 8.73 | 4.03 | 1.56 | 1.97 | 1.73 | 0.51 | 0.75 | 0.10 | 2.44 | 6.81 | 3.62 | 38.88 |
| 0 | 5.66 | 4.50 | 3.21 | 1.82 | 2.70 | 1.19 | 0.15 | 0.12 | 1.67 | 3.25 | 2.46 | 3.47 | 30.20 |
| 1 | 1.47 | 1.29 | 3.11 | 2.85 | 0.91 | 1.79 | 0.95 | 0.74 | 0.70 | 3.12 | 6.89 | 6.62 | 30.44 |
| 2 | | | | | | | | | | | | | |

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[Explanation of the Preliminary Monthly Climate Data (F6) Product]

**These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.**

## WFO Monthly/Daily Climate Data

000
CXUS55 KPQR 011230
CF6PDX
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

STATION: PORTLAND OR
MONTH: MAY
YEAR: 2011
LATITUDE: 45 35 N
LONGITUDE: 122 36 W

| TEMPERATURE IN F: | | | | | | | :PCPN: | SNOW: | | WIND | | | :SUNSHINE: | | SKY | | :PK WND | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6A | 6B | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | | | | | | | | | 12Z | AVG | MX | 2MIN | | | | | | |
| DY | MAX | MIN | AVG | DEP | HDD | CDD | WTR | SNW | DPTH | SPD | SPD | DIR | MIN | PSBL | S-S | WX | SPD | DR |
| 1 | 67 | 38 | 53 | -1 | 12 | 0 | 0.00 | M | 0 | 2.8 | 9 | 110 | M | M | 5 | | 12 | 320 |
| 2 | 61 | 48 | 55 | 1 | 10 | 0 | T | M | 0 | 10.2 | 24 | 200 | M | M | 9 | | 32 | 250 |
| 3 | 60 | 45 | 53 | -1 | 12 | 0 | 0.03 | M | 0 | 5.5 | 14 | 280 | M | M | 6 | | 23 | 330 |
| 4 | 70 | 41 | 56 | 1 | 9 | 0 | 0.00 | 0.0 | 0 | 4.5 | 13 | 280 | M | M | 4 | 8 | 15 | 270 |
| 5 | 59 | 47 | 53 | -2 | 12 | 0 | 0.05 | M | 0 | 4.9 | 13 | 80 | M | M | 9 | 8 | 15 | 80 |
| 6 | 56 | 48 | 52 | -3 | 13 | 0 | 0.26 | M | 0 | 5.7 | 14 | 200 | M | M | 10 | 1 | 20 | 200 |
| 7 | 59 | 47 | 53 | -2 | 12 | 0 | 0.29 | M | 0 | 7.4 | 17 | 200 | M | M | 9 | 1 | 21 | 190 |
| 8 | 59 | 44 | 52 | -4 | 13 | 0 | 0.42 | M | 0 | 6.7 | 14 | 270 | M | M | 7 | 1 | 17 | 290 |
| 9 | 60 | 49 | 55 | -1 | 10 | 0 | 0.00 | 0.0 | 0 | 6.5 | 13 | 310 | M | M | 10 | | 16 | 310 |
| 10 | 65 | 48 | 57 | 1 | 8 | 0 | 0.00 | M | 0 | 2.6 | 8 | 320 | M | M | 8 | | 26 | 70 |
| 11 | 58 | 43 | 51 | -5 | 14 | 0 | 0.25 | M | 0 | 6.3 | 21 | 290 | M | M | 9 | 1 | 32 | 260 |
| 12 | 63 | 38 | 51 | -5 | 14 | 0 | 0.00 | M | 0 | 4.7 | 16 | 210 | M | M | 6 | 1 | 21 | 220 |
| 13 | 73 | 44 | 59 | 2 | 6 | 0 | 0.00 | 0.0 | 0 | 5.8 | 17 | 310 | M | M | 8 | | 22 | 320 |
| 14 | 64 | 51 | 58 | 1 | 7 | 0 | 0.01 | 0.0 | 0 | 6.0 | 15 | 170 | M | M | 10 | 18 | 18 | 170 |
| 15 | 57 | 47 | 52 | -5 | 13 | 0 | 0.75 | M | 0 | 6.6 | 18 | 250 | M | M | 8 | 1 | 21 | 250 |
| 16 | 62 | 47 | 55 | -2 | 10 | 0 | 0.03 | M | 0 | 6.5 | 15 | 190 | M | M | 7 | | 17 | 190 |
| 17 | 64 | 42 | 53 | -4 | 12 | 0 | 0.00 | M | 0 | 2.7 | 12 | 50 | M | M | 7 | | 14 | 320 |
| 18 | 71 | 47 | 59 | 1 | 6 | 0 | 0.00 | M | 0 | 4.2 | 18 | 310 | M | M | 4 | | 23 | 310 |
| 19 | 73 | 43 | 58 | 0 | 7 | 0 | 0.00 | M | 0 | 4.7 | 13 | 310 | M | M | 3 | | 18 | 350 |
| 20 | 74 | 45 | 60 | 2 | 5 | 0 | T | M | 0 | 4.7 | 21 | 310 | M | M | 4 | | 25 | 310 |
| 21 | 62 | 50 | 56 | -2 | 9 | 0 | T | 0.0 | 0 | 3.9 | 13 | 310 | M | M | 9 | | 16 | 310 |
| 22 | 59 | 51 | 55 | -3 | 10 | 0 | T | 0.0 | 0 | 4.4 | 10 | 310 | M | M | 10 | | 13 | 290 |
| 23 | 61 | 49 | 55 | -3 | 10 | 0 | 0.02 | M | 0 | 5.6 | 13 | 300 | M | M | 8 | | 16 | 300 |
| 24 | 68 | 42 | 55 | -4 | 10 | 0 | 0.00 | 0.0 | 0 | 3.8 | 10 | 280 | M | M | 7 | | 14 | 330 |
| 25 | 57 | 45 | 51 | -8 | 14 | 0 | 0.23 | M | 0 | 5.6 | 20 | 250 | M | M | 9 | 1 | 24 | 260 |
| 26 | 57 | 42 | 50 | -9 | 15 | 0 | 0.13 | M | 0 | 8.7 | 20 | 200 | M | M | 8 | 1 | 24 | 210 |
| 27 | 57 | 45 | 51 | -8 | 14 | 0 | 0.22 | M | 0 | 7.7 | 26 | 210 | M | M | 8 | 1 | 31 | 210 |
| 28 | 62 | 44 | 53 | -6 | 12 | 0 | 0.14 | M | 0 | 4.9 | 23 | 350 | M | M | 7 | 3 | 35 | 340 |
| 29 | 56 | 44 | 50 | -10 | 15 | 0 | 0.02 | M | 0 | 3.1 | 10 | 170 | M | M | 9 | 1 | 12 | 180 |
| 30 | 64 | 49 | 57 | -3 | 8 | 0 | 0.01 | M | 0 | 4.4 | 12 | 90 | M | M | 8 | 1 | 17 | 80 |

```
31  61  51  56  -4   9   0 0.06  0.0    0  5.0 12 300   M    M   9 18     14 340
================================================================================
SM 1939 1414       331   0  2.92     0.0 166.1          M      235
================================================================================
AV 62.5 45.6                              5.4 FASTST   M    M   8    MAX(MPH)
                                 MISC ---->  # 26 210               # 35  340
================================================================================
NOTES:
# LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

                                          STATION:  PORTLAND OR
                                          MONTH:    MAY
                                          YEAR:     2011
                                          LATITUDE:   45 35 N
                                          LONGITUDE: 122 36 W

[TEMPERATURE DATA]      [PRECIPITATION DATA]       SYMBOLS USED IN COLUMN 16

AVERAGE MONTHLY: 54.1   TOTAL FOR MONTH:   2.92    1 = FOG OR MIST
DPTR FM NORMAL:  -3.0   DPTR FM NORMAL:    0.54    2 = FOG REDUCING VISIBILITY
HIGHEST:    74 ON 20    GRTST 24HR  0.76 ON 14-15      TO 1/4 MILE OR LESS
LOWEST:     38 ON 12, 1                            3 = THUNDER
                        SNOW, ICE PELLETS, HAIL    4 = ICE PELLETS
                        TOTAL MONTH:   0.0 INCH    5 = HAIL
                        GRTST 24HR     0.0         6 = FREEZING RAIN OR DRIZZLE
                        GRTST DEPTH:   0           7 = DUSTSTORM OR SANDSTORM:
                                                       VSBY 1/2 MILE OR LESS
                                                   8 = SMOKE OR HAZE
[NO. OF DAYS WITH]      [WEATHER - DAYS WITH]      9 = BLOWING SNOW
                                                   X = TORNADO
MAX 32 OR BELOW:   0    0.01 INCH OR MORE:  17
MAX 90 OR ABOVE:   0    0.10 INCH OR MORE:   9
MIN 32 OR BELOW:   0    0.50 INCH OR MORE:   1
MIN  0 OR BELOW:   0    1.00 INCH OR MORE:   0

[HDD (BASE 65) ]
TOTAL THIS MO.   331    CLEAR  (SCALE 0-3)   1
DPTR FM NORMAL    88    PTCLDY (SCALE 4-7)  14
TOTAL FM JUL 1  4507    CLOUDY (SCALE 8-10) 16
DPTR FM NORMAL   203

[CDD (BASE 65) ]
TOTAL THIS MO.     0
DPTR FM NORMAL   -14    [PRESSURE DATA]
TOTAL FM JAN 1     0    HIGHEST SLP 30.54 ON  3
DPTR FM NORMAL   -15    LOWEST  SLP 29.62 ON 15

[REMARKS]
#FINAL-05-11#
```

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## Record Report

```
000
SXUS76 KPQR 161148 AAA
RERPQR

RECORD EVENT REPORT...UPDATED
NATIONAL WEATHER SERVICE PORTLAND OREGON
444 AM PDT MON MAY 16 2011

FINAL RAINFALL AMOUNT FOR MAY 15TH

...RECORD DAILY MAXIMUM RAINFALL SET AT PORTLAND OREGON...

RAIN FALLING ACROSS THE REGION WAS THE HEAVIEST OVER THE CASCADES.
HOWEVER...STEADY LIGHT RAIN OVER THE PORTLAND AND VANCOUVER AREA
TODAY HAS ALLOWED FOR ONE RECORD TO BE BROKEN.

AT THE PORTLAND AIRPORT...THE RAINFALL FOR MAY 15TH WAS 0.75 INCHES.
THIS IS A NEW RECORD DAILY RAINFALL FOR MAY 15. THE PRIOR RECORD OF
0.59 INCH SET ON THIS DATE WAY BACK IN 1942 (PERIOD OF RECORD FOR
PORTLAND AIRPORT IS 1940 TO PRESENT).

THIS IS NOT THE WETTEST START TO MAY ON RECORD FOR PORTLAND. AT THE
AIRPORT...HERE ARE THE TOP 10 WETTEST STARTS TO MAY.
```

| RANK | YEAR | MAY 1-15 RAINFALL |
|---|---|---|
| 1 | 2009 | 2.83 INCHES |
| 2 | 1963 | 2.74 |
| 3 | 1948 | 2.53 |
| 4 | 1978 | 2.42 |
| 5 | 1977 | 2.29 |
| 6 | 1979 | 2.17 |
| 7 | 1959 | 2.12 |
| 8 | 2000 | 2.07 |
| 9 | 1996 | 2.06 |
| 10 | 2011 | 2.04 |

```
IT IS UNLIKELY THAT OTHER STATIONS IN NORTHWEST OREGON AND EXTREME
SOUTHWEST WASHINGTON WILL BREAK THEIR DAILY RAINFALL RECORD FOR MAY
15 AS THEIR RECORD RAINFALL ARE HIGHER.
```

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## Climatological Report (Monthly)

```
000
CXUS56 KPQR 011452
CLMPDX


CLIMATE REPORT
NATIONAL WEATHER SERVICE PORTLAND OREGON
752 AM PDT SUN MAY 1 2011

.....................................

...THE PORTLAND OR CLIMATE SUMMARY FOR THE MONTH OF APRIL 2011...

CLIMATE NORMAL PERIOD 1971 TO 2000
CLIMATE RECORD PERIOD 1940 TO 2011

WEATHER         OBSERVED          NORMAL  DEPART  LAST YEAR`S
                 VALUE   DATE(S)  VALUE   FROM    VALUE  DATE(S)
                                          NORMAL
.................................................................
TEMPERATURE (F)
HIGHEST            71                                 73  04/18
LOWEST             31                                 34  04/10
AVG. MAXIMUM     56.0              60.5    -4.5     59.1
AVG. MINIMUM     39.8              41.9    -2.1     42.8
MEAN             47.9              51.2    -3.3     51.0
DAYS MAX >= 90      0               0.0     0.0        0
DAYS MAX <= 32      0               0.0     0.0        0
DAYS MIN <= 32      1               0.7     0.3        0
DAYS MIN <= 0       0               0.0     0.0        0

PRECIPITATION (INCHES)
RECORD
 MAXIMUM         5.26   1993
 MINIMUM         1.04   1998
TOTALS           5.04              2.64    2.40     2.92
DAYS >= .01        20              15.3     4.7       25
DAYS >= .10        14               7.9     6.1        9
DAYS >= .50         4               0.9     3.1        0
DAYS >= 1.00        0               0.2    -0.2        0
GREATEST
```

```
 24 HR. TOTAL    1.07   04/14 TO 04/15

SNOWFALL (INCHES)
TOTALS            0.0

DEGREE_DAYS
HEATING TOTAL     505              400     105      413
 SINCE 7/1       4176             4061     115     3833
COOLING TOTAL       0                1      -1        0
 SINCE 1/1          0                1      -1        0
.............................................................

WIND (MPH)
AVERAGE WIND SPEED              6.8
RESULTANT WIND SPEED/DIRECTION   3/235
HIGHEST WIND SPEED/DIRECTION    33/230    DATE  04/13
HIGHEST GUST SPEED/DIRECTION    39/230    DATE  04/13

SKY COVER
POSSIBLE SUNSHINE (PERCENT)   MM

NUMBER OF DAYS FAIR            2
NUMBER OF DAYS PC             11
NUMBER OF DAYS CLOUDY         17

AVERAGE RH (PERCENT)     69

WEATHER CONDITIONS. NUMBER OF DAYS WITH
THUNDERSTORM              2     MIXED PRECIP              0
HEAVY RAIN                2     RAIN                     12
LIGHT RAIN               20     FREEZING RAIN             0
LT FREEZING RAIN          0     HAIL                      3
HEAVY SNOW                0     SNOW                      0
LIGHT SNOW                0     SLEET                     0
FOG                      17     FOG W/VIS <= 1/4 MILE     2
HAZE                      2

-  INDICATES NEGATIVE NUMBERS.
R  INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T  INDICATES TRACE AMOUNT.
```

**These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.**

## Climatological Report (Monthly)

```
000
CXUS56 KPQR 012201
CLMPDX


CLIMATE REPORT
NATIONAL WEATHER SERVICE PORTLAND OREGON
301 PM PDT FRI APR 1 2011

.....................................

...THE PORTLAND OR CLIMATE SUMMARY FOR THE MONTH OF MARCH 2011...

CLIMATE NORMAL PERIOD 1971 TO 2000
CLIMATE RECORD PERIOD 1940 TO 2011

WEATHER         OBSERVED          NORMAL  DEPART  LAST YEAR`S
                 VALUE   DATE(S)  VALUE   FROM    VALUE  DATE(S)
                                          NORMAL
.............................................................
TEMPERATURE (F)
HIGHEST            63                                 70  03/20
LOWEST             31                                 30  03/18
AVG. MAXIMUM     52.5              55.7    -3.2     56.8
AVG. MINIMUM     39.7              38.6     1.1     39.6
MEAN             46.1              47.2    -1.1     48.2
DAYS MAX >= 90      0               0.0     0.0        0
DAYS MAX <= 32      0               0.0     0.0        0
DAYS MIN <= 32      1               3.0    -2.0        1
DAYS MIN <= 0       0               0.0     0.0        0

PRECIPITATION (INCHES)
RECORD
 MAXIMUM         7.14   1997
 MINIMUM         1.49   1978
TOTALS           6.43              3.71    2.72     3.58
DAYS >= .01        28              17.2    10.8       17
DAYS >= .10        20              10.4     9.6        9
DAYS >= .50         3               1.7     1.3        3
DAYS >= 1.00        0               0.1    -0.1        0
GREATEST
```

```
 24 HR. TOTAL    0.77   03/15 TO 03/15

SNOWFALL (INCHES)
TOTALS            0.0

DEGREE_DAYS
HEATING TOTAL     577              536      41      510
 SINCE 7/1       3671             3661      10     3420
COOLING TOTAL       0                0       0        0
 SINCE 1/1          0                0       0        0
.............................................................

WIND (MPH)
AVERAGE WIND SPEED              9.1
RESULTANT WIND SPEED/DIRECTION   5/147
HIGHEST WIND SPEED/DIRECTION    40/240    DATE  03/13
HIGHEST GUST SPEED/DIRECTION    55/250    DATE  03/13

SKY COVER
POSSIBLE SUNSHINE (PERCENT)   MM

NUMBER OF DAYS FAIR            0
NUMBER OF DAYS PC              3
NUMBER OF DAYS CLOUDY         28

AVERAGE RH (PERCENT)     79

WEATHER CONDITIONS. NUMBER OF DAYS WITH
THUNDERSTORM              1     MIXED PRECIP              0
HEAVY RAIN                3     RAIN                     13
LIGHT RAIN               28     FREEZING RAIN             0
LT FREEZING RAIN          0     HAIL                      0
HEAVY SNOW                0     SNOW                      0
LIGHT SNOW                0     SLEET                     0
FOG                      25     FOG W/VIS <= 1/4 MILE     3
HAZE                      4

-  INDICATES NEGATIVE NUMBERS.
R  INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T  INDICATES TRACE AMOUNT.
```

# APPENDIX C

## Wetland Determination Data Forms

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: North Clackamas Park City/County: Milwaukie/Clackamas Sampling Date: 6/1/2011

Applicant/Owner: GreenWorks / Clackamas County Water Environment Services State: OR Sampling Point: 1

Investigator(s): C.M. Walker and S. Reed Section, Township, Range: Sec. 6AC, T2S, R2E

Landform (hillslope, terrace, etc.): Floodplain terrace Local relief (concave, convex, none): Concave Slope (%): <3

Subregion (LRR): A, Northwest Forests and Coast Lat: Long: Datum: NAD 1983

Soil Map Unit Name: 84 - Wapato silty clay loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No X (If no, explain in Remarks)

Are Vegetation ,Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation ,Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes X | No | |
| Hydric Soil Present? | Yes | No X | **Is the Sampled Area within a Wetland?** Yes No X |
| Wetland Hydrology Present? | Yes X | No | |

Remarks: NA means Not Applicable (used on plowed and planted agricultural crop sites in reference to the vegetation).
Precipitation prior to fieldwork: 0.34 inches of rainfall day of and 0.83 inches two weeks prior to field work in Portlar
Long cold wet spring. Plot located upslope of left bank of Camas Creek near wetland boundary.

## VEGETATION

| Tree Stratum (Plot size: 30' r) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Fraxinus latifolia* | 80% | Yes | FACW |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| | 80% = Total Cover | | |
| **Sapling/Shrub Stratum (Plot size: 10' r)** | | | |
| 1. *Rosa pisocarpa* | 25% | Yes | FAC |
| 2. *Salix species* | 10% | Yes | FAC ? |
| 3. *Rubus armeniacus* | 5% | No | FACU |
| 4. | | | |
| 5. | | | |
| | 40% = Total Cover | | |
| **Herb Stratum (Plot size: 5' r)** | | | |
| 1. *Phalaris arundinacea* | 55% | Yes | FACW |
| 2. *Carex obnupta* | 20% | Yes | OBL |
| 3. *Lysichiton americanus* | 15% | No | OBL |
| 4. *Athyrium filix-femina* | 5% | No | FAC |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 95% = Total Cover | | |
| **Woody Vine Stratum (Plot size: 10' r)** | | | |
| 1. | | | |
| 2. | | | |
| | 0% = Total Cover | | |

% Bare Ground in Herb Stratum 5%

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index worksheet:**

| | Total % Cover of: | Multiply by: | |
|---|---|---|---|
| OBL species | 35 | x 1 = | 35 |
| FACW species | 135 | x 2 = | 270 |
| FAC species | 40 | x 3 = | 120 |
| FACU species | 5 | x 4 = | 20 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 215 (A) | | 445 (B) |

Prevalence Index = B/A = 2.07

**Hydrophytic Vegetation Indicators:**

- 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- 3 - Prevalence Index is≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- 5 - Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present?** Yes X No

Remarks: *identifies indicator status is tentative
Shrub #1 planted.

Entered by: JCW QC by: CMW

## SOIL

Sampling Point: **1**

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-16 | 10YR 3/1 | 100 | None | | | | sicl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** **Yes** ___ **No** X

Remarks: s = sand; si = silt; c = clay; l = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

| | | | | | |
|---|---|---|---|---|---|
| Surface Water Present? | Yes | ___ | No | X | Depth (inches): ___ |
| Water Table Present? | Yes | X | No | ___ | Depth (inches): 7 |
| Saturation Present? (includes capillary fringe) | Yes | X | No | ___ | Depth (inches): Surface |

**Wetland Hydrology Present?** **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Seeps to surface. Plot located near wetland boundary.

Entered by: JCW QC by: CMW

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: North Clackamas Park City/County: Milwaukie/Clackamas Sampling Date: 6/1/2011

Applicant/Owner: GreenWorks / Clackamas County Water Environment Services State: OR Sampling Point: 2

Investigator(s): C.M. Walker and S. Reed Section, Township, Range: Sec. 6AC, T2S, R2E

Landform (hillslope, terrace, etc.): Floodplain terrace Local relief (concave, convex, none): Concave Slope (%): <3

Subregion (LRR): A, Northwest Forests and Coast Lat: Long: Datum: NAD 1983

Soil Map Unit Name: Wapato silty clay loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No X (If no, explain in Remarks)

Are Vegetation ,Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation ,Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes X | No | **Is the Sampled Area within a Wetland?** Yes X No |
| Hydric Soil Present? | Yes X | No | |
| Wetland Hydrology Present? | Yes X | No | |

Remarks: NA means Not Applicable (used on plowed and planted agricultural crop sites in reference to the vegetation).
Precipitation prior to fieldwork: 0.34 inches of rainfall day of and 0.83 inches two weeks prior to field work in Portlar
Long cold wet spring. Plot located approximately 15' north of plot 1 and 5' south of Camas Creek left bank.

## VEGETATION

| Tree Stratum (Plot size: 30' r) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Fraxinus latifolia* | 65% | Yes | FACW |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| | 65% = Total Cover | | |
| **Sapling/Shrub Stratum (Plot size: 10' r)** | | | |
| 1. *Cornus sericea* | 40% | Yes | FACW |
| 2. *Salix sitchensis* | 20% | Yes | FACW |
| 3. *Rosa pisocarpa* | 5% | No | FAC |
| 4. | | | |
| 5. | | | |
| | 65% = Total Cover | | |
| **Herb Stratum (Plot size: 5' r)** | | | |
| 1. *Carex obnupta* | 80% | Yes | OBL |
| 2. *Athyrium filix-femina* | 10% | No | FAC |
| 3. *Lysichiton americanus* | 5% | No | OBL |
| 4. *Rubus ursinus* | 5% | No | FACU |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 100% = Total Cover | | |
| **Woody Vine Stratum (Plot size: 10' r)** | | | |
| 1. | | | |
| 2. | | | |
| | 0% = Total Cover | | |

% Bare Ground in Herb Stratum 0%

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 85 | x 1 = | 85 |
| FACW species | 125 | x 2 = | 250 |
| FAC species | 15 | x 3 = | 45 |
| FACU species | 5 | x 4 = | 20 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 230 (A) | | 400 (B) |

Prevalence Index = B/A = 1.74

**Hydrophytic Vegetation Indicators:**

- 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- 3 - Prevalence Index is≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- 5 - Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present?** Yes X No

Remarks: *identifies indicator status is tentative

Entered by: JCW QC by: CMW

## SOIL

Sampling Point: **2**

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-12 | 10YR 3/1 | 80 | 7.5YR 3/4 | 20 | C | M | sicl | |
| 12-24 | N 3/1 | 95 | 7.5YR 3/4 | 5 | C | M | c | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ___

Depth (inches): ___

**Hydric Soil Present?** **Yes** X **No** ___

Remarks: s = sand; si = silt; c = clay; l = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

| | | | | | |
|---|---|---|---|---|---|
| Surface Water Present? | Yes ___ | No X | Depth (inches): ___ | | |
| Water Table Present? | Yes X | No ___ | Depth (inches): 12 | **Wetland Hydrology Present?** | |
| Saturation Present? (includes capillary fringe) | Yes X | No ___ | Depth (inches): Surface | **Yes** X | **No** ___ |

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Water slowly rising, seeps at 9 inches.

Entered by: JCW QC by: CMW

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: North Clackamas Park City/County: Milwaukie/Clackamas Sampling Date: 6/1/2011

Applicant/Owner: GreenWorks / Clackamas County Water Environment Services State: OR Sampling Point: 3

Investigator(s): C.M. Walker and S. Reed Section, Township, Range: Sec. 6AC, T2S, R2E

Landform (hillslope, terrace, etc.): Floodplain terrace Local relief (concave, convex, none): Concave Slope (%): <3

Subregion (LRR): A, Northwest Forests and Coast Lat: Long: Datum: NAD 1983

Soil Map Unit Name: Wapato silty clay loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes X | No ___ | **Is the Sampled Area within a Wetland?** **Yes X** **No ___** |
| Hydric Soil Present? | Yes X | No ___ | |
| Wetland Hydrology Present? | Yes X | No ___ | |

Remarks: NA means Not Applicable (used on plowed and planted agricultural crop sites in reference to the vegetation).
Precipitation prior to fieldwork: 0.34 inches of rainfall day of and 0.83 inches two weeks prior to field work in Portlar
Long cold wet spring. Plot located in wetland # 2 south of Mt. Scott Creek.

## VEGETATION

| Tree Stratum (Plot size: 30' r) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Fraxinus latifolia* | 40% | Yes | FACW |
| 2. *Alnus rubra* | 30% | Yes | FAC |
| 3. | | | |
| 4. | | | |
| | 70% | = Total Cover | |
| **Sapling/Shrub Stratum (Plot size: 10' r)** | | | |
| 1. *Cornus sericea* | 5% | Yes | FACW |
| 2. *Rosa species* | 3% | Yes | FAC ? |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 8% | = Total Cover | |
| **Herb Stratum (Plot size: 5' r)** | | | |
| 1. *Carex obnupta* | 70% | Yes | OBL |
| 2. *Lysichiton americanus* | 10% | No | OBL |
| 3. *Athyrium filix-femina* | 10% | No | FAC |
| 4. *Impatiens capensis* | 5% | No | FACW |
| 5. *Urtica dioica* | 3% | No | FAC |
| 6. *Phalaris arundinacea* | 2% | No | FACW |
| 7. *Solanum dulcamara* | 2% | No | FAC |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 92% | = Total Cover | |
| **Woody Vine Stratum (Plot size: 10' r)** | | | |
| 1. | | | |
| 2. | | | |
| | 0% | = Total Cover | |

% Bare Ground in Herb Stratum 8%

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index worksheet:**

| | Total % Cover of: | Multiply by: | |
|---|---|---|---|
| OBL species | 80 | x 1 = | 80 |
| FACW species | 52 | x 2 = | 104 |
| FAC species | 48 | x 3 = | 144 |
| FACU species | 0 | x 4 = | 0 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 180 (A) | | 328 (B) |

Prevalence Index = B/A = 1.82

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present?** **Yes X** **No ___**

Remarks: *identifies indicator status is tentative
Tree root hole nearby.

Entered by: JCW QC by: CMW

## SOIL

Sampling Point: **3**

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-6 | 10YR 3/1 | 90 | 10YR 3/6 | 10 | C | M | sicl | |
| 6-20 | 10YR 4/1 | 90 | 7.5YR 3/4 | 10 | C | M | sic | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** **Yes** X **No** ___

Remarks: s = sand; si = silt; c = clay; l = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

| | | | | | |
|---|---|---|---|---|---|
| Surface Water Present? | Yes | ___ | No | X | Depth (inches): ___ |
| Water Table Present? | Yes | X | No | ___ | Depth (inches): 20 |
| Saturation Present? (includes capillary fringe) | Yes | X | No | ___ | Depth (inches): Surface |

**Wetland Hydrology Present?** **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Entered by: JCW QC by: CMW

Free water accumulated at bottom of pit with sidewall seeps up to the surface; nearby tree root well had free water at surface.

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: North Clackamas Park City/County: Milwaukie/Clackamas Sampling Date: 6/1/2011

Applicant/Owner: GreenWorks / Clackamas County Water Environment Services State: OR Sampling Point: 4

Investigator(s): C.M. Walker and S. Reed Section, Township, Range: Sec. 6AC, T2S, R2E

Landform (hillslope, terrace, etc.): Floodplain terrace Local relief (concave, convex, none): Concave Slope (%): <3

Subregion (LRR): A, Northwest Forests and Coast Lat: Long: Datum: NAD 1983

Soil Map Unit Name: Wapato silty clay loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes X | No ___ | **Is the Sampled Area within a Wetland?** **Yes X** **No ___** |
| Hydric Soil Present? | Yes X | No ___ | |
| Wetland Hydrology Present? | Yes X | No ___ | |

Remarks: NA means Not Applicable (used on plowed and planted agricultural crop sites in reference to the vegetation).
Precipitation prior to fieldwork: 0.34 inches of rainfall day of and 0.83 inches two weeks prior to field work in Portlar
Long cold wet spring. Wetland #2

## VEGETATION

| Tree Stratum (Plot size: 30' r) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Fraxinus latifolia* | 80% | Yes | FACW |
| 2. *Alnus rubra* | 10% | No | FAC |
| 3. | | | |
| 4. | | | |
| | 90% = Total Cover | | |
| **Sapling/Shrub Stratum (Plot size: 10' r)** | | | |
| 1. *Alnus rubra* | 10% | Yes | FAC |
| 2. *Thuja plicata* | 5% | Yes | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 15% = Total Cover | | |
| **Herb Stratum (Plot size: 5' r)** | | | |
| 1. *Phalaris arundinacea* | 75% | Yes | FACW |
| 2. *Impatiens capensis* | 15% | No | FACW |
| 3. *Glyceria species* | 5% | No | FACW/OBL |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 95% = Total Cover | | |
| **Woody Vine Stratum (Plot size: 10' r)** | | | |
| 1. | | | |
| 2. | | | |
| | 0% = Total Cover | | |

% Bare Ground in Herb Stratum 5%

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 170 | x 2 = | 340 |
| FAC species | 25 | x 3 = | 75 |
| FACU species | 0 | x 4 = | 0 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 195 (A) | | 415 (B) |

Prevalence Index = B/A = 2.13

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present?** **Yes X** **No ___**

Remarks: *identifies indicator status is tentative

Entered by: JCW QC by: CMW

## SOIL

Sampling Point: **4**

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-16 | 10YR 3/1 | 95 | 7.5YR 3/4 | 5 | C | M | sicl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ___

Depth (inches): ___

**Hydric Soil Present?** **Yes** X **No** ___

Remarks: s = sand; si = silt; c = clay; l = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

| | | | | | |
|---|---|---|---|---|---|
| Surface Water Present? | Yes ___ | No X | Depth (inches): ___ | | |
| Water Table Present? | Yes X | No ___ | Depth (inches): Surface | | |
| Saturation Present? (includes capillary fringe) | Yes X | No ___ | Depth (inches): Surface | | |

**Wetland Hydrology Present?** **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Seeps to surface.

Entered by: JCW QC by: CMW

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: North Clackamas Park City/County: Milwaukie/Clackamas Sampling Date: 6/1/2011

Applicant/Owner: GreenWorks / Clackamas County Water Environment Services State: OR Sampling Point: 5

Investigator(s): C.M. Walker and S. Reed Section, Township, Range: Sec. 6AC, T2S, R2E

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): <3

Subregion (LRR): A, Northwest Forests and Coast Lat: Long: Datum: NAD 1983

Soil Map Unit Name: Wapato silty clay loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No X (If no, explain in Remarks)

Are Vegetation ,Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation ,Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes | No X | **Is the Sampled Area within a Wetland?** Yes No X |
| Hydric Soil Present? | Yes | No X | |
| Wetland Hydrology Present? | Yes | No X | |

Remarks: NA means Not Applicable (used on plowed and planted agricultural crop sites in reference to the vegetation).
Precipitation prior to fieldwork: 0.34 inches of rainfall day of and 0.83 inches two weeks prior to field work in Portlar
Long cold wet spring.

## VEGETATION

| Tree Stratum (Plot size: 30' r) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Populus balsamifera* | 10% | Yes | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| | 10% = Total Cover | | |
| **Sapling/Shrub Stratum (Plot size: 10' r)** | | | |
| 1. *Rubus armeniacus* | 10% | Yes | FACU |
| 2. *Populus balsamifera* | 5% | Yes | FAC |
| 3. *Oemleria cerasiformis* | 1% | No | FACU |
| 4. *Ilex aquifolium* | 1% | No | NOL |
| 5. | | | |
| | 17% = Total Cover | | |
| **Herb Stratum (Plot size: 5' r)** | | | |
| 1. *Polystichum munitum* | 40% | Yes | FACU |
| 2. *Tellima grandiflora* | 20% | Yes | NOL |
| 3. *Ranunculus repens* | 5% | No | FACW |
| 4. *Geum macrophyllum* | 5% | No | FACW* |
| 5. *Hedera helix* | 1% | No | NOL |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 71% = Total Cover | | |
| **Woody Vine Stratum (Plot size: 10' r)** | | | |
| 1. | | | |
| 2. | | | |
| | 0% = Total Cover | | |

% Bare Ground in Herb Stratum 29%

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 10 | x 2 = | 20 |
| FAC species | 15 | x 3 = | 45 |
| FACU species | 51 | x 4 = | 204 |
| UPL species | 22 | x 5 = | 110 |
| Column Totals: | 98 (A) | | 379 (B) |

Prevalence Index = B/A = 3.87

**Hydrophytic Vegetation Indicators:**

- 1 - Rapid Test for Hydrophytic Vegetation
- 2 - Dominance Test is >50%
- 3 - Prevalence Index is≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- 5 - Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present?** Yes No X

Remarks: *identifies indicator status is tentative

Entered by: JCW QC by: CMW

## SOIL

Sampling Point: **5**

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-11 | 10YR 3/2 | 100 | None | | | | gr sil | |
| 11-20 | 10YR 4/2 | 90 | 7.5YR 4/6 | 10 | C | M | sicl | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** **Yes** ___ **No** X

Remarks: s = sand; si = silt; c = clay; l = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

| | | | | | |
|---|---|---|---|---|---|
| Surface Water Present? | Yes ___ | No X | Depth (inches): ___ | | |
| Water Table Present? | Yes ___ | No X | Depth (inches): >20 | **Wetland Hydrology Present?** | |
| Saturation Present? (includes capillary fringe) | Yes ___ | No X | Depth (inches): >20 | **Yes** ___ | **No** X |

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Entered by: JCW QC by: CMW

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: North Clackamas Park City/County: Milwaukie/Clackamas Sampling Date: 6/2/2011

Applicant/Owner: GreenWorks / Clackamas County Water Environment Services State: OR Sampling Point: 6

Investigator(s): C.M. Walker and S. Reed Section, Township, Range: Sec. 6AC, T2S, R2E

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Convex Slope (%): <3

Subregion (LRR): A, Northwest Forests and Coast Lat: Long: Datum: NAD 1983

Soil Map Unit Name: Wapato silty clay loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes ___ | No X | **Is the Sampled Area within a Wetland?** Yes ___ No X |
| Hydric Soil Present? | Yes ___ | No X | |
| Wetland Hydrology Present? | Yes ___ | No X | |

Remarks: NA means Not Applicable (used on plowed and planted agricultural crop sites in reference to the vegetation).
Precipitation prior to fieldwork: 0.07 inches of rainfall day of the site visit and 1.17 inches the two weeks prior in Portlar
Long cold wet spring. Plot located upslope of right bank of Camas Creek (upstream portion within study area).

## VEGETATION

| Tree Stratum (Plot size: 30' r) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| | 0% = Total Cover | | |
| **Sapling/Shrub Stratum (Plot size: 10' r)** | | | |
| 1. *Rubus armeniacus* | 5% | Yes | FACU |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 5% = Total Cover | | |
| **Herb Stratum (Plot size: 5' r)** | | | |
| 1. *Phalaris arundinacea* | 80% | Yes | FACW |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 80% = Total Cover | | |
| **Woody Vine Stratum (Plot size: 10' r)** | | | |
| 1. | | | |
| 2. | | | |
| | 0% = Total Cover | | |

% Bare Ground in Herb Stratum 20%

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

**Prevalence Index worksheet:**

| | Total % Cover of: | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 80 | x 2 = | 160 |
| FAC species | 0 | x 3 = | 0 |
| FACU species | 5 | x 4 = | 20 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 85 (A) | | 180 (B) |

Prevalence Index = B/A = 2.12

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present?** Yes ___ No X

Remarks: *identifies indicator status is tentative

Entered by: JCW QC by: CMW

## SOIL

Sampling Point: **6**

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-10 | 10YR 3/2 | 100 | None | | | | sil | |
| 10-16 | 10YR 3/1 | 90 | 10YR 3/6 | 10 | C | M | sicl | |
| 16-24 | 10YR 4/1 | 90 | 7.5YR 3/4 | 10 | C | M | sic | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)**(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

**Hydric Soil Present? Yes** _____ **No** X

Remarks: s = sand; si = silt; c = clay; l = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)**(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9)**(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

| | | | | | |
|---|---|---|---|---|---|
| Surface Water Present? | Yes | | No | X | Depth (inches): |
| Water Table Present? | Yes | X | No | | Depth (inches): 20 |
| Saturation Present? (includes capillary fringe) | Yes | X | No | | Depth (inches): 16 |

**Wetland Hydrology Present? Yes** _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Entered by: JCW QC by: CMW

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: North Clackamas Park City/County: Milwaukie/Clackamas Sampling Date: 6/2/2011

Applicant/Owner: GreenWorks / Clackamas County Water Environment Services State: OR Sampling Point: 7

Investigator(s): C.M. Walker and S. Reed Section, Township, Range: Sec. 6AC, T2S, R2E

Landform (hillslope, terrace, etc.): Floodplain terrace Local relief (concave, convex, none): Concave Slope (%): <3

Subregion (LRR): A, Northwest Forests and Coast Lat: Long: Datum: NAD 1983

Soil Map Unit Name: Wapato silty clay loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No X (If no, explain in Remarks)

Are Vegetation ,Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation ,Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes X | No | **Is the Sampled Area within a Wetland?** **Yes X** **No** |
| Hydric Soil Present? | Yes X | No | |
| Wetland Hydrology Present? | Yes X | No | |

Remarks: NA means Not Applicable (used on plowed and planted agricultural crop sites in reference to the vegetation).
Precipitation prior to fieldwork: 0.07 inches of rainfall day of the site visit and 1.17 inches the two weeks prior in Portlar
Long cold wet spring. Wetland 1- plot located upslope right bank of Camas Creek.

## VEGETATION

| Tree Stratum (Plot size: 30' r) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| | 0% = Total Cover | | |
| **Sapling/Shrub Stratum (Plot size: 10' r)** | | | |
| 1. *Alnus rubra* | 10% | Yes | FAC |
| 2. *Spiraea douglasii* | 5% | Yes | FACW |
| 3. *Salix species* | 5% | Yes | FAC ? |
| 4. *Cornus sericea* | 3% | No | FACW |
| 5. | | | |
| | 23% = Total Cover | | |
| **Herb Stratum (Plot size: 5' r)** | | | |
| 1. *Phalaris arundinacea* | 40% | Yes | FACW |
| 2. *Scirpus microcarpus* | 20% | Yes | OBL |
| 3. *Impatiens capensis* | 20% | Yes | FACW |
| 4. *Lysichiton americanus* | 10% | No | OBL |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 90% = Total Cover | | |
| **Woody Vine Stratum (Plot size: 10' r)** | | | |
| 1. | | | |
| 2. | | | |
| | 0% = Total Cover | | |

% Bare Ground in Herb Stratum 10%

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 30 | x 1 = | 30 |
| FACW species | 68 | x 2 = | 136 |
| FAC species | 15 | x 3 = | 45 |
| FACU species | 0 | x 4 = | 0 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 113 (A) | | 211 (B) |
| Prevalence Index = B/A = | | | 1.87 |

**Hydrophytic Vegetation Indicators:**

- 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- 3 - Prevalence Index is≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- 5 - Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present?** **Yes X** **No**

Remarks: *identifies indicator status is tentative
Shrub 1 planted.

Entered by: JCW QC by: CMW

## SOIL

Sampling Point: **7**

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-18 | 10YR 3/1 | 98 | 7.5YR 3/4 | 2 | C | M | sicl | |
| 18-24 | 10YR 4/1 | 90 | 7.5YR 3/4 | 10 | C | M, PL | sic | trace sand |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** **Yes** X **No** ___

Remarks: s = sand; si = silt; c = clay; l = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- X Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

| | | | | | |
|---|---|---|---|---|---|
| Surface Water Present? | Yes | ___ | No | X | Depth (inches): ___ |
| Water Table Present? | Yes | X | No | ___ | Depth (inches): 13 |
| Saturation Present? (includes capillary fringe) | Yes | X | No | ___ | Depth (inches): Surface |

**Wetland Hydrology Present?** **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Sidewall seeps at 9 inches.

Entered by: JCW QC by: CMW

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: North Clackamas Park City/County: Milwaukie/Clackamas Sampling Date: 6/2/2011

Applicant/Owner: GreenWorks / Clackamas County Water Environment Services State: OR Sampling Point: 8

Investigator(s): C.M. Walker and S. Reed Section, Township, Range: Sec. 6AC, T2S, R2E

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Convex Slope (%): <3

Subregion (LRR): A, Northwest Forests and Coast Lat: Long: Datum: NAD 1983

Soil Map Unit Name: Wapato silty clay loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes X | No ___ | **Is the Sampled Area within a Wetland?** **Yes X** **No ___** |
| Hydric Soil Present? | Yes X | No ___ | |
| Wetland Hydrology Present? | Yes X | No ___ | |

Remarks: NA means Not Applicable (used on plowed and planted agricultural crop sites in reference to the vegetation).
Precipitation prior to fieldwork: 0.07 inches of rainfall day of the site visit and 1.17 inches the two weeks prior in Portlar
Long cold wet spring. Wetland 1 - plot located upslope of left bank Camas Creek.

## VEGETATION

| Tree Stratum (Plot size: 30' r) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Fraxinus latifolia* | 80% | Yes | FACW |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| | 80% = Total Cover | | |
| **Sapling/Shrub Stratum (Plot size: 10' r)** | | | |
| 1. *Crataegus monogyna* | 5% | Yes | FACU* |
| 2. *Alnus rubra* | 5% | Yes | FAC |
| 3. *Salix scouleriana* | 5% | Yes | FAC |
| 4. *Rubus armeniacus* | 5% | Yes | FACU |
| 5. | | | |
| | 20% = Total Cover | | |
| **Herb Stratum (Plot size: 5' r)** | | | |
| 1. *Phalaris arundinacea* | 60% | Yes | FACW |
| 2. *Carex obnupta* | 20% | Yes | OBL |
| 3. *Poa species* | 10% | No | FAC ? |
| 4. *Ranunculus uncinatus* | 5% | No | FAC |
| 5. *Hedera helix* | 3% | No | NOL |
| 6. *Equisetum arvense* | 2% | No | FAC |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 100% = Total Cover | | |
| **Woody Vine Stratum (Plot size: 10' r)** | | | |
| 1. | | | |
| 2. | | | |
| | 0% = Total Cover | | |

% Bare Ground in Herb Stratum 0%

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 71% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 20 | x 1 = | 20 |
| FACW species | 140 | x 2 = | 280 |
| FAC species | 27 | x 3 = | 81 |
| FACU species | 10 | x 4 = | 40 |
| UPL species | 3 | x 5 = | 15 |
| Column Totals: | 200 (A) | | 436 (B) |

Prevalence Index = B/A = 2.18

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present?** **Yes X** **No ___**

Remarks: *identifies indicator status is tentative
Some fill and wood pieces.

Entered by: JCW QC by: CMW

## SOIL

Sampling Point: **8**

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-11 | 10YR 3/1 | 98 | 7.5YR 3/4 | 2 | C | M | sicl | cobbles |
| 11-16 | 10YR 4/1 | 80 | 7.5YR 4/6 | 20 | C | M | sic | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ___

Depth (inches): ___

**Hydric Soil Present?** **Yes** X **No** ___

Remarks: s = sand; si = silt; c = clay; l = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

| | | | | | |
|---|---|---|---|---|---|
| Surface Water Present? | Yes ___ | No X | Depth (inches): ___ | | |
| Water Table Present? | Yes X | No ___ | Depth (inches): 11 | **Wetland Hydrology Present?** | |
| Saturation Present? (includes capillary fringe) | Yes X | No ___ | Depth (inches): 8 | **Yes** X | **No** ___ |

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Entered by: JCW QC by: CMW

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: North Clackamas Park City/County: Milwaukie/Clackamas Sampling Date: 6/2/2011

Applicant/Owner: GreenWorks / Clackamas County Water Environment Services State: OR Sampling Point: 9

Investigator(s): C.M. Walker and S. Reed Section, Township, Range: Sec. 6AC, T2S, R2E

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Convex Slope (%): <3

Subregion (LRR): A, Northwest Forests and Coast Lat: Long: Datum: NAD 1983

Soil Map Unit Name: Wapato silty clay loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes X | No ___ | **Is the Sampled Area within a Wetland?** Yes ___ No X |
| Hydric Soil Present? | Yes ___ | No X | |
| Wetland Hydrology Present? | Yes ___ | No X | |

Remarks: NA means Not Applicable (used on plowed and planted agricultural crop sites in reference to the vegetation).
Precipitation prior to fieldwork: 0.07 inches of rainfall day of the site visit and 1.17 inches the two weeks prior in Portlar
Long cold wet spring.

## VEGETATION

| Tree Stratum (Plot size: 30' r) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Fraxinus latifolia* | 40% | Yes | FACW |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| | 40% = Total Cover | | |
| **Sapling/Shrub Stratum (Plot size: 10' r)** | | | |
| 1. *Rubus armeniacus* | 5% | Yes | FACU |
| 2. *Acer circinatum* | 5% | Yes | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 10% = Total Cover | | |
| **Herb Stratum (Plot size: 5' r)** | | | |
| 1. *Schedonorus phoenix* | 50% | Yes | FAC |
| 2. *Poa pratensis* | 25% | Yes | FAC |
| 3. *Arrhenatherum elatius* | 20% | Yes | UPL |
| 4. *Dactylis glomerata* | 5% | No | FACU |
| 5. *Ranunculus species* | 1% | No | FAC ? |
| 6. *Carex obnupta* | 1% | No | OBL |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 102% = Total Cover | | |
| **Woody Vine Stratum (Plot size: 10' r)** | | | |
| 1. | | | |
| 2. | | | |
| | 0% = Total Cover | | |

% Bare Ground in Herb Stratum 0%

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

**Prevalence Index worksheet:**

| | Total % Cover of: | Multiply by: | |
|---|---|---|---|
| OBL species | 1 | x 1 = | 1 |
| FACW species | 40 | x 2 = | 80 |
| FAC species | 81 | x 3 = | 243 |
| FACU species | 10 | x 4 = | 40 |
| UPL species | 20 | x 5 = | 100 |
| Column Totals: | 152 (A) | | 464 (B) |

Prevalence Index = B/A = 3.05

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present?** Yes X No ___

Remarks: *identifies indicator status is tentative

Entered by: JCW QC by: CMW

## SOIL

Sampling Point: **9**

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-13 | 10YR 3/1 | 100 | None | | | | gr sil | |
| 13-16 | 10YR 3/1 | 80 | 10YR 4/6 | 10 | C | M | sic | |
| | | | 7.5YR 4/4 | 10 | C | M | | |
| 16-20 | 10YR 4/1 | 90 | 7.5YR 4/4 | 10 | C | M | sic | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** **Yes** ___ **No** X

Remarks: s = sand; si = silt; c = clay; l = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

| | | | | | |
|---|---|---|---|---|---|
| Surface Water Present? | Yes | ___ | No | X | Depth (inches): ___ |
| Water Table Present? | Yes | X | No | ___ | Depth (inches): 18 |
| Saturation Present? (includes capillary fringe) | Yes | X | No | ___ | Depth (inches): 16 |

**Wetland Hydrology Present?** **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Entered by: JCW QC by: CMW

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: North Clackamas Park City/County: Milwaukie/Clackamas Sampling Date: 6/2/2011

Applicant/Owner: GreenWorks / Clackamas County Water Environment Services State: OR Sampling Point: 10

Investigator(s): C.M. Walker and S. Reed Section, Township, Range: Sec. 6AC, T2S, R2E

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Convex Slope (%): <3

Subregion (LRR): A, Northwest Forests and Coast Lat: Long: Datum: NAD 1983

Soil Map Unit Name: Wapato silty clay loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes X | No | |
| Hydric Soil Present? | Yes | No X | **Is the Sampled Area within a Wetland?** Yes ___ No X |
| Wetland Hydrology Present? | Yes X | No | |

Remarks: NA means Not Applicable (used on plowed and planted agricultural crop sites in reference to the vegetation).
Precipitation prior to fieldwork: 0.07 inches of rainfall day of the site visit and 1.17 inches the two weeks prior in Portlar
Long cold wet spring. Plot located approximately 10' north of right bank of Mt. Scott Creek and west of wetland drainage.

## VEGETATION

| Tree Stratum (Plot size: 30' r) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Alnus rubra* | 20% | Yes | FAC |
| 2. *Fraxinus latifolia* | 20% | Yes | FACW |
| 3. | | | |
| 4. | | | |
| | 40% | = Total Cover | |
| **Sapling/Shrub Stratum (Plot size: 10' r)** | | | |
| 1. *Rubus armeniacus* | 90% | Yes | FACU |
| 2. *Rubus spectabilis* | 5% | No | FAC |
| 3. *Thuja plicata* | 5% | No | FAC |
| 4. | | | |
| 5. | | | |
| | 100% | = Total Cover | |
| **Herb Stratum (Plot size: 5' r)** | | | |
| 1. *Equisetum arvense* | 5% | Yes | FAC |
| 2. *Polystichum munitum* | 2% | No | FACU |
| 3. *Hedera helix* | 1% | No | NOL |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 8% | = Total Cover | |
| **Woody Vine Stratum (Plot size: 10' r)** | | | |
| 1. | | | |
| 2. | | | |
| | 0% | = Total Cover | |

% Bare Ground in Herb Stratum 92%

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 20 | x 2 = | 40 |
| FAC species | 35 | x 3 = | 105 |
| FACU species | 92 | x 4 = | 368 |
| UPL species | 1 | x 5 = | 5 |
| Column Totals: | 148 (A) | | 518 (B) |

Prevalence Index = B/A = 3.50

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present?** Yes X No ___

Remarks: *identifies indicator status is tentative
Shrub #1 recently cut back.

Entered by: JCW QC by: CMW

## SOIL

Sampling Point: **10**

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-13 | 10YR 3/2 | None | | | | | sil | sticky |
| 13-18 | 10YR 3/2 | 90 | 2.5Y 4/1 | 10 | D | M | sicl | manganese concretions |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** **Yes** ___ **No** X

Remarks: s = sand; si = silt; c = clay; l = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

| | | | | | |
|---|---|---|---|---|---|
| Surface Water Present? | Yes | ___ | No | X | Depth (inches): ___ |
| Water Table Present? | Yes | X | No | ___ | Depth (inches): 8 |
| Saturation Present? (includes capillary fringe) | Yes | X | No | ___ | Depth (inches): Surface |

**Wetland Hydrology Present?** **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Seeps at 6 inches.

Entered by: JCW QC by: CMW

# APPENDIX D

## Ground-level Site Photographs

**Photo 1.** View north of paved trail and footbridge crossing Camas Creek and adjacent wetlands.

**Photo 2.** View northeast of Plot 7 in Wetland 1.

**Photo 3.** View southeast of Wetland 1 boundary.

**Photo 4.** View southwest of Wetland 2 (yellow flag is wetland Plot 4).

**Photo 5.** View south of Wetland 2.

**Photo 6.** View north of Camas Creek.

**Photo 7.** View south of wetland drainage in study area.

**Photo 8.** View northeast of Mt. Scott Creek.

# APPENDIX E

## Vegetation List

| North Clackamas Park Mt. Scott Creek and Camas Creek<br>Vegetation List<br>June 1 and 2, 2011 | | |
|---|---|---|
| **Common Name** | **Scientific Name** | **Wetland Indicator Status** |
| **WETLAND VEGETATION** | | |
| red alder | *Alnus rubra* | FAC |
| lady fern | *Athyrium filix-femina* | FAC |
| slough sedge | *Carex obnupta* | OBL |
| red-osier dogwood | *Cornus sericea* | FACW |
| ornamental hawthorn | *Crataegus monogyna* | FACU* |
| common horsetail | *Equisetum arvense* | FAC |
| Oregon ash | *Fraxinus latifolia* | FACW |
| mannagrass | *Glyceria species* | FACW/OBL |
| English ivy | *Hedera helix* | NOL |
| orange balsam, jewelweed | *Impatiens capensis* | FACW |
| skunk cabbage | *Lysichiton americanus* | OBL |
| reed canarygrass | *Phalaris arundinacea* | FACW |
| bluegrass | *Poa species* | FAC ? |
| hooked buttercup | *Ranunculus uncinatus* | FAC |
| rose | *Rosa species* | FACW* to NOL |
| pea-fruit rose | *Rosa pisocarpa* | FAC |
| Himalayan blackberry | *Rubus armeniacus* | FACU |
| willow | *Salix species* | OBL to FAC |
| Scouler willow | *Salix scouleriana* | FAC |
| small-fruited bulrush | *Scirpus microcarpus* | OBL |
| bittersweet nightshade | *Solanum dulcamara* | FAC |
| Douglas' spirea | *Spiraea douglasii* | FACW |
| western red cedar | *Thuja plicata* | FAC |
| stinging nettle | *Urtica dioica* | FAC |
| **UPLAND VEGETATION** | | |
| vine maple | *Acer circinatum* | FAC |
| tall oatgrass | *Arrhenatherum elatius* | UPL |
| slough sedge | *Carex obnupta* | OBL |
| orchard grass | *Dactylis glomerata* | FACU |
| Oregon avens | *Geum macrophyllum* | FACW* |
| English ivy | *Hedera helix* | NOL |
| English holly | *Ilex aquifolium* | NOL |
| Indian plum | *Oemleria cerasiformis* | FACU |
| reed canarygrass | *Phalaris arundinacea* | FACW |
| Kentucky bluegrass | *Poa pratensis* | FAC |
| sword fern | *Polystichum munitum* | FACU |
| black cottonwood | *Populus balsamifera* | FAC |
| creeping buttercup | *Ranunculus repens* | FACW |
| buttercup | *Ranunculus species* | OBL to UPL |
| Himalayan blackberry | *Rubus armeniacus* | FACU |
| tall fescue | *Schedonorus phoenix* | FAC |
| fringecup | *Tellima grandiflora* | NOL |
| western red cedar | *Thuja plicata* | FAC |

An asterisk (*) following a Regional Indicator identifies tentative assignments based on limited information from which to determine the indicator status.

A question mark (?) preceded by a space indicates our default assumption that the plant is FAC.

Taxonomy and synonymy per Reed 1988, Kartesz 1994, and the USDA PLANTS Database
http://plants.usda.gov/

Wetland Indicator Status per Reed 1988 and 1993 supplement (see also USDA Plants Database)

| **WETLAND INDICATOR STATUS** | |
|---|---|
| **OBL** | **Obligate Wetland** - Plants that occur almost always in wetlands (estimated probability >99%) under natural conditions, but which may also rarely occur in non-wetlands (<1% probability). Examples: broadleaf cattail, skunk cabbage |
| **FACW** | **Facultative Wetland** - Plants that usually occur in wetlands (estimated probability 67%-99%), but also occur in non-wetlands an estimated 1%-33% of the time. Examples: Oregon ash, red-osier dogwood |
| **FAC** | **Facultative** - Plants that are equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%). Examples: red alder, salmonberry |
| **FACU** | **Facultative Upland** - Plants that usually occur in non-wetlands (estimated probability 67-99%), but occasionally are found in wetlands (estimated probability 1%-33%). Examples: bigleaf maple, Himalayan blackberry |
| **UPL** | **Upland** - Plants that almost always occur in non-wetlands (<1% probability of occurring in wetlands). |
| **NOL** | **Not Listed** - Plants that are not on the list; assumed to be UPL but may not have occurred in the region when indicators were assigned. |
| **NI** | **No Indicator** - Insufficient information available or plant is widely tolerant. |
| **NO** | **No Occurrence** - The species does not occur in the region. |

**National Indicators** reflect the range of estimated probabilities (expressed as a frequency of occurrence) of a species occurring in wetlands versus non-wetland across the entire distribution of the species. A frequency, for example, of 67%-99% (Facultative Wetland) means that 67%-99% of sample plots containing the species randomly selected across the range of the species would be wetland. When two indicators are given, they reflect the range from the lowest to the highest frequency of occurrence in wetlands across the regions in which the species is found. A positive (+) or negative (-) sign was used with the Facultative Indicator categories to more specifically define the regional frequency of occurrence in wetlands. The + sign indicates a frequency toward the higher end of the category (more frequently found in wetlands), and a - sign indicates a frequency toward the lower end of the category (less frequently found in wetlands). The Regional Supplements to the 1987 Corps Wetland Delineation Manual have removed the significance of the + and - signs and these have been deleted.

**Regional Indicators** express the estimated probability (likelihood) of a species occurring in wetlands versus non-wetlands in the region. Regional Indicators reflect the unanimous agreement of the Regional Interagency Review Panel. If a plant has NI or NO status in our Northwest Region 9, we are instructed to look at the adjacent regions for wetland indicator status. The adjacent regions include Region 0 (California), Region 8 (Intermountain), Region 4 (North Plains), and Region 5 (Central Plains).

The wetland indicator categories should not be equated to degrees of wetness. Many obligate wetland species occur in permanently or semi-permanently flooded wetlands, but a number of obligates also occur in and some are restricted to wetlands which are only temporarily or seasonally flooded. The facultative upland species include a diverse collection of plants, which range from weedy species adapted to exist in a number of environmentally stressful or disturbed sites (including wetlands), to species in which a portion of the gene pool (an ecotype) always occurs in wetlands. Both the weedy and ecotype representatives of the facultative upland category occur in seasonally and semi-permanently flooded wetlands.

# APPENDIX F

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# 2.4 DECIDUOUS FORESTED WETLANDS AND FLOODPLAINS

*Along the Willamette and the Columbia Rivers, the large floodplains and wetlands support a riparian community dominated by deciduous trees.*

The soil ranges from loamy to sandy or gravely, and well drained but with a high water table and frequent flooding. Water saturates the soil much of the year. The dominant trees are black cottonwood, Oregon ash, various willows, and red alder, all of which can quickly recover from periodic flooding.

On higher ground which floods less frequently big–leaf maple and garry oak are common. Western red cedars appear in the transition zones between the lowlands and the forested bluffs overlooking the rivers.

This is a dynamic community that responds to periodic flooding and high disturbance; floods which can rip trees out of the ground or bury them with sediment. Plants are typically fast growing and can readily reestablish themselves after a disturbance.

| KEY | |
|---|---|
| | **Most common species appear in bold type** |
| | *Italic type indicates species that rarely occur in this community within Portland* |

| | Latin Name | Common Name |
|---|---|---|
| TREES | **Alnus rubra** | **Red Alder** |
| | **Crataegus suksdorfii** | **Black Hawthorn** |
| | **Fraxinus latifolia** | **Oregon Ash** |
| | **Populus balsamifera var. trichocarpa** | **Black Cottonwood** |
| | **Populus tremuloides** | **Quaking Aspen** |
| | **Salix lucida ssp. lasiandra** | **Pacific Willow** |
| | **Salix scouleriana** | **Scouler Willow** |

| | Latin Name | Common Name |
|---|---|---|
| TREES (continued | Acer macrophyllum | Big–Leaf Maple |
| | Crataegus suksdorfii | Black Hawthorn |
| | Quercus garryana | Garry Oak |
| | Rhamnus purshiana | Cascara |
| | Salix rigida var. macrogemma | Rigid Willow |
| | *Thuja plicata* | *Western Red Cedar* |
| SHRUBS | **Amelanchier alnifolia** | **Western Serviceberry** |
| | **Cornus sericea ssp. sericea** | **Red–osier Dogwood** |
| | **Oemleria cerasiformis** | **Indian Plum** |
| | **Physocarpus capitatus** | **Pacific Ninebark** |
| | **Rosa gymnocarpa** | **Baldhip Rose** |
| | **Rosa nutkana** | **Nootka Rose** |
| | **Salix fluviatilis** | **Columbia River Willow** |
| | **Sambucus cerulea** | **Blue Elderberry** |
| | **Sambucus racemosa** | **Red Elderberry** |
| | **Symphoricarpos albus** | **Common Snowberry** |
| | Malus fusca | Western Crabapple |
| | Prunus virginiana | Common Chokecherry |
| | Ribes sanguineum | Red Currant |
| | Salix hookeriana | Piper's Willow |
| | Salix sessilifolia | Soft–leafed Willow |
| | Salix sitchensis | Sitka Willow |
| | Spiraea douglasii | Douglas' Spirea |
| | *Ribes lobbii* | *Pioneer Gooseberry* |

| | Latin Name | Common Name |
|---|---|---|
| HERBACIOUS, GRASSES, ETC. | **Angelica arguta** | **Sharptooth Angelica** |
| | **Arnica amplexicaulis var. piperi** | **Clasping Arnica** |
| | **Athyrium filix–femina** | **Lady Fern** |
| | **Bromus carinatus** | **California Brome–grass** |
| | **Claytonia perfoliata or Montia perfoliata** | **Miner's Lettuce** |
| | **Cyperus aristatus** | **Awned flatsedge** |
| | **Cyperus erythrorhizos** | **Red-Rooted flatsedge** |
| | **Cyperus strigosus** | **Straw-colored flatsedge** |
| | **Elymus glaucus** | **Blue Wildrye** |
| | **Equisetum arvense** | **Common Horsetail** |
| | **Galium trifidum** | **Small Bedstraw** |
| | **Heracleum lanatum** | **Cow–parsnip** |
| | **Juncus ensifolius** | **Dagger–leaf Rush** |
| | **Montia sibirica** | **Candy Flower** |
| | **Polypodium glycrrhiza** | **Licorice Fern** |
| | **Polystichum munitum** | **Sword Fern** |
| | **Pteridium aquilinum** | **Bracken** |
| | **Ranunculus occidentalis** | **Western Buttercup** |
| | **Ranunculus uncinatus** | **Little Buttercup** |
| | **Scirpus cyperinus** | **Wooly Sedge** |
| | **Tellima grandiflora** | **Fringecup** |
| | **Urtica dioica** | **Stinging Nettle** |
| | **Vancouveria hexandra** | **White Inside–out Flower** |
| | Alopecurus geniculatus | Water Foxtail |
| | Adiatum pedatum | Northern Maidenhair Fern |
| | Aquilegia formosa | Red Columbine |
| | Aruncus sylvester | Goatsbeard |
| | Blechnum spicant | Deer Fern |
| | Bromus sitchensis | Alaska Brome |
| | Cardamine oligosperma | Little Western Bittergrass |
| | Carex deweyana ssp. leptopoda | Dewey's Sedge |
| | Corydalis scouleri | Western Corydalis |
| | Dicentra formosa | Pacific Bleedingheart |

| | Latin Name | Common Name |
|---|---|---|
| **HERBACIOUS, GRASSES, ETC. (continued)** | Epilobium angustifolium | Fireweed |
| | Epilobium ciliatum spp. glandulosum | Common Willow–reed |
| | Epilobium ciliatum spp. watsonii | Watson's Willow–reed |
| | Festuca occidentalis | Western Fescue–grass |
| | Fragaria vesca var. bracteata | Wood Strawberry |
| | Fragaria vesca var. crinita | Wood Strawbery |
| | Gentianella amerella spp. acuta | Northern Gentian |
| | Geum macrophyllum | Oregon Avens |
| | Heuchera glabra | Smooth Alumroot |
| | Heuchera micrantha | Smallflowered Alumroot |
| | Lupinus rivularis | Stream Lupine |
| | Mertensia platyphylla | Western Bluebells |
| | Mitella pentandra | Five–stamened Mitrewort |
| | Oplopanax horridus | Devil's Club |
| | Oxalis trilliifolia | Trillium–leaved Wood–sorrel |
| | Petasites frigidus var. palmatus | Palmate Coltsfoot |
| | Pyrola asarifolia | Wintergreen |
| | Rubus ursinus | Pacific Blackberry |
| | Ranunculus flammula | Creeping Buttercup |
| | Ranunculus orthorhyncus | Straightbeak Buttercup |
| | Streptopus amplexifolius | Clasping–leaved Twisted–stalk |
| | Thalictrum occidentale | Western Meadowrue |
| | Tiarella trifoliata | Laceflower |
| | Trillium ovatum | Western Trillium |
| | Viola glabella | Stream Violet |
| | *Aster subspicatus* | *Douglas' Aster* |
| | *Boykinia occidentalis* | *Slender Boykinia* |
| | *Carex unilateralis* | *One-sided Sedge* |
| | *Chrysosplenium glechomaefolium* | *Pacific Water–carpet* |
| | *Cinna latifolia* | *Woodreed* |
| | *Dicentra formosa ssp. oregana* | *Oregon Bleeding Heart* |
| | *Festuca subuliflora* | *Coast Range Fescue–grass* |
| | *Festuca subulata* | *Bearded Fescue–grass* |
| | *Trisetum cernuum* | *Nodding Trisetum* |

inter·fluve INC.
Applied River and Wetland Restoration
Founded 1983

April 20, 2012

Dave Elkin
GreenWorks, PC
24 NW 2nd Ave., Suite 100
Portland, Oregon 97209

Dear Dave:

Please find our 90% Design Submittal for the Mt. Scott Creek Fish Enhancement Project at North Clackamas Park. As discussed, this is a small scale enhancement project where maximum hydraulic analysis should not be required. As such, this project has been designed to keep any rise in 100-year flood levels as close to zero as practically possible and that no structures are impacted by a potential rise. Design measures used to reduce flooding risk include removal of fill displaced by large wood and boulders buried in streambanks. In some cases wood protrudes from the stream bed and banks simulating downed trees. Such downed tree simulation emulates conditions to support critical salmonid habitat.

Sincerely,

William Norris, P.E.
Inter-Fluve, Inc.

REGISTERED PROFESSIONAL ENGINEER
18927PE
OREGON
FEB. 3, 1997
WILLIAM P. NORRIS

Expires: 12-31-2012

Offices Nationwide
1020 Wasco Street, Suite I, Hood River, Oregon 97031
541.386.9003 www.interfluve.com

JV#287

# STATUTORY WARRANTY DEED

HARMON INDUSTRIES, INC., an Oregon corporation, Grantor,

conveys and warrants to NORTH CLACKAMAS PARKS & RECREATION DISTRICT, Grantee,

the following described real property free of liens and encumbrances, except as specifically set forth herein:

Tract "C", SILVERLEAF ESTATES, in the County of Clackamas and State of Oregon.

22E06AB 00617

*Scott Creek; Any adverse claim based upon the assertion that some portion of said land has been removed from or brought within the boundaries thereof by an avulsive movement of Mt. Scott Creek or has been formed by the process of accretion or reliction or has been created by artificial means or has accreted to such portion so created; Easement recorded as Fee No. 69-20925; Declaration of Maintenance Agreement recorded as fee no. 97-066833; Regulations and Assessments of SILVERLEAF HOMEOWNERS ASSOCIATION and declaration of conditions and restrictions recorded as Fee No. 97-066833;---

This property is free of liens and encumbrances, EXCEPT: Premises are within the boundaries of Clackamas County Service District No. 1 and Clackamas River Water District and are subject to levie and assessments thereof; Rights of the public and of governmental bodies in and to that portion of the premises herein described lying below the high water mark of Mt. *see abov

THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES AND TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES AS DEFINED IN ORS 30.930.

The true consideration for this conveyance is $ 12,350.00 (Here comply with the requirements of ORS 93.030)

Dated this 17th day of June 19 98.

HARMON INDUSTRIES, INC.

Trev L. Harmon pres.
TREV L. HARMON, PRESIDENT

Beverly Harmon Secretary
BEVERLY J. HARMON, SECRETARY

*STATE OF OREGON*
*County of* CLACKAMAS } *ss.*

*On this* 17th *day of* June, *19* 98, *before me appeared* TREV L. HARMON *and* BEVERLY J. HARMON *both to me personally known, who being duly sworn, did say that he, the said* TREV L. HARMON *is the* _____ *President, and he, the said* BEVERLY J. HARMON *is the* _____ *Secretary* _____ *of* HARMON INDUSTRIES, INC. *the within named Corporation, and that the seal affixed to said instrument is the corporate seal of said Corporation, and that the said instrument was signed and sealed in behalf of said Corporation by authority of its Board of Directors, and* TREV L. HARMON *and* BEVERLY J. HARMON *acknowledge said instrument to be the free act and deed of said Corporation.*

*IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal the day and year last above written.*

OFFICIAL SEAL
FRANCES E. MILLER
NOTARY PUBLIC-OREGON
COMMISSION NO. 041454
MY COMMISSION EXPIRES APRIL 9, 1999

Frances E Miller
*Notary Public for Oregon.*
*My Commission expires* 4/9/99

Recorded By
First American Title Insurance Company of Oregon
No. 834864

Title Order No. 834864
Escrow No. 98070875

THIS SPACE RESERVED FOR RECORDER'S USE

98-056638

After recording return to:
NORTH CLACKAMAS PARKS & RECREATION
11022 S.E. 37TH AVENUE
MILWAUKIE, OR 97222
Name, Address, Zip

Until a change is requested all tax statement shall be sent to the following address.
NORTH CLACKAMAS PARKS & RECREATION
11022 S.E. 37TH AVENUE
MILWAUKIE, OR 97222
Name, Address, Zip

STATE OF OREGON 98-056638
CLACKAMAS COUNTY
Received and placed in the public records of Clackamas County
RECEIPT# AND FEE: 74778 $15.00
DATE AND TIME: 06/24/98 10:39 AM
JOHN KAUFFMAN, COUNTY CLERK

10-11

AFTER RECORDING RETURN TO:
North Clackamas Parks & Recreation District
9101 SE Sunnybrook Blvd.,
Clackamas, OR 97015.

Until a change is requested all tax statements shall be sent to the following address:
SAME AS ABOVE

Escrow No.: 45-426718-MKC
Order No.: 426718

426718

Clackamas County Official Records
Sherry Hall, County Clerk
2006-066307
$31.00
00999939200600663070020022
07/20/2006 02:21:06 PM
D-D Cnt=1 Stn=5 BEV L.
$10.00 $11.00 $10.00

record on
in
Witness
my hand and seal of County affixed.
Name TitleBy
, Deputy.

# WARRANTY DEED - STATUTORY FORM
(INDIVIDUAL or CORPORATION)

Christopher Rogers

Grantor, conveys and warrants to

North Clackamas Parks and Recreation District

Grantee, the following described real property free of encumbrances except as specifically set forth herein:

Tract "A", ANTHONY HEIGHTS, in the County of Clackamas and State of Oregon.

**Before signing or accepting this instrument, the person transferring fee title should inquire about the person's rights, if any, under ORS 197.352. This instrument does not allow use of the property described in this instrument in violation of applicable land use laws and regulations. Before signing or accepting this instrument, the person acquiring fee title to the property should check with the appropriate city or county planning department to verify approved uses, to determine any limits on lawsuits against farming or forest practices as defined in ORS 30.930 and to inquire about the rights of neighboring property owners, if any, under ORS 197.352.**

22E06AB 00716

ENCUMBRANCES: See Attached Exhibit "A"

The true consideration for this conveyance is $0.00 WD

Dated July 18, 2006; if a corporate grantor, it has caused its name to be signed by order of its board of directors.

Christopher Rogers

Chicago Title Insurance Co.

STATE OF OREGON
County of Clackamas

This instrument was acknowledged before me on the 18 day of ~~June~~ July, 2006 by Christopher Rogers.

Notary Public for Oregon

My Commission Expires:

(SEAL)

OFFICIAL SEAL
R. N. BROOKE
NOTARY PUBLIC-OREGON
COMMISSION NO. 389678
MY COMMISSION EXPIRES FEBRUARY 14, 2009

45-426718-MKC

9014710540.rdw

EXHIBIT "A"

1. Rights of the public and of governmental bodies in and to that portion of the premises herein described lying below the high water mark of Scott Creek.

2. Any adverse claims based upon the assertion that Scott Creek has changed in location.

3. An easement created by instrument, including terms and provisions thereof;
   Dated: November 18, 1971
   Recorded: November 22, 1971
   Recorder's Fee No.: 71-033065
   In Favor Of: Clackamas County Service District No. 1
   For: Sewer
   Affects: The Southeasterly corner
   NOTE: Said easement is also delineated upon the recorded plat.

4. Easements as dedicated or delineated on the recorded plat.
   For: Public utilities
   Affects: 10 feet in width along all lots and tracts adjacent to all public right of way line

5. Easements as dedicated or delineated on the recorded plat.
   For: Storm drainage
   Affects: The Northern most 20 feet

6. Easements as dedicated or delineated on the recorded plat.
   For: Stream corridor
   Affects: A portion of the Northerly lot line - see plat for exact location

7. Covenants, conditions and restrictions as shown on the recorded plat.

8. Declaration and Maintenance Agreement for On-Site Stormwater Facilities, including the terms and provisions thereof;
   Dated: December 3, 1996
   Recorded: April 15, 1997
   Recorder's Fee No.: 97-027494
   By and Between: Clackamas County Service District No. 1, a county service district and Chris Rogers

9. Covenants, conditions, restrictions and easements, but omitting covenants or restrictions, if any, based on race, color, religion, sex, sexual orientation, familial status, marital status, disability, handicap, national origin, ancestry, or source of income, as set forth in applicable state or federal laws, except to the extent that said covenant or restriction is permitted by applicable law, imposed by instrument, including the terms and provisions thereof.
   Recorded: April 25, 1997
   Recorder's Fee No.: 97-031021
   Said covenants, conditions and restrictions contain among other things provisions for levies and assessments of the Anthony Heights Owner's Association.

Oregon
Theodore R. Kulongoski, Governor

**Department of Fish and Wildlife**
Northwest Region
17330 SE Evelyn Street
Clackamas, OR 97015-9514
(503) 657-2000
(503) 657-2050

April 18, 2012

City of Milwaukie Planning Department
6101 SE Johnson Creek Blvd
Milwaukie OR 97206

Re: Support for the Mt. Scott Creek Restoration Project

I am writing to express our full support for the Mt. Scott Creek restoration project at North Clackamas Park, including culvert removal, large wood placement, native plantings, and public viewing opportunities. This project was a recommendation of the 2009 Fish Species Distribution and Abundance and Habitat Assessment of Streams in Clackamas County Service District No. 1 performed by the Oregon Department of Fish and Wildlife (ODFW). As District Biologist for the ODFW North Willamette Watershed District, I participated with the staff at Clackamas County Water Environment Services (WES), North Clackamas Parks and Recreation Department and the City of Milwaukie to assist in developing and reviewing the project details.

Our 2009 assessment report identified numerous actions that could be implemented to aid in recovery of fish species listed under the Federal Endangered Species Act in addition to other native fish species in the area. The actions included several fish passage improvement projects (including Kellogg Dam/fish ladder) in addition to projects that would aid in restoring natural stream function in a highly urbanized area. We are very encouraged to see WES utilizing the report and recommendations found within to implement actions that will provide direct benefits to fish species found in the Kellogg/Mt. Scott Creek watershed.

If you have any questions about the project and how it was identified as an opportunity for restoration or general questions about the fish resource in the Kellogg/Mt. Scott watershed please feel free to call.

Thank you,

Todd Alsbury
District Fish Biologist
ODFW-North Willamette Watershed District