WATER ENVIRONMENT SERVICES

MS4 NPDES Permit Annual Report

for

Clackamas County Service District No. 1

(including the City of Happy Valley) and the

Surface Water Management Agency of Clackamas County
(including the City of Rivergrove)

July 1, 2015 – June 30, 2016

This Page Intentionally Left Blank

October 21, 2016

Clackamas County Service District No. 1

Surface Water Management Agency of Clackamas County

(Including the City of Happy Valley and the City of Rivergrove)

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4)

STORMWATER MANAGEMENT PLAN

We, the undersigned, hereby submit this National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater System Annual Report in accordance with NPDES Permit Number 101348. We certify under penalty of law that this document and all attachments were prepared under our direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on our inquiry of the person, or persons, who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of our knowledge and belief, true, accurate and complete. We are aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

10/21/16

Gregory L. Geist, Director
Water Environment Services

Date

10/24/16

Jason Tuck, City Manager
City of Happy Valley

Date

10/25/16

Sheri Richards,
City Manager/City Recorder
City of Rivergrove

Date

This Page Intentionally Left Blank

Table of Contents

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) iii
Section 1 Introduction 1
1.1 Background 1
1.2 District Demographics 1
1.3 Document Organization 2
Section 2 Waterbodies and Associated TMDLS 3
Section 3 Stormwater Management Plan (SWMP 2012) Overview and Activities 5
3.1 Proposed Changes to SWMP Activities 5
3.2 Status of the Implementation of SWMP Components 5
3.3 Public Education and Additional Activities 9
3.4 Best Management Practices Reporting 9
BMP#1: Conduct Dry Weather Inspections 9
BMP#2: Implement the Spill Response Program 11
BMP#3: Respond to reports involving illicit discharges 12
BMP#4: Screen Existing and New Industrial Facilities 14
BMP#5: Address Other Industrial Facilities 15
BMP#6: Conduct Procedures for Site Planning 17
BMP# 7: Implement Requirements for Structural and Non-Structural Best Management Practices 19
BMP#8: Conduct Training for Construction Site Operators 19
BMP# 9: Identify Priorities for Inspecting Sites and Conducting Enforcement Actions 21
BMP#10: Public Education to Reduce Discharges of Pesticides, Herbicides and Fertilizers 23
BMP#11: Proper Disposal Practices to Reduce Discharges of Pesticides, Herbicides and Fertilizers 25
BMP#12: Facilitate Public Reporting of Illicit Discharges and Spills and Other Types of Improper Disposal of Materials 26
BMP#13: Participate in Public Education Effectiveness Evaluation 27
BMP#14: Training for Employees 27
BMP# 15: Provide for Public Participation with SWMP and Benchmark Submittals 29
BMP#16: Planning Procedures for New Development and Significant Redevelopment 29
BMP#17: Update Procedures for New Development and Significant Redevelopment 32
BMP#18: Sizing Tool Development to Address Hydromodification 34
BMP# 19: Street Sweeping 35
BMP# 20: Operations & Maintenance for Public Streets 36
BMP# 21: Proper Road maintenance Practices to Reduce the Discharge of Pesticides, Herbicides and Fertilizers 37
BMP#22: Landscape Maintenance Practices to Reduce the Discharge of Pesticides, Herbicides and Fertilizers 39
BMP# 23: Control Infiltration and Cross Connections to the District's Stormwater System 40
BMP# 24: Flood Management Projects and Water Quality 42
BMP# 25: Detention Pond Retrofit Program 43
BMP# 26: Maintenance of conveyance System Components and Structural Controls 44
BMP# 27: Conduct Catch Basin Cleaning and Maintenance 46
BMP# 28: Storm Drain Cleaning Assistance Program 47
BMP# 29: Private Water Quality Facility Maintenance Program 49
Section 4 Stormwater Monitoring Program 51
4.1 Stormwater Monitoring 51
4.2 Watershed Action Plans and Other Monitoring Surveys 51
Section 5 Funding, Staff and Equipment 53
5.1 Funding – CCSD#1 & SWMACC 53

5.2 Expenditures & Budget – CCSD#1 & SWMACC 54
5.3 Staff – CCSD#1 & SWMACC 55
5.4 Training – CCSD#1 & SWMACC 55
5.5 Equipment – CCSD#1 & SWMACC 56
5.6 Funding for Development Review, Erosion Control & Street Sweeping - City of Happy Valley 56
5.7 Staff - City of Happy Valley 56
5.8 Training - City of Happy Valley 57
5.9 Equipment - City of Happy Valley 57
Section 6 Legal Authority 57
Section 7 Overview of Planning, Land Use Changes and Development Activities Within the UGB 58
Section 8 Proposed Changes to SWMP and/or TMDL Implementation Plan 59
Section 9 Public Comment – Annual Reports 59
Section 10 Adaptive Management 60
Section 11 Appendices 61
Appendix A Guide to Acronyms 61
Appendix A Environmental Monitoring Report 62
Environmental Monitoring Report Attachment 1 73
Environmental Monitoring Report Attachment 2 80
Appendix C Partner Reports 154
Summary of riparian restoration projects for MS4 report FY 2015-16 154
Narrative summary of MS4 projects 155
Narrative summary of projects 159
Appendix D Public Outreach, Articles, and Newsletters for CCSD#1 and SWMACC 163

List of Tables

Table 1 NPDES MS4 Annual Report Submittal Requirement Locations in the Document 2
Table 2 Stormwater Program Funding and Expenditures for CCSD#1 54
Table 3 Stormwater Program Funding and Expenditures for SWMACC 54

SECTION 1 INTRODUCTION

1.1 BACKGROUND

Clackamas County Service District No. 1 (CCSD#1), the Surface Water Management Agency of Clackamas County (SWMACC), the City of Happy Valley, and the City of Rivergrove are co-permittees of the Phase I Municipal Separate Storm Sewer System (MS4) permit. The other Phase I co-permittees of the MS4 permit include the Oak Lodge Sanitary District, Clackamas County Department of Transportation and Development (DTD), and the following cities: Oregon City, Lake Oswego, West Linn, Milwaukie, Gladstone, Wilsonville, and Johnson City. Phase I communities are generally those with a population of 100,000 or more. Clackamas County co-permittees are classified as Phase I communities because they meet this threshold collectively, though not separately. The Clackamas County MS4 permit was first issued by DEQ on December 15, 1995, was renewed by DEQ on March 3, 2004, and was modified by DEQ on July 27, 2005. A renewal permit was issued on March 16, 2012.

A joint Stormwater Management Plan (SWMP) was developed in 1993 for CCSD#1 and SWMACC, pursuant to the (then pending) issuance of initial MS4 permits to Phase 1 communities in Oregon. The 1993 SWMP was updated in 2000. Further revisions were proposed in 2006 as part of the revised SWMPs for CCSD#1 (which includes the City of Happy Valley) and for SWMACC (which includes the City of Rivergrove). A revised SWMP was implemented for each District in May 1, 2012 (2012 SWMP).

This document serves as the annual report for the NPDES MS4 permit and associated SWMPs revised in 2012 for CCSD#1, SWMACC, and the cities of Happy Valley and Rivergrove.

1.2 DISTRICT DEMOGRAPHICS

Both CCSD#1 and SWMACC are administered by Clackamas County Water Environment Services (WES) and together cover approximately 23,817 acres of land under the MS4 permit. Specific information for each District is below

CCSD#1

CCSD#1 is comprised of four geographic subunits, including:

- Fischer's Forest Park - in the Redland area
- Hoodland - in and near Welches, Wemme, and Rhododendron
- Boring - in the hamlet of Boring
- Portland metropolitan area

Only the Portland metro area subunit of CCSD#1 is regulated by the MS4 permit. The remaining subunits serve rural areas or very small urban areas that are not within the Portland metro area's Urban Growth Boundary (UGB). This Portland subunit is known as CCSD#1-UGB. The developed area of the City of Happy Valley lies within CCSD#1-UGB, and the remainder of Happy Valley will be annexed into CCSD#1 as it is developed.

SWMACC

SWMACC is a largely rural area with a small urban component in the City of Rivergrove. Some urbanized, unincorporated lands are also within SWMACC. While SWMACC includes the City of Rivergrove and all of the unincorporated lands in Clackamas County that drain to the Tualatin River and Lake Oswego, only a small portion of the District is within the Portland metro area's UGB. This portion of SWMACC is regulated by the MS4 NPDES permit.

There is limited new development within the District, most of which occurs within the City of Rivergrove. Due to annexations to the cities of Lake Oswego and West Linn, the area under SWMACC's jurisdiction is decreasing.

1.3 DOCUMENT ORGANIZATION

According to Schedule B(5) of the 2012 MS4 Permit, each co-permittee must submit an annual report, summarizing accomplishments and implementation of the MS4 SWMP. This annual report covers permit year 19 (or year 3 under the renewed permit of 2012) and it documents SWMP related activities that occurred from July 1, 2015 to June 30, 2016. Table 1 summarizes the annual report submittal requirements and provides the location in this document where each of the requirements is addressed.

Table 1 NPDES MS4 Annual Report Submittal Requirement Locations in the Document

Annual Report Schedule B(5) Submittal Requirements:	Document Section Where the Annual Report Submittal Requirement is Met:
§a. The status of implementing the stormwater management program and each SWMP program element, including progress in meeting the measurable goals identified in the SWMP.	Section 3.4
§b. Status or results, or both, of any public education program effectiveness evaluation conducted during the reporting year and a summary of how the results were or will be used for adaptive management.	Section 3.3
§c. A summary of the adaptive management process implementation during the reporting year, including any proposed changes to the stormwater management program [e.g., new Best Management Practices (BMPs)] identified through implementation of the adaptive management process.	Section 3.0
§d. Any proposed changes to SWMP program elements that are designed to reduce TMDL pollutants to the maximum extent practicable (MEP).	Section 3.1

§e. A summary of total stormwater program expenditures and funding sources over the reporting fiscal year, and those anticipated in the next fiscal year.	Section 5.0
§f. A summary of monitoring program results, including monitoring data that are accumulated throughout the reporting year and any assessments or evaluations conducted.	Section 4.1 and Appendix B and C
§g. Any proposed modifications to the monitoring plan that are necessary to ensure that adequate data and information are collected to conduct stormwater program assessments	Section 4.0
§h. A summary describing the number and nature of enforcement actions, inspections, and public education programs, including results of ongoing field screening and follow-up activities related to illicit discharges.	Section 3.4
§i. A summary, as it relates to MS4 discharges, describing land use changes, Urban Growth Boundary (UGB) expansion, land annexations, and new development activities that occurred within these areas during the reporting year. The number of new post-construction permits issued and an estimate of the total new and replaced impervious surface area related to development projects that commenced during the reporting year must also be included.	Section 3.4
§j. A summary, as related to MS4 discharges, describing concept planning or other activities conducted in preparation of UGB expansion or land annexation, if anticipated for the following year.	Section 7.0

SECTION 2 WATERBODIES AND ASSOCIATED TMDLS

CCSD#1

CCSD#1 falls entirely within the Willamette River basin, and thus is subject to the Willamette River Total Maximum Daily Load (TMDL) that was issued in September 2006. The pollutants covered under the Willamette TMDL include:

- DDT & dieldrin (for Johnson Creek only)
- Temperature
- Mercury
- Bacteria (E. coli)

The tributaries to the Willamette River receiving discharges from CCSD#1's MS4 permit area (including the City of Happy Valley) include, but are not limited to the following:

- Johnson Creek
    - Mitchell Creek

- Kellogg Creek
    - Mt. Scott Creek
        - Cedar Creek
            - Mel Brook Creek
        - Dean Creek
        - Phillips Creek
- Clackamas River
    - Cow Creek
    - Carli Creek
    - Sieben Creek
        - Rose Creek
        - Sunshine Creek
    - Rock Creek
        - Graham Creek
        - Trillium Creek

SWMACC

SWMACC falls within the Tualatin River basin. The Tualatin River, a major tributary to the Willamette River, was issued a TMDL in 2001. Subsequently the TMDL implementation plan was updated in 2006 to include the mercury TMDL associated with the Willamette River TMDL. The pollutants covered under the Tualatin TMDL include:

- Temperature
- Dissolved Oxygen
- pH and chlorophyll A (total phosphorus)
- Bacteria (E. coli)
- Mercury

There are no rivers or creeks within SWMACC's MS4 permit area. The following creeks are subject to the Tualatin TMDL:

- Tualatin River
    - Pecan Creek
    - Saum Creek
    - Wilson Creek
    - Carter Creek (tributary to Fanno Creek)
    - Rock Creek "South"
    - Tate Creek

Reporting on TMDL's for this reporting year will be in a separate report.

SECTION 3 STORMWATER MANAGEMENT PLAN (SWMP 2012) OVERVIEW AND ACTIVITIES

With respect to MS4 annual reporting requirements, this section covers the following items per schedule B (5) of the MS4 permit:

§a. The status of implementing the stormwater management program and each SWMP program element, including progress in meeting the measurable goals identified in the SWMP.

§c. A summary of the adaptive management process implementation during the reporting year, including any proposed changes to the stormwater management program (e.g., new BMPs) identified through implementation of the adaptive management process.

§d. Any proposed changes to SWMP program elements that are designed to reduce TMDL pollutants to the maximum extent practicable (MEP).

§h. A summary describing the number and nature of enforcement actions, inspections, and public education programs, including results of ongoing field screening and follow-up activities related to illicit discharges.

3.1 PROPOSED CHANGES TO SWMP ACTIVITIES

Both Districts submitted NPDES MS4 permit renewal applications to DEQ on September 2, 2008. As part of these applications, the districts evaluated and revised their SWMPs. SWMP changes were presented in this report, and became effective May 1, 2012. No further changes are anticipated to the 2012 SWMP for the upcoming year.

Both Districts on behalf of Happy Valley and Rivergrove will submit permit renewal applications to DEQ by February 2017, part of which is a SWMP review and revision.

3.2 STATUS OF THE IMPLEMENTATION OF SWMP COMPONENTS

BMP's summaries will include the tracking measures, measurable goals, and implementation activities outlined in the 2012 SWMP. A more complete listing of the Willamette and Tualatin TMDL activities can be found under a separate report.

Permit Section	Requested	Date Provided or Due
Schedule A.4.a.	Enforcement Procedures, Pollution Action Levels and Dry-weather Screening Priority Locations	November 2012
Schedule A.4.b.	Industrial and Commercial Facility Inspection and Stormwater Control Program	July 2013

Schedule A.4.d.	Education and Outreach Effective Evaluation	July 2015
Schedule A.4.f.	Post Construction Site Runoff Program	November 2014
Schedule A.4.g.	Operations Inventory and Assessment	July 2013
Schedule A.4.h.	Structural Stormwater Controls Operation and Maintenance Program	July 2013
Schedule A.5	Hydromodification Assessment	July 2015
Schedule A.6	Retrofit Strategy Development: 1. Identification of Stormwater Quality Improvement Project	July 2014
Schedule A.6	Retrofit Strategy Development: 2. Stormwater Retrofit Strategy and Plan	July 2015
Schedule A.6	Retrofit Strategy Development: 3. Construction of Stormwater Quality Improvement Project	Due permit expiration date, March 1, 2017

The Districts' and Cities' SWMPs are organized into sections covering the required SWMP components per permit schedule A(4), shown below:

Component #1

Illicit Discharge Detection and Elimination

BMP 1	Conduct Dry Weather Inspections
BMP 2	Implement the Spill Response Program
BMP 3	Respond to Reports Involving Illicit Discharges

Component #2

Industrial and Commercial Facilities

BMP 4	Screen Existing and New Industrial Facilities
BMP 5	Address Other Industrial Facilities

Component #3

Construction Site Runoff

BMP 6	Conduct Procedures for Site Planning
BMP 7	Implement Requirements for Structural and Non-Structural Best Management Practices
BMP 8	Conduct Training for Construction Site Operators
BMP 9	Identify Priorities for Inspecting Sites and Conducting Enforcement Actions

Component #4

Education and Outreach

BMP 10	Public Education to Reduce Discharges of Pesticides, Herbicides and Fertilizers
BMP 11	Proper Disposal Practices to Reduce Discharges of Pesticides, Herbicides and Fertilizers
BMP 12	Facilitate Public Reporting of Illicit Discharges and Spills and Other Types of Improper Disposal of Materials
BMP 13	Participate in a Public Education Effectiveness Evaluation
BMP 14	Training for Employees

Component #5

Public Involvement and Participation

BMP 15	Provide for Public Participation with SWMP and Benchmark Submittals

Component #6
Post-Construction Site Runoff

BMP 16	Planning Procedures for New Development and Significant Redevelopment
BMP 17	Updated Procedures for New Development and Significant Redevelopment
BMP 18	BMP Sizing Tool Development to address Hydromodification (CCSD#1 and City of Happy Valley only)

Component #7
Pollution Prevention for Municipal Operations BMPs

BMP 19	Street Sweeping
BMP 20	Operations & Maintenance for Public Streets
BMP 21	Proper Road Maintenance Practices to Reduce the Discharge of Pesticides, Herbicides and Fertilizers
BMP 22	Landscape Maintenance Practices to Reduce the Discharge of Pesticides, Herbicides and Fertilizers
BMP 23	Control Infiltration and Cross Connections to the District's Stormwater System
BMP 24	Flood Management Projects and Water Quality (CCSD#1 and City of Happy Valley only)
BMP 25	Detention Pond Retrofit Program (CCSD#1 and City of Happy Valley only)

Component #8
Structural Stormwater Facility Operations and Maintenance

BMP 26	Maintenance of Conveyance System Components and Structural Controls
BMP 27	Conduct Catch basin Cleaning and Maintenance
BMP 28	Storm Drain Cleaning Assistance Program
BMP 29	Private Water Quality Facility Maintenance Program

3.3 PUBLIC EDUCATION AND ADDITIONAL ACTIVITIES

The co-permitees perform a variety of stormwater related outreach and public involvement activities each year in addition to those outlined in the Districts' SWMPs. These activities include public education campaigns; presentations and course development; public engagement; intergovernmental coordination; and staff training. These strategies are implemented each year to increase citizen and stakeholder awareness and engagement in programs and services provided by the Districts to help strengthen the Districts' identity within the community and to expand information-sharing efforts.

Throughout the year, the Districts creates awareness for ratepayers (both residential and business) and the general public about the impact of stormwater pollution on public health and the health of the region's rivers and streams. Awareness messages and outreach activities are designed to educate area residents, students, and businesses about their personal link to protecting, restoring and enhancing water quality to maintain healthy watersheds. The goal of these communication efforts is to build public awareness, change daily behavior or business practices, and encourage stewardship that will improve stormwater quality and protect the health of our rivers.

Through citizen and stakeholder outreach, business workshops and public education programs, the Districts continue to engage the public and other jurisdictions in decision-making. The Districts continue to seek out opportunities to maintain an ongoing two-way dialogue with customers, citizens, other utilities, stewardship organizations, businesses, and schools to build partnerships in the region.

Outreach over the course of the 2015-2016 year is detailed in BMP#13.

3.4 BEST MANAGEMENT PRACTICES REPORTING

BMP#1: CONDUCT DRY WEATHER INSPECTIONS

DISTRICTS REQUIRED TO REPORT: CCSD#1 AND SWMACC

BMP Description: The purpose of dry-weather outfall inspections is to detect an illicit discharge at the outfall or confirm that they are not present. If flow is detected during dry weather, District staff track it upstream through the storm sewer system to the source, and then address, or if necessary, control the discharge. Illicit discharges are detected during dry-weather inspections through the use of hand-held water quality measuring equipment and through visual inspections by the inspector. When a visual inspection or a pollutant level measured at an outfall indicates that an illicit discharge may be present, an upstream investigation through the storm sewer system is performed. When the discharge's source is located, District staff work with the property owner and/or business owner to evaluate, and if necessary, control the discharge.

TRACKING MEASURES

1. Number of outfalls inspected during dry-weather
2. Number and type of illicit discharges encountered and controlled
3. Status of updating procedures to address new permit requirements

CCSD#1 TRACKING MEASURE RESPONSES

1. Thirty-two outfalls inspected
2. No spills, illicit discharges, or non-stormwater discharges were discovered during the dry-weather outfall inspection work in CCSD#1.
3. The following three written procedures were implemented during this reporting period to address recent MS4 permit requirements:
    I. The final *Enforcement Response Plan* was placed into effect on October 1, 2012, as required by the permit's Schedule A(4)(a)(ii)
    II. The written *Rationale for the Pollutant Parameter Action Levels*, which are used during dry-weather storm sewer system field screening work at priority locations, was placed into effect on October 29, 2012, as required by the permit's Schedule A(4)(a)(iii), and
    III. The written summary of the current *Priority Locations* for conducting dry-weather storm sewer system field screening work was placed into effect on October 25, 2012, as required by the permit's Schedule A(4)(a)(iv).

SWMACC TRACKING MEASURE RESPONSES

1. Five outfalls inspected.
2. No spills, illicit discharges or non-stormwater discharges were discovered during the dry-weather outfall inspection work in SWMACC.
3. The following three written procedures were implemented during this reporting period to address recent MS4 permit requirements:
    I. The final *Enforcement Response Plan* was placed into effect on October 1, 2012, as required by the permit's Schedule A(4)(a)(ii),
    II. The written *Rationale for the Pollutant Parameter Action Levels*, which are used during dry-weather storm sewer system field screening work at priority locations, was placed into effect on October 29, 2012, as required by the permit's Schedule A(4)(a)(iii)
    III. The written summary of the current Priority Locations for conducting dry-weather storm sewer system field screening work was placed into effect on October 25, 2012, as required by the permit's Schedule A(4)(a)(iv).

MEASURABLE GOALS

1. Inspect major or priority outfalls for the presence of illicit discharges at least once per year.
2. Update maps of major outfalls on an annual basis.
3. Update dry weather field screening program to address new permit requirements by November 1, 2012

PROGRESS ON MEASURABLE GOALS FOR BOTH DISTRICTS

1. Attained: All major or priority outfalls were inspected once for the presence of illicit discharges, spills, and non-stormwater discharges.
2. Attained: The maps were not updated during the reporting period, this was considered and it was deemed un-necessary, since no existing major outfalls were discovered and no new major outfalls were constructed.

3. Attained: The dry weather field screening program was updated to address new permit requirements by November 1, 2012.

BMP#2: IMPLEMENT THE SPILL RESPONSE PROGRAM

DISTRICTS REQUIRED TO REPORT: CCSD#1, SWMACC AND DTD

BMP Description: The Districts' Spill Response Program prevents, contains, and responds to spills of dangerous, hazardous and other materials in the MS4-permitted areas of CCSD#1 and SWMACC. The Districts' Spill response Program ensures that the actual or possible release of dangerous /hazardous materials to the MS4 is properly addressed. Except for minor incidents, the Districts' Spill Response Program personnel always coordinate closely with other agencies and departments, including Clackamas County Fire District No. 1 (and for certain incidents involving hazardous materials, the Gresham HazMat Team), DEQ, Oregon State Police, Clackamas County's Road Department (DTD), and Oregon's Department of Transportation (ODOT).

TRACKING MEASURES

1. Number of reported spills to the MS4 system
2. Number and type of response to the reported spills

CCSD#1 TRACKING MEASURE RESPONSE

1. There was one spill reported to CCSD#1 through request for service. On 07/13/15 crews responded to c-com call about a car fire fuel to the storm system at 14564 Arbor Valley Dr. WES staff cleaned the road and affected catch basin.
2. WES line staff visited all the sites of all reports of possible spills. Each incident was corrected or responded to with the appropriate action as set in the standard operating procedure for spills and dangerous or hazardous materials.

SWMACC TRACKING MEASURE RESPONSE

1. There were no spills reported within SWMACC boundaries
2. No spills were reported so no spills were controlled

DTD TRACKING MEASURE RESPONSE

1. See DTD MS4 Annual Report response
2. See DTD MS4 Annual Report response

MEASURABLE GOALS

1. Implement the spill response program and associated protocols

PROGRESS ON CCSD#1 AND SWMACC MEASURABLE GOALS

1. "SUMMARY OF SPILL RESPONSE & REPORTING PROCEDURES," which provides instructions on reporting procedures, was updated in 2014-2015 to streamline staff response time to spills *reported by the public* and to spills *reported by WES and County staff* during their inspections of detention ponds, catch basins, manholes, drywells and swales.

   CCSD#1
   As such, WES staff investigates all reports of possible spills received. Each incident is corrected or responded to with the appropriate action in accordance to the standard operating procedure for spills and dangerous or hazardous materials.

   SWMACC
   There were no reported spills within SWMACC. If spills had been reported, we would have applied the same procedure followed for CCSD#1.

   DTD
   See DTD MS4 Annual Report response.

BMP#3: RESPOND TO REPORTS INVOLVING ILLICIT DISCHARGES

DISTRICTS REQUIRED TO REPORT: CCSD#1 AND SWMACC

BMP Description: Reports are often received from Oregon's DEQ, ODOT, Water Districts, Fire Districts, cities, citizens, CCSD#1 and SWMACC co-workers, DTD employees and others which allege that an illicit discharge has occurred or is occurring. When reports are received which allege that an illicit discharge has occurred or is occurring, the Districts will attempt to confirm the allegation in a timely manner. If it can be confirmed than an illicit discharge has occurred or is occurring, District staff will cooperate with the property owner and/or business owner to evaluate, and if necessary, control the discharge. Control options that may be applied or recommended by the District include, but are not limited to:

- The removal of certain pollutants from the wastewater prior to discharge to the storm sewer system (i.e. cease usage of soap when washing).
- Issuance of the proper discharge permit from DEQ. A discharge that has been authorized and controlled by a DEQ water quality permit is not an illicit discharge.
- Application of the wastewater to dry land with no discharge to surface waters or storm sewers. This option is inappropriate for certain types of wastewaters, discharge rates, and soil types and may require the issuance of a WPCF permit from DEQ.
- Wastewater reuse without any discharge.
- Hauling the wastewater off-site for proper disposal.
- With the necessary permits, discharge the wastewater to sanitary sewer.

TRACKING MEASURES

1. Number of alleged (a) illicit discharges and (b) non-stormwater (i.e., fire suppression flows and de-chlorinated flows from swimming pools) discharges which were reported each year
2. Number of illicit discharges that were controlled

CCSD#1 TRACKING MEASURES RESPONSES

1. Investigated 11 alleged illicit discharges, whose reports line staff receive as requests for service. There were no requests received for non-storm water discharges.
2. Of the 11, after investigation, two were determined to be illicit discharges and were controlled:
    a. On July 30, 2015, Field Operations staff found sewer contaminants in a catch basin in the west bound lanes just past 11899 SE Sunnyside (McDonalds). The two downstream catch basins, which connected to the first catch basin, were also contaminated. The down-stream catch basins and lines ultimately led to a sedimentation manhole and then to a nearby pond at the corner of 117th and Sunnyside. On Monday August 3rd staff confirmed (with a TV Truck camera and dye test) that it was a cross connection coming from nearby McDonalds. The detention basin at the pond at 117th was also full of contaminants. For the next several days and one night, staff cleaned the 36" pipe leading to the pond, the pond itself, and the surrounding pond as well. We also laid down lime to kill any remaining contaminants.
    b. On 8/26/27 crews responded to 15547 SE Piazza Avenue and found active illicit flow into storm MH CC10C-207 which then flows through the stormwater structures down Piazza Avenue to Cow Creek. Crews discovered that a local business has refrigerated trailers that the plugs had been removed and allowed meat remnants to drain into storm catch basins in their parking lot which then leads to MH 207. This discharge affected the downstream structures including a filter vault and the outfall. WES lab personnel tested the water. WES field operations supervisor requested that the business hire an environmental cleanup contractor to clean the system and replace the contaminated filter cartridges, which they did.

SWMACC TRACKING MEASURES RESPONSES

1. No illicit discharges were reported within SWMACC
2. Since there were no illicit discharges reported, none were controlled.

MEASURABLE GOALS

1. Respond to reports involving alleged illicit discharges within two weeks.

PROGRESS ON CCSD#1 MEASURABLE GOALS

Response time is down to less than five hours due to last year's process improvement. The "SOP: Spills and Dangerous or Hazardous Materials" was updated last year to focus on WES line staff responses to illicit discharges and spills. Improvement came from reevaluating staff responsibilities, making reassignments, and placing line staff on an existing after-hours call-out list in an effort to streamline our response time and cleanup efforts. As a result, WES staff responds to incidents more efficiently and effectively.

PROGRESS ON SWMACC MEASURABLE GOALS

"SOP: Spills and Dangerous or Hazardous Materials" discussed above is in place for SWMACC and would be launched should SWMACC illicit discharges be reported.

BMP#4: SCREEN EXISTING AND NEW INDUSTRIAL FACILITIES

DISTRICTS REQUIRED TO REPORT: CCSD#1 AND SWMACC

BMP Description: Once during the permit term, CCSD#1 will review their new industrial development applications to determine whether any existing or new facilities would be subject to an industrial stormwater NPDES permit. This determination will occur based on a review of the facilities' proposed activities and the applicable Standard Industrial Classification (SIC) codes related to the 1200-series NPDES permit. If a facility is identified that would be subject to an industrial stormwater NPDES permit, the facility and DEQ will be notified within 30 days.

TRACKING MEASURE

1. Track the number of existing or new industrial facilities subject to a stormwater industrial NPDES permit during the permit term.

CCSD#1 TRACKING MEASURE RESPONSE

1. Twenty-five (25) facilities in CCSD#1 are currently in possession of a 1200Z permit and an additional facility is in possession of a 1200A permit. During the 2015-2016 reporting period, WES did not notify any industrial facilities they might be required to apply for a 1200Z permit [required by MS4 permit schedule A(4)(b)(ii)].

SWMACC TRACKING MEASURES RESPONSES

1. Very little or no acreage in SWMACC's MS4-permitted area is zoned for industrial uses. During the 2015-2016 reporting period, WES did not notify any industries in SWMACC that they might need to apply for a 1200Z permit.

MEASURABLE GOALS

1. Review new industrial development applications once during the permit term to identify additional facilities who may need to obtain a 1200Z permit or a waiver from permit coverage.

PROGRESS ON CCSD#1 MEASURABLE GOALS

Progress was made during the 2015-2016 permit year. On June 22, 2016, WES staff created a list of development applications received since March 16, 2012 (the MS4 permit's renewal date). Before the current MS4 permit term expires in March 2017, this list will be reviewed and industrial facilities who may need to obtain a 1200Z permit or a waiver from permit coverage will be identified and contacted by WES.

PROGRESS ON SWMACC MEASURABLE GOALS

There were no new industrial development applications to review.

BMP#5: ADDRESS OTHER INDUSTRIAL FACILITIES

DISTRICTS REQUIRED TO REPORT: CCSD#1 AND SWMACC

BMP Description: The facilities that are addressed by the District for this BMP are those that are not required to obtain a 1200Z permit, and/or are anticipated to contribute a substantial load of pollutants to the MS4.

Facilities will primarily be inspected on a complaint-driven basis, but it is possible that some inspections will be conducted by the District during source tracking activities if the District's storm event monitoring work or routine monitoring work shows that excessive levels of one or more pollutants are present. All facilities that are the subject of a complaint will be inspected in a timely manner by District staff. The implementation of control measures for stormwater discharges from these facilities will be deemed necessary by the District if the presence of excess levels of stormwater pollution can be confirmed by the District. For instances where the presence of excess levels of pollution in stormwater has been confirmed by the District, and in the event that the discharger's initial attempts to improve stormwater quality do not produce the required improvement, then District personnel will continue to provide guidance and technical assistance until the facilities stormwater quality improves.

The presence of excess levels of pollution in stormwater can generally be confirmed by two general methods: visual and analytical. Analytical methodologies include hand-held meters, and those performed by an environmental laboratory. The District will use visual or analytical methods at the District's discretion.

Industrial users permitted under the pretreatment program 40CFR403 have an annual facility inspection which includes a review of storm water facilities. As of 2016, this includes 25 industries. In addition, the District has implemented a Storm Drain Cleaning Assistance Program. See BMP #28 CCSD#1.

TRACKING MEASURES

1. The number of inspections performed, and where applicable, monitoring data collected.
2. The number of letters, enforcement actions, or other contacts made.
3. Number of pretreatment inspections performed (CCSD#1 – only).

CCSD#1 TRACKING MEASURES RESPONSES

1. WES performed six inspections at industrial/commercial facilities in CCSD#1 during the reporting period. WES collected no stormwater quality monitoring data which relates to these inspections, however. Sense of Place Permaculture, a landscaping company headquartered at 8438 SE Clackamas Road in CCSD#1 (97267), received an inspection on March 8, 2016; this was an EcoBiz Program re-certification inspection. See Tracking Measures Response #3 for information about the other 16 inspections, for they were WES pretreatment inspections.
2. No enforcement actions were undertaken during the reporting period in response to a WES stormwater quality site inspection at an industrial or commercial facility. "Other contacts" were made which included face-to-face meetings at commercial and industrial facilities in CCSD#1 while others were phone conversations and some involved the provision of educational materials. All of these other contacts were made by staff from the Pacific NW Pollution Prevention Resource Center (PPRC) as they administered the EcoBiz Automotive and Landscaping Programs in CCSD#1 and as they provided outreach services during the Carli Creek outreach project in CCSD#1. CCSD#1 hired the PPRC to provide these two categories of services in CCSD#1 during the 2015-2016 MS4 Permit reporting period.
3. Of the 25 permitted industries, 14 were inspected during the reporting period between July 1, 2015 and June 30, 2016. Six of those 14 industries were inspected again in the first half of 2016. (The Industrial Pretreatment Program conduct their activities based on a calendar year instead of a fiscal year.)

SWMACC TRACKING MEASURES RESPONSES

1. No inspections were performed in the MS4-permitted portion of SWMACC; this geographic area has no known industrial facilities and an exceptionally small number of commercial facilities. WES collected no stormwater quality monitoring data from any facilities in SWMACC during the reporting period.
2. No letters were sent and no enforcement actions were undertaken during the reporting period.

MEASURABLE GOALS

1. Notify and work with industries to improve stormwater management if an inspection is conducted that indicates improvement is needed.

PROGRESS ON CCSD#1 MEASURABLE GOALS

This was not applicable to the inspections which were conducted by WES, for none of these inspections indicated that improvement is needed. Some progress was made during some of the "other contacts" visits that had been conducted by the PPRC because a need for improvement was noted in some instances. For example, 2 illicit discharges were documented by the PPRC and reported to WES on April 26, 2016; these illicit discharges will be reported to DEQ in the portion of this annual report which pertains to BMP #3, which is titled "Respond to reports involving illicit discharges". As a 2nd example, an absorbent boom (which was provided free of charge to a landscaping business by the PPRC) was placed around a stormwater catch basin near the landscaping business' gasoline fueling station to capture any leaks or drips which might occur.

PROGRESS ON SWMACC MEASURABLE GOALS

No inspections were conducted

BMP#6: CONDUCT PROCEDURES FOR SITE PLANNING

DISTRICTS REQUIRED TO REPORT: CCSD#1, SWMACC AND HAPPY VALLEY

BMP Description:

CCSD#1 and SWMACC Service Area Development Review

The Districts review all development plans for new construction or redevelopment projects in the Districts' service areas (disturbing sites of 800 sq. ft. or greater) through the building permit process. All reviews are conducted in accordance with the Surface Water Management Rules and Regulations for CCSD#1 and SWMACC. These regulations require submittal of an erosion prevention and sediment control (EPSC) plan containing methods and/or interim facilities to be constructed or used concurrently with land development. Plan submittals are required to provide details of erosion control measures, schedules for construction, and a maintenance schedule for erosion control activities.

The Districts also administer the 1200C permitting program for the areas inside Clackamas County and outside the incorporated cities (with the exception of Gladstone as the District administers the program for that City).

City of Happy Valley Service Area Development Review

The City of Happy Valley reviews all development plans for new construction or redevelopment projects in the District's service area through the land use and building permit processes. The pertinent regulations are in Sections 8 and 15 of the Happy Valley Municipal Code. These regulations require submittal of an erosion prevention and sediment control plan, which contains methods and/or interim facilities to be constructed or used concurrently with land development. Plan submittals are required to provide details of erosion control measures, schedules for construction,

and a maintenance schedule for erosion control activities. 1200C permits in the city of Happy Valley are administered by DEQ.

CCSD#1, SWMACC & Happy Valley

The Erosion Prevention and Sediment Control Planning and Design Manual is part of the EPSC requirements and is also offered as an educational resource to the development community for preparation of plans for erosion prevention and sediment control by both the city of Happy Valley and the districts. In addition to erosion prevention and sediment control, the document also includes measures related to good house-keeping and addressing non-stormwater related waste. A multi-jurisdictional team revised this manual in December 2009.

TRACKING MEASURES

1. Annual number of permitted active construction projects (i.e., those projects disturbing 800 sq. ft. or more)
2. Annual number of site plan reviews and approved plans

TRACKING MEASURES RESPONSES

	Annual number of permitted active construction projects	Annual number of site plan reviews and approved plans
CCSD#1	137	137
SWMACC	23	23
Happy Valley	443	477[1]

MEASURABLE GOALS

1. Review all applicable erosion and sediment control plans submitted as part of the building permit

PROGRESS ON CCSD#1, SWMACC AND HAPPY VALLEY MEASURABLE GOALS

All applicable erosion and sediment control plans were reviewed, approved and permitted for CCSD#1 and SWMACC. All submitted erosion and sediment control plans were reviewed by the City of Happy Valley.

[1] The number of City of Happy Valley's site plan reviews and approved plans is greater than their permitted active construction projects. Some plans are still in the review process and have not yet been approved.

BMP# 7: IMPLEMENT REQUIREMENTS FOR STRUCTURAL AND NON-STRUCTURAL BEST MANAGEMENT PRACTICES

DISTRICTS REQUIRED TO REPORT: CCSD#1, SWMACC AND HAPPY VALLEY

BMP Description: CCSD#1 Service Area/SWMACC/City of Happy Valley Service Area

Structural and non-structural BMPs are required for all construction disturbing 800 sq. ft. of land or more by the District's erosion prevention and sediment control regulations. Erosion control plans require specific descriptions of erosion prevention measures, and implementation of control measures for any erosion identified prior to and concurrent with construction activities. Maintenance of all erosion control measures pursuant to an approved plan is the applicant's responsibility.

TRACKING MEASURES

See tracking measures for BMP #6

TRACKING MEASURES RESPONSES

See tracking measure responses for BMP #6

MEASURABLE GOALS

1. CCSD#1 and SWMACC: Require structural and non-structural BMPs for erosion prevention and sediment control on all construction sites disturbing 800 sq. ft. of land or more
2. City of Happy Valley: Require structural and non-structural BMPs for erosion control prevention and sediment control on all construction sites disturbing 800 sq. ft. of land or more.

PROGRESS ON MEASURABLE GOALS

1. Attained as is required for sites disturbing 800 sq. ft. of land or more
2. Attained for the same reason provided in #1

BMP#8: CONDUCT TRAINING FOR CONSTRUCTION SITE OPERATORS

DISTRICTS REQUIRED TO REPORT: CCSD#1, SWMACC AND HAPPY VALLEY

BMP Description: The Districts and the City of Happy Valley participate in the same activities regarding educational and training measures for construction site operators. These activities include the following:

1. The *Erosion Prevention and Sediment Control Planning and Design Manual* was developed in coordination with multiple regional jurisdictions. It is available for contractors, citizens, or others involved with construction activities within the permit area.

2. The Districts and the City of Happy Valley provide information to contractors during the permit review process, including pre-construction review meetings. District and city staff meet with developers and contractors to discuss requirements and to visit sites to review specific requirements.
3. The Districts and the City of Happy Valley have initiated a voluntary certification program for erosion control through Clackamas Community College. The certification process and procedure are coordinated with other jurisdictions in Clackamas County.
4. The Districts and the City of Happy Valley have partnered with regional jurisdictions, the Oregon Association of General Contractors and the Homebuilders Association of Metropolitan Regional Erosion Prevention Awards Program. Developed to provide recognition for contractors and developers with outstanding achievements in exceeding local erosion control requirements, the program provides recipients with media recognition, peer recognition and prizes donated by vendors of erosion prevention and sediment control products and services. The annual Regional Erosion Prevention Awards Program provides the development community with incentive to seek education regarding erosion prevention BMPs, improve BMP selection and installation and to better monitor and maintain the BMP's used in their projects. Additional benefits of the program include education for inspection staff and help with the standardization of erosion prevention requirements and reductions in noncompliance with erosion control requirements. In 2007-2008, participants included over 28 jurisdictions from 5 counties within Oregon and southern Washington.

TRACKING MEASURES

1. Track the number and type of educational and training events the District conducts and/or participates in annually.

TRACKING MEASURES RESPONSES

CCSD#1 and SWMACC

WES has made available the *Erosion Prevention and Sediment Control Planning and Design Manual* (download from the WES website) as well as the *ACWA Construction Site Stormwater Guide* (offered to contractors by WES staff as need arises). To reduce the instances of the use of the incorrect type of sediment fencing (non-pocketed) and incorrect installation, staff mailed to each new erosion permit applicant a flyer identifying the approved type of sediment fencing for within the Districts as well as reminders regarding proper installation. In regards to the training by Clackamas Community College and the certification program, there are no certified individuals at this time. This program is currently under review and revision. The former downturn in the building industry resulted in insufficient interest in the program to warrant offering certification training or the awards program at this time. In addition, WES staff have been participating in discussions of the Oregon ACWA Stormwater Committee to consider helping to offer Certified Erosion Sediment Control Lead (CESCL) training for the development community in multiple areas of the state.

Happy Valley

Happy Valley has made the *Erosion Prevention and Sediment Control Planning and Design Manual* available on the City website. The City did not sponsor training courses this year for construction site operators.

MEASURABLE GOALS

1. Conduct training for new employees as appropriate and whenever there is a significant update to the *Erosion Prevention and Sediment Control Planning and Design Manual*.

PROGRESS ON CCSD#1, SWMACC AND HAPPY VALLEY MEASURABLE GOALS

CCSD#1 and SWMACC
No applicable new employees were hired and there have been no changes to the manual. In January, 2016 an existing inspector took training in (and was certified as) a Certified Erosion Sediment Control Lead (CESCL). Additional training will be provided as needed.

Happy Valley
Storm Water Inspection Certification for 2 employees

BMP# 9: IDENTIFY PRIORITIES FOR INSPECTING SITES AND CONDUCTING ENFORCEMENT ACTIONS

DISTRICTS REQUIRED TO REPORT: CCSD#1, SWMACC AND HAPPY VALLEY

BMP Description:

CCSD#1 Service Area

The District inspects all construction project sites disturbing 800 sq. ft. of land or more for implementation of erosion prevention and sediment control BMPs within the district's service area. Additionally Water Environment Services is an agent of DEQ in the issuance and administration of NPDES 1200C permits for developments disturbing areas one acre or larger throughout unincorporated Clackamas County and, by agreement, within the Oak Lodge Sanitary District and the cities of Gladstone and Rivergrove. District staff inspects construction sites a minimum of three times (initial, unscheduled and final) during construction to verify proper implementation of required BMPs. Additional monitoring inspections are performed as necessary.

Priorities for monitoring inspections are based on site-specific characteristics (i.e., watershed, grade, percentage of soil cover to be removed, construction practices, season, and proximity to sensitive areas). Based on the recommendations from the WAPs, the prioritization process has been formally codified and inspection resources are allocated based on priority.

Note: CCSD#1 has developed a protocol for identifying high priority erosion control sites based on a number of criteria related to: site location; stage of development; and adjacency to sensitive features and other factors. A preliminary ranking scheme was developed and several CCSD#1 staff were trained on the protocol and sent out into the field to perform an initial ranking of all existing erosion control sites. These data have been collected and compiled in the District's Permits database. This database will be used to refine the ranking process and track all future erosion control inspections. The prioritization ranking scheme and inspection records will be used to allocate future erosion control resources based on priority.

The Districts monitor compliance with the erosion prevention and sediment control regulations and has the authority to issue deficiency notices, charge re-inspection fees, issue fines and stop land-disturbing development work at the site until provisions of the regulations are met.

Records of activities are maintained on file at the District. Erosion control plans are filed as well as inspection reports that describe non-compliance/enforcement actions.

City of Happy Valley Service Area

The City inspects all construction project sites disturbing 800 sq. ft. of land or more for implementation of erosion prevention and sediment control BMPs within the District's disturbing areas one acre or larger inside the city limits. City staff inspections construction sites a minimum of twice during construction to verify proper implementation of required BMPs. Additional inspections are performed as necessary.

The City monitors compliance with the erosion control regulations and has the authority to issue deficiency notices, charge re-inspection fees, issue fines and stop land-disturbing development work at the site until provisions of the regulations are met.

Records of activities are maintained on file at Happy Valley City Hall. Erosion control plans are filed as well as inspection reports that describe non-compliance-enforcement actions.

Enforcement procedures are documented in the District's rules and regulations.

TRACKING MEASURES

1. Annual number of permitted sites and percentage of sites inspections
2. Annual number of erosion control inspections conducted
3. Annual number of enforcement actions

TRACKING MEASURES RESPONSES

Tracking Measure	CCSD#1	Happy Valley	SWMACC
(1) Annual number of permitted sites and percentage of sites inspected	137 (99%)	443 (100%)	23 (100%)
(2) Annual number of erosion control inspections conducted	638	2373	105
(3) Annual number of enforcement actions	10 actions	16 actions	4 actions

MEASURABLE GOALS

1. Inspect construction sites disturbing 800 sq. ft. of land or more a minimum of three times during construction to verify proper implementation of required BMPs

2. Monitor compliance with the erosion control regulations for sites disturbing 800 sq. ft. or more of land and when necessary, issue deficiency notices, charge re-inspection fees, issue fines and stop land-disturbing development work at the site until provisions of the regulations are met

PROGRESS ON CCSD#1 AND SWMACC AND HAPPY VALLEY MEASURABLE GOALS

1. Performed initial, final and, at least one, monitoring inspection per site; but there was one exception. Staff did not know about construction that had begun at one single-family home site as this site was located at the edge of the service area. Inspection staff had not noted the construction had occurred until after completion. Since this appears to have been the only such occurrence this year, no corrective actions of our process are proposed other than staff has since emphasized to subsequent applicants that they must call for an initial erosion control inspection prior to construction of a home.
2. Attained as described in the tracking measure #2 listed above.

PROGRESS ON HAPPY VALLEY MEASURABLE GOALS

1. Measurable goals met
2. Measurable goals met

BMP#10: PUBLIC EDUCATION TO REDUCE DISCHARGES OF PESTICIDES, HERBICIDES AND FERTILIZERS

DISTRICTS REQUIRED TO REPORT: CCSD#1 AND SWMACC

BMP Description: CCSD#1 administers a public education program which provides information that attempts to motivate workers and residents to reduce stormwater pollution that is caused by the application of pesticides, herbicides, and fertilizers in the Districts. Educational information is shared with the public through the use of:

- Articles in newsletters
- Districts' website
- U.S. Geological Survey publications
- Local public involvement campaigns
- Brochures

Common topics that are addressed by this program include:

- Less harmful alternatives to the use of pesticides, herbicides, and fertilizers are provided.
- Information about the potential hazards to water quality, public health, and aquatic life associated with the misuse of pesticides, herbicides, and fertilizers in the District.
- Users are reminded that pesticide and herbicide products need to be used in a manner consistent with the product's label.

TRACKING MEASURES:

1. Track program messages delivered, type of communication piece, and where appropriate the number of people affected.

CCSD#1 AND SWMACC TRACKING MEASURES RESPONSES

1. The following is a list of communication pieces that inform the public of potential hazards to water quality, public health, and aquatic life associated with the misuse of pesticides, herbicides, and fertilizers in the District:
    a. Happy Valley Monthly reaches approximately 17,000
        i. "The River Starts Here" ad messages the protection of water by being mindful of yard and garden products washing in to streams and suggests using natural gardening methods, July 2015 and June 2016
        ii. "Discover Rock Creek" article invites the public to attend an event where tips to protect stream health will be presented, November 2015
        iii. "Families and friends gather to improve Rock Creek Watershed' ad messages the importance of planting native vegetation to improve habitat for a healthier watershed to protect water quality, April 2016
    b. Clackamas County Citizen News
        i. "Clackamas river is vulnerable to surface water runoff - #1 cause of water pollution" article provides tips to prevent water pollution, which includes the use of natural gardening practices rather than pesticides, herbicides and fertilizers, Fall 2016
        ii. "Protecting our rivers and streams: Waterways provide beauty, challenge and opportunity" article provides tips to help protect water quality, which includes planting native trees and shrubs that generally do not require fertilizers, Winter 2016
        iii. "The River Starts Here" ad messages the protection of water quality by messaging that stormwater runoff is the #1 source of water pollution and that pollutants from the garden can wash into our rivers and streams, Winter 2016
        iv. "Report pollution entering storm drains and waterways" article describes chemicals, such as pesticides, herbicides and fertilizers, washed into our surface water storm system can cause water pollution, Spring 2016

MEASURABLE GOALS

1. Continue to maintain relevant public education materials on the County's website.
2. Prepare a minimum of one relevant article per year for inclusion with Clackamas County customer billing statements.
3. Pursue additional relevant USGS studies if the opportunity presents itself.

PROGRESS ON MEASURABLE GOALS

1. Relevant public education materials are currently maintained via clackamas.us/wes and riverhealth.org
2. A bill insert was mailed out in late February 2016 to approximately 20,000 CCSD#1 customers that contained the article "Yard and garden chemicals can contaminate our community's water"
3. No additional USGS studies were funded during the 2015-2016 MS4 permit year. Note that CCSD#1, the SWMACC, and the Cities of Rivergrove and Happy Valley contributed funds towards a USGS pesticide monitoring study, which assessed pesticide concentrations in creek water, creek bed sediments, and discharges from MS4 outfalls, during the current 2012-2017 MS4 permit term. This monitoring study satisfies the pesticide monitoring requirement in table B-1 of the MS4 permit. The USGS wrote an article about this study which was published in the Journal of Environmental Monitoring Assessment, a scientific journal, in May 2016.

BMP#11: PROPER DISPOSAL PRACTICES TO REDUCE DISCHARGES OF PESTICIDES, HERBICIDES AND FERTILIZERS

DISTRICTS REQUIRED TO REPORT: CCSD#1 AND SWMACC

BMP Description: When the District receives inquiries from the public about the proper disposal method for empty containers that once held pesticides/herbicides or for disposal of unwanted quantities of these products, citizens are promptly forwarded to Metro's informational phone number (503-234-3000).

TRACKING MEASURES

1. Number of calls received and referred to Metro annually

CCSD#1 AND SWMACC TRACKING MEASURES RESPONSES

1. 3 calls

MEASURABLE GOALS

1. Refer all pesticide/herbicide disposal related calls to METRO

PROGRESS ON MEASURABLE GOALS

CCSD#1 and SWMACC
Goal achieved, as all pesticide/herbicide disposal related calls were referred to METRO

BMP#12: FACILITATE PUBLIC REPORTING OF ILLICIT DISCHARGES AND SPILLS AND OTHER TYPES OF IMPROPER DISPOSAL OF MATERIALS

DISTRICTS REQUIRED TO REPORT: CCSD#1, SWMACC AND PUBLIC & GOVERNMENT RELATIONS

BMP Description: The District implements a program to promote, publicize, and facilitate public reporting of the presence of illicit discharges and other types of improper disposal of materials into the MS4. After District staff has received a report which relates to one of these discharges, they investigate and, if appropriate, applies control measures. See BMP #3.

TRACKING MEASURES

1. Describe news articles reported per year when appropriate.
2. Describe type of public complaints received. Resulting follow-up actions per year will be kept in a database.

CCSD#1 & SWMACC TRACKING MEASURES RESPONSES

1. "Report pollution entering storm drains and waterways" – Clackamas County Citizen News Spring Issue, page 15. Article describes possible sources of water pollution entering the storm drain system from unlawful or accidental spills and provides contact information for public to report to WES.
2. Of the 258 complaints received about Surface Water during the reporting period, including stormwater events, 15 were illicit discharges or improper disposal of materials into the MS4. Total requests for service are listed below:

Public complaints/reports by category

Illicit discharge	11
Spills	2
Non-stormwater discharge	2
Total illicit discharges and improper disposals	15

MEASURABLE GOALS

1. Include a relevant article in The Citizen News (for the County) once a permit term
2. Continue to include area for public complaints on the county's website, and track number of complaints reported

PROGRESS ON CCSD#1 & SWMACC MEASURABLE GOALS

1. Attained
2. Attained
    a. http://web3.clackamas.us/up/forms/reportproblem.jsp

BMP#13: PARTICIPATE IN PUBLIC EDUCATION EFFECTIVENESS EVALUATION

DISTRICTS REQUIRED TO REPORT: CCSD#1 AND SWMACC

BMP Description: Over the permit term CCSD#1 will provide information related to an effectiveness evaluation. This may be conducted in coordination with other local Phase 1 jurisdictions. The effectiveness evaluation information will focus on assessing changes in targeted behaviors and will allow for additional information that can be used in adaptive management of the CCSD#1 education and outreach strategy.

TRACKING MEASURES

1. Report on activities annually

CCSD#1 AND SWMACC TRACKING MEASURES RESPONSES

1. The evaluation was completed and submitted to DEQ in June 2015.

MEASURABLE GOALS

1. Provide/compile information regarding a public education effectiveness evaluation over the permit term

PROGRESS ON MEASURABLE GOALS

<u>CCSD#1 and SWMACC</u>

1. Completed and submitted to DEQ in June 2015.

BMP#14: TRAINING FOR EMPLOYEES

DISTRICTS REQUIRED TO REPORT: CCSD#1 AND SWMACC

BMP Description: CCSD# 1 and SWMACC

A variety of training is provided to CCSD#1 staff associated with stormwater management. Training and advisory committee opportunities are made available through local agencies and groups involved with a broad range of water quality issues including stormwater (e.g., Oregon Association of

Clean Water Agencies conferences). Such training is provided based on need and availability. With respect to firefighting-related training activities, firefighting is conducted within the permit area by Clackamas County Fire District #1. They have a training center at SE 130th in Clackamas County. The training center includes a valve that is used to divert training flows into the sanitary system. CCSD#1 will check-in with the Fire District during the permit term to ensure they are using the valve. Check-ins will include discussion related to training and the potential for other waste waters to enter the system.

TRACKING MEASURES

1. Track the number of employees receiving training in stormwater management annually.

CCSD#1 & SWMACC TRACKING MEASURES RESPONSES

1. Fifty-five employees attended stormwater management training this year. Please note that the 2016 ORWEF Short School did not offer stormwater sessions.

MEASURABLE GOALS

1. Attend relevant stormwater management related training based on need and availability.
2. Check-in with the Fire District regarding stormwater issues.

PROGRESS ON CCSD#1 & SWMACC MEASURABLE GOALS

1. Trainings that WES staff have attended with a portion of the school related to stormwater infrastructure include:

TRAINING	# of Employees
ACWA 2015 Summer Conference	6
ASCE 2015 Sustainable Stormwater Symposium	2
PNCWA 2015 Annual Conference - Boise	6
LCEP Science to Policy Summit	2
Low Impact Development Facility Maintenance Workshop	13
APWA Street Maintenance & Collections Systems	5
PSU - River Restoration Program	1
ACWA Stormwater Summit	6
Tree Preservation in Urban Areas Conference	1
NWETC - Certified Erosion and Sediment Control Lead Training	6
2015 WEFTEC	3
Intertwine Alliance Fall Summit	1
TOTAL	**52**

2. Attained. The check-in meeting with Clackamas County Fire District No. 1 occurred on December 3, 2014. During this meeting, WES staff verified that CCFS#1 staff have been using the valve correctly.

BMP# 15: PROVIDE FOR PUBLIC PARTICIPATION WITH SWMP AND BENCHMARK SUBMITTALS

DISTRICTS REQUIRED TO REPORT: CCSD#1 AND SWMACC

BMP Description: Schedule A(4)(e) of the District's MS4 NPDES permit requires CCSD#1 to provide opportunity for public participation in the development, implementation, and modification of the CCSD#1 Stormwater Management Plan (SWMP) and pollutant load reduction benchmark development.

SWMP revisions and pollutant load reduction benchmarks are required for submittal to DEQ at the permit renewal submittal (180-days prior to permit expiration). Prior to submittal of these items, CCSD#1 will provide the public with an opportunity to comment on the revised draft SWMP and proposed pollutant load reduction benchmarks for a minimum of 30 days. Comments on the documents will be collected and considered and response to comments will be publically provided.

TRACKING MEASURES

N/A

CCSD#1 & SWMACC TRACKING MEASURES RESPONSES

N/A

MEASURABLE GOALS

1. Provide for public participation with the SWMP and pollutant load reduction benchmarks prior to the permit renewal application deadline.
2. Provide for public participation with the monitoring plan due to the department by September 1, 2012.

PROGRESS ON CCSD#1 & SWMACC MEASURABLE GOALS

1. This activity is on track to prior to permit renewal
2. Done

BMP#16: PLANNING PROCEDURES FOR NEW DEVELOPMENT AND SIGNIFICANT REDEVELOPMENT

DISTRICTS REQUIRED TO REPORT: CCSD#1 AND SWMACC

BMP Description: This BMP covers the planning procedures for developing, implementing, and enforcing controls to reduce the discharge of pollutants from storm sewers collecting runoff from areas of significant development or redevelopment. These controls include county-funded capital improvement projects to provide new stormwater treatment facilities in previously developed areas and regulations requiring such facilities with all new land development or redevelopment projects.

For residential subdivisions and partitions of parcels with the potential to create more than two additional lots as currently zoned, and for developments having more than 5,000 sq. ft. of impervious surface, on-site stormwater flow control, water quality treatment, and infiltration facilities are required. For 2 and 3 lot partitions that cannot be further partitioned under current zoning, flow control is not required if there are no downstream impacts. All subdivisions and partitions must include a storm water management plan. Infiltration facilities are required where soil conditions permit. With respect to maintenance of the private facilities that are constructed, the following applies:

Private Residential Storm System Maintenance (e.g. subdivisions)

Properties with private storm systems for new residential developments are required as part of the development approval process to inspect and maintain their storm systems themselves (e.g. through a Homeowners Association) or to sign an agreement that they will have the District staff maintain their systems on their behalf in exchange for a monthly on-site management fee.

Private Non-Residential Storm System Maintenance (e.g. commercial, industrial, etc.)

Private storm systems for new non-residential development and redevelopment are required as part of the development approval process to sign an agreement to inspect, maintain and, if needed, clean their storm systems annually. Further, they must report on these activities to the District annually. The District is compiling a database of these private facilities to allow for tracking of compliance with the terms of the agreements. In addition, the district has implemented a Storm Drain Cleaning Assistance Program. See CCSD#1 BMP #28

Maps are updated to include the location, type and drainage area of new facilities resulting from CCCSD#1's post construction standards.

TRACKING MEASURES

1. The number and type of flow control, water quality treatment or infiltration facilities installed in accordance with the requirements.
2. Narrative to describe the status of the private facility database.
3. Narrative to describe results of tracking compliance with private facility maintenance agreements.

CCSD#1 & SWMACC TRACKING MEASURES RESPONSES

1. Districts:
   a. CCSD#1: 7 Water Quality, infiltration and flow control ponds
   b. SWMACC: 0 Water Quality, infiltration and flow control ponds.

2. and 3. In GIS, CCSD#1 and SWMACC staff track areas that drain to water quality and flow-control facilities by mapping project areas from As-Builts. For one year, however, CCSD#1 and SWMACC staff have not mapped new storm water projects. Staff is redesigning the GIS database and improving existing data. The mapping of new storm water projects will resume when the improvements are complete.

Maintenance Agreements for the private industrial/commercial facilities are currently tracked through a combination of databases and an excel spreadsheet.

Commercial/Industrial:
In addition to the enhanced Storm Drain Cleaning Assistance Program (SCAP) for private facilities performed this year (See BMP 28), staff sent a letter to each of the properties within the MS4 area that had Commercial Maintenance Agreements. The letter was to remind them of the cleaning and reporting requirements. These efforts resulted in additional cleaning and reports received.

For 16/17, staff have decided to:

- Send three SCAP mailings to all commercial/industrial sites;
- Send a separate letter to Commercial Maintenance Agreement properties;
- Increase follow up on properties that fail to respond.

The results for sites with maintenance agreements are as follows:
CCSD#1: Approx. 129 agreements, 36 reported for a total of 304 structures inspected and/or cleaned.
SWMACC: Approximately 10 agreements, 0 reported for a total of 0 structures inspected and/or cleaned.

Total cleaning of private commercial/industrial facilities through SCAP (See BMP 28) and other methods:
CCSD#1: 108 businesses, 738 structures inspected and cleaned, and 76,137 gallons of material removed.
SWMACC: 1 business, 47 structures inspected and cleaned, and 4,648 gallons of material removed.

MEASURABLE GOALS

1. Continue to implement and enforce controls for stormwater quality treatment from new and redevelopment.
2. Track the location, type and drainage area of new water quality facilities using GIS.
3. Continue with work to compile a database of private facilities
4. Annually, check in on compliance with terms of private facility maintenance agreements.

PROGRESS ON MEASURABLE GOALS

1. WES continues to implement and enforce controls for stormwater quality treatment from new and redevelopment.
2. The location, type and drainage area of new water quality facilities are entered in to GIS.
3. Updating and refining the database of private facilities is ongoing. (see #4 below)
4. In March 2016, EPA presented WES with the findings of their audit of components of WES' MS4 program. Audit results included concerns regarding the industrial/commercial portion of the private facility maintenance program. Prior to (and after) the findings, staff met with the new Surface Water Manager regarding compliance issues with the industrial/commercial private facility maintenance program. As a result of those meetings, efforts are underway to improve the GIS and the maintenance management software to provide an improved inventory and tracking of private systems. Staff was also directed to create a prioritized list of private industrial/commercial properties that could serve as a

focus for a program of meeting onsite with the owners to evaluate and assist with minimizing the pollutants from their property and activities.

Another compliance improvement tool was an increased level of outreach to property owners/managers. WES augmented its Storm System Cleaning Assistance program from one postcard mailing to two in the fall of 2015 and another in the spring of 2016. A separate, specific letter was sent to holders of Commercial Maintenance Agreements in the spring of 2016 regarding the need for them to maintain and report on the cleaning of their private system. This enhanced effort resulted in increased compliance over the previous year.

Possible changes to the private industrial/commercial program and to the SWMP will be evaluated as part of our MS4 permit renewal submittal.

BMP#17: UPDATE PROCEDURES FOR NEW DEVELOPMENT AND SIGNIFICANT REDEVELOPMENT

DISTRICTS REQUIRED TO REPORT: CCSD#1 AND SWMACC

BMP Description: The County conducted watershed evaluations and developed watershed action plans for the Kellogg Creek and Rock Creek watersheds in 2009. Recommendations in the action plans included proposed changes to the District's stormwater standards for new and re-development. As a result, CCSD#1 embarked on a process to revise and update their standards in late 2009. Updated standards will include new thresholds for meeting standards and increased emphasis on infiltration, on-site retention, and the duration of peak flows in order to address impacts associated with hydro-modification. In addition, the design storm is being evaluated to ensure it will address the capture and treatment of 80% of average annual runoff. CCSD#1 anticipates adoption of the standards and development of a guidance manual to meet new permit requirements by June 30, 2013.

TRACKING MEASURES

CCSD#1

1. Track status of adopting

SWMACC

2. Track status of policy development

CCSD#1 & SWMACC TRACKING MEASURES RESPONSES

1. Completed July 1, 2013. Water Environments Services adopted new CCSD#1 stormwater standards which included the MS4 requirement to capture and treat 80% of the annual average runoff volume, which roughly equates to 1" of rainfall on a development site. The new standard allows Low Impact Development Approach (LIDA) to mitigate stormwater runoff. The newly adopted stormwater standards are a guide for the development

community to assist in the planning and design of a stormwater management plan. The District through the Permitting Program communicates with land owners, developers and engineers to educate them on the value of implementing a low impact development approach to treat stormwater runoff. As part of the permitting and land-use process, the District emphasizes the feasibility of a low impact development/green infrastructure approach to mitigate stormwater runoff.

2. The District is not proposing to implement any substantial changes to the SWMACC Rules and Regulations or standards at this time. The District will continue to discuss the stormwater requirements within SWMACC with developers, customers and engineers to assure the MS4 permit requirements are being fully implemented. The MS4 area within the SWMACC boundary is a geographically small area within the City of Rivergrove and the District only receives a couple of new proposals for development each year.

MEASURABLE GOALS

CCSD#1:

1. Complete all updates to the standards in order to meet new permit requirements by June 30, 2013
2. Complete the guidance manual for developers to facilitate the implementation of the new standards by June 30, 2013

SWMACC:

1. Policy development and implementation by November 1, 2014

PROGRESS ON MEASURABLE GOALS

CCSD#1

1. Completed. CCSD#1 completed the updates to the standards on July 1, 2013 by adopting new CCSD#1 stormwater standards. These standards included the MS4 requirement to capture and treat the 80th percentile storm event.
2. The newly adopted stormwater standards combined with the BMP Sizing Tool and Planning Tool are guides to assist the development community with planning and design of SWM facilities to mitigate stormwater runoff. A new guidance manual was not created.

SWMACC

1. The District is not proposing to implement any substantial changes to the SWMACC Rules and Regulations or standards at this time.

BMP#18: SIZING TOOL DEVELOPMENT TO ADDRESS HYDROMODIFICATION

DISTRICTS REQUIRED TO REPORT: CCSD#1

BMP Description: Develop a simplified tool for development engineers to easily size LID BMPs to address the duration of elevated flow levels in addition to addressing flow volumes and peaks. Use of the tool in designing LID BMPs is expected to ultimately address the long-term impacts of increased runoff from development. To address flow durations, a long-term continuous simulation of hydrology is required. As a result, designing and sizing BMPs becomes more complicated than traditional design practices focused on a single design event. In order to make the BMP design process easier for the development community, neighboring states have developed a sizing tool. Currently, there are no BMP design/sizing tools to address the impacts of hydromodification that are applicable to local conditions such as rainfall patterns and critical channel forming flows. This tool provides a simple, consistent and defensible methodology for designing/sizing LID throughout Clackamas County and the region to address hydromodification impacts.

TRACKING MEASURES

1. Net impervious area treated by LID
2. Number of applications submitted using tool.
3. Customer Feedback/Community Relations

CCSD#1 TRACKING MEASURES RESPONSES

1. CCSD#1 Development Services approved 3 development permits encompassing 11.53 acres of pervious area.
2. 3
1. No customer feedback was solicited for the sizing tool.

MEASURABLE GOALS

1. The primary goal is to develop, by June 30, 2013, a tool to assist development engineers with the design/sizing of stormwater management facilities in order to reduce target pollutants and stream degradation impacts (i.e., hydromodification) associated with the development of impervious surfaces.

PROGRESS ON MEASURABLE GOALS

1. Attained. The sizing tool has been developed and is available to the public for use.

BMP# 19: STREET SWEEPING

DISTRICTS REQUIRED TO REPORT: DTD AND HAPPY VALLEY (#19) AND SWMACC (#18)

BMP Description: Major arterial curbed streets within the DTD service area (which includes CCSD#1) are swept on a regular basis by DTD. The frequency varies depending on a variety of factors (for example, traffic volumes). For information on their street sweeping activities, refer to DTD MS4 NPDES SWMP and annual report.

Major arterial curbed streets within the City of Happy Valley service area are swept on a regular basis by the City. The frequency varies depending on a variety of factors (for example, traffic volumes).

TRACKING MEASURES

1. Number of miles that were swept in Happy Valley, (and portions of CCSD#1)
2. Mass or volume of material removed during sweeping in Happy Valley

For DTD, see tracking measures in the DTD MS4 NPDES SWMP.

HAPPY VALLEY AND CCSD#1TRACKING MEASURES RESPONSES

1. 1,800 miles (including miles swept in Happy Valley and miles swept under contract with CCSD#1); 900 yards removed
2. 1,035 miles swept in Clackamas County; 460 yards removed in Clackamas County

SWMACC AND DTD TRACKING MEASURES RESPONSES

See DTD MS4 Annual Report responses

MEASURABLE GOALS

DTD and Happy Valley

1. DTD: See DTD's MS4 NPDES SWMP.
2. City of Happy Valley Roads: Sweep approximately 1000 lane miles of curbed streets per year on average.

PROGRESS ON DTD MEASURABLE GOALS

1. See DTD's MS4 Annual Report response

PROGRESS ON HAPPY VALLEY MEASURABLE GOALS

2. Measurable goals met in Happy Valley

BMP# 20: OPERATIONS & MAINTENANCE FOR PUBLIC STREETS

DISTRICTS REQUIRED TO REPORT: CCSD#1 (#20) AND SWMACC (#19)

BMP Description: Operations and maintenance of public streets within the DTD service area (which includes CCSD#1) is the responsibility of DTD. For information on their activities, refer to the DTD MS4 NPDES SWMP.

Public streets within the city of Happy Valley are carried out by the city as follows:

1. Road repair activities: These are conducted by Happy Valley as needed in a manner that minimizes or prevents erosion. When possible, this work is scheduled during the dry season.
2. Litter control: This involves 1) the removal of large dead animals from roadways, 2) preventing illegal solid waste dumping through signage and enforcement actions against offenders, 3) removal of illegal solid waste dumps, and 4) the District's "Adopt-a-Road" program, which enlists the support for litter removal on specific road segments from individuals, families, community groups and businesses.
3. Ice removal work: This is performed by Happy Valley on certain paved streets on an as-needed basis. The frequency varies depending on a range of factors, inkling personnel availability, air temperature, road surface temperature, humidity, and precipitation.
4. Road sanding: This enhances traction during ice/snow events. After the ice/snow event when practical, the sand is removed from the roadway with mechanical sweeping machines.

TRACKING MEASURES

1. Mass or volume of material removed by the city of Happy Valley "Adopt-a-Road" program
2. Number of illegal solid waste dumps that are removed in the city of Happy Valley
3. Mass or volume of material that is removed by the elimination of illegal solid waste dumping sites in the City of Happy Valley
4. Amount of sand applied and then removed by Happy Valley as a result of a snow/ice event and time of removal after the event

CCSD#1 TRACKING MEASURES RESPONSES

Tracking measure responses refer only to the work performed by the City of Happy Valley.

1. None
2. 15 illegal solid waste dumps removed
3. The volume of material removed is not available. Illegal dumps on public lands are removed via a partnership between the City of Happy Valley, Metro and Multnomah County
4. 100 yards of sand applied; 60 yards of sand picked up after storm event

SWMACC TRACKING MEASURES RESPONSES

For information on DTD activities, please refer to the DTD MS4 Annual Report.

MEASURABLE GOALS

1. DTD: See DTD's MS4 NPDES SWMP
2. Remove illegal solid waste dumps as they are discovered
3. Collect sand applied for ice/snow events within 10 days of the end of the event

PROGRESS ON CCSD#1 MEASURABLE GOALS

1. See DTD's Annual Report
2. Illegal dump sites were removed as they were discovered
3. The sand applied for ice/snow events were picked up within 10 days after the event

PROGRESS ON SWMACC MEASURABLE GOALS

For information on DTD activities, please refer to the DTD MS4 NPDES SWMP

BMP# 21: PROPER ROAD MAINTENANCE PRACTICES TO REDUCE THE DISCHARGE OF PESTICIDES, HERBICIDES AND FERTILIZERS

DISTRICTS REQUIRED TO REPORT: HAPPY VALLEY AND DTD (#21) AND SWMACC (#20)

BMP Description: Proper road maintenance practices to reduce the discharge of pesticides, herbicides, and fertilizers within the DTD service area (which includes CCSD#1, SWMACC, and County roads in Happy Valley) is the responsibility of DTD. For information on their activities, refer to the DTD MS4 NPDES SWMP.

Proper road maintenance practices within the city of Happy Valley are carried out by the city as follows:

Herbicides are occasionally but rarely used in road maintenance operations in the MS4-permitted area. In fact, in many years, no herbicides have been applied for roadside vegetation control in the district's area. This is due to the facts that: a) most roads in the MS4-permitted area are paved, have curbs, and are served by piped storm sewer systems, and b) any vegetation present in the road right-of-way is usually part of a landscape maintained by the property's owner. In most of the instances that involve Road Department roadside vegetation management activity within the MS4-permitted area, mowing is the preferred vegetation control system. When herbicides are used, these products are always used in a manner consistent with the product's label.

Happy Valley has adopted the Oregon Department of Transportation (ODOT) Routine Road Maintenance Manual which includes integrated pest management. The manual governs the manner in which maintenance crews proceed on a wide variety of routine maintenance activities. The ODOT manual received approval from the National Marine Fisheries Service (NOAA Fisheries) as being exempt from "takings" with respect to salmonids listed as endangered. In other words, the practices in the manual have been designed to eliminate the adverse impacts of road maintenance activities on salmonid habitat while preserving the ability to maintain the functional integrity of the road system.

HAPPY VALLEY AND DTD TRACKING MEASURES

1. Happy Valley – The quantity of herbicide products used per zip code. This is the same data that will be reported to Oregon's Department of Agriculture per the Pesticide Use Reporting System.
2. For DTD, see tracking measures in the DTD MS4 NPDES SWMP.

HAPPY VALLEY TRACKING MEASURES RESPONSES

1. Quantity of herbicide used by the City of Happy Valley: No Herbicides used on roadways. Quantity of Magnesium chloride/De-icing – 2750 gallons
2. City of Happy Valley Landscape Maintenance Product Usage: Chemical Usage –
    - City Hall:
        - Surfland pre-emergent - 188 gallons
        - Triplet Nu Farm - 113 gallons
        - Zinc Sulfate Powder – 6 cups
        - QC Corp moss control 40lbs
        - Prosecutor Pro – 50 gallons (mixed chemical)
    - Public Works Yard: Roundup - 7 gallons
    - CPC:
        - Moss Melt - 16 gallons
        - Park: Roundup - 81 gallons
    - City Owned Spaces:
        - Roundup - 9 gallons
        - Element 4 - 4 gallons
    - Library:
        - Prosecutor Pro - 12.50 gallons (mixed chemical)

    Note: All public buildings are located within the 97086 zip code.

SWMACC AND DTD TRACKING MEASURES RESPONSES

See tracking measures responses in the DTD MS4 annual report.

MEASURABLE GOALS

1. For City of Happy Valley: Continue to implement the integrated pest management portion of the ODOT Routine Road Maintenance Manual
2. For DTD, see Measurable Goals in the DTD MS4 NPDES SWMP.

PROGRESS ON HAPPY VALLEY AND DTD MEASURABLE GOALS

1. The City of Happy Valley implemented the integrated pest management portion of the ODOT Routine Road Maintenance Manual in 2015-2016. The City of Happy Valley also continues to implement the December 2012 Integrated Pest Management Plan. This document's other co-owners are CCSD#1 and SWMACC. This IPM Plan and the "integrated pest management portion of the ODOT Routine Road Maintenance Manual" are two separate documents.
2. For SWMACC and DTD, see DTD's MS4 Annual Report.

BMP#22: LANDSCAPE MAINTENANCE PRACTICES TO REDUCE THE DISCHARGE OF PESTICIDES, HERBICIDES AND FERTILIZERS

DISTRICTS REQUIRED TO REPORT: CCSD#1, HAPPY VALLEY AND DTD (#22), AND SWMACC (#21)

BMP Description: Herbicides, pesticides and fertilizers are used by Clackamas County and the City of Happy Valley in landscape maintenance applications around County and City owned buildings and facilities. When herbicides and pesticides are used, these products are used in a manner consistent with the product's label.

During the previous permit term (2004-2009), the county and city performed the following tasks in an attempt to reduce the discharge of pollutants associated with landscape maintenance activities:

- Assembled a list of all County and City of Happy Valley buildings and facilities in the districts' MS4 permit areas.
- Met with the proper County facilities and building maintenance personnel to inform them that herbicides, pesticides and fertilizers must be used with care in landscape maintenance applications around County-owned buildings and facilities in the District. These personnel were encouraged to:
- Substitute the use of these products for other, less harmful ones,
- Use less herbicide, pesticide and fertilizer, if possible, when they are used, and
- Naturescape with native plants, which are likely to need less herbicides, pesticides and fertilizers, whenever possible.

For this permit term, this BMP will include:

- Going back to these personnel to check-in on progress and to continue to encourage activities which reduce landscape maintenance related discharges of pesticides/herbicides/fertilizers. Please note that lands and buildings which have been leased by the city of Happy Valley and Clackamas County (i.e., the library at Clackamas Town Center) are not included in this BMP, for lease terms do not, or tend to not, provide the city or County with the authority to make landscaping decisions.
- Assembling a list of lands in CCSD#1's MS4 permit area that are not owned by Clackamas County, CCSD#1, or the City of Happy Valley, but are owned by other local governments. These local governments have their own board of directors. Water Authority, Clackamas River Water, Clackamas County Fire District No. 1, and the North Clackamas School District, are not MS4 permit holders. After this list has been assembled, we will meet with each local government during this permit term to request that they consider taking the same steps that County and City employees were asked to take (i.e., use less toxic herbicides if herbicides must be used).

TRACKING MEASURES

1. The number of meetings conducted.
2. The results and follow-up activities conducted as a result of the meetings.

TRACKING MEASURES RESPONSES (ALL DISTRICTS)

1. Four. Meetings were held during the 2015-2016 MS4 Permit year with the Cities of Rivergrove and Happy Valley, the North Clackamas Parks & Recreation District, and the Clackamas County Development Agency. Additional meetings with the other property owners who are also MS4 co-permittees (Clackamas County's Housing Authority, for example) are expected to be conducted prior to the expiration of the MS4 permit on March 1, 2017.
2. The meetings' results are positive. In every instance, the message (encouraged to use less herbicides, pesticides, and fertilizer if the smaller amount will still get the job done, for example) was received. No follow-up activities were conducted as a result of the meetings this is due to the fact these four meetings were all held in June 2016 and insufficient time has elapsed to follow up with them.

MEASURABLE GOALS

1. Check back in with all County and City of Happy Valley buildings and facilities that were visited (during the last permit cycle) at least once during this permit cycle.
2. Develop and implement an Integrated Pest Management (IPM) plan by December 31, 2012.

PROGRESS ON MEASURABLE GOALS

1. Some progress was made towards achieving this measurable goal. Four meetings were held during the 2015-2016 MS4 Permit year (Cities of Rivergrove and Happy Valley, for example). All of the additional required meetings (which are those to be held with the other property owners who are also MS4 co-permittees; Clackamas County's Housing Authority, for example) are expected to be conducted prior to the expiration of the MS4 permit on March 1, 2017.
2. Achieved. for the City of Happy Valley, SWMACC and CCSD#1. The MS4 permit required these co-permittees to implement an IPM plan by December 31, 2012 and it continued to be implemented during the 2014-2015 reporting period. The City of Rivergrove was also bound by this same MS4 permit requirement, but they elected to create and submit their own separate IPM Plan to DEQ.

BMP# 23: CONTROL INFILTRATION AND CROSS CONNECTIONS TO THE DISTRICT'S STORMWATER SYSTEM

DISTRICTS REQUIRED TO REPORT: CCSD#1 (#23) AND SWMACC (#22)

BMP Description: The District's prevent exfiltration of flows from municipal sanitary sewers in the following ways:

- Through ownership of a relatively new sanitary sewer system. Most of the infrastructure in CCSD#1-UGB's sanitary sewer system has been constructed since 1974 and its condition is generally sound and free of cracks and leaks.
- Through the presence of a rigorous maintenance program involving routine cleaning and inspection of lines to ensure that there are very few leaks. Lines are inspected with a television camera on a periodic basis. Tree roots, which could cause leakage, are removed whenever identified.

The Districts' rules prohibit cross-connections in new/redevelopments through the development building permit review and issuance process. This system, which features plan review in other office and field inspections by certified plumbing inspectors, ensures that fixtures that need to be plumbed into CCSD#1's and SWMACC's sanitary sewer system or a private septic system are actually plumbed into those systems, preventing hundreds of illicit discharges per year. The Districts are able to identify and control the exfiltration of flows from municipal sanitary sewers when it occurs by:

- Performing dry weather inspections at all major or priority outfalls on an annual basis to detect non-stormwater flows, and
- Receiving and promptly responding to reports from citizens of unusual colors, odors and solids.

TRACKING MEASURES

1. Number of cross-connections/sanitary discharges identified
2. The number and type of inspections performed, abatement actions and enforcement actions taken

CCSD#1 TRACKING MEASURES RESPONSES

1. 1 cross-connection was found within the CCSD#1 collections system
2. 0 enforcement actions, 3,096 cleanings and 600 inspections
   - 1647 Inlets and 1449 Maintenance Agreement Inlets cleaned at catch basins, inlets and curb inlets
   - 345 water quality facilities and 255 maintenance agreement WQ Facilities inspected

SWMACC TRACKING MEASURES RESPONSES

1. No cross connections were found or reported.
2. No customer requests, which drive cleaning and infiltration inspections, were received and, therefore, no inspections and cleanings were conducted, and no abatement and enforcement actions were taken.

MEASURABLE GOALS

1. Eliminate any identified sanitary discharges to the storm system

PROGRESS ON CCSD#1 AND SWMACC MEASURABLE GOALS

Complete. One cross-connection eliminated. Inspections and cleaning activities continue with an effort to also identify cross connections.

BMP# 24: FLOOD MANAGEMENT PROJECTS AND WATER QUALITY

DISTRICTS REQUIRED TO REPORT: CCSD#1(#24)

BMP Description: There are two components to this BMP. The first is to ensure that water quality is assessed and addressed when developing capital improvement projects (CIPs) for flooding. The second is to examine the existing system to determine whether water quality retrofits would be beneficial and feasible.

CIPs: The District hired a consultant for development of Watershed Action Plans which were completed in July 2009. These Action Plans were based on watershed assessments which identified prioritized and scheduled projects and actions necessary to address factors limiting watershed health. The Action Plans include recommendations for site specific and reach oriented solutions and management programs for the significant, and often, interrelated, problems related to flooding, erosion and deposition, water quality, and habitat. One of the main goals and outcomes of the Action Plans was to prioritize what stormwater management actions and activities should be conducted in specific sub-basin areas, such as where to assist the operations and maintenance program in targeting specific activities in various locals. Another main goal of the Watershed Action Plans is to protect, restore, and enhance the health and function of a watershed. Action Plans are currently being utilized to:

1) Identify key problems and opportunities
2) Identify areas where efforts should be focused both in terms of protection and restoration efforts and asset management activities
3) Implement policies, programs, and standards in specific areas
4) Build support for implementation and serve as a tool for funding.

As a result, the stormwater CIP process includes consideration of water quality benefits.

Retrofits: As structural facility inspections occur under CCSD#1 BMP #26, sediment and debris from the facilities are removed. In the process of conducting this maintenance, facilities are sometimes found to be dysfunctional due to design flaws. As a result, facilities are sometimes retrofitted or reconstructed. In addition, projects resulting from the Watershed Action Plans described above include retrofits in addition to proposed new CIP facilities. A specific program to retro fit detention facilities is also described under CCSD#1 BMP#25.

TRACKING MEASURES

1. Number of retrofits constructed that address water quality treatment.
2. Number of flood management projects implemented or constructed and the percentage of those projects that include water quality components.
3. Number of riparian enhancement projects completed each year. Number of acres enhanced.

CCSD#1 TRACKING MEASURES RESPONSES

1. One. A stormwater planter was constructed at Clackamas High School.
2. Zero.

3. A total of 92 riparian enhancement projects were completed for a total of 71.27 acres enhanced.

MEASURABLE GOALS

1. Ensure all planned stormwater CIPs include consideration of water quality.

PROGRESS ON MEASURABLE GOALS

1. All WES retrofit projects are planned and constructed using current industry standards for water quality treatment. Plans and specifications are developed for each specific project.

BMP# 25: DETENTION POND RETROFIT PROGRAM

DISTRICTS REQUIRED TO REPORT: CCSD#1 (#25)

BMP Description: One recommendation from the Watershed Action Plans is to upgrade and change the performance of older detention facilities in the watershed. Since 1993, when the first stormwater requirements were adopted, the stormwater management standards have been changed four times. Facilities constructed prior to 1995, are generally thought to be in the greatest need of updating to more current performance standards. A retrofit program has been initiated to design specific modifications for selected facilities (or collection of facilities). Facilities built before 1995 are targeted, but additional facilities constructed prior to using the current standards may also be considered. A test basin will be selected to focus initial retrofit activities and will consider a) the number of older facilities; b) the potential or need for protection or improvement in the sub-basin; c) the location of a monitoring station that could be used to evaluative before and after conditions (to show improvements and value); and d) the ease and opportunity to make immediate improvements.

The facility improvements will consider changes to outlet structures; expansion or optimization of available storage; increasing flow control for small storms in exchange for flood control; modifying flow paths or changing the water quality treatment method; improving the aesthetics, landscape, or access control; and major expansion (e.g. acquire additional land), consolidation or replacement. The evaluation will be conducted in two phases – Phase 1 was an assessment phase where existing systems were reviewed, a test sub-basin was selected, alternatives and preferences were identified, opportunities were considered. The remaining sub-basins were evaluated, and a plan was devised for consideration by CCSD#1. Phase 2, will be preparing the design documents to implement the proposed changes for CCSD#1 crews or contract bids.

TRACKING MEASURES

1. Track pilot testing activities.
2. Number, type and location of retrofits.

CCSD#1 TRACKING MEASURES RESPONSES

1. Two pilot testing activities were initiated during the reporting period; see Progress on Measurable Goals below.

2. Two retrofit projects were initiated during the reporting period. In the 2014-2015 monitoring report, two retrofit projects were 50% complete and anticipated to be constructed during Summer 2016. The design of those 2 retrofit projects is 100% complete. Construction of those retrofits has been delayed in order to implement the retrofit of the two pilot test projects as described below.

MEASURABLE GOALS

1. The primary goal of the retrofitting existing ponds is to improve their function to better meet watershed health goals. The goal will be to conduct 2 to 5 retrofits per year.

PROGRESS ON MEASURABLE GOALS

CCSD#1 is completing a pilot project using OptiRTC ("Opti") technology at 2 detention ponds. As an alternative to completing retrofit construction projects CCSD#1 is planning to install continuous monitoring and active control technology to address flooding and performance at two large regional stormwater ponds. Opti is a flexible platform that provides real-time continuous monitoring and adaptive control services for stormwater systems. Specifically, Opti's OptiNimbus continuous monitoring and adaptive control services use data from connected on-site sensors, weather forecasts, and site specific parameters to make intelligent and predictive control decisions about when and at what rate water is discharged from stormwater infrastructure. This process of predictive control improves stormwater management performance and reduces costs to meet stormwater regulatory goals. CCSD#1 was selected to participate in Opti's Continuous Monitoring and Adaptive Control (CMAC) initiative. As part of the initiative, Opti is offering an incentive to install this equipment and will fund half of the equipment costs. Participation in the CMAC initiative requires the equipment to be installed and operational by September 2016.

Due to the timing requirements to participate in the CMAC initiative, CCSD#1 postponed the construction of the 2 previously identified detention pond retrofits. The design has been completed for those 2 retrofits and construction will be re-assessed during the next reporting period.

BMP# 26: MAINTENANCE OF CONVEYANCE SYSTEM COMPONENTS AND STRUCTURAL CONTROLS

DISTRICTS REQUIRED TO REPORT: CCSD#1 (#26) AND SWMACC (#23)

BMP Description: The District maintains conveyance and treatment components of the stormwater system that are located outside the right-of-way of publicly owned roads in maintenance agreement subdivisions or that are owned by the District. The conveyance components include, but are not limited to, manholes, storm sewer lines and inlets. The stormwater treatment components of the

system include, but are not limited to, vegetated above ground stormwater detention facilities, swales, and various types of underground proprietary pollution control systems.

The Districts, the Cities and Clackamas County are working to clarify and coordinate maintenance activities. Based on the growing needs of the District for stormwater maintenance, the District purchased a vehicle for conveyance system and structural controls maintenance. Additionally, on average, there is one full time equivalent (FTE) dedicated to inspection of structures, The District currently utilizes Clackamas County Corrections crews for maintenance of stormwater detention/water quality swales and ponds.

NOTE: CCSD#1 has been updating Watershed Action Plans (WAPs) and anticipates completion in 2017. The updated WAPs may identify high priority areas based on a watershed assessment, set and focus maintenance responsibilities and priorities, and develop performance metrics to assess overall effectiveness. The WAP outcomes may result in new or revised Measurable Goals related to frequency and prioritization of maintenance activities.

Recently, the District, the Cities and Clackamas County have shifted the focus from updating WAPs to an integrated stormwater management plan. The integrated plan will identify maintenance activities, roles and responsibilities, and tracking measures and goals.

TRACKING MEASURES

1. Miles of ditches and storm lines maintained
2. Number and type of components inspected and/or cleaned, and
3. Mass or volume of material removed during cleaning.

CCSD#1 TRACKING MEASURES RESPONSE

1. Storm line maintained:
    - 4,101 Linear feet of ditch cleaned
    - 356 Linear feet of pipe cleaned
2. Components inspected and/or cleaned:
    - Maintenance Agreement Ponds: 145
    - Other structures (catch basins): 1,627
    - Water quality structures: 98
3. Cubic Yards of debris removed: 651.25 cu yd (CCSD#1) and 189 cu yd/ft (DTD)

SWMACC TRACKING MEASURES RESPONSE

1. Storm line maintained: 5077 Linear feet (DTD)
2. Components inspected or cleaned: 0
3. Cubic Yards of debris removed: 73 cu yds/ft (DTD)

MEASURABLE GOALS

1. Clean storm lines and ditches on an as-needed basis, identify inspection frequency
2. Maintain structural water quality facilities on a 3-year cycle
3. Conduct conveyance system assessment by January 31, 2013

PROGRESS ON CCSD#1 MEASURABLE GOALS

1. Cleaning of storm lines, structures, and ditches is being conducted in an organized and efficient manner based on a sub-division by sub-division basis. This is a logical process due to a clearly defined area and a start finish point for each area. Cleanings are based on age of the sub-division, recent inspections in the area, and represent activity in the area.
2. All structures such as vortex separators and others with active separation methods are cleaned yearly. Ninety-eight (98) water quality structure were cleaned in 2015-2016. Ponds are inspected, have vegetation control, and structures are cleaned as needed.
3. Our process is to establish an accurate location for each structure that we may need to locate in an emergency. GIS activities continue to be updated as needed. Data collected from that process is uploaded onto a GIS mapping system to manage the cleaning of storm lines, structures and ditches within each subdivision. At the time the structure is mapped, a cursory inspection is done and any deficiencies are noted for repair.

PROGRESS ON SWMACC MEASURABLE GOALS

1. Inspection and cleaning of storm lines and structures were not conducted. For ditch maintenance, see DTD's MS4 annual report.
2. There were no structural water quality facilities maintained in SWMACC
3. Conveyance system assessment was not conducted

   Note: WES on behalf of SWMACC will adjust the conveyance system and structural controls maintenance program to meet this BMP's goal during the next reporting year. Staff will work to properly identify and inventory the number of District owned/operated structural water quality facilities draining to MS4 permitted outfalls that are covered by the SWMP. Each of those MS4 permitted facilities will be inspected and cleaned. Conveyance systems within the MS4 permitted area will also be identified, inspected, and maintained as necessary. Quarterly progress on attaining the measurable goal will be reported to District Managers so that adjustments in necessary resources can be made.

BMP# 27: CONDUCT CATCH BASIN CLEANING AND MAINTENANCE

DISTRICTS REQUIRED TO REPORT: CCSD#1 (#27) AND SWMACC (#24)

BMP Description: CCSD#1 cleans all District owned or District operated/maintained catch basins once every two years; cleaning approximately 15% of the catch basins each year. Catch basin cleaning activities primarily occur during the dry weather season, but during the fall, certain catch basins may be cleaned more frequently if needed. Utility crews utilize a database to document inspection and maintenance activities for the annual reports. Repair or replacement of public catch basins is scheduled as needed following inspection.

TRACKING MEASURES

1. Track the percent of District owned or District operated/maintained catch basins cleaned per year
2. Track the volume of debris removed during cleaning activities

CCSD#1 TRACKING MEASURES RESPONSES

1. Total CCSD No. 1 Inlets Cleaned (Catch Basins and Curb Inlets) 1,627/10,624 = 15.3%; Total CCSD No. 1 Maintenance Agreement Inlets Cleaned (Catch Basins and Curb Inlets) 1,291/3,200 = 40.3%
2. 23.5 cubic yards of material removed

SWMACC TRACKING MEASURES RESPONSES

1. 0.00 % catch basins cleaned
2. 0.00 cubic yards of material removed

MEASURABLE GOALS

1. Clean 15% of District owned or District operated maintained public catch basins each year (50% found in CCSD#1 and SWMACC Stormwater Management Plans dated April 27, 2012 is typo).
2. Schedule repair or replacement of catch basins based on inspection results

PROGRESS ON CCSD#1 MEASURABLE GOALS

1. WES staff cleaned 15.3% of district owned/operated catch basins and 40.3% of catch basins within maintenance agreement areas.
2. No catch basins were found to be in need of repair.

PROGRESS ON SWMACC MEASURABLE GOALS

1. No district-owned and operated catch basin was cleaned and/or inspected
2. No catch basin was repaired or replaced

   Note: WES on behalf of SWMACC will adjust the catch basin cleaning program to meet this BMP's 15% goal during the next reporting year. Staff will work to properly identify and inventory the number of District owned/operated catch basins that require cleaning. A subset of catch basins in high priority areas, including high traffic roads and commercial areas, will be targeted for cleaning. Quarterly progress on attaining the measurable goal will be reported to District Managers so that adjustments in necessary resources can be made.

BMP# 28: STORM DRAIN CLEANING ASSISTANCE PROGRAM

DISTRICTS REQUIRED TO REPORT: CCSD#1 (#28) AND SWMACC (#25)

BMP Description: ndustrial, commercial, and multi-family residential subdivisions have signed stormwater facility maintenance agreements with the District that obligate the signee to inspect and maintain their stormwater facilities and to report on their activities annually to the district. To assist commercial and industrial facilities with maintaining their devices and reporting on their activities, the District implemented a Storm Drain Cleaning Assistance Program, that consists of the following components:

- Obtaining the lowest price quote from vendors for the cleaning of stormwater devices.
- Send notification to agreement holder as well as other commercial and industrial facilities of their obligation to maintain their devices and to report on their activities. The notification also includes an invitation to participate in a program to have their stormwater devices inspected and cleaned for a low price.
- Providing a list of business that wish to have their stormwater devices cleaned to the vendor.
- Tracking the number of annual reports submitted.
- Obtaining a summary from the vendor, the number of facilities visited as well as the number and types of structures maintained.

TRACKING MEASURES

1. Number of agreement holders compared with the number of annual reports received and the number devices being serviced by the vendor.
2. Total number of businesses serviced by the vendor with total number of devices maintained and volume of debris removed.

CCSD#1 AND SWMACC TRACKING MEASURES RESPONSES

1. No. of agreement holders, no. of annual reports received & no. devices being serviced by the vendor.

District	# of Agreements	Annual Reports Received	# of Devices Serviced by Vendor
CCSD#1	129	36	147
SWMACC	10	0	0

   a. No. of agreement holders, no. of annual reports received & no. devices being serviced by the vendor & others.

District	# of Agreements	Annual Reports Received	# of Devices Serviced by Vendor & Others
CCSD#1	129	36	304
SWMACC	10	0	0

2. No. of businesses serviced by the vendor, no. of devices maintained & volume of debris removed.

District	# of Businesses Serviced by Vendor	Total # of Devices Maintained by Vendor	Volume of Debris Removed
CCSD#1	60	381	41,208 gals
SWMACC	1	47	4,648 gals

a. Total no. of businesses that reported cleaning their system (including those that used the vendor):

District	# of Businesses Serviced by Vendor or Other	Total # of Devices Maintained	Volume of Debris Removed
CCSD#1	108	738	76,137 gals
SWMACC	1	47	4,648 gals

MEASURABLE GOALS

1. Continue to provide assistance to commercial and industrial facilities to support their water quality facility maintenance.

PROGRESS ON CCSD#1 AND SWMACC MEASURABLE GOALS

CCSD#1 & SWMACC

In 2015/16 the District implemented the seventh year of a Storm Drain Cleaning Assistance Program (SCAP) for private facilities. To help streamline the program, raise awareness and seek greater compliance, WES again partnered with the cities of Milwaukie, Gresham, Fairview, Wood Village and the Oak Lodge Sanitary District on a joint SCAP. The program implementation was easier through sharing of printing, postage and advertising and the mailers were increased from 1 mailing to 3 (two in the fall and one in the spring). This improved compliance. Staff then sent a separate letter to each of the properties within the MS4 area that had Commercial Maintenance Agreements. The letter was to remind them of the cleaning and reporting requirements. This resulted in additional cleaning and reports received.

For 16/17, staff have decided to:

- Send three general SCAP mailings to all commercial/industrial sites;
- Send a separate letter to Commercial Maintenance Agreement properties;
- Increase follow up on properties that fail to respond.

BMP# 29: PRIVATE WATER QUALITY FACILITY MAINTENANCE PROGRAM

DISTRICTS REQUIRED TO REPORT: CCSD#1 (#29) AND SWMACC (#26)

BMP Description: This BMP includes maintenance agreements for stormwater quality and detention structures in residential areas. Since approximately 1996, developers of nearly all newly constructed single-family residential subdivisions have elected to voluntarily sign an agreement that requires, for a monthly fee, District staff to maintain, clean and/or repair their privately owned

stormwater quality and/or detention infrastructure. This infrastructure varies from subdivision to subdivision, but may include two or more of the following: catch basins, below-ground stormwater detention tanks, above-ground storm water detention and/or water quality ponds, below-ground vortex separators, and swales. On a periodic basis, pollution is removed from these structures and properly disposed of.

TRACKING MEASURES

1. Number of structures inspected and cleaned.

CCSD#1 AND SWMACC TRACKING MEASURES RESPONSES

District	# of Structures Inspected	# of Structures Cleaned
CCSD#1	255	145
SWMACC	0	0

MEASURABLE GOALS

1. Inspect 70% of our maintenance agreement subdivisions annually
2. Cleaning and repair schedules will be developed based on inspection outcomes
3. All non-maintenance agreement cleaning and repairs will be request or service driven
4. Emergency driven cleaning and maintenance will be addressed within 24 hours of the call being received
5. Non-emergency driven cleaning and maintenance will be addressed within 72 hours of the call being received

PROGRESS ON CCSD#1 MEASURABLE GOALS

1. 53.6% of maintenance agreement subdivision structures were inspected; 145 ponds cleanings, vegetation control, or inspections were completed
2. Inspections drove vegetation control schedules while preventative maintenance drove inspection and pond-cleaning schedules
3. Request for service calls and staff inspections initiated non-maintenance agreement cleaning and repairs
4. All emergency-driven requests were addressed within 24 hours of call being received
5. All non-emergency requests were addressed within 72 hours of call being received

Note: WES on behalf of CCSD#1 will adjust the private water quality facility maintenance program to meet this BMP's goal during the next reporting year. Staff will work to properly identify and inventory the number of District owned/operated private water quality facilities that require inspection, likely with a list of facilities with private maintenance agreements. A subset of private water quality facilities with private maintenance agreements will be targeted for inspection next year. Quarterly progress on attaining the measurable goal will be reported to District Managers so that adjustments in necessary resources can be made.

PROGRESS ON SWMACC MEASURABLE GOALS

1. 0 % of maintenance agreement subdivision structures were inspected because there are no maintenance agreement subdivisions in SWMACC
2. No cleaning and repair was performed
3. No non-maintenance agreement cleaning and repairs were performed
4. All emergency-driven requests were addressed within 24 hours of call being received
5. All non-emergency requests were addressed within 72 hours of call being received

SECTION 4 STORMWATER MONITORING PROGRAM

4.1 STORMWATER MONITORING

During this permit year WES operated under the Surface/Stormwater Monitoring Plan submitted to DEQ on September 30, 2012, effective October 1, 2012. DEQ requested additional rationale to be submitted by June 30, 2013. This monitoring plan, entitled "Comprehensive Clackamas County Stormwater Monitoring Plan" was a joint effort by several co-permittees and applies to Clackamas County, CCSD#1, SWMACC, and the Cities of Gladstone, Milwaukie, Oregon City, Happy Valley, Rivergrove, and West Linn. The monitoring reports for both CCSD#1 and SWMACC, including the data accumulated over the reporting period, are included as Appendices B and C of this report.

Per the allowance to make minor changes in the plan, WES moved a stormwater outfall monitoring location in CCSD#1 because the outfall being monitored was eliminated by a transportation project. A new outfall monitoring location was established near Happy Valley. No other changes were made to schedules or monitoring parameters.

Both Districts on behalf of Happy Valley and Rivergrove will submit permit renewal applications to DEQ by February 2017, part of which is a monitoring plan review and revision. WES is working with the other Clackamas co-permittees on changes the comprehensive monitoring plan. Changes may include updating parameter lists, locations, frequencies, and sampling protocols. An updated monitoring plan will be submitted before the permit renewal deadline for DEQ approval, and will be included in the renewal package. Monitoring under the new plan is expected in July 2017.

4.2 WATERSHED ACTION PLANS AND OTHER MONITORING SURVEYS

CCSD#1 completed Watershed Action Plans (WAPs) for the two largest watersheds in the District (Kellogg-Mt. Scott Creeks and Rock Creek) in June 2009.

The top 11 high priority recommendations included:

1) Stakeholder Communication Plan
2) Update Erosion Prevention and Sediment Control Protocols
3) Regional Detention Pond Property Acquisition
4) Development of an integrated monitoring program (benthics, geomorphology, water quality)
5) Additional Benthic Macroinvertebrate Sampling

6) Development of a Channel Morphology Monitoring Program

7) Microbial Source Study

8) Updating the Surface Water Management Technical Design Standards

9) Improving Riparian Buffers

10) Priority Retrofit Program for Surface Water Detention Facilities

11) Enhanced Street Sweeping Program

During the current reporting cycle, WES has implemented or is in the process of implementing all of the top 11 recommendations listed above.

(1) A Stakeholder Communications Plan has been developed and is being incrementally implemented. (Please see Public Participation/Intergovernmental Cooperation sections above.)
(2) Erosion Control Protocols have been updated to facilitate the prioritization of erosion control sites based on a number of criteria.
(3) WES purchased property that will be used to construct a regional stormwater treatment facility. This facility will serve a 500+ acre industrial area that is currently under-served in terms of water quality treatment. Final design for this facility is expected in fall 2016 and construction will begin in 2017.
(4) WES developed an integrated monitoring program that "clustered" monitoring sites for both the SWMACC and CCSD#1 Districts. WES sampling is conducted using this integrated program.
(5) Benthic Macroinvertebrate/Geomorphology sampling sites have been integrated into the overall integrated monitoring program.
(6) Channel Morphology Monitoring
(7) Microbial Source Study was not performed. Instead a strategy that leveraged sanitary sewer activities to meet E.coli load reduction requirements was implemented.
(8) Macroinvertebrate and Geomorphic surveys were conducted in the fall of 2011 and 2014 in both the CCSD#1 and SWMACC service districts and are scheduled to be completed again in the fall of 2017.
(9) Surface Water Technical Design Standards include new provisions that encourage the use of low impact development techniques, address hydromodification, and require enhancements to riparian buffer areas as part of development process. Use of the updated standards and BMP sizing tool is being promoted and encouraged. WES partners have conducted 92 projects to improve riparian buffers within approximately 71 acres of riparian area along 29,156 linear feet of stream corridor during the 2015-16 fiscal year. These projects included planting over 7,900 trees and 25,106 shrubs by over 1,063 volunteers.
(10) District detention pond facilities have been evaluated for retrofit. Retrofits are focusing on addressing hydromodification impacts where feasible; improving water quality or both. The District intends to retrofit 2-5 detention facilities per year.
(11) CCSD#1 and Happy Valley have an Intergovernmental Agreement (IGA) to establish an enhanced street sweeping program for streets within the CCSD#1 service district. The IGA is evaluated on a yearly basis and has been renewed for 2016.

Recommendations from the WAPs for other monitoring surveys including additional benthic macro-invertebrate sampling and channel morphology were conducted October-December 2011; the reports are available on the Districts website at http://www.riverhealth.org/watershed-health.

SECTION 5 FUNDING, STAFF AND EQUIPMENT

5.1 FUNDING – CCSD#1 & SWMACC

The Stormwater Management Program for CCSD#1 is funded through four primary sources: monthly stormwater utility fees, onsite stormwater maintenance fees, systems development charges (SDCs), and permit fees.

CCSD#1

In Fiscal Year 2015-16 the main funding for the Stormwater Management Program for CCSD#1 came from four sources (preliminary):

Monthly Stormwater Utility Fees	$	3,946,651.48
Maintenance Fees	$	299,774.57
Systems Development Charges (SDCs)	$	239,175.50
Stormwater and Erosion Control Permit Fees	$	286,671.00

All CCSD#1 customers pay the monthly program fee of $6.50 per Equivalent Service Unit (ESU) which is defined as one single-family residence or 2,500 square feet of impervious surface for nonresidential customers. New single-family residential customers, since 1998, also pay a monthly maintenance agreement fee of $3 per ESU which is dedicated for maintenance of local subdivision stormwater conveyance, detention, treatment, and infiltration facilities.

SDCs are collected from new development and dedicated to planning, design, and construction of additional stormwater infrastructure capacity needed to accommodate growth. The current SDC rate is $205 per ESU.

SWMACC

In Fiscal Year 2015-16 the main funding for the Stormwater Management Program for SWMACC came from two sources:

Monthly Stormwater Utility Fees	$	172,894.02
Miscellaneous Income	$	17,246.00

All SWMACC customers pay the monthly program fee of $4 per Equivalent Service Unit (ESU), which is defined as one single-family residence. Only a small portion of this revenue was collected within the MS4-permitted area. Permit fees for stormwater and erosion control plan review and inspection are collected with every new development application. The current stormwater plan review fee is $400 or 4% of the installed cost of the surface water management system (whichever is greater) per subdivision or commercial/industrial development and $55 per single-family residential building permit. The erosion control review and inspection fee is $460 for the first acre, plus $80 per additional acre for subdivisions and commercial/industrial developments, while new single family residences are charged a flat rate of $310.

5.2 EXPENDITURES & BUDGET – CCSD#1 & SWMACC

The following tables display actual expenditures for permit activities for both districts for the previous two reporting periods, the actual expenditures for the 2014 and 2015 periods, the budgeted and estimated expenditures for the 2015/2016 reporting period, and the adopted 2016/17 budget.

Table 2 Stormwater Program Funding and Expenditures for CCSD#1 including Capital, Operating and SDC Funds

CCSD#1	13/14 Actual	14/15 Actual	15/16 Budget	15/16 Estimate	16/17 Adopted
Resources	**13,559,815**	**14,619,334**	**15,130,356**	**15,277,122**	**16,131,655**
Materials & Services	3,014,505	3,039,918	4,037,046	3,690,508	4,149,836
Capital Outlay	446,808	690,548	1,620,000	223,020	1,495,000
Transfers	379,633	378,742	0	0	0
Contingency	0	0	1,077,841	0	1,065,390
Ending Fund Balance	9,718,869	10,510,126	8,395,469	11,363,594	9,421,429
Total Requirements	**13,559,815**	**14,619,334**	**15,130,356**	**15,277,122**	**16,131,655**

Table 3 Stormwater Program Funding and Expenditures for SWMACC

SWMACC	13/14 Actual	14/15 Actual	15/16 Budget	15/16 Estimate	16/17 Adopted
Resources	**406,006**	**493,709**	**575,234**	**598,042**	**670,223**
Materials & Services	93,622	87,104	130,439	119,641	202,960
Contingency	0	0	13,044	0	20,296
Ending Fund Balance	312,384	406,605	431,751	478,401	446,967
Total Requirements	**406,006**	**493,709**	**575,234**	**598,042**	**670,223**
Capital Outlay	0	0	0	0	0

5.3 STAFF – CCSD#1 & SWMACC

Staffing for surface water program management activities are integrated throughout WES. Staff is provided from the various divisions of WES and is dedicated both to CCSD#1 and SWMACC. In 2015/2016, 15,000 hours or more than 7 employees were dedicated to Surface Water service.

SURFACE WATER PROGRAM HOURS AND FTE, 7/1/2015 - 6/30/2016, BY PROGRAM CORE ACTIVITY

Surface Water Activity	Hours	FTEs
Administration	4,417	2.12
Erosion Control	1,518	0.73
Maintenance	5,275	2.54
Program Effectiveness	407	0.20
Public Education	282	0.14
Regulatory Compliance	2,178	1.05
Riparian Restoration	922	0.44
Grand Total	**15,000**	**7.21**

5.4 TRAINING – CCSD#1 & SWMACC

Staff attended the following conferences and events:

TRAINING	Date
ACWA 2015 Summer Conference	7/22/2015
ASCE 2015 Sustainable Stormwater Symposium	9/16/2015
PNCWA 2015 Annual Conference - Boise	10/24/2015
LCEP Science to Policy Summit	11/19/2015
Low Impact Development Facility Maintenance Workshop	3/3/2016
APWA Street Maintenance & Collections Systems	3/29/2016
PSU - River Restoration Program	4/12/2016
ACWA Stormwater Summit	5/11/2016
Tree Preservation in Urban Areas Conference	5/11/2016
NWETC - Certified Erosion and Sediment Control Lead Training	5/24/2016
2015 WEFTEC	9/25/2016
Intertwine Alliance Fall Summit	10/21/2016

5.5 EQUIPMENT – CCSD#1 & SWMACC

Stormwater management activities require a range of equipment. This equipment is owned by Cities, the County Road Department or by the Districts. Additional equipment is rented or contracted out. A partial list of equipment used for stormwater management activities includes:

- Combination Vacuum/Hydrocleaner trucks
- Regenerative air sweepers
- 1-ton utility vehicles
- 3-yard and 5-yard dump trucks
- 16-foot Felling trailer
- Skid steer front end loader
- Mini excavator
- Dye testing and smoke testing equipment
- Sampling stations and sampling gear
- Volunteer stream restoration tool trailer
- 6-inch trailer mounted dry prime pump
- Additional larger excavation equipment as needed
- Private conveyor material placement equipment

5.6 FUNDING FOR DEVELOPMENT REVIEW, EROSION CONTROL & STREET SWEEPING - CITY OF HAPPY VALLEY

For the City of Happy Valley, the permit fees for development plan review and inspection is based upon the construction value of the project. The erosion control plan review and inspection fees is $500 base fee up to 1 acre plus $ 100 per acre or fraction thereof for sites greater than 1 acre. In the July 2015 through June 2016 fiscal year, the City collected approximately $ 442,567 in development review and erosion control permit fees.

Funds for Street Sweeping are budgeted through General Funds.

5.7 STAFF - CITY OF HAPPY VALLEY

<u>Public Works Department</u>
Street Sweeping, stormwater related issues and topics in Happy Valley

- 1 FTE Program Manager
- 3 FTE Street Maintenance Employees
- 1 FTE Administrative Assistant
- Additional staff as needed

<u>Engineering Services</u>
Engineering development review, capital projects, and erosion control, and stormwater related issues and topics in Happy Valley.

- 1 FTE Program Manager
- 1 FTE Engineer
- 1 FTE Engineering Technician
- Additional staff as needed.

5.8 TRAINING - CITY OF HAPPY VALLEY

City staff attended the following conferences and events:

- Certified Storm Water Inspection Class – March 2016
- APWA Street Maintenance & Collection Systems 2015/2016
- Landscape Product Training Seminar 2016
- Roadside Right-Of-Way Meeting 2016

5.9 EQUIPMENT - CITY OF HAPPY VALLEY

Street Sweeping and erosion control activities require a range of equipment. This equipment is owned by the City. Additional equipment is rented or contracted out. A partial list of equipment used for these activities includes:

- (2) Regenerative air sweepers
- (1) Mechanical sweeper
- (1) 35 HP tractor
- (4) utility trucks
- (2) 2-yd dump trucks
- (1) 5-yd dump truck
- (1) Rubber tired backhoe

SECTION 6 LEGAL AUTHORITY

<u>SWMACC and CCSD#1</u>

The NPDES Permit in Schedule D.1. requires the Districts to maintain adequate legal authority through ordinances, interagency agreements or other means to implement and enforce the provisions of the permit, and to control discharges to and from the municipal separate storm sewer systems (MS4).

Through County Board Order No. 92-289, SWMACC was granted the authority to construct capital improvements to address surface water quality and quantity and to provide nonpoint source pollution controls to meet state and federal regulations. County Board Order No. 93-196 provided CCSD#1 with this same authority within its jurisdiction.

Both SWMACC and CCSD#1 have locally-adopted Rules and Regulations that prohibit illicit discharges and spills into the county's MS4 and require the control of industrial/commercial site runoff. The Rules and Regulations also authorize the Districts to enforce any provisions through inspection, surveillance, monitoring, and enforcement actions.

The Districts' Rules and Regulations contain a suite of requirements regulating the design, construction, and operation of stormwater controls on development and re-development sites that will discharge to the MS4 or to waters of the state. Both SWMACC and CCSD#1 Rules and Regulations require erosion control plans in accordance with the WES's Erosion Control Manual. For CCSD#1

specifically, additional stormwater and erosion control measures for development projects are outlined in a Stormwater Standards manual.

Through the legislative authority of the Board of County Commissioners (BOCC), the Districts have the ability to enter into contracts and intergovernmental agreements with other permittees for the purpose of controlling pollutants entering or leaving the Districts' MS4s.

References SWMACC and CCSD#1 Documents:

- Water Environment Services, December 2002, Surface Water Management Agency of Clackamas County Rules and Regulations.
- Water Environment Services, December 2008. Erosion Prevention and Sediment Control Planning and Design Manual.
- Water Environment Services, January 2013. Clackamas County Service District No. 1 Rules and Regulations for Sanitary Sewer and Surface Water Management.
- Water Environment Services, July 2013. Stormwater Standards, Clackamas County Service District No. 1.

City of Happy Valley

Most SWMP related activities are conducted by CCSD#1 using the legal authority to conduct those activities is described above. However, the City does conduct some of these activities, such as plan review, and construction inspection for erosion control measures within City limits through Municipal Code Title 15 Building and Construction, and Title 16 Land Development. Water pollution and drainage nuisances are prohibited in Municipal Code Title 8 Health and Safety, including erosion entering the MS4 or surface water.

SECTION 7 OVERVIEW OF PLANNING, LAND USE CHANGES AND DEVELOPMENT ACTIVITIES WITHIN THE UGB

Land use did not significantly change within the Service Districts and the adjacent UGB expansion areas over the course of the 2015/2016 reporting period.

Within Clackamas County Service District No.1 ("CCSD#1") 41.5 acres was annexed to CCSD#1 during this reporting period. Approximately 37.0 acres were developed in CCSD#1 in accordance with City and District Standards, Stormwater Management Plan ("SWMP") and Willamette River TMDL Implementation Plan.

The Surface Water Management Agency of Clackamas County ("SWMACC") boundary currently is the portion Tualatin River Drainage Basin within the County of Clackamas. The SWMACC District is slowly decreasing in size because adjacent cities are expanding into this service area. Approximately 5.4 acres of impervious area was developed in SWMACC in accordance with District Standards, Stormwater Management Plan ("SWMP") and Tualatin River TMDL Implementation Plan.

Both Districts require development projects to mitigate stormwater from impervious areas. The District, through the regulations and standards, requires development to address water quality, quantity and infiltration.

Five non-single family post-construction permits were finalized, enveloping 8.0 acres with an estimated total impervious area of 296,208 square feet. The development which occurred during this reporting period in both Districts was constructed in compliance with the MS4 Permit and TMDL Plans.

The District is forecasting similar growth in this reporting year to occur over the next reporting period. The development activities occurring in 2016-2017 will be reported in next year's annual report.

SECTION 8 PROPOSED CHANGES TO SWMP AND/OR TMDL IMPLEMENTATION PLAN

Both Districts on behalf of Happy Valley and Rivergrove will submit permit renewal applications to DEQ by February 2017, part of which is a SWMP review and revision.

SECTION 9 PUBLIC COMMENT – ANNUAL REPORTS

Schedule A (4) (e) Public Involvement and Participation requires a public participation approach that provides opportunities for the public to effectively participate in the development, implementation and modification of the co-permittee's stormwater management program. The approach must include provisions for receiving and considering public comments on the monitoring plan due to the Department by September 1, 2012, annual reports, SWMP revisions, and the TMDL pollutant load reduction benchmark development.

The 2015/2016 Annual Report was noticed in the Oregonian on October 1 and was made available to the public on the District's website and available by hard copy. Public comment opened October 1, 2016 and ended noon October 14, 2016. No comments were received.

SECTION 10 ADAPTIVE MANAGEMENT

Schedule B(5)(c) of the MS4 Permit requires that a summary of the implementation of our adaptive management process be provided in each annual report. Permit Schedule D(10)(a) defines adaptive management as a structured, iterative process designed to refine and improve stormwater programs over time by evaluating results and adjusting actions on the basis of what has been learned. Our October 2012 document titled "Outline for Adaptive Management Approach" was used to guide our 2014-2015 adaptive management process.

BMP implementation and environmental monitoring data analysis has been performed by Clackamas County's WES on behalf of the SWMACC, CCSD#1, and the Cities of Rivergrove and Happy Valley throughout the 2015-2016 reporting period. The effort to adaptively manage BMP implementation in light of measurable goals in the two SWMPs is on track. At this point no revisions to our two SWMPs (SWMACC-City of Rivergrove and City of Happy Valley-CCSD#1) are deemed necessary, and adjustments to ensure attainment of the measurable goals in the current SWMPs, if needed, will be made.

Two potential programmatic changes that are expected to be made in the future were also identified during the 2014 / 2015 year:

- Upon reviewing SWMP BMP's, we recognized the need to provide additional stormwater services in the following subject area: Permit Schedule A(4)(h)'s "Stormwater Management Facilities Operation and Maintenance Activities". The portion of our program which pertains to the inspection and maintenance of privately owned storm sewer systems which serve churches, industrial facilities, apartment complexes, shopping malls, etc. has relied heavily upon education and technical assistance in the past. We expect to expand some related service categories, such as inspections and enforcement, in the future.

- Upon reviewing SWMP BMP's, we recognized the need to re-categorize the way that MS4-permitted storm sewer system outfalls are organized in our GIS system. Other structures, such as pipes which discharge into man-made stormwater quality ponds, had been categorized together with storm sewer system outfalls, making it difficult to list or map only the storm sewer system outfalls which discharge to Waters of the State. This re-categorization process is underway and we expect to complete it soon.

SECTION 11 APPENDICES

APPENDIX A GUIDE TO ACRONYMS

Abbreviation	Definition
BMP	Best Management Practice
CCSD#1	Clackamas County Service District #1
CCCSMP	Comprehensive Clackamas County Stormwater Monitoring Plan
CIP	Capital Improvement Project
DEQ	Department of Environmental Quality
DTD	Clackamas County Department of Transportation and Development
EPSC	Erosion Prevention and Sediment Control
LID	Low Impact Development
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
ODOT	Oregon Department of Transportation
PSU	Portland State University
SCAP	Stormdrain Cleaning Assistance Program
SIC	Standard Industrial Classification
SWMACC	Surface Water Management Agency of Clackamas County
SWRP	Student Watershed Research Program
TBPAC	Tualatin Basin Public Awareness Committee
TMDL	Total Maximum Daily Load
UGB	Urban Growth Boundary
WAP	Watershed Action Plan
WPCF	Water Pollution Control Facility

APPENDIX B ENVIRONMENTAL MONITORING REPORT

JULY 1, 2015 – JUNE 30, 2016 MONITORING YEAR

As part of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit requirement, Clackamas County Water Environment Services (WES), on behalf of Clackamas County, Clackamas County Service District #1 (CCSD#1), the Surface Water Management Agency of Clackamas County (SWMACC), the City of Rivergrove, and the City of Happy Valley implements a stormwater and creek water monitoring program. Specific monitoring requirements and objectives are defined in Schedule B of the March 2012 Clackamas County MS4 NPDES permit (number 101348). Note that these five co-permittees are also regulated by either the Willamette TMDL or the Tualatin TMDL.

Given the effort associated with implementing an effective environmental monitoring program that adequately meets all permit requirements and objectives, nine Clackamas County co-permittees (including Clackamas County, CCSD#1, SWMACC, and the Cities of Rivergrove and Happy Valley) agreed to consolidate efforts and prepare one comprehensive stormwater monitoring plan several years ago. This plan is called the Comprehensive Clackamas County NPDES MS4 Stormwater Monitoring Plan (CCCSMP). An updated version of the CCCSMP went into effect on June 30, 2013 and is now being implemented.

Environmental Monitoring Program Description

As described in the CCCSMP, the MS4 NPDES stormwater monitoring program requires two components. The first component is program monitoring, which involves the tracking and assessment of programmatic activities, as described in the individual permittee's SWMP, through the use of performance indicators or metrics. Results of the program monitoring are reported in a separate section of this MS4 NPDES/TMDL Annual Report. The second component is environmental monitoring, which includes actual collection and analysis of water quality samples. Environmental monitoring efforts reported for compliance with MS4 NPDES permit conditions consist of instream sample collection and stormwater outfall sample collection.

Monitoring Data: Summary

Instream monitoring was conducted at eight locations on seven tributaries to the Willamette River within the CCSD#1 service boundary and at one location on one tributary to the Tualatin River within the SWMACC service area. Note that the SWMACC creek monitoring location, Pecan Creek, is not located in the geographic area which is regulated by SWMACC's MS4 permit, and no runoff from any MS4-permitted area in SWMACC flows into this creek. Although SWMACC requested relief from this requirement as the MS4 permit was being written, the final MS4 permit which was issued to SWMACC included a requirement to monitor the creek.

MONITORING CREEKS DURING STORM EVENTS: For parameters which can be composited (total lead, for example) time-weighted grab samples were collected and composited during each storm in CCSD#1 and SWMACC. Three grab samples were collected for compositing from every storm. The resulting pollution concentration can be considered to be an average pollution concentration for the storm (aka. Event Mean Concentration).

ROUTINE CREEK MONITORING: An additional six routinely scheduled monitoring events were conducted at all nine creek monitoring locations in CCSD#1 and SWMACC during the July 1st-June 30th monitoring year. .. MS4 Permit Schedule B(3)(a)(i) specifies that a minimum of 50% of the instream water quality sample events must be collected during the wet season, which is defined as October 1st to April 30th, and wee complied with this requirement.

"Routine" monitoring events are scheduled in advance, and thus occur with varying weather conditions. Creeks are occasionally monitored during storms when Routine monitoring events are conducted; This occurred once (on March 10, 2016) during 2015-2016 MS4 permit year. Only one grab sample is collected from the creek during Routine monitoring events, including those which occur during storms.

MS4 OUTFALLS: Storm sewer system outfall monitoring was conducted at four locations which discharge to tributaries of the Willamette and Clackamas Rivers in CCSD#1. A storm sewer system outfall in SWMACC was also monitored; this outfall discharges to the Tualatin River in the City of Rivergrove. Time-weighted composite samples were taken during three visits to these five outfall locations during the year. MS4 Permit Schedule B(3)(b)(i) specifies that any storm which is monitored at an MS4 outfall shall deliver no less than 1/10th of an inch of rainfall. Two of the storms which were caught at SWMACC's outfall (at the Rivergrove Boat Ramp) did not generate enough rainfall to exceed this minimum storm size threshold, but we elected to include the stormwater quality data from these storms here to demonstrate the significant level of effort which was made to capture 3 storms each at all 5 MS4 outfalls during the 2015-2016 MS4 permit year.

WATER QUALITY & FLOW DATA: Complete results of the instream and MS4 outfall sample collection efforts conducted by WES for the 2015-2016 monitoring year are provided in Table 3 (for monitoring conducted within CCSD#1) and Table 4 (for monitoring conducted within SWMACC).

MERCURY: Monitoring for total mercury and some related pollutants began in 2013-2014, and continued in 2014-2015, at an outfall in SWMACC and at an outfall in CCSD#1. This monitoring was required by the MS4 Permit's Schedule B (see Table B-1s). No additional mercury monitoring was conducted during the 2015-2016 MS4 permit year, and mercury will not be monitored during the remaining years of the current MS4 permit term, because a mercury monitoring waiver was granted by DEQ's Lisa Cox on September 25, 2015.

Monitoring Data: Discussion

The benefit of participation in a coordinated monitoring effort with other co-permittees is that resources may be more widely distributed and the data produced will provide comprehensive information for the County as a whole. Monitoring data continues to be collected with the expectation that some analyses would be conducted annually and submitted with the annual compliance reports, while other analyses would be conducted after several years of data have been collected (e.g., the 5-year permit period) so that the data are more statistically robust in terms of providing information.

BASELINE STATISTICS: Monitoring data compiled into Tables 3 and 4 include baseline statistics (mean, maximum, and minimum) at each sampling location. This annual monitoring report summary addresses requirements identified in the CCCSMP (see Chapter 7,"Data Analysis and Interpretation").

WATER QUALITY INDEX: In conjunction with the monitoring data summary included in Tables 3 and 4, a generalized Water Quality Index is also provided in Attachment 1 to assist the reader with drawing conclusions and making informed decisions based on the monitoring results.

FACT SHEETS: Individual Fact Sheets for each instream and storm sewer outfall monitoring location have been prepared which summarize the monitoring site's location and associated monitoring results. The Fact Sheets can be found in Attachment 2.

RAINY WEATHER AND DRY WEATHER: For instream monitoring sites, data have been segregated according to whether samples were collected during Storm Event weather conditions or not. One benefit of this comparison is that it more readily identifies the impact of stormwater runoff on instream water quality. Unfortunately, some of the Routine monitoring events which were not conducted during Storm Events were

conducted soon after a storm had moved through (the April 4, 2016 Routine monitoring event, for example). This complicates the interpretation of the data, for the water quality from these events is clearly influenced to some degree by the tail-end of the runoff from the recent storm.

STORM EVENT SIZE: Review of the Storm Event monitoring data should be conducted while considering the rainfall amounts associated with the storm event. Precipitation amounts for monitored Storm Events are listed below in Table 2. Rainfall for storms that were caught in SWMACC was recorded at the Portland Community College's Sylvania Campus and rainfall for storms which were caught in CCSD#1 was recorded at the Pleasant Valley School near the City of Happy Valley (except for the September 17, 2015 storm; rain gage data from the CCSD#1-owned rain gage at the Unified Grocers site at 6433 SE Lake Road was used, because the rainfall which fell during this storm in CCSD#1 was quite different than the rainfall which fell at Pleasant Valley School during the storm, and the data from the Unified Grocers site better represents the conditions in CCSD#1 on September 17, 2015).

Table 2

Storm Event Monitoring Date	Sites Monitored	Rain Prior to Event	Rain During Sample Collection Period	Total Rainfall (prior to & during event only)
9/17/2015	All 5 outfalls	0.26 inch fell in the 5 hours prior to the initiation of monitoring at the 4 CCSD#1 outfalls, and 0.52 inch fell in the 6 hours prior to the initiation of monitoring at the SWMACC outfall.*	0.01 inch in SWMACC and 0.16 inch in CCSD#1	0.53 inch in SWMACC and 0.42 inch in CCSD#1
10-28-2015	4 CCSD#1 creeks	0.18 inch fell in the 5 hours prior to the initiation of monitoring. An 48 hour period with no rain preceded the arrival of the 0.18 inch.	0.03	0.21 inch
10-30-2015	4 CCSD#1 creeks and the SWMACC creek	CCSD#1: 0.21 inch fell in the 6 hours prior to the initiation of monitoring at the CCSD#1 creeks. Only 0.05 inch fell in CCSD#1 in the 31 hour period which preceded the arrival of the 0.21 inch. SWMACC: 0.15 inch fell in the 7 hours prior to the initiation of monitoring at Pecan Creek. Only 0.03 inch fell in SWMACC in the 38 hour period which preceded the arrival of the 0.15 inch.	0.04 in CCSD#1 and 0.03 in SWMACC	0.25 in CCSD#1 and 0.18 in SWMACC
11-17-2015	4 CCSD#1 creeks	0.60 inch fell in the 25 hours prior to the initiation of monitoring	0.21 inch	0.81 inch
11-19-2015	4 CCSD#1 creeks and the SWMACC creek	CCSD#1: 0.79 inch fell in the 14 hours prior to the initiation of monitoring at the CCSD#1 creeks. SWMACC: 0.72 inch fell in the 14 hours prior to the initiation of monitoring at Pecan Creek.	0.11 in CCSD#1 and 0.05 in SWMACC	0.90 in CCSD#1 and 0.77 in SWMACC
12-7-2015	8 CCSD#1 creeks and the SWMACC creek	CCSD#1: 2.53 inch fell in the 17 hours prior to the initiation of monitoring at the CCSD#1 creeks. SWMACC: 1.43 inch fell in the 16 hours prior to the initiation of monitoring at Pecan Creek.	1.35 inches in CCSD#1 and 0.84 in SWMACC	3.88 inches in CCSD#1 and 2.27 inches in SWMACC
3-10-2016	8 CCSD#1 creeks and the SWMACC creek	CCSD#1: 0.73 inch fell in the 24 hours prior to the initiation of monitoring at the CCSD#1 creeks. SWMACC: 0.85 inch fell in the 24 hours prior to the initiation of monitoring at Pecan Creek.	NA (this was a Routine monitoring event, so samples weren't composited over a period of time)	0.73 inch in CCSD#1 and 0.85 inch in SWMACC
4-12-2016	4 CCSD#1 outfalls	0.13 inch fell in the ~3 hours prior to the initiation of monitoring at the 4 CCSD#1 outfalls. During the 8 days (194 hrs) before the arrival of this storm, no rain fell.*	0.05 inch	0.18 inch
5-19-2016	4 CCSD#1 outfalls	0.16 inch fell in the ~14 hours prior to the initiation of monitoring at the 4 CCSD#1 outfalls. During the 74 hrs before the arrival of this storm, only 0.01 inch of rain fell.*	0.07 inch	0.23 inch
6-9-2016	The SWMACC outfall	0.05 inch fell in the 3 hours prior to the initiation of monitoring at this outfall.	0.00 inch	0.05 inch** (note: an add'l 0.02 inch fell 3 hours after monitoring was completed)
6-10-2016	The SWMACC outfall	No rain fell in the 4 hours prior to the initiation of monitoring at this outfall. However, 0.05 inch fell in the preceding 8 hours (this rain fell during the 4 hour period which preceded the 4 rain-free hours).***	0.00 inch	0.00 inch**

* = This monitoring event at outfalls was conducted during a storm which had an Antecedent Dry Period, as defined by the MS4 permit, that separated the monitoring storm from the preceding storm. However, it was not possible to perform sample collection during the initial runoff-producing phase of the monitored storm (aka. first flush).

** = MS4 Permit Schedule B(3)(b)(i) specifies that any storm which is monitored at an MS4 outfall shall deliver no less than 1/10th of an inch of rainfall. Two of the storms which were caught at the SWMACC outfall at the Rivergrove Boat Ramp did not generate enough rainfall to exceed this minimum storm size threshold, but we elected to include the stormwater quality data from these storms here to demonstrate the significant level of effort which was made to capture 3 storms each at all 5 MS4 outfalls during the 2015-2016 MS4 permit year.

*** = Data from many rain gages is available in the City of Portland-USGS Hydra network. One of the two rain gages which is closest to the one at PCC Sylvania is also near the Rivergrove Boat Ramp outfall. This other rain gage is located at Riverdale High School at 9806 SW Boones Ferry Road in the City of Portland. At the Riverdale High School rain gage during the June 10th storm, no rain fell in the 3 hours prior to the initiation of monitoring at this outfall. However, 0.08 inch fell in the preceding 8 hours (this rain fell during the 5 hour period which preceded the 4 rain-free hours). And an additional 0.01 inch fell at ~6am on June 10th (the monitoring event occurred in the evening), so total storm size could have been 0.09 inch, depending on the definition of storm that is used. The rain gage at Riverdale High School may have been more representative of the rainfall conditions during the June 10th monitoring event.

Table 3 CCSD#1 Water Quality and Flow Monitoring Results

Carli Creek

				Water Quality Standard Comparison																	Additional Parameters of Concern										Supporting Parameters			
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate (mg/L)	WQ Std[3] (mg/L)	E. coli (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Copper, Dissolved (ug/L)	Guidance Conc (Chronic) (ug/L)	Guidance Conc (Acute) (ug/L)	Lead, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Zinc, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	Reported Flow (CFS)	pH	Conducti-vity (uS/cm)
#05 SE 120th & Carpenter Manhole	10/30/15	Y	Storm	15.4	18	8.0	6.5	0.47	10	228	406	2.7	3.7	5.1	0.09	0.81	20.90	44	50	49	113	8.0	2.2	108	0.07	0.04	0.05	7.5	0.12	70.0	36	2.29	7.3	109.6
#05 SE 120th & Carpenter Manhole	11/19/15	Y	Storm	9.8	18	6.1	6.5	0.54	10	276	406	0.8	2.4	3.1	0.05	0.44	11.40	17	31	31	59	5.0	1.6	62	< 0.05	0.04	0.03	2.0	0.38	29.0	21	29.60	6.8	208
#05 SE 120th & Carpenter Manhole	12/7/15	Y	Storm	10.0	18	10.7	6.5	0.05	10	179	406	0.5	1.5	1.8	0.03	0.24	6.04	13	20	19	83	53.0	1.3	44	< 0.05	0.04	< 0.04	4.7	0.54	47.0	12	> 92.31	6.5	45.7
#05 SE 120th & Carpenter Manhole	3/10/16	Y	Routine	11.2	18	9.8	6.5	0.47	10	142	406	1.2	3.6	4.9	0.07	0.76	19.61	49	47	47	88	11.0	1.2	86	< 0.05	< 0.04	0.03	3	0.79	66.0	34	11.52	7.0	99.7
			Mean	11.6		8.7		0.38		200		1.3			0.06			31			86	19.3	1.6	75	0.04	0.04	0.03	4.3	0.46	53.0	26	33.93	6.9	115.8
			Max	15.4		10.7		0.54		276		2.7			0.09			49			113	53.0	2.2	108	0.07	0.04	0.05	7.5	0.79	70.0	36	> 92.31	7.3	208.0
			Minimum	9.8		6.1		0.05		142		0.5			0.03			13			59	5.0	1.2	44	< 0.05	0.04	0.03	2.0	0.12	29.0	12	2.29	6.5	45.7
			Water Quality Exceedance (number of samples)	0		1		0		0			0	0		0	0		1	1								2	1	4				
#05 SE 120th & Carpenter Manhole	7/16/15	N	Routine	16.7	18	9.4	6.5	1.00	10	6	406	0.6	10.2	15.6	< 0.01	2.98	76.59	8	135	134	215	4.0	0.0	204	< 0.05	0.09	0.10	0.8	0.12	12.0	117	0.06	7.7	270
#05 SE 120th & Carpenter Manhole	9/14/15	N	Routine	17.1	18	9.0	6.5	1.00	10	9	406	0.6	10.1	15.3	< 0.01	2.93	75.17	10	133	132	229	7.0	< 0.6	221	< 0.05	< 0.04	0.09	2	0.38	24.0	115	0.94	7.8	534
#05 SE 120th & Carpenter Manhole	1/25/16	N	Routine	12.7	18	8.2	6.5	1.50	10	13	406	1.2	6.9	10.1	0.11	1.81	46.46	18	92	91	158	4.0	0.6	151	< 0.05	< 0.04	0.05	2.6	0.54	28.0	74	5.42	7.2	186.1
#05 SE 120th & Carpenter Manhole	2/22/16	N	Routine	11.5	18	9.0	6.5	1.20	10	236	406	0.9	6.0	8.6	0.04	1.49	38.24	23	79	78	142	8.0	0.5	140	< 0.05	< 0.04	0.05	1.4	0.24	30.0	62	4.73	7.3	161
#05 SE 120th & Carpenter Manhole	4/4/16	N	Routine	12.3	18	9.5	6.5	0.85	10	308	406	1.4	6.0	8.6	0.08	1.49	38.24	25	79	78	130	3.2	1.8	126	< 0.05	< 0.04	0.05	2.1	0.82	38.0	62	0.52	6.7	150.4
			Mean	14.1		9.0		1.11		114		0.9			0.05			17			175	5.2	0.6	168	0.03	0.03	0.07	1.78	0.42	26.4	86	2.33	7.3	260
			Maximum	17.1		9.5		1.50		308		1.4			0.11			25			229	8.0	1.8	221	< 0.05	0.09	0.10	2.6	0.82	38.0	117	5.42	7.8	534
			Minimum	11.5		8.2		0.85		6		0.6			< 0.01			8			130	3.2	0.0	126	< 0.05	< 0.04	0.05	0.8	0.12	12.0	62	0.06	6.7	150
			Water Quality Exceedance (number of samples)	0		0		0		0			0	0		0	0		0	0								0	0	0				

Sieben Creek

				Water Quality Standard Comparison																	Additional Parameters of Concern										Supporting Parameters			
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate (mg/L)	WQ Std[3] (mg/L)	E. coli (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Copper, Dissolved (ug/L)	Guidance Conc (Chronic) (ug/L)	Guidance Conc (Acute) (ug/L)	Lead, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Zinc, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	Reported Flow (CFS)	pH	Conducti-vity (uS/cm)
#07 Sieben Creek at Hwy 212	10/30/15	Y	Storm	13.8	18	8.6	6.5	0.43	10	687	406	1.3	3.3	4.5	0.08	0.69	17.68	31	44	43	104	12	1.4	90	< 0.05	< 0.04	0.05	4.4	0.53	48	31	9.29	7.6	69.1
#07 Sieben Creek at Hwy 212	11/19/15	Y	Storm	9.6	18	10.8	6.5	1.10	10	866	406	1.2	2.7	3.6	0.09	0.54	13.88	22	36	36	84	15	1.0	79	< 0.05	< 0.04	0.04	3.4	0.55	43	25	39.47	6.9	118.9
#07 Sieben Creek at Hwy 212	12/7/15	Y	Storm	10.3	18	9.7	6.5	0.95	10	2420	406	1.7	3.7	5.1	0.04	0.81	20.90	6	50	49	1530	1300	2.7	110	0.06	1.8	0.06	43.3	24.02	290	36	97.45	6.7	50.1
#07 Sieben Creek at Hwy 212	3/10/16	Y	Routine	10.5	18	10.4	6.5	0.90	10	231	406	1.5	3.7	5.0	0.08	0.79	20.25	16	49	48	97	13	0.6	90	< 0.05	< 0.04	0.03	3.1	0.64	32	35	NA	7.3	90.9
			Mean	11.1		9.9		0.81		759		1.3			0.08			23			454	335	1.4	92	0.03	0.02	0.05	13.6	6.44	103	32	48.74	7.1	82.3
			Maximum	13.8		10.8		1.10		2420		1.7			0.09			31			1530	1300	2.7	110	0.06	1.80	0.06	43.3	24.02	290	36	97.45	7.6	118.9
			Minimum	9.6		8.6		0.43		231		1.2			0.04			6			84	12	0.6	79	< 0.05	< 0.04	0.03	3.1	0.53	32	25	9.29	6.7	50.1
			Water Quality Exceedance (number of samples)	0		0		0		3			0	0		0	0		0	0								2	1	3				
#07 Sieben Creek at Hwy 212	7/16/15	N	Routine	16.6	18	9.3	6.5	1.10	10	121	406	0.8	5.6	8.0	0.01	1.38	35.52	5	74	74	158	3	0.0	141	< 0.05	< 0.04	0.09	1.3	0.12	7	58	NA	7.6	158.1
#07 Sieben Creek at Hwy 212	9/14/15	N	Routine	13.9	18	9.4	6.5	1.50	10	272	406	0.6	6.4	9.3	< 0.01	1.65	42.33	4	85	85	195	< 1	< 0.6	187	< 0.05	0.04	0.10	1.2	0.07	7	68	NA	7.8	385
#07 Sieben Creek at Hwy 212	1/25/16	N	Routine	10.2	18	10.4	6.5	1.90	10	457	406	1	4.4	6.2	0.06	1.02	26.14	26	59	58	117	2	0.0	110	< 0.05	< 0.04	0.04	1.7	0.21	34	44	NA	7.5	122.3
#07 Sieben Creek at Hwy 212	2/22/16	N	Routine	8.8	18	10.8	6.5	1.80	10	86	406	0.8	4.6	6.5	0.02	1.07	27.47	13	61	61	126	5	0.3	124	< 0.05	< 0.04	< 0.04	1.2	0.15	17	46	NA	7.5	123
#07 Sieben Creek at Hwy 212	4/4/16	N	Routine	10.9	18	10.5	6.5	0.71	10	387	406	2.7	3.1	4.2	0.04	0.64	16.40	46	41	41	84	6	2.7	81	< 0.05	< 0.04	0.03	4.1	0.39	69	29	NA	6.7	89.5
			Mean	12.1		10.1		1.40		265		1.2			0.03			19			136	3.4	0.7	128.6	0.03	0.02	0.06	1.9	0.2	26.8	49		7.4	176
			Maximum	16.6		10.8		1.90		457		2.7			0.06			46			195	6.4	2.7	187	< 0.05	< 0.04	0.10	4.1	0.39	69.0	68		7.8	385
			Minimum	8.8		9.3		0.71		86		0.6			0.01			4			84	< 1.0	0.0	81	< 0.05	< 0.04	0.03	1.2	0.07	7.0	29		6.7	90
			Water Quality Exceedance (number of samples)	0		0		0		1			0	0		0	0		1	1								0	0	1				

Phillips Creek

				Water Quality Standard Comparison																	Additional Parameters of Concern										Supporting Parameters			
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate (mg/L)	WQ Std[3] (mg/L)	E. coli (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Copper, Dissolved (ug/L)	Guidance Conc (Chronic) (ug/L)	Guidance Conc (Acute) (ug/L)	Lead, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Zinc, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	Reported Flow (CFS)	pH	Conducti-vity (uS/cm)
#11 Phillips Creek at SE 84th Ave.	10/28/15	Y	Storm	12.8	18	9.0	6.5	0.30	10	> 2420	406	4.1	2.4	3.1	0.16	0.44	11.40	25	31	31	83	20	5.2	114	0.14	0.08	0.05	6.7	1.61	47	21	5.44	7.1	57.3
#11 Phillips Creek at SE 84th Ave.	11/17/15	Y	Storm	12.9	18	8.6	6.5	0.31	10	1550	406	3.2	2.6	3.5	0.24	0.52	13.26	25	35	35	108	38	5.4	83	< 0.05	0.07	0.06	8.9	2.46	66	24	3.66	7.5	66
#11 Phillips Creek at SE 84th Ave.	12/7/15	Y	Storm	10.5	18	11.0	6.5	0.72	10	2420	406	1.4	3.2	4.3	0.05	0.66	17.04	7	43	42	736	612	4.1	102	0.05	0.65	0.04	24.9	17.61	148	30	254.70	6.9	72.1
#11 Phillips Creek at SE 84th Ave.	3/10/16	Y	Routine	11.0	18	10.4	6.5	0.68	10	411	406	1.4	3.9	5.4	0.13	0.87	22.20	41	52	52	99	10	0.6	96	< 0.05	< 0.04	0.03	2.9	0.83	62	38	11.60	7.4	99.8
			Mean	11.8		9.8		0.50		1390		2.5			0.15			25			257	170	3.8	99	0.05	0.05	0.05	10.9	5.63	81	28	68.85	7.2	73.8
			Maximum	12.9		11.0		0.72		> 2420		4.1			0.24			41			736	612	5.4	114	0.14	0.65	0.06	24.9	17.61	148	38	254.70	7.5	99.8
			Minimum	10.5		8.6		0.30		411		1.4			0.05			7			83	10	0.6	83	< 0.05	< 0.04	0.03	2.9	0.83	47	21	3.66	6.9	57.3
			Water Quality Exceedance (number of samples)	0		0		0		4			2	1		0	0		0	0								3	3	4				
#11 Phillips Creek at SE 84th Ave.	9/14/15	N	Routine	15.9	18	8.5	6.5	0.50	10	1050	406	0.8	6.4	9.3	0.04	1.65	42.33	4	85	85	177	< 1	0.7	166	< 0.05	< 0.04	0.06	1.4	0.26	12	68	3.42	7.5	599
#11 Phillips Creek at SE 84th Ave.	1/25/16	N	Routine	10.4	18	10.2	6.5	1.40	10	49	406	1	5.2	7.4	0.06	1.25	32.15	14	69	68	125	3	0.1	113	< 0.05	< 0.04	0.03	2.2	0.34	21	53	4.23	7.2	139.1
#11 Phillips Creek at SE 84th Ave.	2/22/16	N	Routine	9.6	18	10.6	6.5	1.10	10	51	406	1	5.3	7.5	0.05	1.28	32.82	19	70	70	127	4	0.0	124	< 0.05	< 0.04	< 0.04	1.4	0.25	25	54	4.33	7.5	138.5
#11 Phillips Creek at SE 84th Ave.	4/4/16	N	Routine	12.6	18	9.2	6.5	2.10	10	866	406	3.3	4.4	6.1	0.09	0.99	25.48	66	58	57	92	5	4.3	101	0.07	< 0.04	0.03	4.7	0.53	93	43	2.81	7.0	117.2
#11 Phillips Creek at SE 84th Ave.	4/26/16	N	Routine	12.8	18	9.4	6.5	0.78	10	687	406	1.1	5.5	7.9	0.02	1.36	34.84	13	73	73	111	3	0.6	105	< 0.05	< 0.04	0.03	1.6	0.26	19	57	1.43	7.1	142.3
			Mean	12.3		9.6		1.18		541		1.44			0.05			23			126	2.9	1.1	121.8	0.03	0.02	0.03	2.26	0.3	34.0	55	3.24	7.3	227
			Maximum	15.9		10.6		2.10		1050		3.30			0.09			66			177	4.8	4.3	166	0.07	< 0.04	0.06	4.7	0.53	93.0	68	4.33	7.5	599
			Minimum	9.6		8.5		0.50		49		0.80			0.02			4			92	< 1.0	0.0	101	< 0.05	< 0.04	0.03	1.4	0.25	12.0	43	1.43	7.0	117
			Water Quality Exceedance (number of samples)	0		0		0		3			0	0		0	0		1	1								0	0	1				

Kellogg Ck at Rowe Middle School

				Water Quality Standard Comparison																Additional Parameters of Concern										Supporting Parameters			
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate (mg/L)	WQ Std[3] (mg/L)	E. coli (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Copper, Dissolved (ug/L)	Guidance Conc (Chronic) (ug/L)	Guidance Conc (Acute) (ug/L)	Lead, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Zinc, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	Reported Flow (CFS)	pH	Conducti-vity (uS/cm)
#27 Kellogg Creek at Rowe Middle School	10/28/15	Y	Storm	12.4	18	8.6	6.5	0.87	10	548	406	2.2	6.0	8.7	0.09	1.52	38.92	25	80	79	155	10	1.5	180	< 0.05	0.09	0.07	3.3	0.49	43	63	19.63	7.4	150.5
#27 Kellogg Creek at Rowe Middle School	11/17/15	Y	Storm	11.9	18	9.4	6.5	0.63	10	687	406	2.3	3.7	5.1	0.14	0.81	20.90	13	50	49	121	19	1.6	96	< 0.05	< 0.04	0.05	4.3	1.07	31	36	93.73	7.5	97.8
#27 Kellogg Creek at Rowe Middle School	12/7/15	Y	Storm	11.6	18	10.2	6.5	0.72	10	> 2420	406	1.7	2.4	3.1	0.09	0.44	11.40	8	31	31	272	132	2.4	59	0.06	0.34	0.06	13.5	8.44	91	21	1117.70	6.5	75.4
#27 Kellogg Creek at Rowe Middle School	3/10/16	Y	Routine	10.9	18	10.2	6.5	0.76	10	308	406	1.5	4.4	6.2	0.11	1.02	26.14	13	59	58	108	12	0.7	108	< 0.05	< 0.04	0.03	2.9	0.96	25	44	73.40	7.4	108.1
			Mean	11.7		9.6		0.75		728		1.9			0.11			15			164	43	1.6	111	0.03	0.04	0.05	6.0	2.74	48	41	326.12	7.2	108.0
			Maximum	12.4		10.2		0.87		> 2420		2.3			0.14			25			272	132	2.4	180	0.06	0.34	0.07	13.5	8.44	91	63	1117.70	7.5	150.5
			Minimum	10.9		8.6		0.63		308		1.5			0.09			8			108	10	0.7	59	< 0.05	< 0.04	0.03	2.9	0.49	25	21	19.63	6.5	75.4
			Water Quality Exceedance (number of samples)	0		0		0		3			0	0		0	0		0	0									1	2	1				
#27 Kellogg Creek at Rowe Middle School	7/16/15	N	Routine	18.3	18	8.2	6.5	1.20	10	411	406	1.3	7.7	11.4	0.05	2.08	53.39	4	102	101	184	7	0.5	32	< 0.05	< 0.04	0.10	1.7	0.23	9	84	4.11	7.7	207
#27 Kellogg Creek at Rowe Middle School	9/14/15	N	Routine	15.0	18	9.1	6.5	1.20	10	613	406	0.7	8.0	11.9	0.06	2.19	56.17	4	106	105	215	1	2.0	201	< 0.05	0.14	0.09	1.2	0.24	10	88	4.11	7.9	313
#27 Kellogg Creek at Rowe Middle School	1/25/16	N	Routine	9.4	18	9.4	6.5	1.60	10	37	406	1.1	5.7	8.2	0.06	1.41	36.20	8	76	75	130	5	0.1	125	< 0.05	< 0.04	0.05	2.1	0.38	14	59	35.00	7.1	155.5
#27 Kellogg Creek at Rowe Middle School	2/22/16	N	Routine	9.0	18	10.7	6.5	1.40	10	128	406	1	5.9	8.4	0.04	1.46	37.56	13	78	77	139	7	0.5	144	< 0.05	< 0.04	0.04	1.5	0.26	18	61	31.70	7.6	152.7
#27 Kellogg Creek at Rowe Middle School	4/4/16	N	Routine	13.3	18	9.8	6.5	0.83	10	488	406	3.9	5.3	7.5	0.12	1.28	32.82	23	70	70	135	10	6.8	123	< 0.05	< 0.04	0.04	5.6	0.71	38	54	29.00	6.9	137
			Mean	13.0		9.4		1.25		335		1.6			0.07			10			161	5.9	2.0	125	0.03	0.04	0.06	2.4	0.36	17.8	69	20.78	7.4	193
			Maximum	18.3		10.7		1.60		613		3.9			0.12			23			215	9.6	6.8	201	< 0.05	0.14	0.10	5.6	0.71	38.0	88	35.00	7.9	313
			Minimum	9.0		8.2		0.83		37		0.7			0.04			4			130	1.0	0.1	32	< 0.05	< 0.04	0.04	1.2	0.23	9.0	54	4.11	6.9	137
			Water Quality Exceedance (number of samples)	1		0		0		3			0	0		0	0		0	0									0	0	0				

Mt Scott Creek

				Water Quality Standard Comparison																Additional Parameters of Concern										Supporting Parameters			
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate (mg/L)	WQ Std[3] (mg/L)	E. coli (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Copper, Dissolved (ug/L)	Guidance Conc (Chronic) (ug/L)	Guidance Conc (Acute) (ug/L)	Lead, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Zinc, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	Reported Flow (CFS)	pH	Conducti-vity (uS/cm)
#15 Mt. Scott Creek in NCCP	10/28/15	Y	Storm	12.6	18	7.9	6.5	0.32	10	> 2420	406	2.6	3.7	5.1	0.14	0.81	20.90	30	50	49	124	19	3.6	115	0.07	0.08	0.07	4.6	0.99	52	36	18.47	7.3	79.3
#15 Mt. Scott Creek in NCCP	11/17/15	Y	Storm	11.9	18	8.8	6.5	0.52	10	816	406	2.5	3.6	4.9	0.17	0.76	19.61	15	47	47	123	22	2.2	101	< 0.05	< 0.04	0.05	5.1	1.34	35	34	78.60	7.3	94
#15 Mt. Scott Creek in NCCP	12/7/15	Y	Storm	10.7	18	7.0	6.5	0.59	10	2420	406	1.8	2.5	3.2	0.06	0.47	12.02	5	33	32	181	111	2.2	92	0.05	0.18	0.06	9.3	4.6	45	22	870.30	6.6	72.4
#15 Mt. Scott Creek in NCCP	3/10/16	Y	Routine	10.8	18	10.3	6.5	0.63	10	101	406	1.6	4.9	6.9	0.14	1.15	29.47	15	65	64	105	15	0.7	92	< 0.05	< 0.04	0.03	2.9	0.91	28	49	58.40	7.4	104.5
			Mean	11.5		8.5		0.49		1112		2.2			0.15			20			133	42	2.2	103	0.04	0.04	0.05	4.2	1.08	38.3	35	51.82	7.2	224
			Maximum	12.6		10.3		0.63		> 2420		2.6			0.17			30			181	111.0	3.6	115	0.07	0.18	0.07	9.3	4.60	52.0	49	870.30	7.4	105
			Minimum	10.7		7.0		0.32		101		1.6			0.06			5			105	15.0	0.7	92	< 0.05	< 0.04	0.03	2.9	0.91	28.0	22	18.47	6.6	72
			Water Quality Exceedance (number of samples)	0		0		0		3			0	0		0	0		0	0									2	3	2				
#15 Mt. Scott Creek in NCCP	7/16/15	N	Routine	19.0	18	6.1	6.5	0.48	10	411	406	1.8	8.4	12.6	0.07	2.33	59.67	7	111	110	184	5	0.5	180	0.06	0.08	0.10	2.3	0.3	10	93	1.60	7.3	212
#15 Mt. Scott Creek in NCCP	9/14/15	N	Routine	16.0	18	7.7	6.5	0.45	10	178	406	0.7	8.2	12.2	0.04	2.24	57.57	3	108	107	203	6	0.6	193	< 0.05	0.15	0.10	1.6	0.24	9	90	1.46	7.4	227
#15 Mt. Scott Creek in NCCP	1/25/16	N	Routine	9.4	18	9.6	6.5	1.30	10	43	406	1.3	5.8	8.3	0.09	1.44	36.88	11	77	76	133	3	0.1	121	< 0.05	< 0.04	0.04	2.0	0.35	15	60	28.70	7.1	149.6
#15 Mt. Scott Creek in NCCP	2/22/16	N	Routine	8.9	18	9.9	6.5	1.10	10	47	406	1.1	5.9	8.4	0.06	1.46	37.56	11	78	77	136	5	0.4	141	< 0.05	0.06	< 0.04	1.7	0.27	15	61	24.40	7.4	150.1
#15 Mt. Scott Creek in NCCP	4/4/16	N	Routine	12.4	18	8.4	6.5	0.63	10	387	406	3.9	5.5	7.8	0.14	1.33	34.17	27	72	72	126	11	5.9	122	< 0.05	0.06	0.03	5.6	0.74	44	56	19.20	6.5	138.5
			Mean	13.1		8.3		0.79		213		1.8			0.08			12			156	5.9	1.5	151	0.03	0.07	0.06	2.6	0.38	18.6	72	15.07	7.1	175
			Maximum	19.0		9.9		1.30		411		3.9			0.14			27			203	10.8	5.9	193	0.06	0.15	0.10	5.6	0.74	44.0	93	28.70	7.4	227
			Minimum	8.9		6.1		0.45		43		0.7			0.04			3			126	2.8	0.1	121	< 0.05	< 0.04	0.03	1.6	0.24	9.0	56	1.46	6.5	139
			Water Quality Exceedance (number of samples)	1		1		0		1			0	0		0	0		0	0									0	0	0				

Rock Creek

				Water Quality Standard Comparison																Additional Parameters of Concern										Supporting Parameters			
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate (mg/L)	WQ Std[3] (mg/L)	E. coli (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Copper, Dissolved (ug/L)	Guidance Conc (Chronic) (ug/L)	Guidance Conc (Acute) (ug/L)	Lead, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Zinc, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	Reported Flow (CFS)	pH	Conducti-vity (uS/cm)
#16 Rock Creek near Mouth	10/30/15	Y	Storm	12.9	18	8.2	6.5	0.49	10	105	406	1	5.5	7.9	0.03	1.36	34.84	4	73	73	144	2	1.2	138	< 0.05	< 0.04	0.08	1.5	0.15	9	57	2.71	7.7	147.7
#16 Rock Creek near Mouth	11/19/15	Y	Storm	9.8	18	7.6	6.5	3.30	10	1550	406	1.7	3.8	5.3	0.08	0.84	21.55	4	51	50	131	34	1.1	115	< 0.05	0.08	0.06	4.0	1	17	37	78.13	7.3	108.5
#16 Rock Creek near Mouth	12/7/15	Y	Storm	9.5	18	9.6	6.5	2.50	10	1730	406	2	4.9	6.9	0.07	1.15	29.47	3	65	64	2150	1820	3.5	147	0.085	2.4	0.05	50.4	42.71	194	49	705.00	6.8	84.6
#16 Rock Creek near Mouth	3/10/16	Y	Routine	7.4	18	10.8	6.5	0.97	10	488	406	0.9	3.0	4.1	0.06	0.61	15.77	2	40	40	120	40	0.6	83	< 0.05	0.04	0.03	2.1	0.82	7	28	59.10	7.4	78.7
			Mean	9.9		9.1		1.59		714		1.2			0.06			3			636	474	1.0	112	0.03	0.05	0.06	2.5	0.66	11	43	46.65	7.3	224.0
			Maximum	12.9		10.8		3.30		1730		2.0			0.08			4			2150	1820	3.5	147	0.09	2.40	0.08	50.4	42.71	194	57	705.00	7.7	147.7
			Minimum	7.4		7.6		0.49		105		0.9			0.03			2			120	2	0.6	83	< 0.05	< 0.04	0.03	1.5	0.15	7	28	2.71	6.8	78.7
			Water Quality Exceedance (number of samples)	0		0		0		3			0	0		0	0		0	0									1	3	1				
#16 Rock Creek near Mouth	7/16/15	N	Routine	7.7	18	8.9	6.5	0.57	10	67	406	0.4	7.1	10.4	0.01	1.86	47.84	1	94	93	154	1	0.1	152	< 0.05	0.04	0.09	0.6	0.11	4	76	0.70	7.7	182.1
#16 Rock Creek near Mouth	9/14/15	N	Routine	7.7	18	9.8	6.5	0.41	10	46	406	0.4	6.2	9.0	0.01	1.57	40.28	1	82	81	164	2	< 0.6	145	< 0.05	< 0.1	0.08	0.7	0.06	4	65	1.07	7.7	298
#16 Rock Creek near Mouth	1/25/16	N	Routine	7.4	18	10.6	6.5	1.70	10	101	406	0.7	3.3	4.5	0.05	0.69	17.68	6	44	43	83	8	0.1	87	< 0.05	0.04	0.03	1.3	0.34	5	31	28.80	7.4	85.2
#16 Rock Creek near Mouth	2/22/16	N	Routine	7.4	18	8.8	6.5	1.50	10	185	406	0.6	3.1	4.2	0.05	0.64	16.40	2	41	41	89	6	0.3	84	< 0.05	0.04	< 0.04	0.9	0.2	3	29	19.80	7.4	83.8
#16 Rock Creek near Mouth	4/4/16	N	Routine	7.1	18	10.0	6.5	0.75	10	121	406	1	3.7	5.0	0.04	0.79	20.25	3	49	48	93	4	1.3	83	< 0.05	0.04	0.03	1.3	0.28	5	35	5.63	7.1	97.3
			Mean	7.5		9.6		0.99		104		0.6			0.03			3			117	4.2	0.4	110	0.03	0.04	0.05	1.0	0.20	4.2	47	11.20	7.5	149
			Maximum	7.7		10.6		1.70		185		1.0			0.05			6			164	8.0	1.3	152	< 0.05	< 0.10	0.09	1.3	0.34	5.0	76	28.80	7.7	298
			Minimum	7.1		8.8		0.41		46		0.4			0.01			1			83	1.0	0.1	83	< 0.05	0.04	0.03	0.6	0.06	3.0	29	0.70	7.1	84
			Water Quality Exceedance (number of samples)	0		0		0		0			0	0		0	0		0	0									0	0	0				

Kellogg Ck at SE Rusk Rd

				Water Quality Standard Comparison																	Additional Parameters of Concern										Supporting Parameters			
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate (mg/L)	WQ Std[3] (mg/L)	E. coli (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Copper, Dissolved (ug/L)	Guidance Conc (Chronic) (ug/L)	Guidance Conc (Acute) (ug/L)	Lead, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Zinc, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	Reported Flow (CFS)	pH	Conducti-vity (uS/cm)
#14 Kellogg Creek at SE Rusk Rd	10/28/15	Y	Storm	12.5	18	6.8	6.5	1.40	10	261	406	1.2	5.9	8.4	0.09	1.46	37.56	12	78	77	188	10	1.6	189	0.09	0.06	0.07	1.8	0.46	18	61	3.63	7.0	155.6
#14 Kellogg Creek at SE Rusk Rd	11/17/15	Y	Storm	11.6	18	6.2	6.5	1.10	10	345	406	1.7	4.4	6.1	0.1	0.99	25.48	16	58	57	153	26	1.8	134	0.05	0.09	0.09	3.4	1.14	32	43	13.40	7.1	109.5
#14 Kellogg Creek at SE Rusk Rd	12/7/15	Y	Storm	10.4	18	9.5	6.5	0.98	10	> 2420	406	1.7	2.5	3.2	0.08	0.47	12.02	10	33	32	229	136	2.7	132	0.07	0.36	0.08	11.0	7.87	77	22	> 143.93	6.6	72
#14 Kellogg Creek at SE Rusk Rd	3/10/16	Y	Routine	11.0	18	9.8	6.5	1.60	10	206	406	1.3	4.4	6.1	0.09	0.99	25.48	13	58	57	123	7	0.9	118	< 0.05	< 0.04	0.06	2.6	0.55	18	43	9.33	7.1	123.4
			Mean	11.4		8.1		1.37		271		1.4			0.09			14			173	45	1.4	147	0.06	0.06	0.07	2.6	0.72	23	42	8.79	7.0	224.0
			Maximum	12.5		9.8		1.60		> 2420		1.7			0.10			16			229	136	2.7	189	0.09	0.36	0.09	11.0	7.87	77	61	> 143.93	7.1	155.6
			Minimum	10.4		6.2		0.98		206		1.2			0.08			10			123	7	0.9	118	0.05	< 0.04	0.06	1.8	0.46	18	22	3.63	6.6	72.0
			Water Quality Exceedance (number of samples)	0		1		0		1			0	0		0	0		0	0								1	2	1				
#14 Kellogg Creek at SE Rusk Rd	7/16/15	N	Routine	16.8	18	6.8	6.5	1.70	10	649	406	0.6	7.3	10.8	0.04	1.95	49.92	6	97	96	189	5	0.5	178	0.07	< 0.04	0.08	1.0	0.22	8	79	1.80	6.9	203
#14 Kellogg Creek at SE Rusk Rd	9/14/15	N	Routine	14.9	18	7.6	6.5	1.80	10	291	406	0.3	7.4	10.9	0.03	1.97	50.61	4	98	97	207	1	< 0.6	199	< 0.05	< 0.04	0.07	0.9	0.25	8	80	1.50	7.0	300
#14 Kellogg Creek at SE Rusk Rd	1/25/16	N	Routine	10.0	18	8.6	6.5	2.30	10	43	406	0.9	5.9	8.4	0.09	1.46	37.56	9	78	77	163	8	0.3	149	0.06	0.04	0.08	1.3	0.42	13	61	6.66	7.0	159.7
#14 Kellogg Creek at SE Rusk Rd	2/22/16	N	Routine	9.5	18	8.4	6.5	2.30	10	461	406	0.9	6.1	8.8	0.07	1.54	39.60	11	81	80	164	7	0.5	156	< 0.05	0.08	0.07	1.2	0.32	13	64	6.37	7.1	160
#14 Kellogg Creek at SE Rusk Rd	4/4/16	N	Routine	12.8	18	8.2	6.5	1.80	10	461	406	3	5.5	7.8	0.07	1.33	34.17	26	72	72	142	6	4.1	137	< 0.05	< 0.04	0.06	4.0	0.5	33	56	4.11	6.7	149.8
			Mean	12.8		7.9		1.98		381		1.14			0.06			11			173	5.5	1.1	164	0.04	0.04	0.07	1.7	0.34	15	68	4.09	6.9	195
			Maximum	16.8		8.6		2.30		649		3.00			0.09			26			207	8.0	4.1	199	0.07	0.08	0.08	4.0	0.50	33	80	6.66	7.1	300
			Minimum	9.5		6.8		1.70		43		0.30			0.03			4			142	1.0	0.3	137	< 0.05	< 0.04	0.06	0.9	0.22	8	56	1.50	6.7	150
			Water Quality Exceedance (number of samples)	0		0		0		3			0	0		0	0		0	0								0	0	0				

Cow Creek at SE Last Road

				Water Quality Standard Comparison																	Additional Parameters of Concern										Supporting Parameters			
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate (mg/L)	WQ Std[3] (mg/L)	E. coli (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Copper, Dissolved (ug/L)	Guidance Conc (Chronic) (ug/L)	Guidance Conc (Acute) (ug/L)	Lead, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Zinc, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	Reported Flow (CFS)	pH	Conducti-vity (uS/cm)
#24 Cow Creek at SE Last Road	10/28/15	Y	Storm	12.4	18	10.3	6.5	0.35	10	24	406	4.8	1.7	2.1	0.11	0.28	7.20	58	22	22	102	27	5.2	81	0.19	0.09	0.04	10.4	1.26	103	14	0.73	6.6	33.1
#24 Cow Creek at SE Last Road	11/19/15	Y	Storm	9.5	18	9.4	6.5	0.26	10	1730	406	2.2	2.2	2.8	0.09	0.40	10.18	47	29	29	56	7	1.2	59	< 0.05	< 0.04	0.06	4.1	1.84	69	19	13.99	6.6	122.6
#24 Cow Creek at SE Last Road	12/7/15	Y	Storm	10.8	18	9.6	6.5	0.22	10	613	406	1.5	1.7	2.1	0.16	0.28	7.20	30	22	22	100	70	1.8	48	0.06	0.08	< 0.04	9.6	1.29	105	14	> 28.68	6.6	32.4
#24 Cow Creek at SE Last Road	3/10/16	Y	Routine	10.7	18	9.4	6.5	0.24	10	205	406	1.9	3.8	5.3	0.16	0.84	21.55	36	51	50	80	10	0.9	81	< 0.05	< 0.04	0.03	3.4	1.29	52	37	1.63	7.1	90.6
			Mean	10.9		9.7		0.27		269		2.6			0.13			43			85	28	2.3	67	0.08	0.05	0.04	6.9	1.42	82	21	11.26	6.7	69.7
			Maximum	12.4		10.3		0.35		1730		4.8			0.16			58			102	70	5.2	81	0.19	0.09	0.06	10.4	1.84	105	37	> 28.68	7.1	122.6
			Minimum	9.5		9.4		0.22		24		1.5			0.09			30			56	7	0.9	48	< 0.05	< 0.04	0.03	3.4	1.26	52	14	0.73	6.6	32.4
			Water Quality Exceedance (number of samples)	0		0		0		2			2	1		0	0		3	3								3	4	4				
Cow Creek at SE Fish Hatchery Road	7/16/15	N	Routine	16.8	18	8.2	6.5	0.56	10	1300	406	0.8	8.0	11.9	0.06	2.19	56.17	6	106	105	211	13	0.2	184	< 0.05	< 0.04	0.07	1.4	0.41	13	88	NA	7.2	213
#24 Cow Creek at SE Last Road	1/25/16	N	Routine	10.0	18	8.7	6.5	0.72	10	15	406	1.6	6.1	8.8	0.11	1.54	39.60	44	81	80	127	11	0.3	125	< 0.05	< 0.04	0.03	3.1	1.26	62	64	0.12	7.2	154.9
#24 Cow Creek at SE Last Road	2/22/16	N	Routine	8.7	18	9.1	6.5	0.57	10	26	406	1.5	6.2	9.0	0.09	1.57	40.28	32	82	81	202	63	1.4	134	< 0.05	0.14	< 0.04	4.3	1.84	57	65	0.14	7.2	149.8
#24 Cow Creek at SE Last Road	4/4/16	N	Routine	12.2	18	7.6	6.5	0.21	10	> 2420	406	3.3	4.6	6.5	0.11	1.07	27.47	44	61	61	109	5	7.5	105	0.07	< 0.04	0.04	5.0	0.72	65	46	0.29	6.9	118.4
#24 Cow Creek at SE Last Road	4/26/16	N	Routine	13.2	18	7.4	6.5	0.12	10	47	406	1.2	7.2	10.6	0.09	1.92	49.22	11	96	95	133	4	1.4	133	< 0.05	0.04	0.05	1.5	0.33	14	78	0.01	7.5	195.8
			Mean	12.2		8.2		0.44		337		1.68			0.09			27			156	19	2.2	136	0.03	0.05	0.04	3.06	0.91	42.20	68	0.14	7.2	166
			Maximum	16.8		9.1		0.72		> 2420		3.30			0.11			44			211	63	7.5	184	0.07	0.14	0.07	5.0	1.84	65.0	88	0.29	7.5	213
			Minimum	8.7		7.4		0.12		15		0.80			0.06			6			109	4	0.2	105	< 0.05	< 0.04	0.03	1.4	0.33	13.0	46	0.01	6.9	118
			Water Quality Exceedance (number of samples)	0		0		0		2			0	0		0	0		0	0								0	0	1				

#101 SE Pheasant Court Outfall

				Water Quality Standard Comparison																	Additional Parameters of Concern										Supporting Parameters			
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate (mg/L)	WQ Std[3] (mg/L)	E. coli (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Copper, Dissolved (ug/L)	Guidance Conc (Chronic) (ug/L)	Guidance Conc (Acute) (ug/L)	Lead, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Zinc, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	Reported Flow (CFS)	pH	Conducti-vity (uS/cm)
#101 SE Pheasant Court Outfall	9/17/15	Y	Storm	15.0	18	8.8	6.5	0.51	10	> 2420	406	6	0.8	0.9	0.18	0.11	2.73	65	11	11	79	7	5.0	73	1.20	0.19	0.10	8.4	1.14	87	6	1.65	6.6	220
#101 SE Pheasant Court Outfall	4/12/16	Y	Storm	12.3	18	0.1	6.5	0.32	10	24	406	39.2	3.9	5.4	0.76	0.87	22.20	312	52	52	157	31	20.0	136	0.06	0.31	0.08	61.3	2.38	392	38	1.74	6.2	136.5
#101 SE Pheasant Court Outfall	5/19/16	Y	Storm	15.9	18	8.3	6.5	0.24	10	1410	406	5.7	1.8	2.2	0.16	0.30	7.79	79	24	23	115	57	4.8	46	0.12	0.11	0.05	12.9	4.64	139	15	2.69	5.9	34.5
			Mean	14.4		5.7		0.36		434		17.0			0.37			152			117	32	9.9	85	0.46	0.20	0.08	27.5	2.72	206	20	2.03	6.2	130.3
			Maximum	15.9		8.8		0.51		> 2420		39.2			0.76			312			157	57	20.0	136	1.20	0.31	0.10	61.3	4.64	392	38	2.69	6.6	220.0
			Minimum	12.3		0.1		0.24		24		5.7			0.16			65			79	7	4.8	46	0.06	0.11	0.05	8.4	1.14	87	6	1.65	5.9	34.5
			Water Quality Exceedance (number of samples)	0		1		0		2			3	3		1	0		3	3								3	3	3				

#105 Sunnyside Village Apts. at Pond

				Water Quality Standard Comparison																	Additional Parameters of Concern										Supporting Parameters			
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate (mg/L)	WQ Std[3] (mg/L)	E. coli (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Copper, Dissolved (ug/L)	Guidance Conc (Chronic) (ug/L)	Guidance Conc (Acute) (ug/L)	Lead, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Zinc, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspe-nded Solids (mg/L)	BOD (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	Reported Flow (CFS)	pH	Conducti-vity (uS/cm)
#105 Sunnyside Village Apartments OF	9/17/15	Y	Storm	15.5	18	7.2	6.5	0.58	10	> 2420	406	5	2.74	3.64	0.07	0.54	13.88	29	36.50	36.20	120	12	4.9	93	0.11	0.12	0.04	8.1	0.88	50	25	NA	6.50	86.2
#105 Sunnyside Village Apartments OF	4/12/16	Y	Storm	12.8	18	5.6	6.5	0.47	10	18	406	120.3	3.56	4.86	0.16	0.76	19.61	85	47.36	46.98	175	19	> 36.0	174	1	0.31	0.18	158.0	0.58	103	34	NA	6.60	146.4
#105 Sunnyside Village Apartments OF	5/19/16	Y	Storm	14.9	18	8.2	6.5	0.33	10	> 2420	406	8.8	1.77	2.25	0.08	0.30	7.79	28	23.68	23.48	73	9	2.2	67	0.06	< 0.04	< 0.04	11.6	0.52	35	15	NA	6.10	15.5
Mean				14.4		7.0		0.46		472		44.7			0.10			47.3			123	13	14.4	111	0.39	0.15	0.08	59.2	0.66	63	25		6.4	82.7
Maximum				15.5		8.2		0.58		> 2420		120.30			0.16			85			175	19	> 36.0	174	1.00	0.31	0.18	158.0	0.88	103	34		6.6	146.4
Minimum				12.8		5.6		0.33		18		5.00			0.07			28			73	9	2.2	67	0.06	< 0.04	0.04	8.1	0.52	35	15		6.1	15.5
Water Quality Exceedance (number of samples)				0		1		0		2			3	3		0	0		2	2								3	2	3				

#103 SE Oregon Trail Dr. Outfall

				Water Quality Standard Comparison																	Additional Parameters of Concern										Supporting Parameters			
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate (mg/L)	WQ Std[3] (mg/L)	E. coli (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Copper, Dissolved (ug/L)	Guidance Conc (Chronic) (ug/L)	Guidance Conc (Acute) (ug/L)	Lead, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Zinc, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspe-nded Solids (mg/L)	BOD (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	Reported Flow (CFS)	pH	Conducti-vity (uS/cm)
#103 SE Oregon Trail Dr. Outfall	9/17/15	Y	Storm	14.9	18	8.8	6.5	0.62	10	> 2420	406	4.3	1.67	2.11	0.07	0.28	7.20	53	22.33	22.15	102	22	3.8	79	0.16	0.12	0.04	8.1	0.75	82	14	0.29	6.4	97.1
#103 SE Oregon Trail Dr. Outfall	4/12/16	Y	Storm	12.6	18	6.3	6.5	0.39	10	80	406	11.6	4.61	6.47	0.43	1.07	27.47	170	61.19	60.69	184	29	> 35.0	161	0.77	0.28	0.07	15.7	2.08	247	46	0.04	6.5	139
#103 SE Oregon Trail Dr. Outfall	5/19/16	Y	Storm	15.8	18	9	6.5	0.56	10	32	406	5.4	2.36	3.09	0.15	0.44	11.40	51	31.49	31.23	86	14	2.3	66	< 0.05	< 0.04	0.04	8.5	1.09	75	21	0.16	5.7	55.6
Mean				14.4		8.0		0.52		184		7.1			0.22			91.3			124	22	13.7	102	0.32	0.14	0.05	10.8	1.31	135	27	0.16	6.2	97.2
Maximum				15.8		9		0.62		> 2420		11.60			0.43			170			184	29	> 35.0	161	0.77	0.28	0.07	15.7	2.08	247	46	0.29	6.5	139.0
Minimum				12.6		6.3		0.39		32		4.30			0.07			51			86	14	2.3	66	< 0.05	< 0.04	0.04	8.1	0.75	75	14	0.04	5.7	55.6
Water Quality Exceedance (number of samples)				0		1		0		1			3	3		0	0		3	3								3	3	3				

#102 SE Webster Road Outfall

				Water Quality Standard Comparison																	Additional Parameters of Concern										Supporting Parameters			
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate (mg/L)	WQ Std[3] (mg/L)	E. coli (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Copper, Dissolved (ug/L)	Guidance Conc (Chronic) (ug/L)	Guidance Conc (Acute) (ug/L)	Lead, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Zinc, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspe-nded Solids (mg/L)	BOD (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	Reported Flow (CFS)	pH	Conducti-vity (uS/cm)
#102 SE Webster Road Outfall	9/17/15	Y	Storm	14.8	18	8.7	6.5	1.00	10	> 2420	406	6	1.36	1.68	0.16	0.21	5.47	68	18.20	18.06	106	11	4.6	93	0.13	0.2	0.09	9.2	1.01	100	11	1.98	6.7	125.8
#102 SE Webster Road Outfall	4/12/16	Y	Storm	12.9	18	8.2	6.5	0.37	10	50	406	30.3	2.83	3.78	0.47	0.57	14.51	808	37.73	37.43	134	14	14.0	124	0.79	0.24	0.09	37.3	1.26	964	26	0.37	6.4	83.6
#102 SE Webster Road Outfall	5/19/16	Y	Storm	15.3	18	9	6.5	0.19	10	1990	406	5.7	1.57	1.97	0.17	0.26	6.62	49	20.97	20.80	78	32	3.8	48	0.072	0.06	0.04	10.8	2.07	84	13	2.13	6.1	20.6
Mean				14.3		8.6		0.52		622		14.00			0.27			308.3			106	19	7.5	88	0.33	0.17	0.07	19.1	1.45	383	17	1.49	6.4	76.7
Maximum				15.3		9		1.00		> 2420		30.30			0.47			808			134	32	14.0	124	0.79	0.24	0.09	37.3	2.07	964	26	2.13	6.7	125.8
Minimum				12.9		8.2		0.19		50		5.70			0.16			49			78	11	3.8	48	0.07	0.06	0.04	9.2	1.01	84	11	0.37	6.1	20.6
Water Quality Exceedance (number of samples)				0		0		0		2			3	3		0	0		3	3								3	3	3				

Notes:

General: Red font indicates that the dissolved values are higher than the total. QC
Green font indicates that orthophosphate value is higher than total phosphorus. QC
N/A = Data is not available

1) WQ Standard of 18 C per DEQ's Temperature Water Quality Standard Implementation IMD 2008 for salmon and trout rearing and migration
2) 6.5 mg/L selected as target minimum DO concentraiton for cool water habitat
also corresponds to the Ecology "good" criteria and the Chlorphyl a TMDL in the tualatin for mainstem Tualatin R
3) Geometric means were calculated for E. coli and entered in the row titled "mean"
4) Volatile Solids data (mg/L), which was collected at a few sites on a few dates, is available upon request

Table 4 SWMACC's Water Quality and Flow Monitoring Results

Pecan Creek

				Water Quality Standard Comparison																	Additional Parameters of Concern											Supporting Parameters			
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate (mg/L)	WQ Std[3] (mg/L)	E. coli (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Copper, Diss-olved (ug/L)	Guidance Conc (Chronic) (ug/L)	Guidance Conc (Acute) (ug/L)	Lead, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Zinc, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspe-nded Solids (mg/L)	Total Volatile Solids (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosph-orus (mg/L)	BOD (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	Reported Flow (CFS)	pH	Conducti-vity (uS/cm)
#11 Pecan Creek at SW Mossy Brae Rd	10/30/15	Y	Storm	13.0	18	7.8	6.5	0.46	10	866	406	3.0	3.6	4.9	0.08	0.76	19.61	3	47	47	113	6	41	121	< 0.05	0.05	0.9	0.08	4.00	0.33	7	34	1.67	7.4	109
#11 Pecan Creek at SW Mossy Brae Rd	11/19/15	Y	Storm	10.0	18	10.4	6.5	1.50	10	1200	406	2.2	3.1	4.2	0.17	0.64	16.40	6	41	41	101	17	36	97	< 0.05	< 0.04	0.7	0.06	3.70	0.78	10	29	8.12	7.28	83.4
#11 Pecan Creek at SW Mossy Brae Rd	12/7/15	Y	Storm	10.9	18	9.4	6.5	1.00	10	2420	406	2.0	3.7	5.0	0.03	0.79	20.25	4	49	48	1810	1340	211	97	0.05	1.90	4.4	0.10	35.60	27.27	180	35	27.28	6.9	108.5
#11 Pecan Creek at SW Mossy Brae Rd	3/10/16	Y	Routine	10.0	18	10.6	6.5	0.98	10	156	406	1.1	3.3	4.5	0.08	0.69	17.68	2	44	43	111	19	47	101	< 0.05	< 0.04	0.3	0.04	2.10	0.61	6	31	8.47	7	89.2
			Mean	11.0		9.6		0.99		791		2.1			0.09			4			534	345.5	83.8	104.0	0.0	0.5	1.6	0.1	11.4	7.25	51	32	11.39	7.15	97.5
			Maximum	13.0		10.6		1.50		2420		3.0			0.17			6			1810	1340	211	121	< 0	2	4.4	0	36	27.27	180	35	27.28	7.4	109.0
			Minimum	10.0		7.8		0.46		156		1.1			0.03			2			101	6	36	97	< 0	< 0	0.3	0	2	0.33	6	29	1.67	6.9	83.4
			Water Quality Exceedance (number of samples)	0		0		0		3			0	0		0	0		0	0									1	2	1				
#11 Pecan Creek at SW Mossy Brae Rd	7/16/15	N	Routine	16.3	18	9	6.5	2.00	10	345	406	0.6	5.3	7.5	0.01	1.28	32.82	< 1	70	70	142	2	52	137	< 0.05	< 0.04	0.1	0.08	0.80	0.13	2	54	0.58	7.3	151.3
#11 Pecan Creek at SW Mossy Brae Rd	9/14/15	N	Routine	13.0	18	9.2	6.5	1.50	10	1050	406	0.6	5.5	7.9	0.02	1.36	34.84	< 1	73	73	185	< 1	104	158	< 0.05	0.10	< 0.6	0.08	1.10	0.09	5	57	0.46	7.5	215
#11 Pecan Creek at SW Mossy Brae Rd	1/25/16	N	Routine	9.8	18	10.4	6.5	1.40	10	72	406	0.7	3.2	4.3	0.07	0.66	17.04	2	43	42	99	4	39	98	< 0.05	< 0.04	0.1	0.04	1.30	0.28	4.0	30	NA	7.3	93.3
#11 Pecan Creek at SW Mossy Brae Rd	2/22/16	N	Routine	8.3	18	10.8	6.5	1.10	10	248	406	0.7	3.3	4.5	0.04	0.69	17.68	2	44	43	103	10	39	110	< 0.05	< 0.04	0.3	< 0.04	1.10	0.28	4	31	3.51	7	92.2
#11 Pecan Creek at SW Mossy Brae Rd	4/4/16	N	Routine	10.5	18	10.4	6.5	0.68	10	461	406	3.8	3.7	5.0	0.08	0.79	20.25	4	49	48	96	10	30	98	< 0.05	< 0.04	1.5	0.04	5.50	0.81	8	35	1.19	6.8	112.3
			Mean	11.6		10.0		1.34		313		1.3			0.04			2			125	5.1	52.8	120.2	0.03	0.04	0.5	0.05	1.96	0.32	4.6	41	1.44	7.18	132.8
			Maximum	16.3		10.8		2.00		1050		3.8			0.08			4			185	10.0	104.0	158.0	< 0.05	0.10	1.5	0.08	5.50	0.81	8	57	3.51	7.5	215.0
			Minimum	8.3		9		0.68		72		0.6			0.01			< 1			96	< 1.0	30.0	98.0	< 0.05	< 0.04	0.1	0.04	0.80	0.09	2	30	0.46	6.8	92.2
			Water Quality Exceedance (number of samples)	0		0		0		2			1	0		0	0		0	0									1	0	0				

River Grove Boat Ramp Outfall

				Water Quality Standard Comparison																	Additional Parameters of Concern											Supporting Parameters			
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate (mg/L)	WQ Std[3] (mg/L)	E. coli (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Copper, Diss-olved (ug/L)	Guidance Conc (Chronic) (ug/L)	Guidance Conc (Acute) (ug/L)	Lead, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Zinc, Diss-olved (ug/L)	Water Quality Std (Chronic) (ug/L)	Water Quality Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspe-nded Solids (mg/L)	Total Volatile Solids (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosph-orus (mg/L)	BOD (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	Reported Flow (CFS)	pH	Conducti-vity (uS/cm)
#203 River Grove Boat Ramp Outfall	9/17/15	Y	Storm	16.6	18	8.1	6.5	1.50	10	> 2420	406	5.9	1.87	2.39	0.21	0.33	8.38	29	25	25	111	7	41	91	0.10	0.17	4.4	0.10	7.00	5.90	43	16	NA	6.8	405
#203 River Grove Boat Ramp Outfall	6/9/16	Y	Storm	17.1	18	7.8	6.5	2.70	10	365	406	1.7	6.60	9.60	0.03	1.70	43.71	17	87	87	208	35	62	177	0.06	0.16	2.6	0.07	6.80	1.70	34	70	NA	6.7	218
#203 River Grove Boat Ramp Outfall	6/10/16	Y	Storm	17.9	18	7.6	6.5	3.10	10	109	406	1.5	7.64	11.28	0.03	2.05	52.69	7	101	100	262	63	67	219	< 0.05	0.08	3.1	0.05	4.90	1.50	23	83	NA	7	194
			Mean	17.2		7.8		2.32		458		3.0			0.1			17.7			208	35	57	162	0.06	0.14	3.4	0.07	6.23	3.03	33	56	NA	6.83	272.3
			Maximum	17.9		8.1		3.10		> 2420		5.90			0.21			29			262	63	67	219	0.10	0.17	4.4	0.10	7.00	5.90	43	83	NA	7	405.0
			Minimum	16.6		7.6		1.50		109		1.50			0.03			7			111	7	41	91	< 0.05	0.08	2.6	0.05	4.90	1.50	23	16	NA	6.7	194.0
			Water Quality Exceedance (number of samples)	0		0		0		1			1	0		0	0		1	1									1	1	1				

Notes:

General: Red font indicates that the dissolved values are higher than the total. QC

#N/A = Data is not available

* = creek flow backed up due to high Tualatin River flows, so actual flow not known

1) WQ Standard of 18 C per DEQ's Temperature Water Quality Standard Implementation IMD 2008 for salmon and trout rearing and migration
2) No instream monitoring locations specifically referenced in the Tualatin River TMDL - 6.5 mg/L selected as target minimum DO concentraiton for cool water habitat also corresponds to the Ecology "good" criteria and the Chlorphyl a TMDL in the tualatin for mainstem Tualatin R
3) Table 20 - Protection of human health for water and fish ingestion
4) Geometric means were calculated for E. coli and entered in the row titled "mean"

This Page Intentionally Left Blank

WATER ENVIRONMENT SERVICES
WATER QUALITY INDEX

Clackamas County Water Environment Services (WES) conducts water quality and flow monitoring of water in streams and from discharges from storm sewer outfalls. Monitoring is conducted so that WES can make informed decisions and establish priorities to improve water quality and watershed health through CCSD#1 and SWMACC. Monitoring results collected in the field and analyzed in laboratories are documented, tracked, and reported to the Oregon Department of Environmental Quality (DEQ) in accordance with terms of WES' municipal NPDES MS4 permit.

Selected pollutant parameters that have the potential to impact the beneficial uses (i.e., water contact recreation, fishing, etc.) of surface water bodies, sources of pollutant discharges, and potential management practices to address these sources are identified in some instances. To assist WES in making informed decisions related to the monitoring data collected, an indication of appropriate pollutant concentration levels is provided as well.

TEMPERATURE

Why is it a problem?

Fish species including salmonids and trout require water temperatures lower than 61 degrees Fahrenheit to survive and reproduce. Warm temperatures also reduce the amount of dissolved oxygen in water, which is also essential for survival.

What are the potential sources?

The most typical and significant sources include the following:

- Removal of streamside vegetation results in decreased shade and increased thermal heat load.
- Decreased flow as a result of flow diversions results in lower instream depths and flow velocities and hence greater susceptibility to increased temperatures.
- Channel erosion can contribute to elevated instream temperatures as it can cause sedimentation and reduced flow depths.
- Impoundments such as dams and ponds result in longer residence times for solar heating of the water.
- Point sources can also contribute to increased temperatures. Sources include non-contact cooling wastewater from some industrial processes.

What are some potential solutions?

Riparian planting and increased shade; maintain stormwater runoff flows and volumes consistent with pre-developed conditions; and encourage infiltration of runoff (groundwater discharges to streams typically have lower temperatures than surface discharges).

What temperature levels are appropriate?

Temperature ranges are based on documented temperatures required for salmon and trout rearing and migration (18 C) and salmon and steelhead spawning (13 C).

- Temperatures exceeding 18 degrees Celsius.....Poor
- Temperatures ranging from to 13 to 18 degrees Celsius.....Fair
- Temperatures lower than 13 degrees Celsius.....Good

CONDUCTIVITY

Why is it a problem?

Conductivity is a measure of the ability of the water to pass an electrical current. Instream conductivity is typically constant. Therefore, changes in conductivity can be an indicator of the presence of illicit or wastewater discharges entering a waterbody, as conductivity is affected by the presence of inorganic, dissolved solids including chloride, nitrate, phosphate, and sulfate.

What are the potential sources?

The most typical and significant sources of changing conductivity include the following:

- Increasing temperature
- Illicit discharges including process waters and wastewaters

What are some potential solutions?

- Riparian plantings and increased shade (to minimize fluctuations in stream temperatures)
- Implementation of an illicit discharge detection and elimination program

What conductivity levels are appropriate?

Conductivity ranges are based on the suitability of the water to support various fish and macroinvertebrate species. Conductivity outside of the optimum range could indicate that the water may be unsuitable to support various species. The identified range is based on EPA's guidelines.

- Conductivity greater than 500 umhos/cm or less than 150 umhos/cm.....Poor
- Conductivity between 150 umhos/cm and 500 umhos/cm.....Good

PH

Why is it a problem?

pH is a measure of the acidity of the waterbody. Aquatic organisms are sensitive to deviations from a normal range of pH.

What are the potential sources?

The most typical and significant sources include the following:

- Lime soil additives and fertilizers.
- Acid rain created by fossil fuel combustion.
- Illicit discharges including process waters and wastewaters.

What are some potential solutions?

Implementation of an integrated pest management program; public education related to the use of pesticides and fertilizers; implementation of an illicit discharge detection and elimination program.

What pH levels are appropriate?

pH ranges are based on the suitability of the water to support of various fish and macroinvertebrate species. Instream pH outside of the optimum range could indicate that the water may be unsuitable to support various species. The following identified range is based on DEQ's OAR 340-041-0021:

- pH lower than 6.5 and higher than 8.5.....Poor
- pH ranging from 6.5 to 8.5.....Good

DISSOLVED OXYGEN

Why is it a problem?

Fish and other aquatic organisms require dissolved oxygen for survival. Adequate dissolved oxygen concentrations are required to ensure that oxygen can be transferred from the water to the organism's blood stream efficiently. Dissolved oxygen is also necessary for various biological and chemical processes and to facilitate decomposition of organic matter in water and bed sediment. Low dissolved oxygen concentrations can lead to a buildup of organic matter and limit fish and other aquatic organisms' survival.

What are the potential sources?

The most typical and significant sources include the following:

- Dissolved oxygen concentrations are reduced with elevated temperatures resulting from the removal of streamside vegetation and decreased or stagnant flow.
- Discharge of oxygen-demanding wastes (wastewater and stormwater runoff) that carry pollutant s (sediments, nutrients, and organic matter) that require oxygen for decomposition or chemical reactions.

What are the solutions?

Plant riparian vegetation to lower instream temperatures; filter pollutants prior to discharge; reduce fertilizer and pesticide usage and discharge; prevent erosion and control sediment; implement setbacks for livestock and animals; implement practices that reduce impediments to flow (e.g., reduce use of impoundments, promote infiltration to support groundwater recharge and summer flows).

What Dissolved Oxygen levels are appropriate?

Dissolved oxygen ranges are based on DEQ's documented dissolved oxygen concentrations required for maintenance of cold-water aquatic life.

- Dissolved oxygen concentrations less than 6.5 mg/L.....Poor
- Dissolved oxygen concentrations ranging from 6.5 mg/L to 8 mg/L.....Fair

- Dissolved oxygen concentrations higher than 8 mg/L..... .....Good

NUTRIENTS (NITROGEN AND PHOSPHORUS)

Why are they a problem?

High levels of nutrients (most commonly in the form of nitrogen and\or phosphorus) can over-stimulate biological growth (i.e., algal production). When plants die and decompose, they reduce the dissolved oxygen concentrations in a water body. Some forms of nutrients (e.g., ammonia and nitrate) may be toxic to organisms. High nutrient levels may also contribute to odor problems and aesthetic concerns related to algal blooms.

What are the potential sources?

The most typical and significant sources (of nitrogen and phosphorus specifically) include the following:

- Agricultural activities and urban landscaping practices that use fertilizers;
- Human waste products, commonly from septic systems and impaired sanitary sewers;
- Animal waste products; and
- Vehicle exhaust.

What are some of the potential solutions?

Land cultivation management practices and landscaping with native plants that limit the discharge of nutrient-rich fertilizers into surface waters; implementation of pet waste programs; riparian plantings and implementation of setback requirements to limit livestock and animals from accessing stream channels and allow for filtration of nutrient-rich runoff; implementation of an illicit discharge program and/ or plan review activities to identify and remove potential human nutrient sources; stormwater runoff treatment utilizing filtration or infiltration unit processes (to address the various chemical forms of nutrients); public education related to proper disposal practices for household chemicals.

What nutrient concentrations are appropriate?

Nutrient water quality criteria are temperature and pH dependent. Some states (not Oregon) have identified state-wide water quality criteria for nutrients.

In the absence of nutrient water quality criteria, nutrient concentrations ranges are provided for nitrate (given its effect on human health) and total phosphorus (based on EPA's 1986 water quality criteria for freshwater aesthetics).

- Nitrate concentrations greater than 10 mg/L ..... Poor
- Nitrate concentrations less than 10 mg/L..... Good
- Total phosphorus concentrations greater than 0.14 mg/L..... Poor or Fair
- Total phosphorus concentrations equal to or less than 0.14 mg/L ..... Good

Note: The total phosphorus concentration of 0.14 mg/L is the Load Allocation and Waste Load Allocation which was specified in the Tualatin TMDL for Pecan Creek and the Tualatin River in SWMACC. This concentration is also used for comparative purposes for creeks and storm sewer

outfalls in CCSD#1, for a watershed-specific total phosphorus concentration has not been established yet by DEQ for any of the watersheds in CCSD#1.

BACTERIA (FECAL COLIFORM AND *E COLI*)

Why is it a problem?

Fecal coliform and *E coli* (a subset of fecal coliform bacteria) are found in the intestines of warm blooded animals. Presence indicates fecal matter in the water and is used as an indicator of pathogens that may cause a potential human health risk. Human exposure to high bacteria concentrations could potentially lead to skin irritation and gastrointestinal ailments if consumed.

What are the potential sources?

Animal feces (either wild or domestic) and human waste, which may be attributed to impaired sanitary sewer or septic systems and illicit discharges

What are some of the potential solutions?

Implementation of pet waste disposal programs; riparian plantings and implementation of setback requirements to limit livestock and animals from accessing stream channels and to allow for filtration of bacteria from runoff; implementation of an illicit discharge program and/or plan review activities to identify and remove any human bacteria sources such as sewer system cross-connections; public education related to proper disposal practices for animal waste; ensure that septic systems are in a properly functioning condition; and stormwater runoff treatment utilizing infiltration unit processes.

What bacteria levels are appropriate?

E coli is currently monitored both instream and in runoff by the County. E coli concentration ranges are based on DEQ's documented bacteria water quality standards applicable for recreational beneficial uses.

- *E coli* concentrations exceeding 406 Counts/100 mL ..... Poor
- *E coli* concentrations ranging from 126 Counts/100 mL to 406 Counts/100 mL ..... Fair
- *E coli* concentrations less than 126 Counts/100 mL ..... Good

Note: The E coli water quality standards are as follows: a 30-day log mean of 126 Counts/100 mL, based on a minimum of five samples, and no single sample shall exceed 406 Counts/100 mL.

SOLIDS AND SEDIMENT

Why are they a problem?

Excessive levels of solids and sediment can lead to high turbidity levels, loss of aquatic habitat, elevated sediment deposition on stream beds and other stream channel modification. Suspended sediment can reduce plant photosynthesis, which in turn can lower instream dissolved oxygen levels and affect the food chain for fish. Finally, solids and sediment can result in elevated instream temperatures through modification of the stream channel depth to width ratio, which facilitates heat exchange, and the addition of dark colored, fine sediment which store more solar radiation and increase temperatures. Suspended solids are also typically used as a surrogate for other contaminants that bind to or absorb onto fine particles (e.g., heavy metals).

What are the potential sources?

Construction site runoff from sites with ineffective erosion and sediment control practices/programs; agricultural, landscaping and logging activities; pavement, tire, and vehicular abrasion; litter and garbage accumulation; increased runoff flows from impervious surfaces that cause channel erosion.

What are some of the potential solutions?

Riparian plantings and implementation of setback requirements to allow for settling and filtration of solids and sediment from runoff; implementation of an erosion and sediment control program including provisions for enforcement of active construction sites with ineffective controls; roadway maintenance including catchbasin cleaning and regular street sweeping; stormwater runoff treatment utilizing sedimentation, filtration, and infiltration unit processes.

What sediment levels are appropriate?

Total suspended solids (TSS) instream and in runoff are currently monitored by WES. Instream water quality standards do not exist for sediments. In general, instream levels of TSS in creeks in CCSD#1 and SWMACC on rain-free days is expected to be below 25 mg/L. Concentrations of TSS on rainy days can often be in the hundreds due to erosion of upland soils, etc.

METALS (COPPER, LEAD, AND ZINC)

Why are they a problem?

Metals at elevated concentrations are toxic to aquatic ecosystems and some metals can bioaccumulate in aquatic organisms (mercury in fish tissue, for example). Metals are relatively soluble (tendency to exist in the dissolved form instead of being combined with sediment) in natural waters and partition based on the pH and hardness of the discharge, which limits the effectiveness of many treatment methods/technologies.

What are the potential sources?

Vehicular traffic through the combustion of fossil fuels and the wear and tear of tires and brake pads; metal corrosion from gutters, roofs, etc; improper disposal of paints, vehicle components (tires, wheel weights, batteries, etc); wood preservatives; pesticides usage.

What are some of the potential solutions?

Management of solids and sediment in stormwater runoff, specifically utilizing sedimentation, filtration, and infiltration unit processes; roadway maintenance including catchbasin cleaning and regular street sweeping; integrated pest management practices that limit the discharge of pesticides and fertilizers into surface waters; residential pick-up and recycling programs; implementation of an erosion and sediment control program including provisions for enforcement of active construction sites with ineffective controls; public education related to proper disposal practices for household chemicals.

What metals levels are appropriate?

The toxicity of metals to aquatic life is dependent on water pH and hardness. Guidance values and water quality standards for acute and chronic exposure are established based on the water's hardness. Acute toxicity implies that the stimulus is severe enough to rapidly induce an effect.

Chronic toxicity implies that the stimulus would induce an effect if it continues for a relatively long period of time.

- Dissolved metal concentrations which exceed the guidance value..... Poor
- Dissolved metal concentrations which are equal to the guidance value .....Fair
- Dissolved metal concentrations which are less than the guidance value..... Good

Note: Using a hardness concentration range between 25 mg/L and 100 mg/L, the following ranges of acute and chronic dissolved metal concentrations are provided:

- Dissolved copper conc. (guidance value: **chronic** exposure) .....2.8 – 9.0 ug/L
- Dissolved copper conc. (guidance value: **acute** exposure) .....3.7 – 14.0 ug/L
- Dissolved lead conc. (WQ Standard value: **chronic** exposure) .....0.6 - 2.6 ug/L
- Dissolved lead conc. (WQ Standard value: **acute** exposure).....14 – 65 ug/L
- Dissolved zinc conc. (WQ Standard values: **acute & chronic** exposure)…….. 37 – 119 ug/L

As of January 31, 2013, the total amount of copper in discharges to surface waters is regulated by the State of Oregon, but only the dissolved amount of lead and zinc in these discharges is regulated. The appropriate Freshwater Chronic and Acute Criteria, which are also hardness-dependent, have been calculated and compared to our copper, lead, and zinc data. See the Fact Sheets for more information.

ENVIRONMENTAL MONITORING REPORT ATTACHMENT 2

MONITORING SITE FACT SHEETS

FACT SHEET INDEX

Monitoring Location	**Page**
Carli Creek	81
Sieben Creek	86
Phillips Creek	91
Kellogg Creek Sites (Rusk Road and Rowe Middle School)	96
Mt. Scott Creek	110
Rock Creek	110
Cow Creek	116
Mt. Scott Outfalls (SE Pheasant Court and SE Tolbert)	121
Oregon Trail Drive Outfall	126
Webster Road Outfall	131
Pecan Creek	142
Rivergrove Boat Ramp Outfall	147

Drainage Characteristics

- Tributary to the Clackamas River
- Dominant Land Use = Industrial (Clackamas Industrial Area)

Monitoring Location

Carli Creek begins where a 54" diameter Clackamas County-owned storm sewer system ends. The creek then flows for about ½ mile before it meets the Clackamas River. Access to the creek is difficult, so the monitoring location is located at the 1st manhole upgradient from the outfall. This manhole is in the intersection of SE 120th Avenue and Carpenter Drive in Clackamas.

2015/2016 Monitoring Results (provided in tabular format)

Instream monitoring data collected during the 2015-2016 MS4/TMDL reporting year were sorted based on whether the data were collected during storm event conditions or not. Four monitoring events were conducted during storms and the other 5 monitoring events were not.

Data were analyzed and comprehensive results are provided below for storm and non-storm event conditions. Where water quality standards exceedances are indicated, the basis for that determination is provided in the attached Clackamas County Water Quality Index (Attachment 1). Although not reflected in the table below, total dissolved solids, water flow rate, and conductivity were also measured.

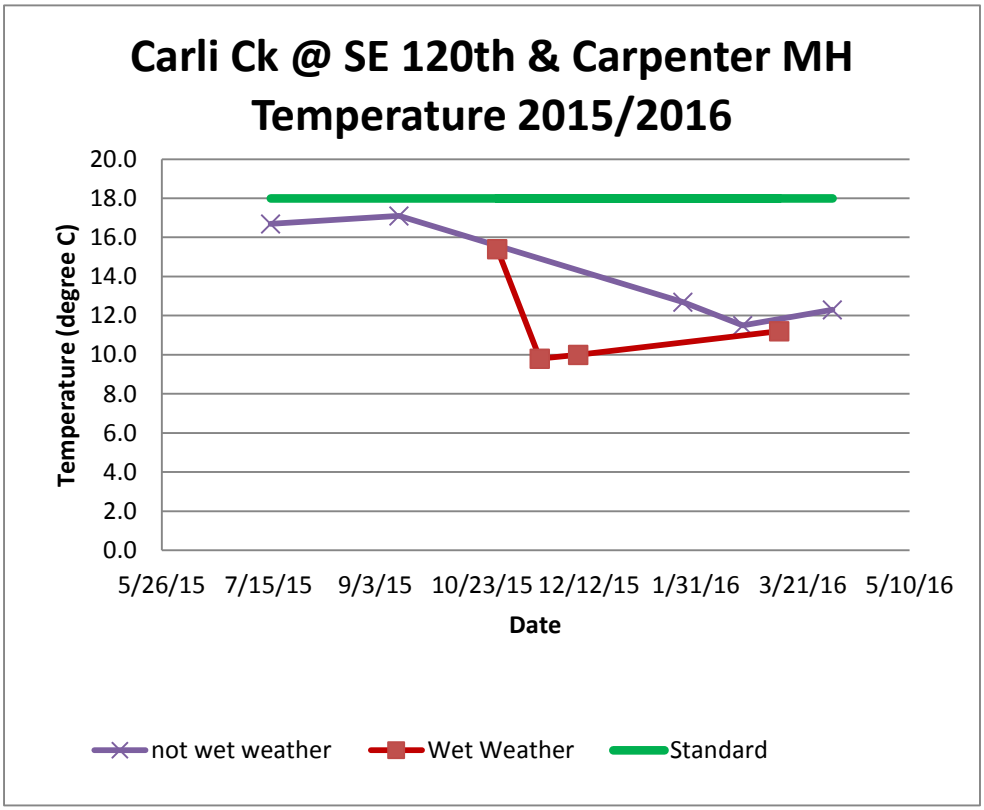
	Temperature (C)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	E coli (Counts/100 mL)	Total Copper (ug/L)	Dissolved Copper (ug/L)	Total Lead (ug/L)	Dissolved Lead (ug/L)	Total Zinc (ug/L)	Dissolved Zinc (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Orthophosphate (mg/L)	Hardness (mg/L)	pH
Monitored Storms (4 events)																		
Mean	11.6	8.7	0.38	200	4.30	1.3	0.46	0.06	53.0	30.8	86	19	1.6	0.04	0.04	0.03	26	6.9
Maximum	15.4	10.7	0.54	276	7.50	2.7	0.79	0.09	70.0	49.0	113	53	2.2	0.07	0.04	0.05	36	7.3
Minimum	9.8	6.1	0.05	142	2.00	0.5	0.12	0.03	29.0	13.0	59	5	1.2	<0.05	0.04	0.03	12	6.5
Exceedance of guidance value or criteria (# exceed/total)	0/4	1/4	0/4	0/4	2/4	0/4	1/4	0/4	4/4	1/4	NA	NA	NA	0/4	0/4	NA	NA	0/4
Other Weather Conditions (5 monitoring events)																		
Mean	14.1	9.0	1.11	114	1.78	0.9	0.42	0.05	26.4	16.8	175	5	0.6	0.03	0.03	0.07	86	7.3
Maximum	17.1	9.5	1.50	308	2.60	1.4	0.82	0.11	38.0	25.0	229	8	1.8	<0.05	0.09	0.10	117	7.8
Minimum	11.5	8.2	0.85	6	0.80	0.6	0.12	<0.01	12.0	8.0	130	3	0.0	<0.05	<0.04	0.05	62	6.7
Exceedance of guidance value or criteria (# exceed/total)	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	NA	NA	NA	0/5	0/5	NA	NA	0/5

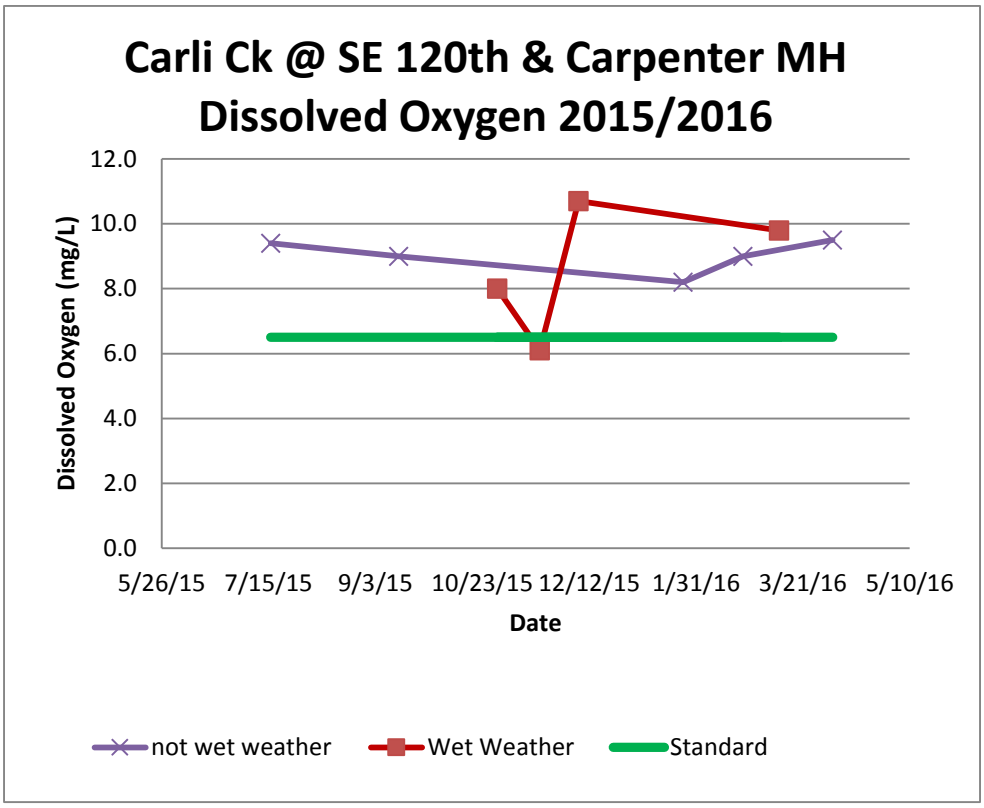
Note: Exceedance totals for metals data is based on exceedances of chronic guidance values and chronic criteria, not acute guidance values and acute criteria.

Also Note: The geometric mean value is shown for E. coli in the row titled "Mean"

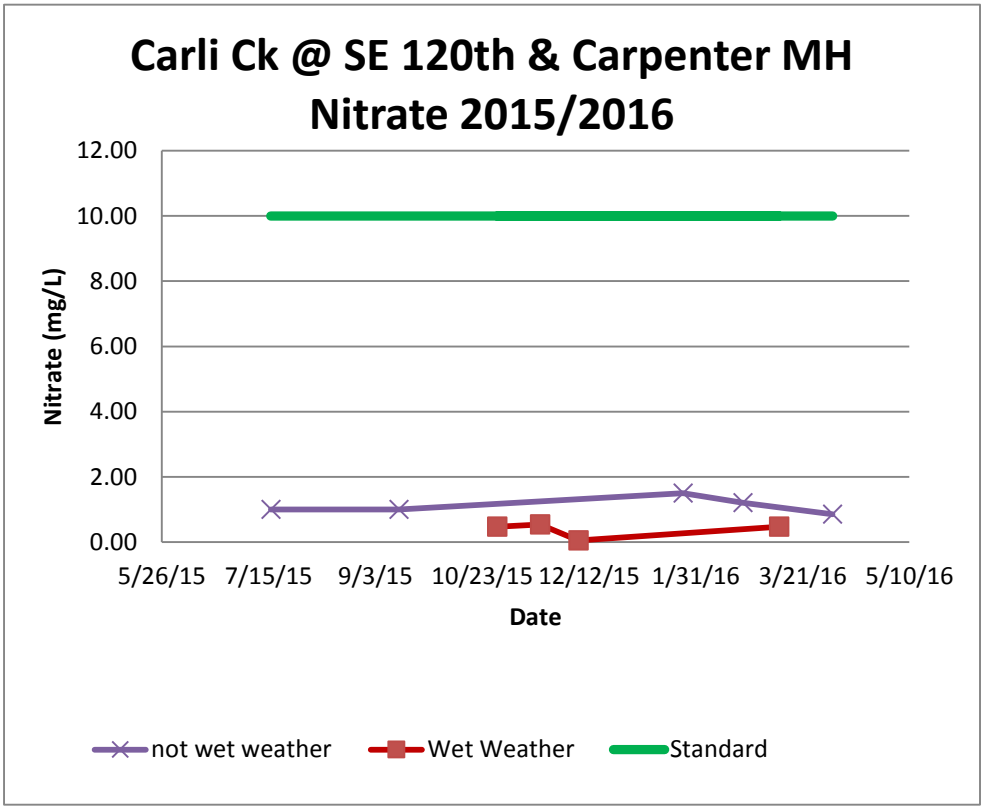
2015/2016 Monitoring Results (provided in graphical format)

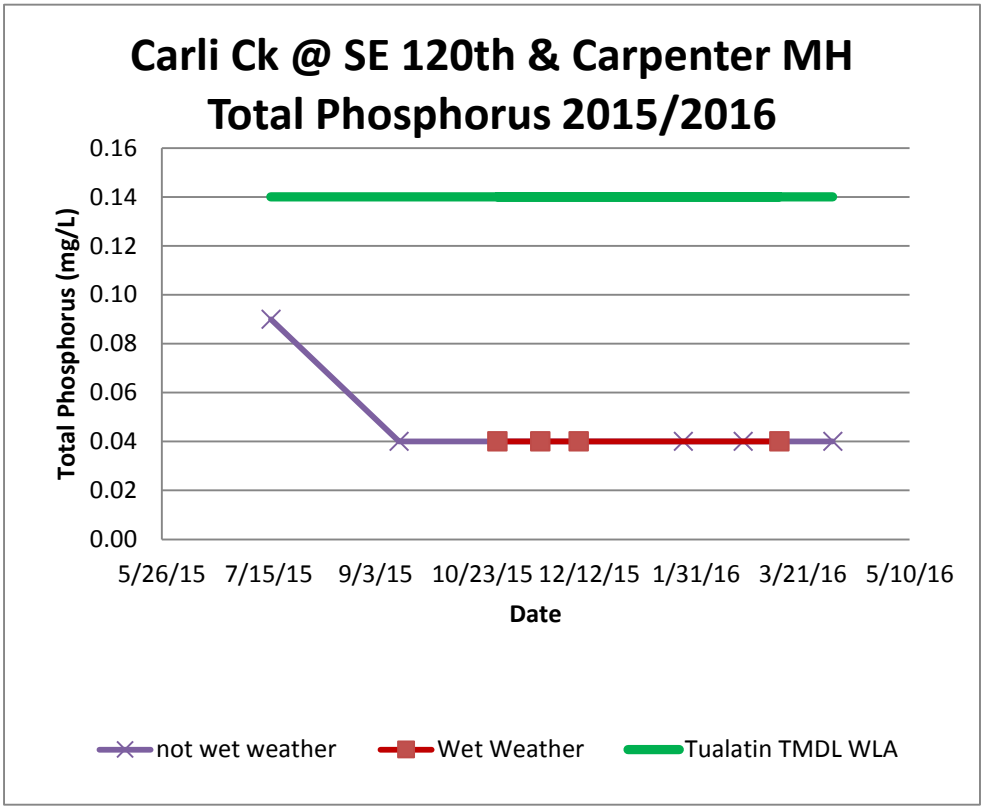
Monitoring results for select parameters have been plotted to indicate either adherence to the water quality standard (where standards apply) or to indicate whether data are in a "healthy" range as referenced in the attached Clackamas County Water Quality Index (Attachment 1). In cases where the monitoring result is less than the laboratory method's detection limit, the plotted value is the laboratory method's detection limit.



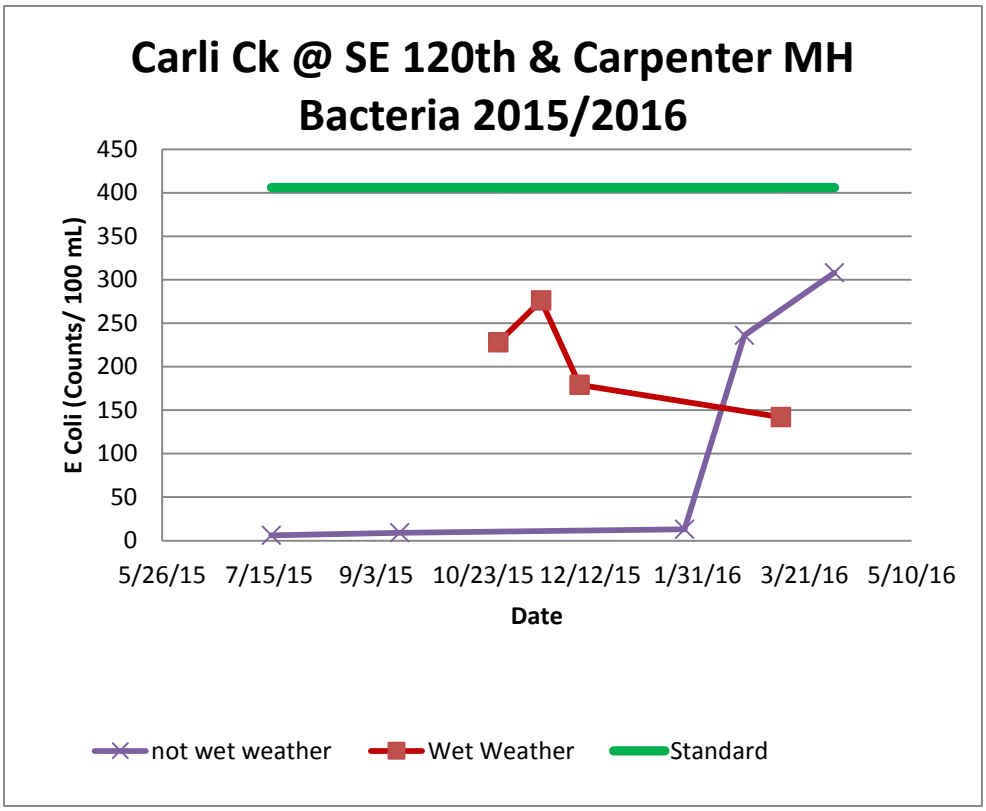


Please note that for dissolved oxygen, the standard is a minimum concentration that the samples should not drop below.

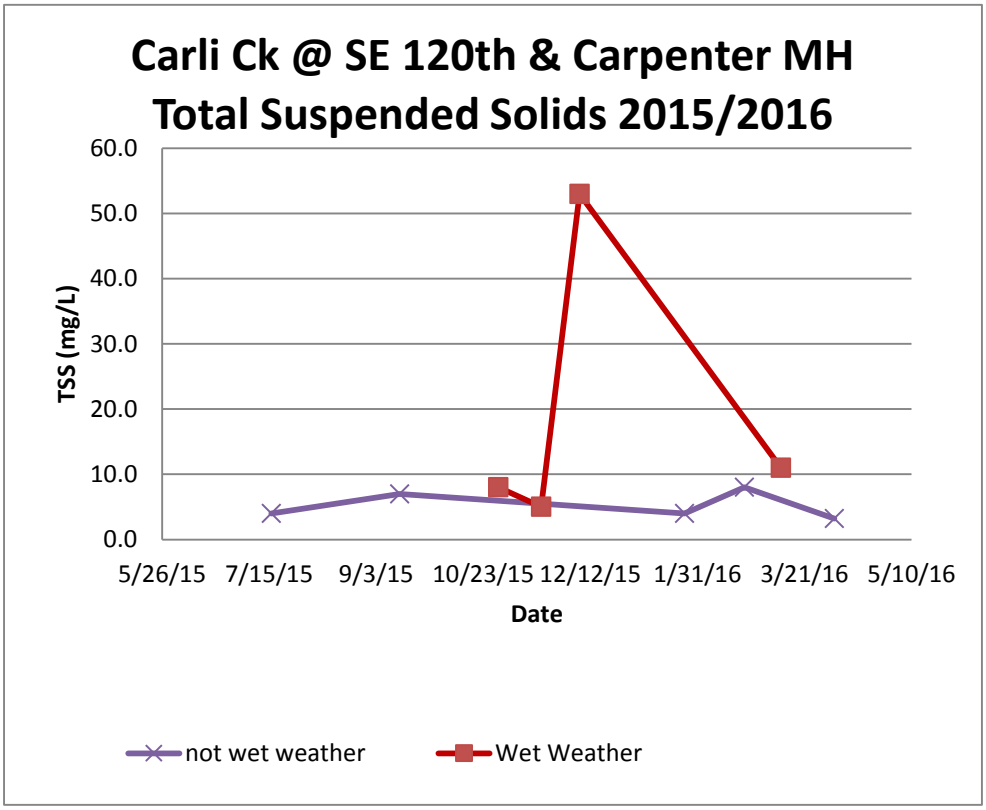




Note: The comparison is made here to the Waste Load Allocation for total phosphorus in the Tualatin TMDL, for the Clackamas River watershed does not have a specific guidance value for instream total phosphorus



Note: The >2420 bacteria value is charted as 2420 colonies/100ml



2015/2016 Monitoring Results Discussion

The 406 colonies/100 ml standard for E. coli wasn't exceeded during any of the 9 monitoring events. Total phosphorus concentrations were below the 0.14 mg/L guidance value during all 9 monitoring events. During 8 of the 9 monitoring events, total suspended solids values were no higher than 11 mg/L; the highest value (53 mg/L) was recorded during the exceptionally large storm event on December 7, 2015 (see Table #2). Measured pH values were protective of watershed health during all 9 monitoring events.

The State of Oregon's instream criteria for total copper were exceeded during 2 of the 4 monitoring events which occurred during storms. The State of Oregon's instream criteria for dissolved zinc was exceeded during 1 of the 4 monitoring events which occurred during storms. Guidance values for the following parameters were also exceeded:

- total lead (1 of 4 storms)
- total zinc (all 4 storms)

SIEBEN CREEK FACT SHEET

Drainage Characteristics

- Tributary to the Clackamas River
- Dominant Land Uses = Primarily single-family and multi-family residential, commercial, open space, and government-owned (a portion of Clackamas High School's campus, Oregon Trail Elementary School, Sunnyside Elementary School, the Happy Valley library, and numerous park sites are in the watershed). A modest amount of rural residential lands are also present.

Monitoring Location

Sieben Creek is monitored at the point where Highway 212/224 crosses the creek (in the 13600 block of Hwy 212/224).

2015/2016 Monitoring Results (provided in tabular format)

Instream monitoring data collected during the 2015/2016 MS4/TMDL reporting year were sorted based on whether the data were collected during storm event conditions or not. Four monitoring events were conducted during storms and the other 5 monitoring events were not.

Data were analyzed and comprehensive results are provided below for storm and non-storm event conditions. Where water quality standards exceedances are indicated, the basis for that determination is provided in the attached Clackamas County Water Quality Index (Attachment 1). Although not reflected in the table below, total dissolved solids, water flow rate, and conductivity were also measured.

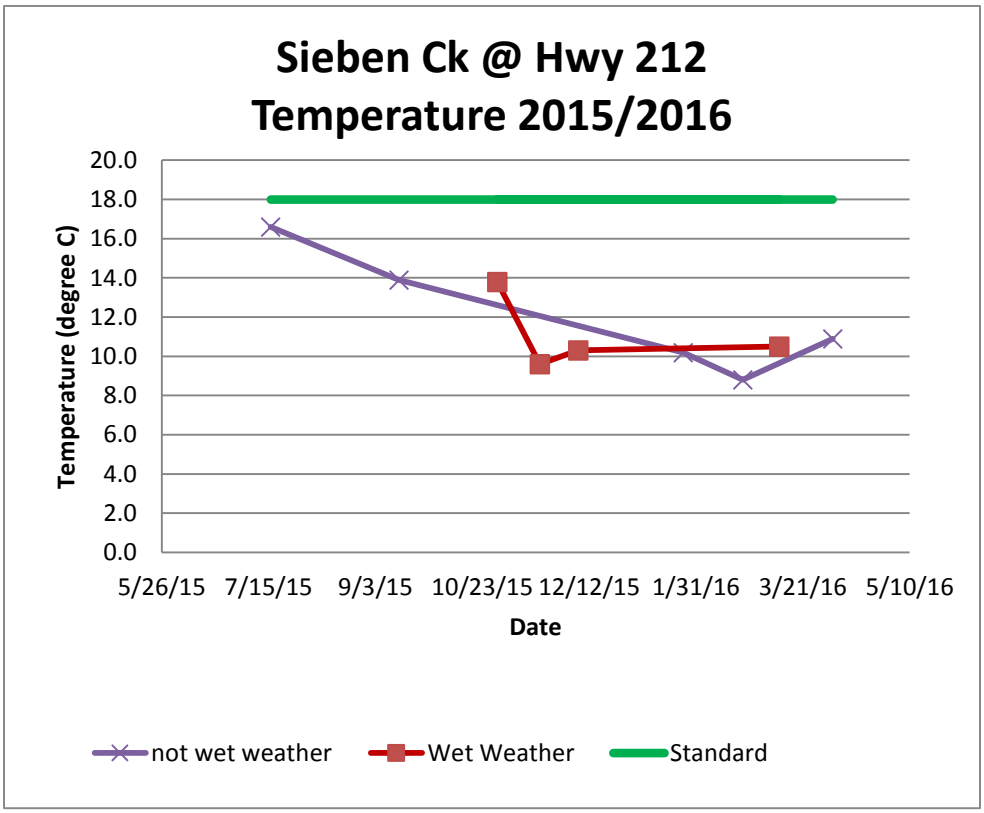
	Temperature (C)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	E coli (Counts/100 mL)	Total Copper (ug/L)	Dissolved Copper (ug/L)	Total Lead (ug/L)	Dissolved Lead (ug/L)	Total Zinc (ug/L)	Dissolved Zinc (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Orthophosphate (mg/L)	Hardness (mg/L)	pH
Monitored Storms (4 events)																		
Mean	11.1	9.9	0.81	759	13.55	1.3	6.44	0.08	103.3	23.0	454	335	1.4	0.03	0.02	0.05	32	7.1
Maximum	13.8	10.8	1.10	2420	43.30	1.7	24.02	0.09	290.0	31.0	1530	1300	2.7	0.06	1.80	0.06	36	7.6
Minimum	9.6	8.6	0.43	231	3.10	1.2	0.53	0.04	32.0	6.0	84	12	0.6	<0.05	<0.04	0.03	25	6.7
Exceedance of guidance value or criteria (# exceed/total)	0/4	0/4	0/4	3/4	2/4	0/4	1/4	0/4	3/4	0/4	NA	NA	NA	0/4	1/4	NA	NA	0/4
Other Weather Conditions (5 monitoring events)																		
Mean	12.1	10.1	1.40	265	1.90	1.2	0.19	0.03	26.8	18.8	136	3	0.7	0.03	0.02	0.06	49	7.4
Maximum	16.6	10.8	1.90	457	4.10	2.7	0.39	0.06	69.0	46.0	195	6	2.7	<0.05	<0.04	0.10	68	7.8
Minimum	8.8	9.3	0.71	86	1.20	0.6	0.07	0.01	7.0	4.0	84	<1	0.0	<0.05	<0.04	0.03	29	6.7
Exceedance of guidance value or criteria (# exceed/total)	0/5	0/5	0/5	1/5	0/5	0/5	0/5	0/5	1/5	1/5	NA	NA	NA	0/5	0/5	NA	NA	0/5

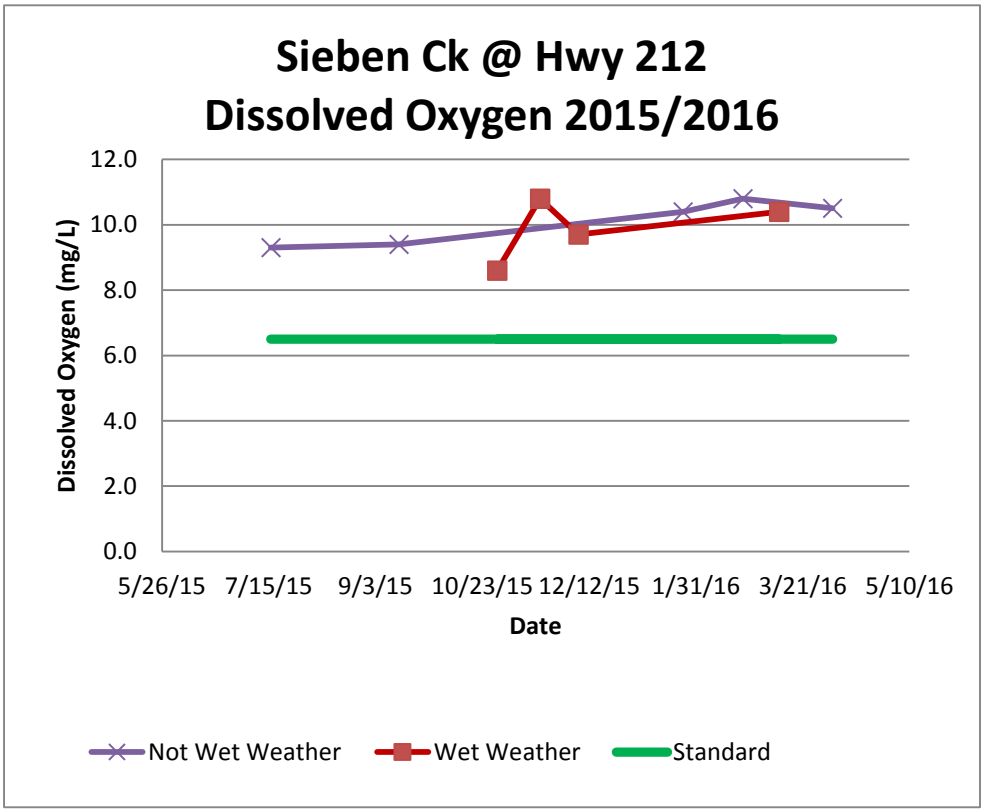
Note: Exceedance totals for metals data is based on exceedances of chronic guidance values and chronic criteria, not acute guidance values and acute criteria.

Also Note: The geometric mean value is shown for E. coli in the row titled "Mean"

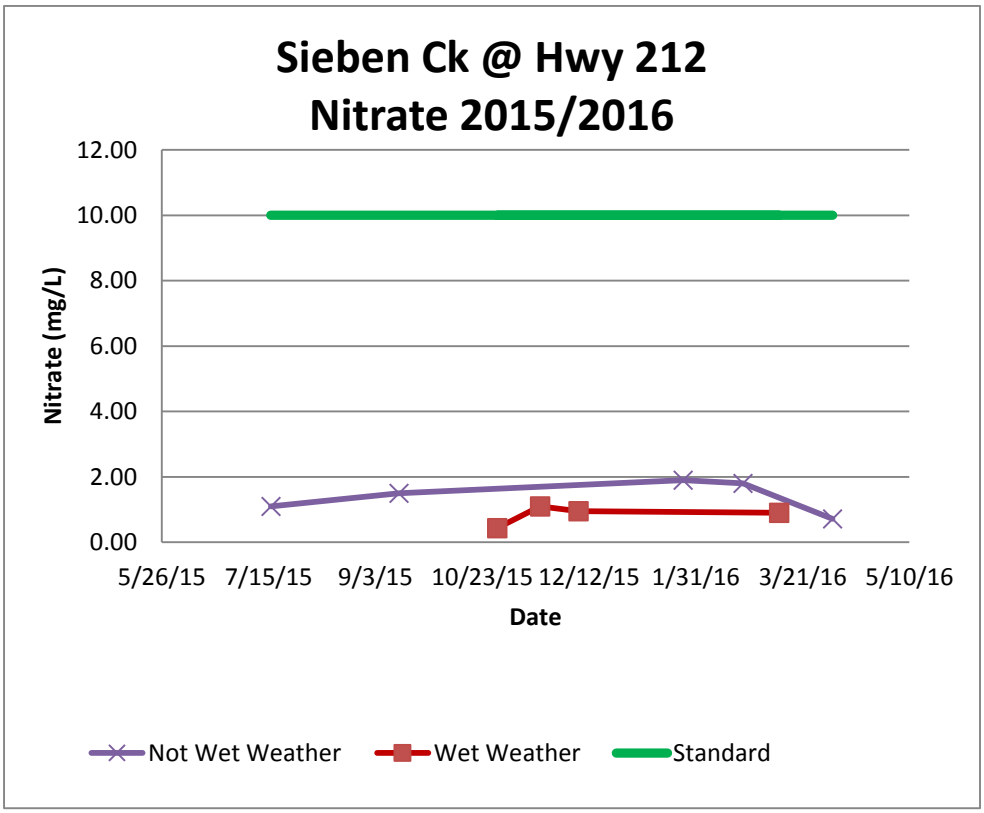
2015/2016 Monitoring Results (provided in graphical format)

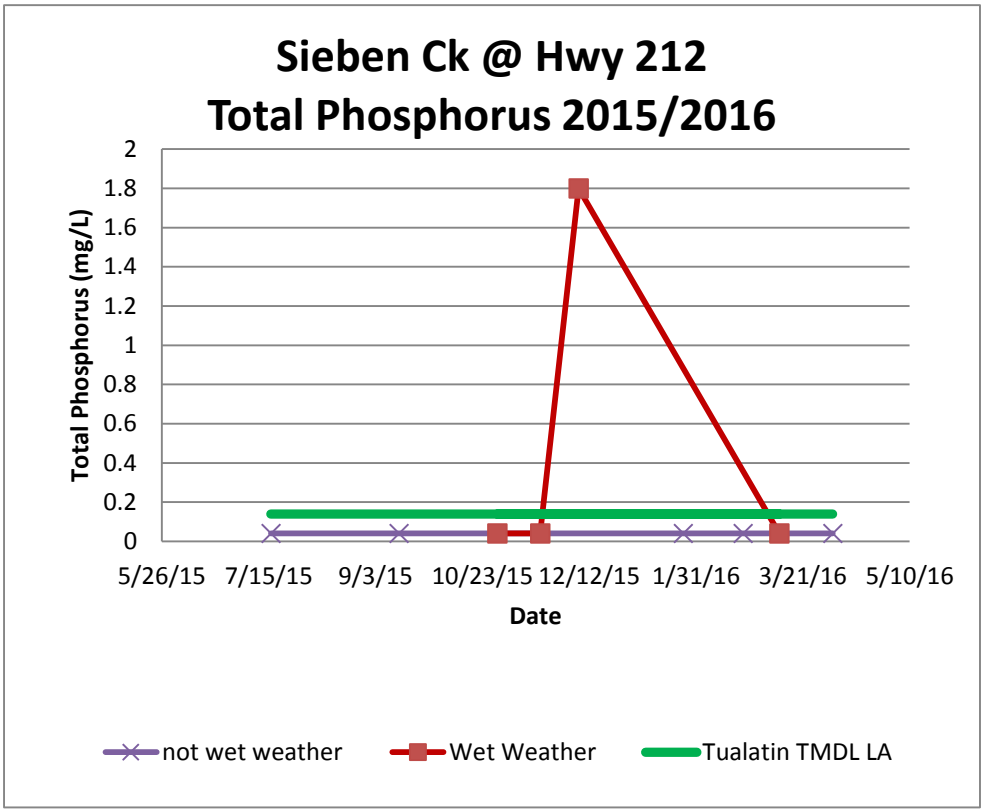
Monitoring results for select parameters have been plotted to indicate either adherence to the water quality standard (where standards apply) or to indicate whether data are in a “healthy” range as referenced in the attached Clackamas County Water Quality Index (Attachment 1). In cases where the monitoring result is less than the laboratory method's detection limit, the plotted value is the laboratory method's detection limit.



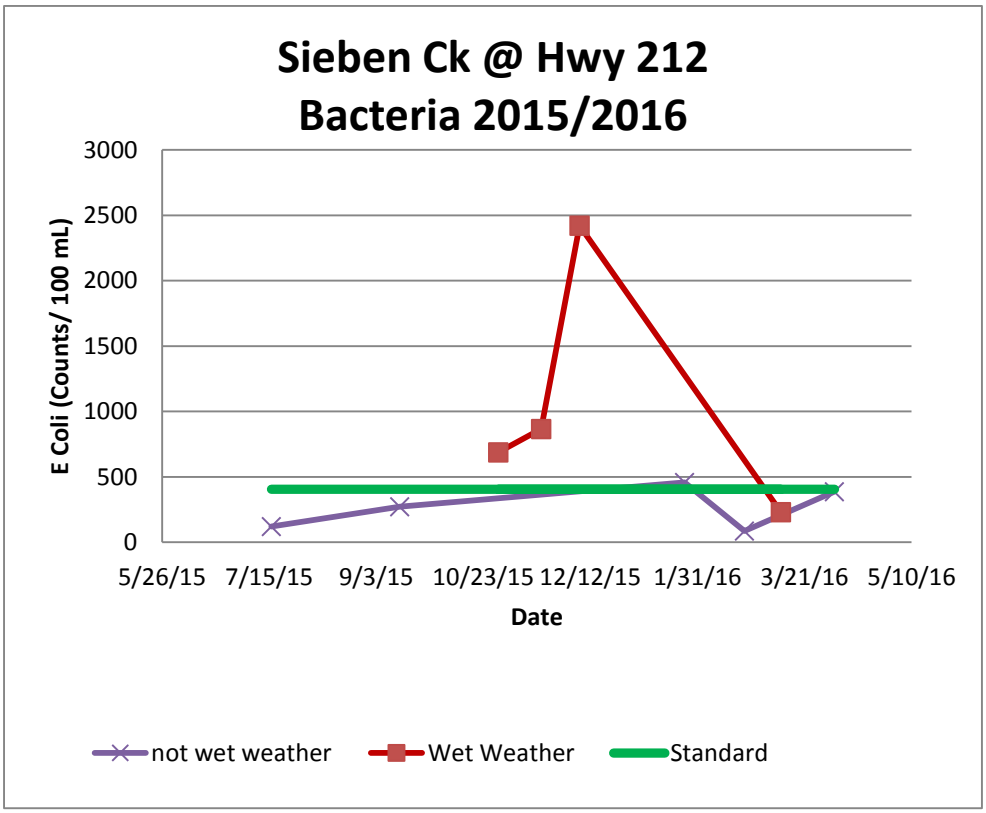


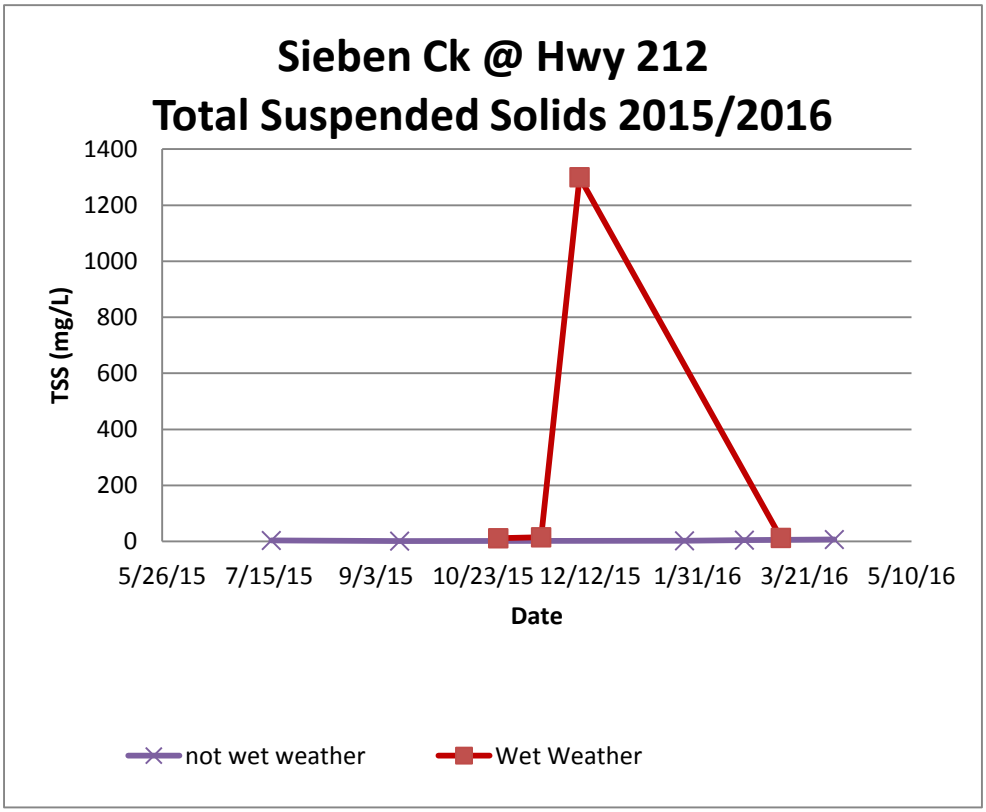
Please note that for dissolved oxygen, the standard is a minimum concentration that the samples should not drop below.





Note: The comparison is made here to the Load Allocation for total phosphorus in the Tualatin TMDL, for the Clackamas River watershed does not have a specific guidance value for instream total phosphorus


Sieben Ck @ Hwy 212
Bacteria 2015/2016
E Coli (Counts/ 100 mL)
3000
2500
2000
1500
1000
500
0
5/26/15
7/15/15
9/3/15
10/23/15
12/12/15
1/31/16
3/21/16
5/10/16
Date
not wet weather
Wet Weather
Standard


Sieben Ck @ Hwy 212
Total Suspended Solids 2015/2016
TSS (mg/L)
1400
1200
1000
800
600
400
200
0
5/26/15
7/15/15
9/3/15
10/23/15
12/12/15
1/31/16
3/21/16
5/10/16
Date
not wet weather
Wet Weather

2015/2016 Monitoring Results Discussion

The 406 colonies/100 ml standard for E. coli was exceeded on 4 occasions; 3 of these monitoring events occurred during storms. Measured pH values were protective of watershed health during all 9 monitoring events. Dissolved oxygen levels were above 8.0 mg/L, which is protective of watershed health, during all 9 monitoring events.

During the exceptionally large storm event on December 7, 2015 (see Table #2), the total phosphorus level was 1.8 mg/L, which is almost 13 times greater than the 0.14 mg/L guidance value; the total suspended solids value for this same storm was 1,300 mg/L. During the year's other 8 monitoring events, total suspended solids values were no higher than 15 mg/L and total phosphorus levels were no higher than 0.04 mg/L.

The State of Oregon's instream criteria for total copper were exceeded during 2 of the 4 monitoring events which occurred during storms. The State of Oregon's instream criteria for dissolved zinc was exceeded during 1 of the year's 9 monitoring events. Guidance values for the following parameters were also exceeded:

- total lead (1 of 4 storms)
- total zinc (4 of the year's 9 monitoring events; 3 of these occurred during storms)

PHILLIPS CREEK FACT SHEET

Drainage Characteristics

- Tributary to Mt. Scott Creek in the Kellogg-Mt. Scott Watershed
- Dominant Land Uses = Over half of the watershed is zoned for commercial or transportation purposes (roads, highways, light rail, etc.). A significant portion of the rest of the watershed is high and moderate density residential.

Monitoring Location

The water quality monitoring site is the place where SE 84th Avenue crosses the creek (near the Costco store in Clackamas). Water flow rate data is collected in an upstream reach of the creek between SE Sunnyside Road and Sunnybrook Blvd.

2015/2016 Monitoring Results (provided in tabular format)

Instream monitoring data collected during the 2015/2016 MS4/TMDL reporting year were sorted based on whether the data were collected during storm event conditions or not. Four monitoring events were conducted during storms and the other 5 monitoring events were not.

Data were analyzed and comprehensive results are provided below for storm and non-storm event conditions. Where water quality standards exceedances are indicated, the basis for that determination is provided in the attached Clackamas County Water Quality Index (Attachment 1). Although not reflected in the table below, total dissolved solids, water flowrate, and conductivity were also measured.

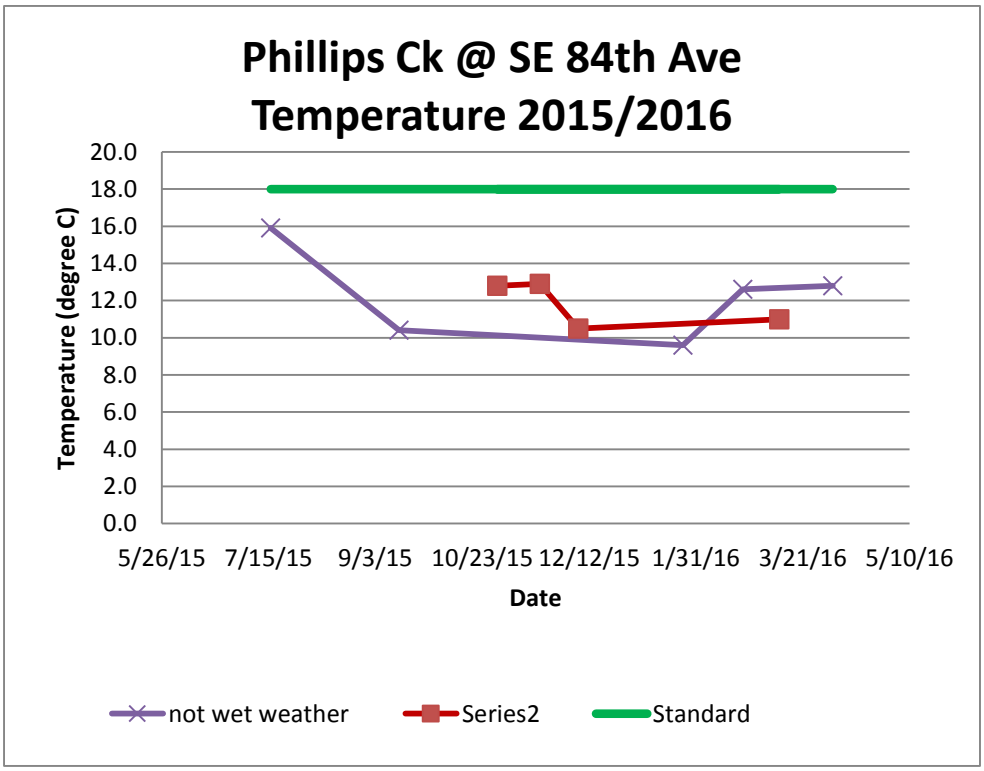
	Temperature (C)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	E coli (Counts/100 mL)	Total Copper (ug/L)	Dissolved Copper (ug/L)	Total Lead (ug/L)	Dissolved Lead (ug/L)	Total Zinc (ug/L)	Dissolved Zinc (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Orthophosphate (mg/L)	Hardness (mg/L)	pH
Monitored Storms (4 events)																		
Mean	11.8	9.8	0.50	1390	10.85	2.5	5.63	0.15	80.8	24.5	257	170	3.8	0.05	0.05	0.05	28	7.2
Maximum	12.9	11.0	0.72	>2420	24.90	4.1	17.61	0.24	148.0	41.0	736	612	5.4	0.14	0.65	0.06	38	7.5
Minimum	10.5	8.6	0.30	411	2.90	1.4	0.83	0.05	47.0	7.0	83	10	0.6	<0.05	<0.04	0.03	21	6.9
Exceedance of guidance value or criteria (# exceed/total)	0/4	0/4	0/4	4/4	3/4	2/4	3/4	0/4	4/4	0/4	NA	NA	NA	0/4	1/4	NA	NA	0/4
Other Weather Conditions (5 monitoring events)																		
Mean	12.3	9.6	1.18	541	2.26	1.4	0.33	0.05	34.0	23.2	126	3	1.1	0.03	0.02	0.03	55	7.3
Maximum	15.9	10.6	2.10	1050	4.70	3.3	0.53	0.09	93.0	66.0	177	5	4.3	0.07	<0.04	0.06	68	7.5
Minimum	9.6	8.5	0.50	49	1.40	0.8	0.25	0.02	12.0	4.0	92	<1	0.0	<0.05	<0.04	0.03	43	7.0
Exceedance of guidance value or criteria (# exceed/total)	0/5	0/5	0/5	3/5	0/5	0/5	0/5	0/5	1/5	1/5	NA	NA	NA	0/5	0/5	NA	NA	0/5

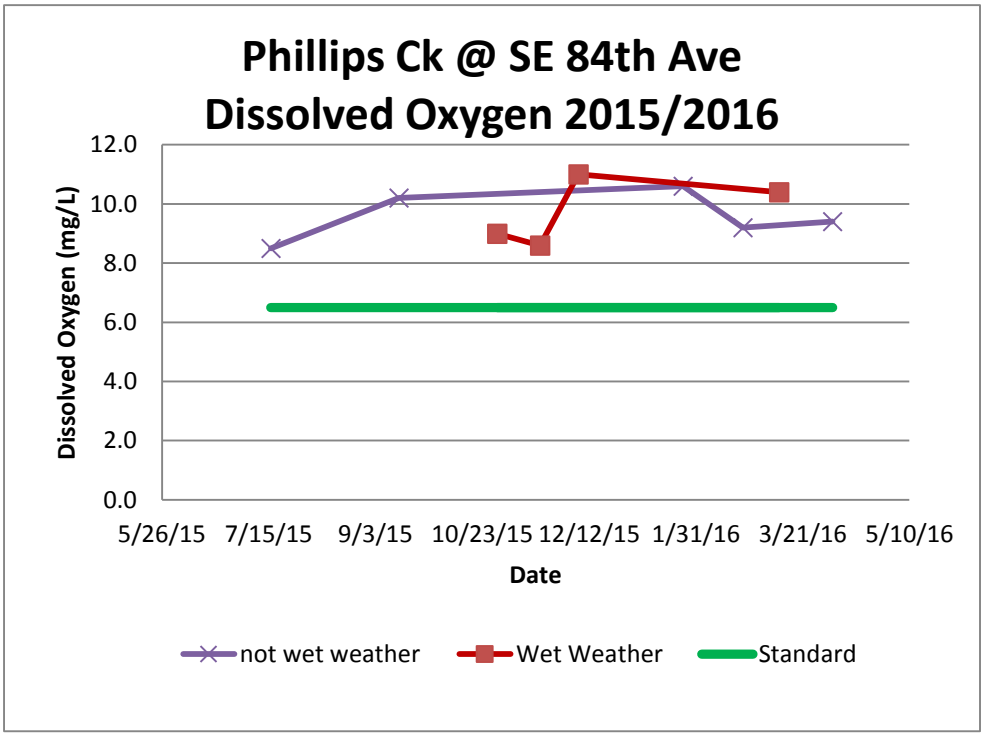
Note: Exceedance totals for metals data is based on exceedances of chronic guidance values and chronic criteria, not acute guidance values and acute criteria.

Also Note: The geometric mean value is shown for E. coli in the row titled "Mean"

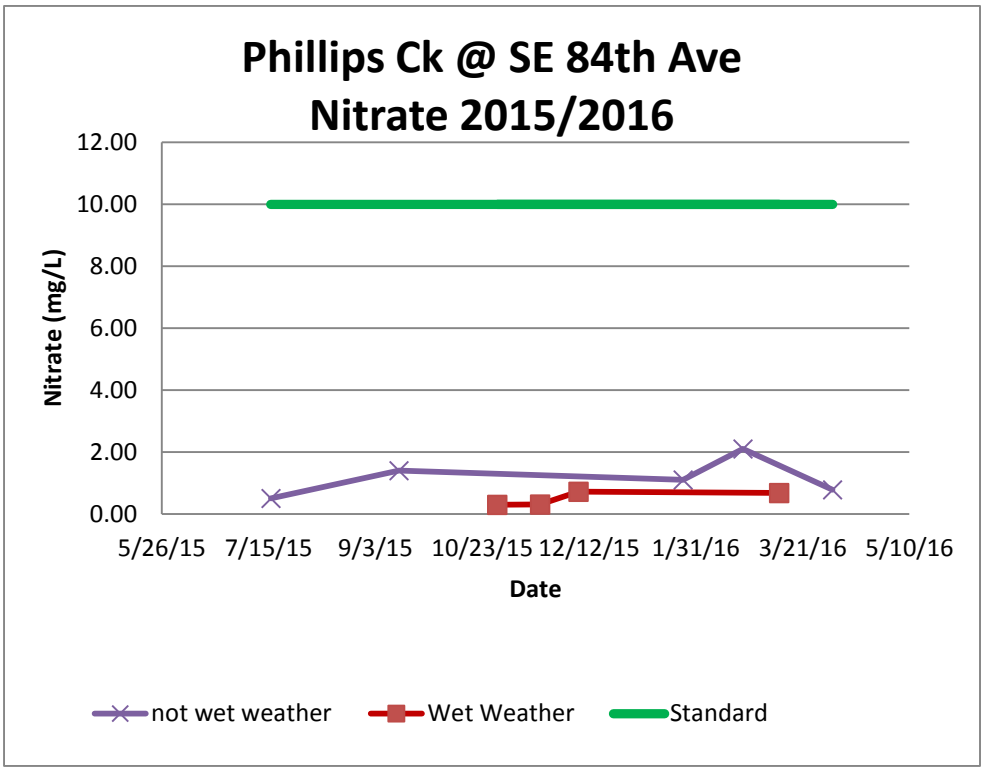
2015/2016 Monitoring Results (provided in graphical format)

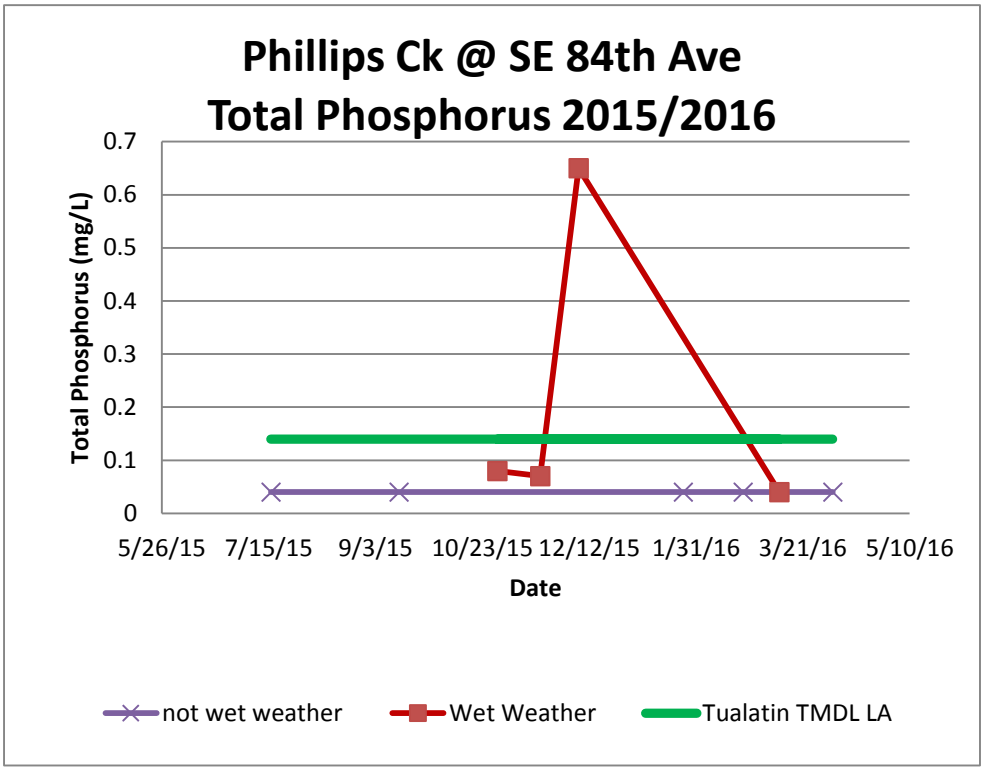
Monitoring results for select parameters have been plotted to indicate either adherence to the water quality standard (where standards apply) or to indicate whether data are in a “healthy” range as referenced in the attached Clackamas County Water Quality Index (Attachment 1). In cases where the monitoring result is less than the laboratory method's detection limit, the plotted value is the laboratory method's detection limit.



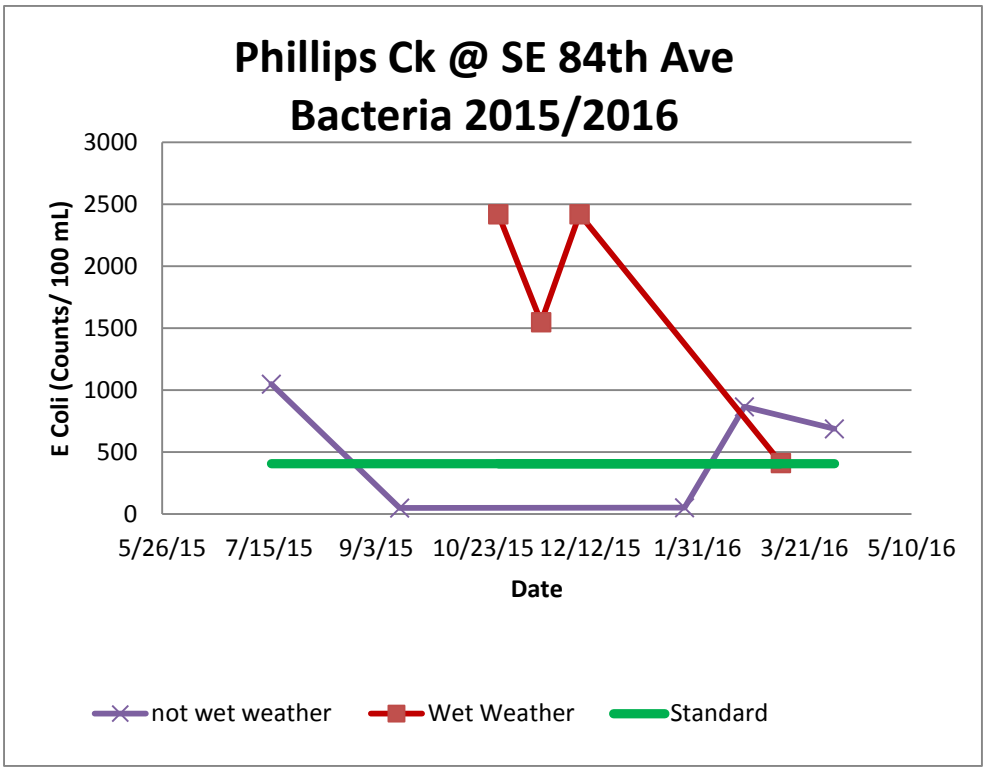


Note that for dissolved oxygen, the standard is a minimum concentration that the samples should not drop below.

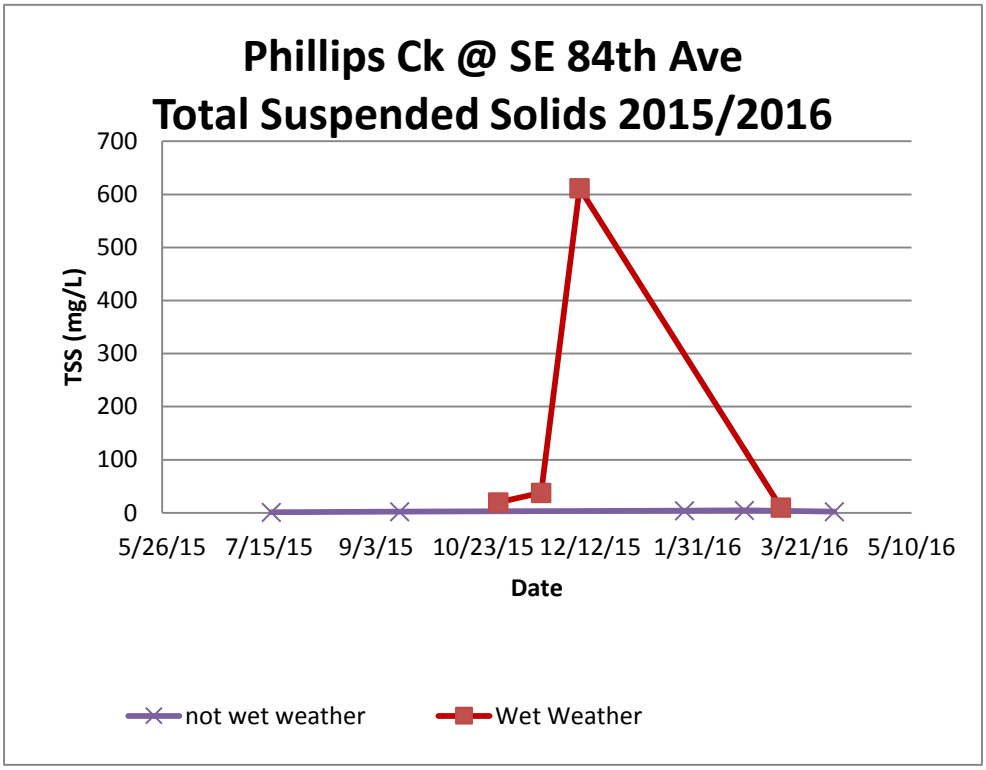




Note: The comparison is made here to the Load Allocation for total phosphorus in the Tualatin TMDL, for the Kellogg-Mt. Scott Creek watershed does not have a specific guidance value for instream total phosphorus



Note: The >2420 bacteria value is charted as 2420 colonies/100ml



2015/2016 Monitoring Results Discussion

The 406 colonies/100 ml standard for E. coli was exceeded on 7 occasions, which yields an exceedance percentage of 77.8% for the year; 4 of these monitoring events occurred during storms. Measured pH values were protective of watershed health during all 9 monitoring events. Dissolved oxygen levels were above 8.0 mg/L, which is protective of watershed health, during all 9 monitoring events.

During the exceptionally large storm event on December 7, 2015 (see Table #2), the total phosphorus level was 0.65 mg/L, which is over 4 times greater than the 0.14 mg/L guidance value; the total suspended solids value for this same storm was 612 mg/L. Phillips creek's flow during this monitoring event was 254.7 cubic feet per second, which is very high. During the year's other 8 monitoring events, total suspended solids values were no higher than 38 mg/L and total phosphorus levels were no higher than 0.08 mg/L.

The State of Oregon's instream criteria for total copper were exceeded during 3 of the 4 monitoring events which occurred during storms. The State of Oregon's instream criteria for dissolved zinc was exceeded during 1 of the year's 9 monitoring events. Guidance values for the following parameters were also exceeded:

- total lead (3 of 4 storms)
- total zinc (5 of the year's 9 monitoring events; 4 of these where during the monitored storms)
- dissolved copper (2 of 4 storms)

KELLOGG CREEK MONITORING SITES FACT SHEET

Drainage Characteristics

- Tributary to the Willamette River
- Dominant Land Uses = Various

Monitoring Locations

Upstream instream location = Water Quality is monitored at SE Rusk Road and Flow is monitored a short distance upstream near SE Parmenter Court.

Downstream instream location = Rowe Middle School at 3606 SE Lake Road in the City of Milwaukie

2015/2016 Monitoring Results (provided in tabular format)

Instream monitoring data collected during the 2015/2016 MS4/TMDL reporting year were sorted based on whether the data were collected during storm event conditions or not. Four monitoring events were conducted during storms and the other 5 monitoring events were not.

Data were analyzed and comprehensive results are provided below for storm and non-storm event conditions. Where water quality standards exceedances are indicated, the basis for that determination is provided in the attached Clackamas County Water Quality Index (Attachment 1). Although not reflected in the table below, water flow rate, total dissolved solids, and conductivity were also measured.

Kellogg Ck at SE Rusk Rd	Temperature (C)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	E coli (Counts/100 mL)	Total Copper (ug/L)	Dissolved Copper (ug/L)	Total Lead (ug/L)	Dissolved Lead (ug/L)	Total Zinc (ug/L)	Dissolved Zinc (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Orthophosphate (mg/L)	Hardness (mg/L)	pH
Monitored Storms (4 events)																		
Mean	11.4	8.1	1.37	271	2.60	1.4	0.72	0.09	22.7	13.7	173	45	1.4	0.06	0.06	0.07	42	7.0
Maximum	12.5	9.8	1.60	>2420	11.00	1.7	7.87	0.10	77.0	16.0	229	136	2.7	0.09	0.36	0.09	61	7.1
Minimum	10.4	6.2	0.98	206	1.80	1.2	0.46	0.08	18.0	10.0	123	7	0.9	0.05	<0.04	0.06	22	6.6
Exceedance of guidance value or criteria (# exceed/total)	0/4	1/4	0/4	1/4	1/4	0/4	2/4	0/4	1/4	0/4	NA	NA	NA	0/4	1/4	NA	NA	0/4
Other Weather Conditions (5 monitoring events)																		
Mean	12.8	7.9	1.98	381	1.68	1.1	0.34	0.06	15.0	11.2	173	5	1.1	0.04	0.04	0.07	68	6.9
Maximum	16.8	8.6	2.30	649	4.00	3.0	0.50	0.09	33.0	26.0	207	8	4.1	0.07	0.08	0.08	80	7.1
Minimum	9.5	6.8	1.70	43	0.90	0.3	0.22	0.03	8.0	4.0	142	1	0.3	<0.05	<0.04	0.06	56	6.7
Exceedance of guidance value or criteria (# exceed/total)	0/5	0/5	0/5	3/5	0/5	0/5	0/5	0/5	0/5	0/5	NA	NA	NA	0/5	0/5	NA	NA	0/5

Note: Exceedance totals for metals data is based on exceedances of chronic guidance values and chronic criteria, not acute guidance values and acute criteria.

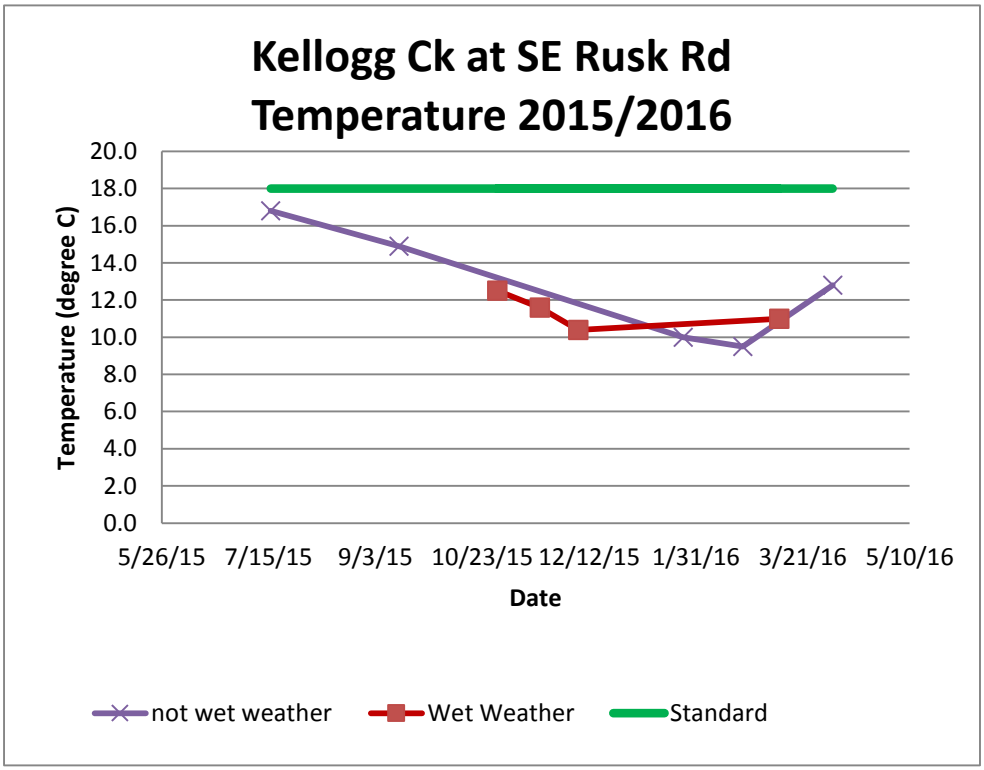
Also Note: The geometric mean value is shown for E. coli in the row titled "Mean"

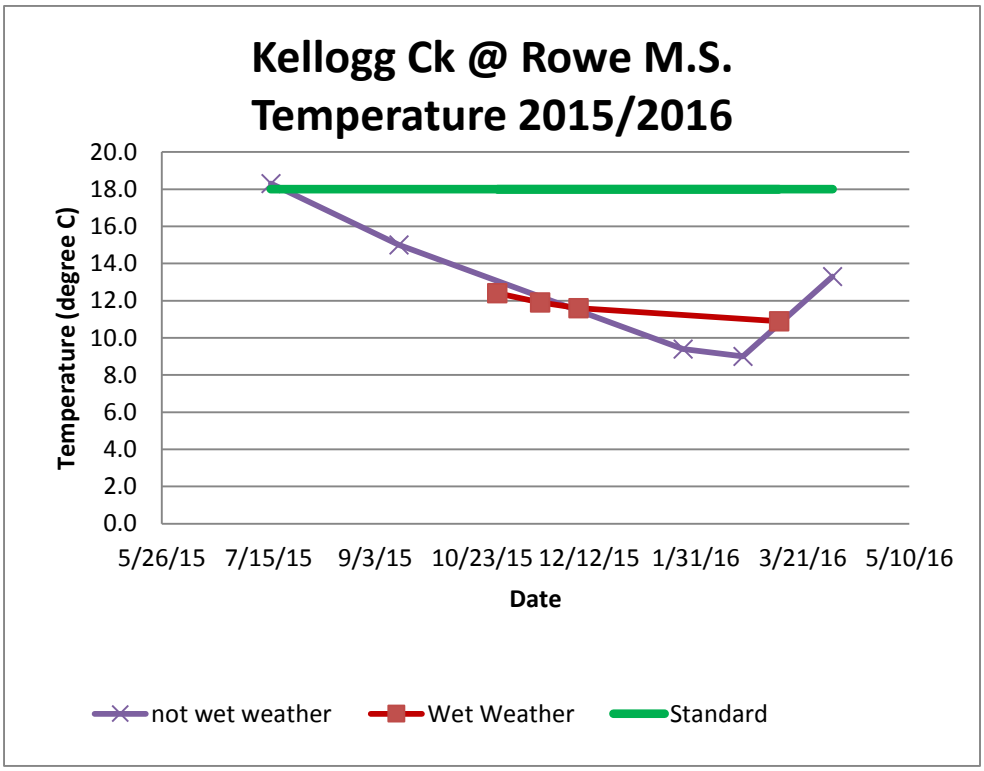
Kellogg Ck at Rowe Middle School	Temperature (C)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	E coli (Counts/100 mL)	Total Copper (ug/L)	Dissolved Copper (ug/L)	Total Lead (ug/L)	Dissolved Lead (ug/L)	Total Zinc (ug/L)	Dissolved Zinc (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Orthophosphate (mg/L)	Hardness (mg/L)	pH
Monitored Storms (4 events)																		
Mean	11.7	9.6	0.75	728	6.00	1.9	2.74	0.11	47.5	14.8	164	43	1.6	0.03	0.04	0.05	41	7.2
Maximum	12.4	10.2	0.87	>2420	13.50	2.3	8.44	0.14	91.0	25.0	272	132	2.4	0.06	0.34	0.07	63	7.5
Minimum	10.9	8.6	0.63	308	2.90	1.5	0.49	0.09	25.0	8.0	108	10	0.7	<0.05	<0.04	0.03	21	6.5
Exceedance of guidance value or criteria (# exceed/total)	0/4	0/4	0/4	3/4	1/4	0/4	2/4	0/4	1/4	0/4	NA	NA	NA	0/4	1/4	NA	NA	0/4
Other Weather Conditions (5 monitoring events)																		
Mean	13.0	9.4	1.25	335	2.42	1.6	0.36	0.07	17.8	10.4	161	6	2.0	0.03	0.04	0.06	69	7.4
Maximum	18.3	10.7	1.60	613	5.60	3.9	0.71	0.12	38.0	23.0	215	10	6.8	<0.05	0.14	0.10	88	7.9
Minimum	9.0	8.2	0.83	37	1.20	0.7	0.23	0.04	9.0	4.0	130	1	0.1	<0.05	<0.04	0.04	54	6.9
Exceedance of guidance value or criteria (# exceed/total)	1/5	0/5	0/5	3/5	0/5	0/5	0/5	0/5	0/5	0/5	NA	NA	NA	0/5	0/5	NA	NA	0/5

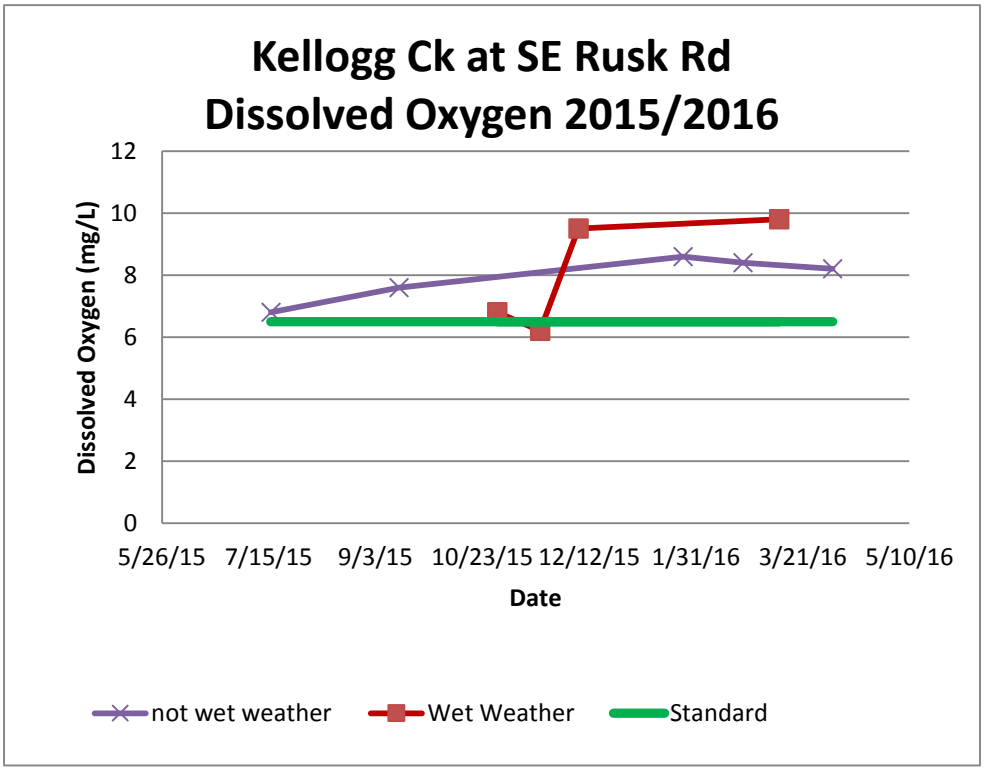
Note: Exceedance totals for metals data is based on exceedances of chronic guidance values and chronic criteria, not acute guidance values and acute criteria.
Also Note: The geometric mean value is shown for E. coli in the row titled "Mean"

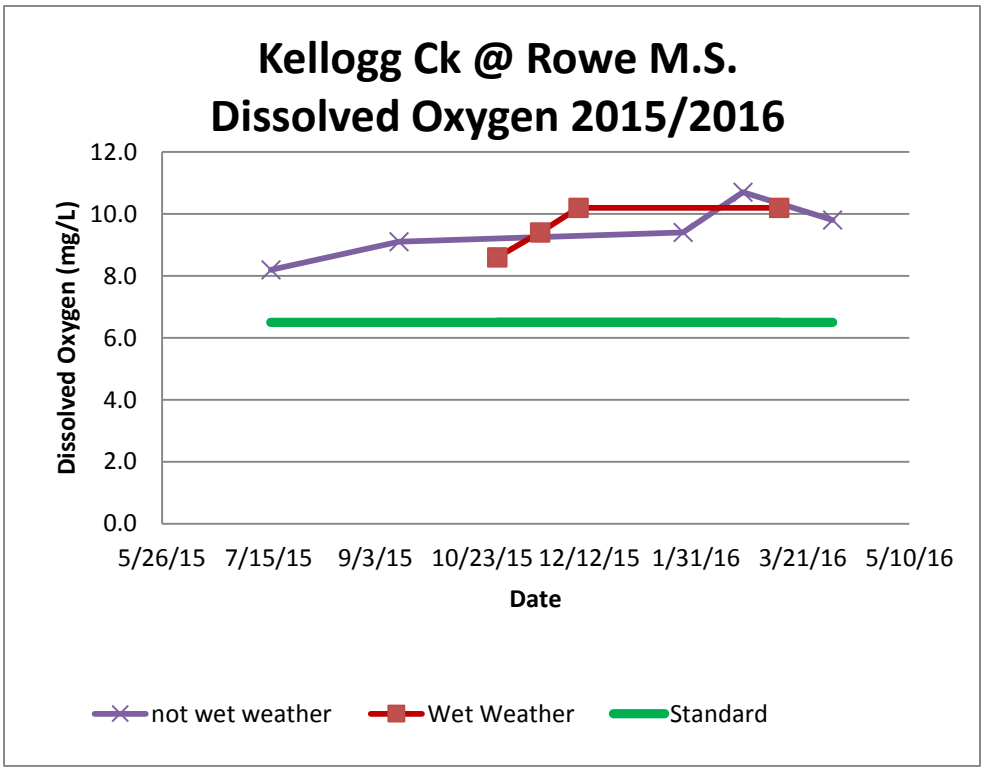
2015/2016 Monitoring Results (provided in graphical format)

Monitoring results for select parameters have been plotted to indicate either adherence to the water quality standard (where standards apply) or to indicate whether data are in a "healthy" range as referenced in the attached Clackamas County Water Quality Index (Attachment 1). In cases where the monitoring result is less than the laboratory method's detection limit, the plotted value is the laboratory method's detection limit.

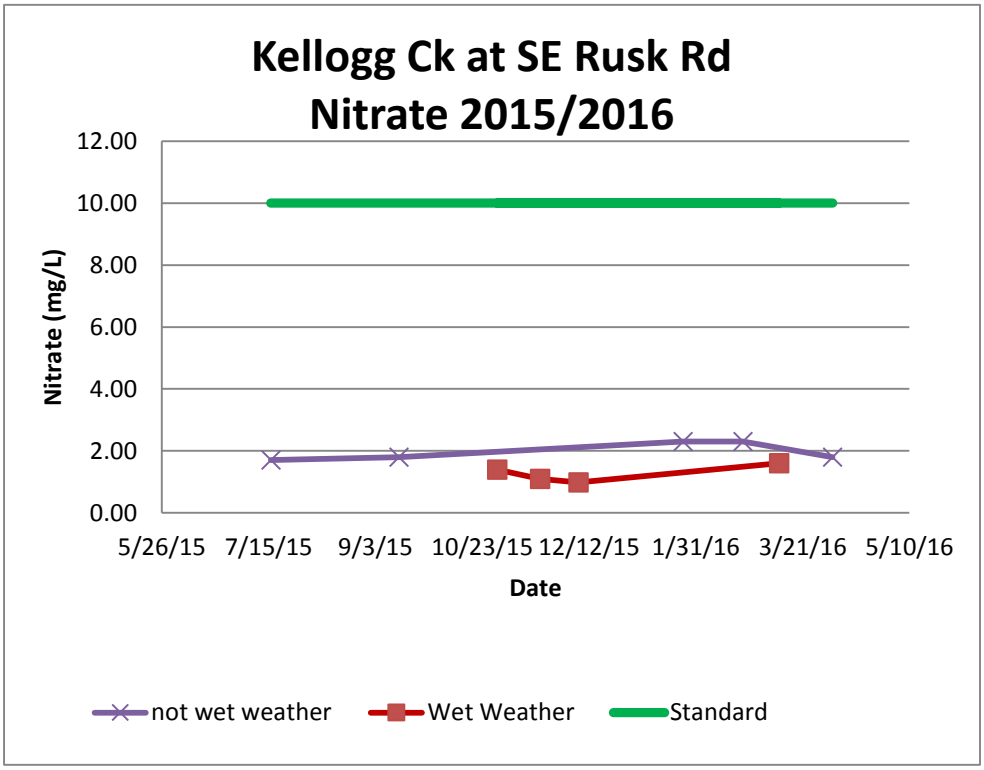


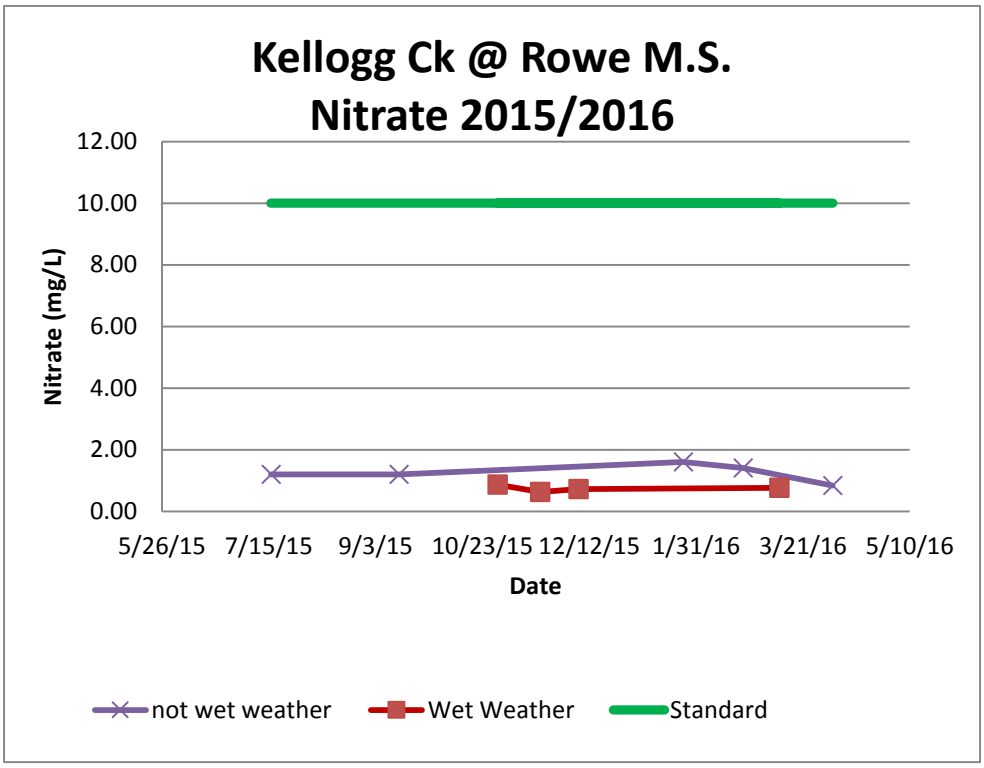

Kellogg Ck @ Rowe M.S.
Temperature 2015/2016
Temperature (degree C)
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
5/26/15
7/15/15
9/3/15
10/23/15
12/12/15
1/31/16
3/21/16
5/10/16
Date
not wet weather
Wet Weather
Standard

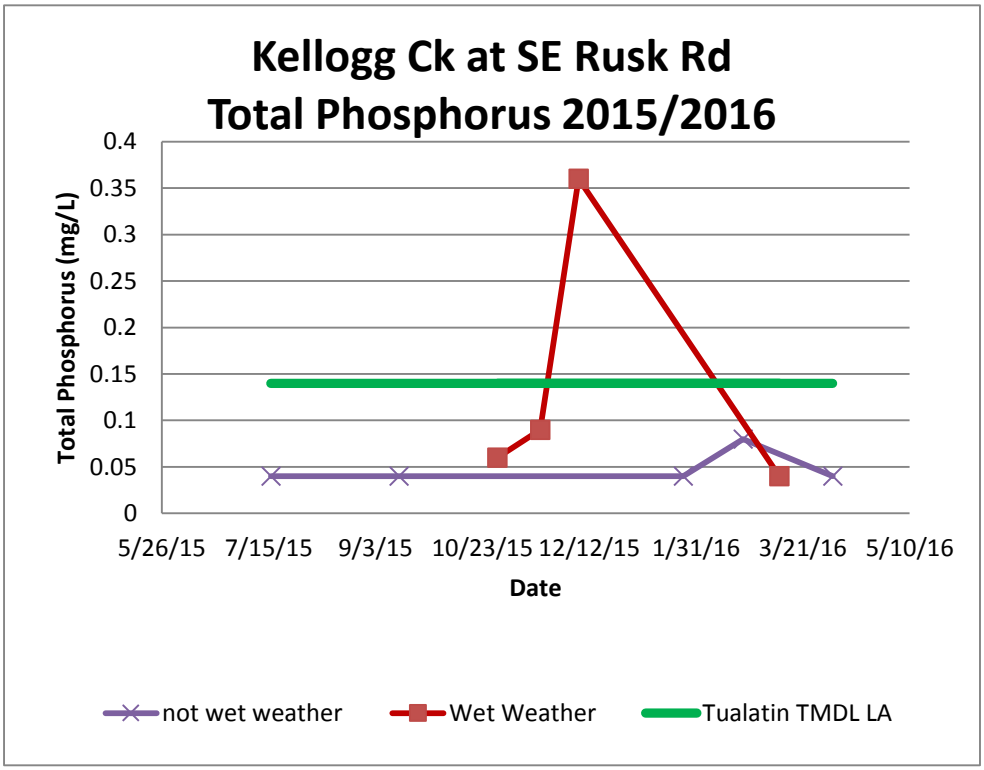

Kellogg Ck at SE Rusk Rd
Dissolved Oxygen 2015/2016
Dissolved Oxygen (mg/L)
12
10
8
6
4
2
0
5/26/15
7/15/15
9/3/15
10/23/15
12/12/15
1/31/16
3/21/16
5/10/16
Date
not wet weather
Wet Weather
Standard

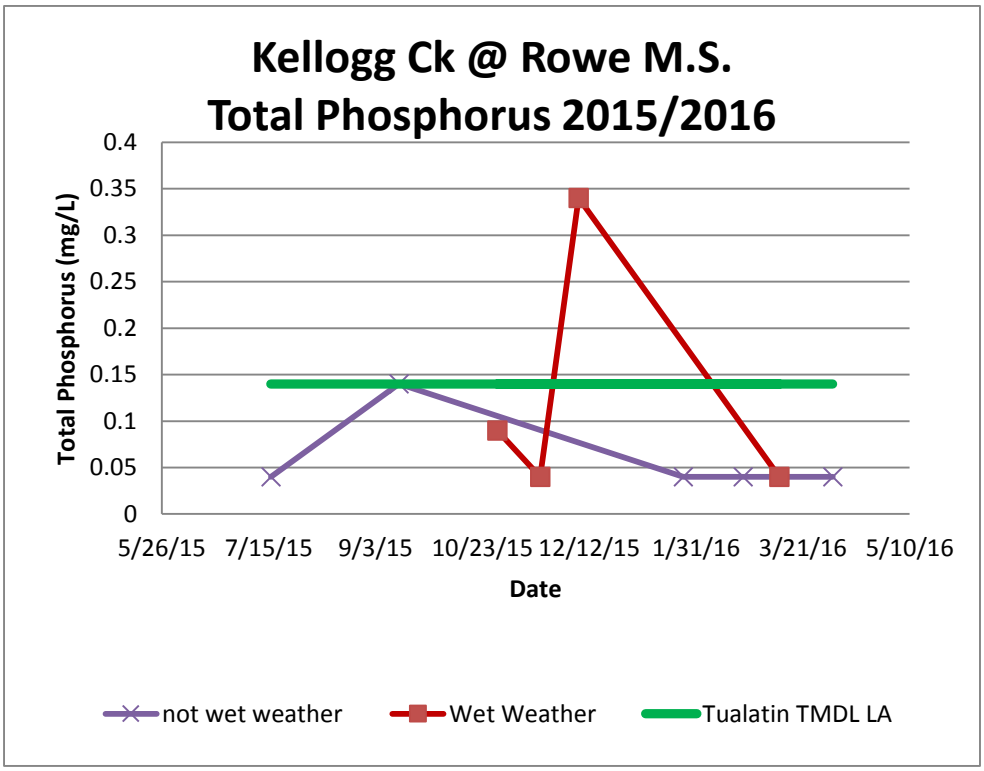


Please note that for dissolved oxygen, the standard is a minimum concentration that the samples should not drop below.

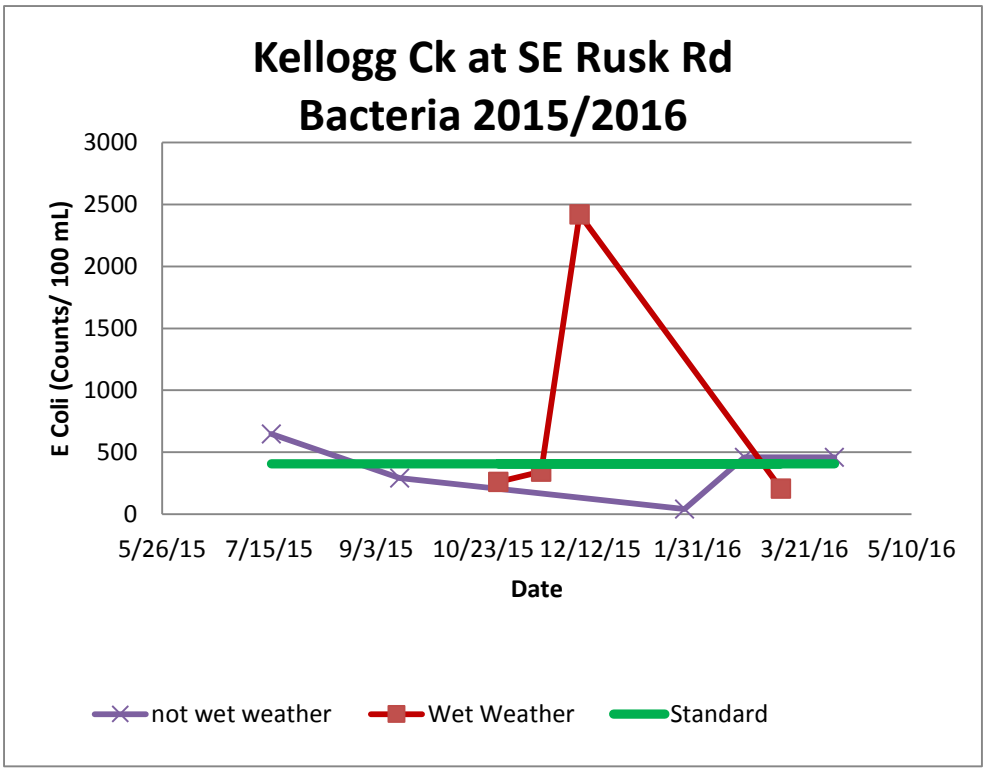



Kellogg Ck @ Rowe M.S.
Nitrate 2015/2016
Nitrate (mg/L)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
5/26/15
7/15/15
9/3/15
10/23/15
12/12/15
1/31/16
3/21/16
5/10/16
Date
not wet weather
Wet Weather
Standard

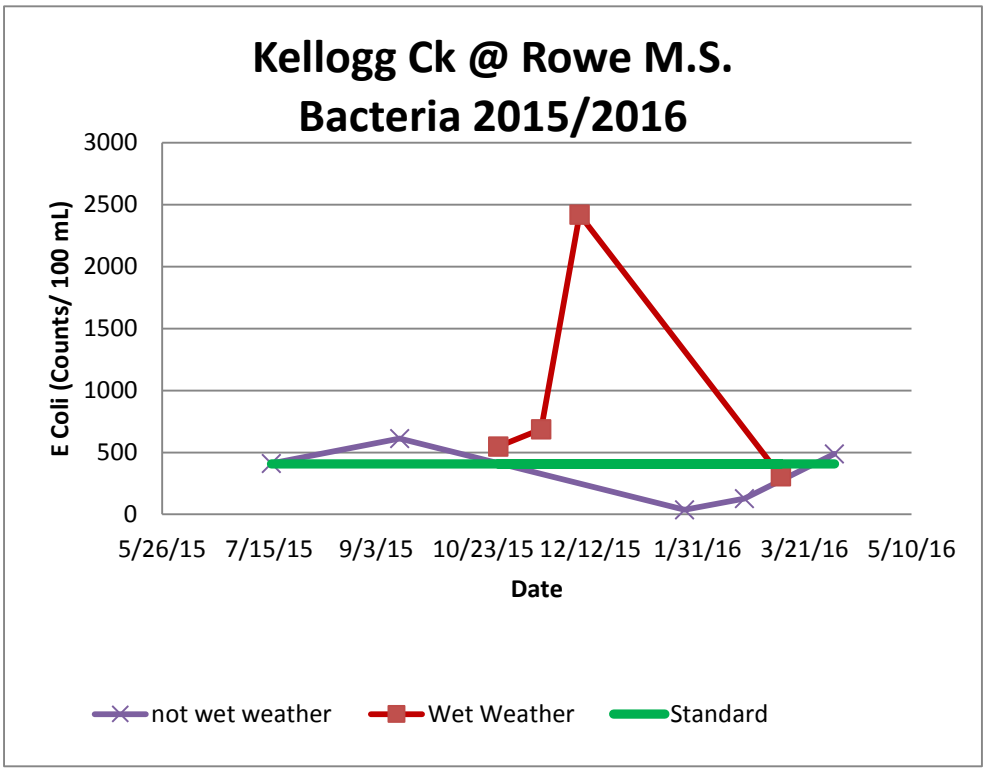

Kellogg Ck at SE Rusk Rd
Total Phosphorus 2015/2016
Total Phosphorus (mg/L)
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
5/26/15
7/15/15
9/3/15
10/23/15
12/12/15
1/31/16
3/21/16
5/10/16
Date
not wet weather
Wet Weather
Tualatin TMDL LA



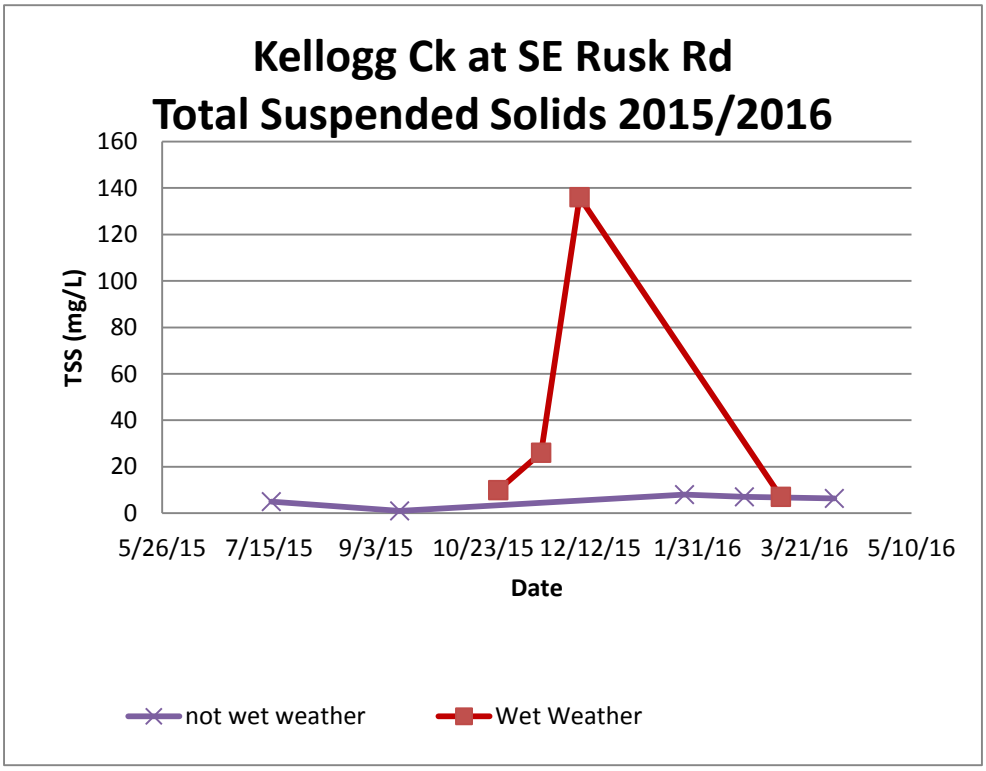
Note: The comparison is made here in these two charts to the Load Allocation for total phosphorus in the Tualatin TMDL, for the Kellogg Creek watershed does not have a specific guidance or regulated value for instream total phosphorus

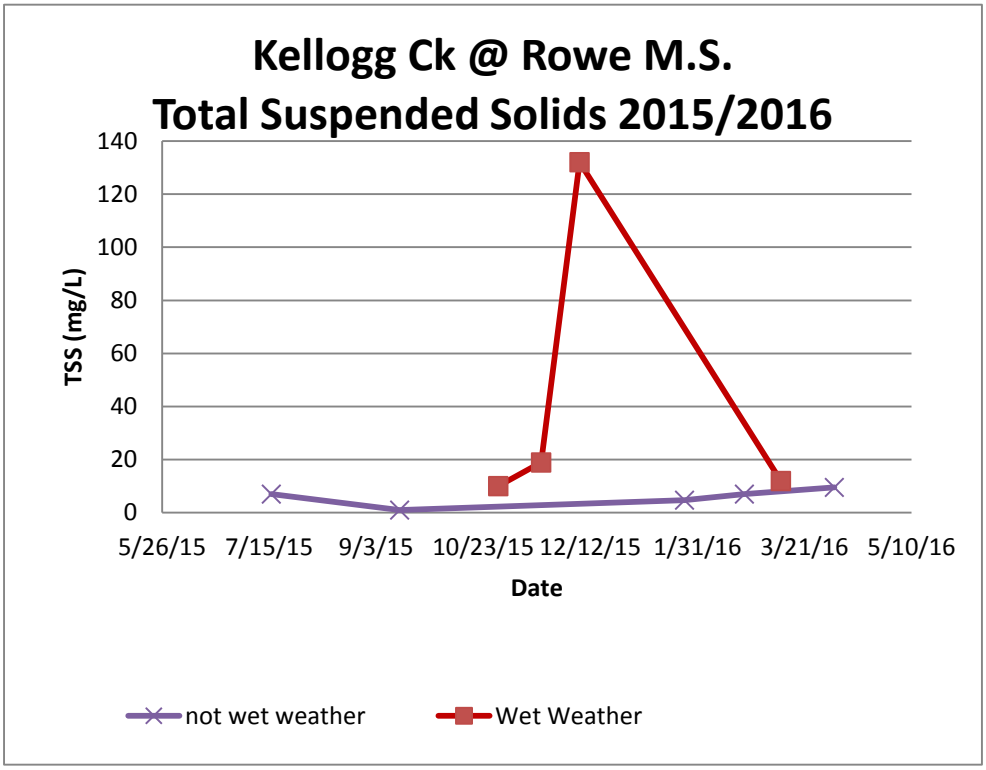


Note: The >2420 bacteria value is charted as 2420 colonies/100ml



Note: The >2420 bacteria value is charted as 2420 colonies/100ml





2015/2016 Monitoring Results Discussion

The pH levels during all 9 monitoring events at both Kellogg Creek monitoring sites were between 6.5 and 8.5, which indicates good watershed health.

The 406 colonies/100 ml standard for E. coli was exceeded during 6 of the year's 9 monitoring events at Rowe Middle School and during 4 of the year's 9 monitoring events at SE Rusk Road.

The dissolved oxygen levels was low (6.2 mg/L) during the November 17, 2015 storm monitoring event at the SE Rusk Road site.

During the exceptionally large storm event on December 7, 2015 (see Table #2), the total phosphorus levels were 0.34 mg/L at the Rowe M.S. site and 0.36 mg/L at the SE Rusk Road site. The total suspended solids values during this same storm were 132 mg/L at the Rowe M.S. site and 136 mg/L at the SE Rusk Road site. During the year's other 8 monitoring events at both sites, total suspended solids values were no higher than 26 mg/L and total phosphorus levels were no higher than 0.14 mg/L.

During the exceptionally large storm event on December 7, 2015, over 143 cubic feet per second (CFS) of water were flowing through the creek at the SE Rusk Road site and over 1,117 CFS were flowing through the creek at the Rowe M.S. monitoring site. Both of these measured flow rates are very high relative to other measured water flow rates from these monitoring sites.

The State of Oregon's instream criteria for dissolved lead and dissolved zinc were not exceeded during any of the year's 9 monitoring events at either monitoring site. The guidance value for dissolved copper was not exceeded during any of the year's 9 monitoring events at either monitoring site. The State of Oregon's instream criteria for total copper was exceeded during the exceptionally large storm event on December 7, 2015 at both monitoring sites. Guidance values for the following parameters were also exceeded:

- Total lead during 2 monitoring events each at both monitoring sites (both monitoring events were conducted during storms).
- Total zinc was exceeded during the exceptionally large storm event on December 7, 2015 at both monitoring sites.

MT. SCOTT CREEK FACT SHEET

Drainage Characteristics

- Largest tributary in the Kellogg Creek Watershed
- Dominant Land Uses = Mixed. Large portions of the watershed are used for urban single-family and multi-family housing, commercial, transportation (i.e. I-205), open space, and industry.

Monitoring Location

The quality of Mt. Scott Creek is monitored in the North Clackamas Parks & Recreation District park near the intersection of SE Rusk Road and Highway 224. The precise location of the water quality monitoring location is near the Southern end of SE Casa Del Rey Dr., and flow is measured near the Hwy 224 bridge.

2015/2016 Monitoring Results (provided in tabular format)

Instream monitoring data collected during the 2015/2016 MS4/TMDL reporting year were sorted based on whether the data were collected during storm event conditions or not. Four monitoring events were conducted during storms and the other 5 monitoring events were not.

Data were analyzed and comprehensive results are provided below for storm and non-storm event conditions. Where water quality standards exceedances are indicated, the basis for that determination is provided in the attached Clackamas County Water Quality Index (Attachment 1). Although not reflected in the table below, total dissolved solids, water flow rate, and conductivity were also measured.

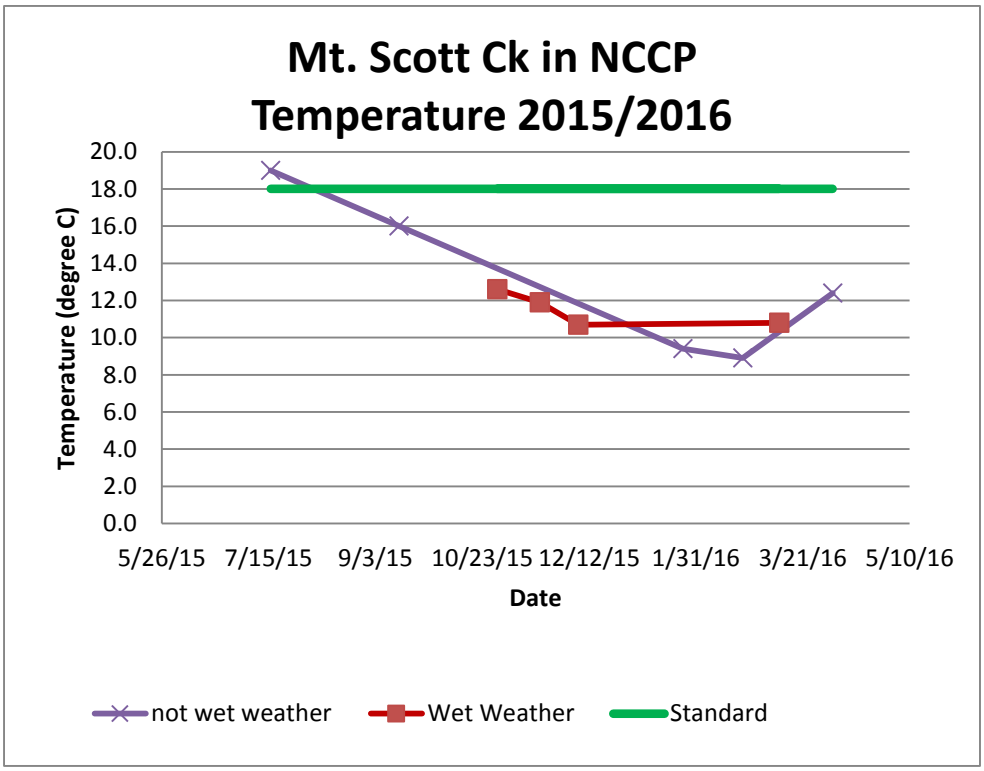
	Temperature (C)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	E coli (Counts/100 mL)	Total Copper (ug/L)	Dissolved Copper (ug/L)	Total Lead (ug/L)	Dissolved Lead (ug/L)	Total Zinc (ug/L)	Dissolved Zinc (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Orthophosphate (mg/L)	Hardness (mg/L)	pH
Monitored Storms (4 events)																		
Mean	11.5	8.5	0.49	1112	4.20	2.2	1.08	0.15	38.3	20.0	133	42	2.2	0.04	0.04	0.05	35	7.2
Maximum	12.6	10.3	0.63	>2420	9.30	2.6	4.60	0.17	52.0	30.0	181	111	3.6	0.07	0.18	0.07	49	7.4
Minimum	10.7	7.0	0.32	101	2.90	1.6	0.91	0.06	28.0	5.0	105	15	0.7	<0.05	<0.04	0.03	22	6.6
Exceedance of guidance value or criteria (# exceed/total)	0/4	0/4	0/4	3/4	2/4	0/4	3/4	0/4	2/4	0/4	NA	NA	NA	0/4	1/4	NA	NA	0/4
Other Weather Conditions (5 monitoring events)																		
Mean	13.1	8.3	0.79	213	2.64	1.8	0.38	0.08	18.6	11.8	156	6	1.5	0.03	0.07	0.06	72	7.1
Maximum	19.0	9.9	1.30	411	5.60	3.9	0.74	0.14	44.0	27.0	203	11	5.9	0.06	0.15	0.10	93	7.4
Minimum	8.9	6.1	0.45	43	1.60	0.7	0.24	0.04	9.0	3.0	126	3	0.1	<0.05	<0.04	0.03	56	6.5
Exceedance of guidance value or criteria (# exceed/total)	1/5	1/5	0/5	1/5	0/5	0/5	0/5	0/5	0/5	0/5	NA	NA	NA	0/5	1/5	NA	NA	0/5

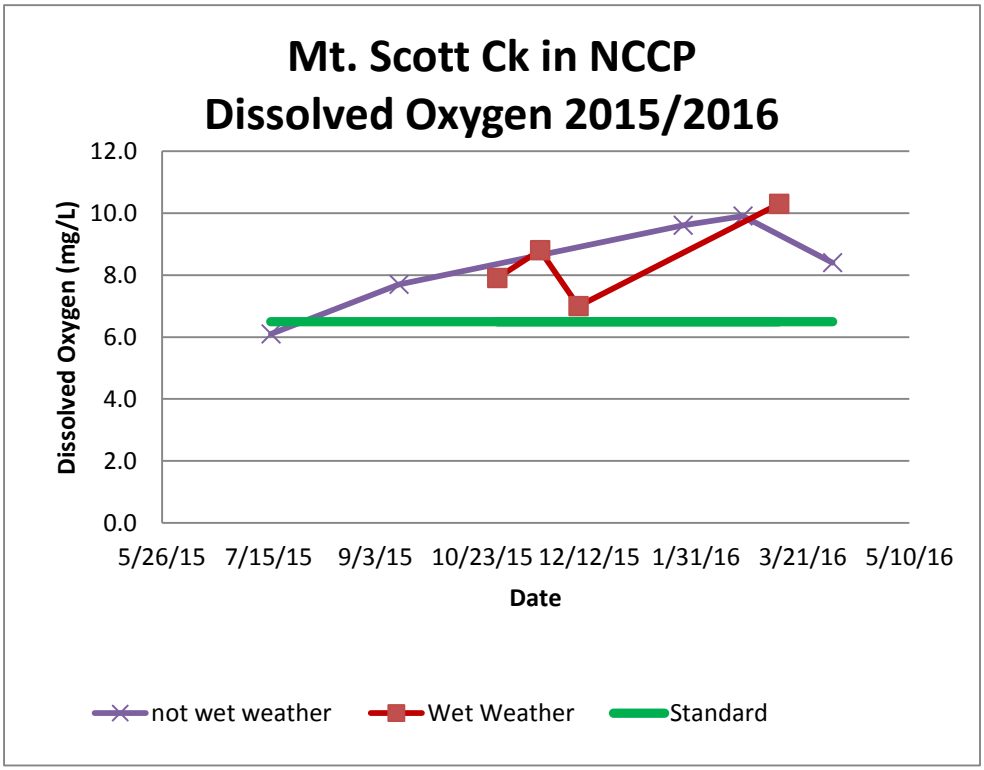
Note: Exceedance totals for metals data is based on exceedances of chronic guidance values and chronic criteria, not acute guidance values and acute criteria.

Also Note: The geometric mean value is shown for E. coli in the row titled "Mean"

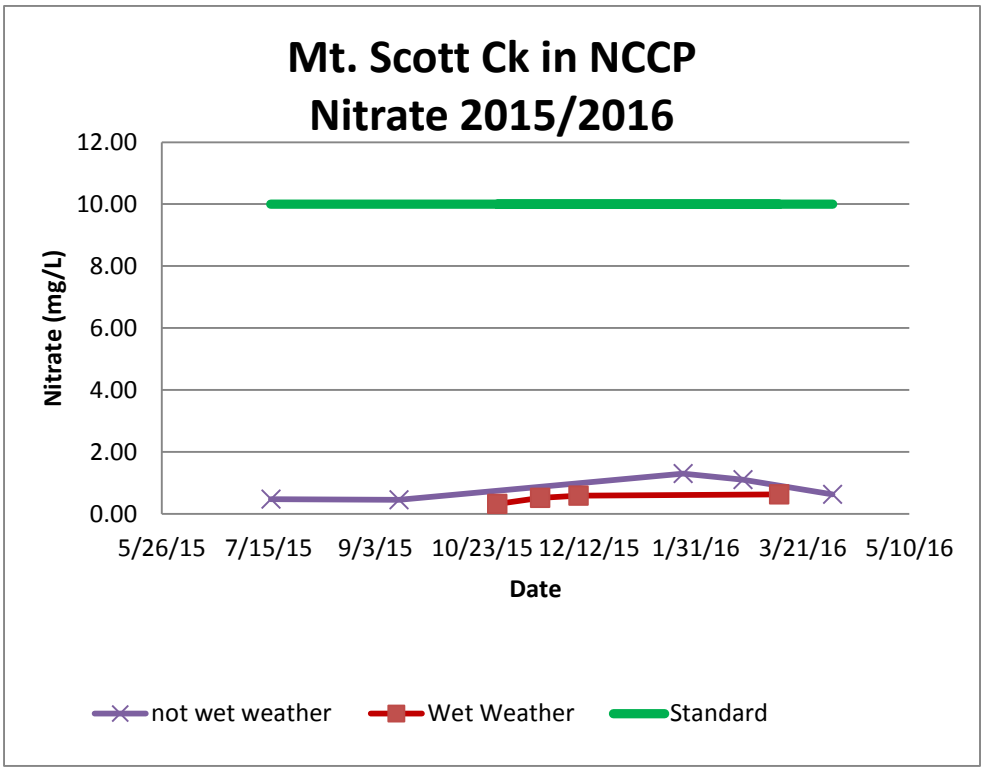
2015/2016 Monitoring Results (provided in graphical format)

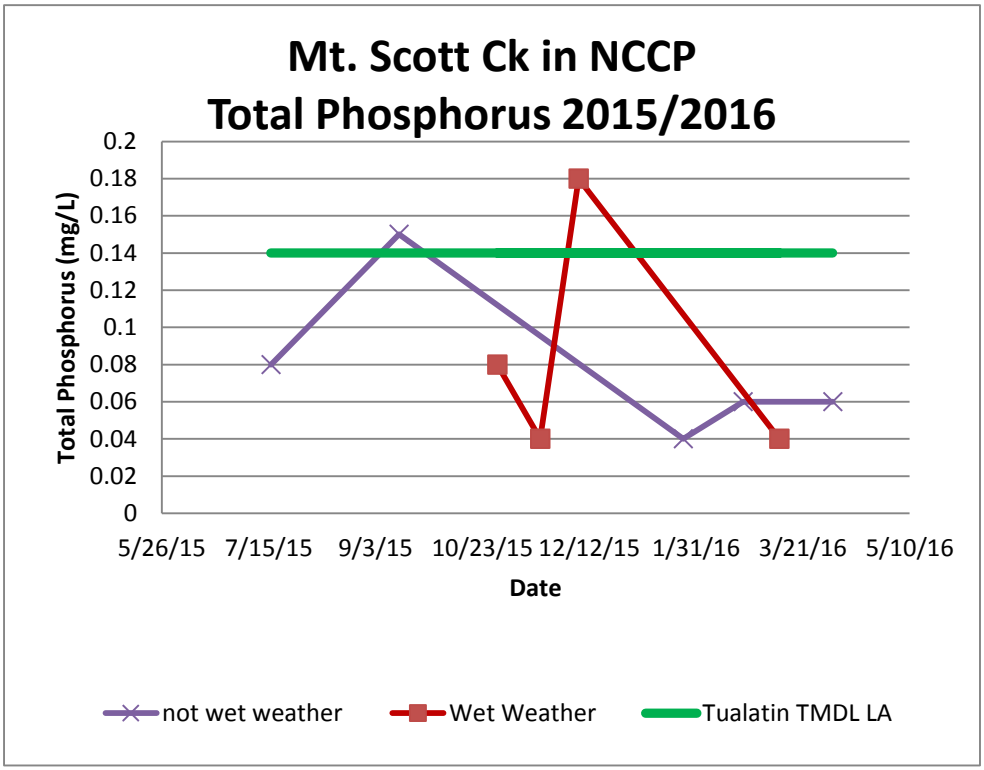
Monitoring results for select parameters have been plotted to indicate either adherence to the water quality standard (where standards apply) or to indicate whether data are in a “healthy” range as referenced in the attached Clackamas County Water Quality Index (Attachment 1). In cases where the monitoring result is less than the method's detection limit, the plotted value is the method's detection limit.



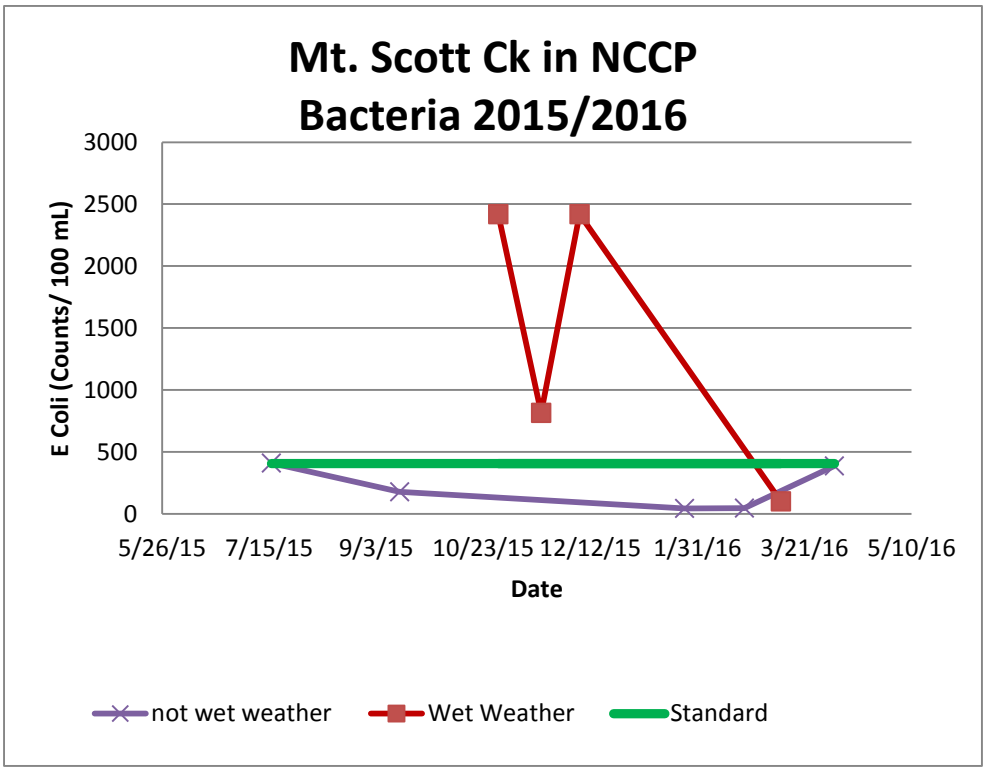


Please note that for dissolved oxygen, the standard is a minimum concentration that the samples should not drop below.

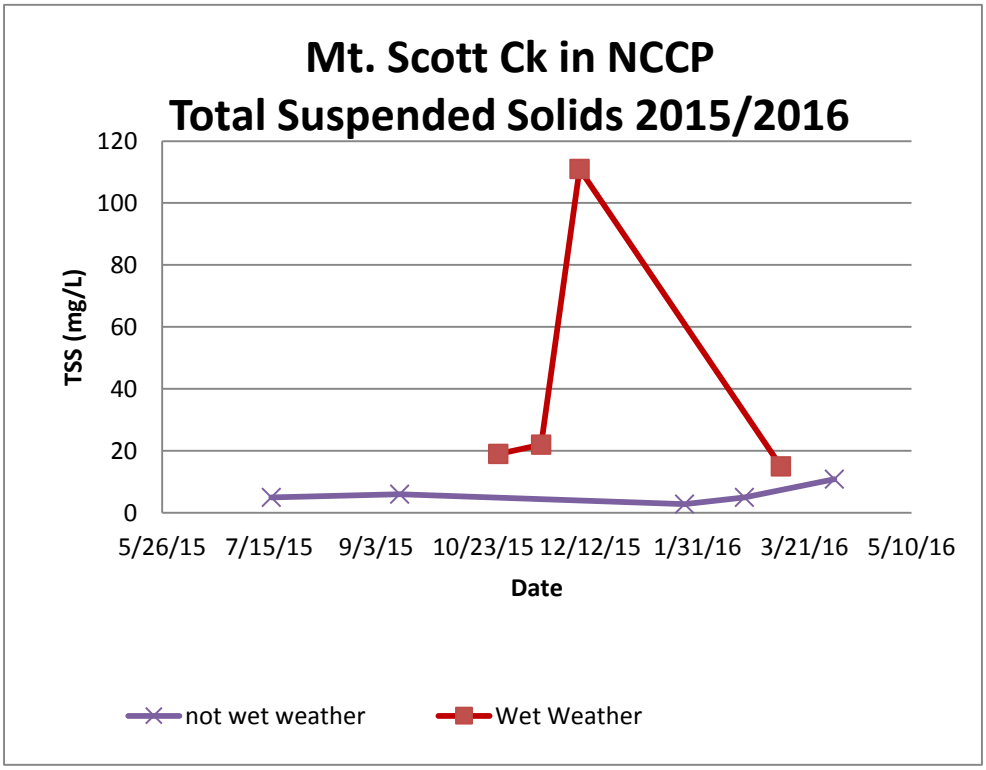




Note: The comparison is made here to the Load Allocation for total phosphorus in the Tualatin TMDL, for the Kellogg-Mt. Scott Creek watershed does not have a specific guidance value for instream total phosphorus



Note: The >2420 bacteria value is charted as 2420 colonies/100ml



2015/2016 Monitoring Results Discussion

Measured pH levels were between 6.5 and 8.5, which is protective of watershed health, during all monitoring events. The 406 colonies/100 ml standard for E. coli was exceeded on 4 occasions; 3 of these monitoring events occurred during storms. The dissolved oxygen (DO) level was 6.1 mg/L during the July 16, 2015 monitoring event, which is below the 6.5 mg/L threshold; DO levels were at or above 7.0 mg/L during the other 8 monitoring events.

During the exceptionally large storm event on December 7, 2015 (see Table #2):

- The total phosphorus level was only 0.18 mg/L, which is only slightly greater than the 0.14 mg/L guidance value. Note that the total phosphorus level was 0.15 mg/L on September 14, 2015 which is also slightly above the guidance value.
- The total suspended solids (TSS) value was 111 mg/L. During the year's other 8 monitoring events, TSS values were no higher than 22 mg/L.
- The water flow rate was over 870 cubic feet per second, which is very high compared to other measured creek flow rates at this monitoring site.

The State of Oregon's instream criteria for total copper were exceeded during 2 of the 4 monitoring events which occurred during storms. The State of Oregon's instream criteria for dissolved zinc and dissolved lead were not exceeded during any of the year's 9 monitoring events. The guidance values for dissolved copper were not exceeded during any of the year's 9 monitoring events. Guidance values for the following parameters were exceeded, however:

- total lead (during 3 of the 4 storms)
- total zinc (during 2 of the 4 storms)

ROCK CREEK FACT SHEET

Drainage Characteristics

- Tributary to the Clackamas River. Less than half of the watershed's area is in CCSD#1/Happy Valley.
- Dominant Land Uses = Rural residential, agriculture, and urban single-family residential. Some open space, multi-family urban residential, and commercial lands are also present.

Monitoring Location

Water quality in Rock Creek is monitored downstream from the Hwy 212/224 bridge; The location is ~650 feet upstream from the Creek's confluence with the Clackamas River. The creek's flow is measured at a point which is several hundred feet upstream from the Hwy 212/224 bridge.

2015/2016 Monitoring Results (provided in tabular format)

Instream monitoring data collected during the 2015/2016 MS4/TMDL reporting year were sorted based on whether the data were collected during storm event conditions or not. Four monitoring events were conducted during storms and the other 5 monitoring events were not.

Data were analyzed and comprehensive results are provided below for storm and non-storm event conditions. Where water quality standards exceedances are indicated, the basis for that determination is provided in the attached Clackamas County Water Quality Index (Attachment 1). Although not reflected in the table below, water flow rate, total dissolved solids, and conductivity were also measured.

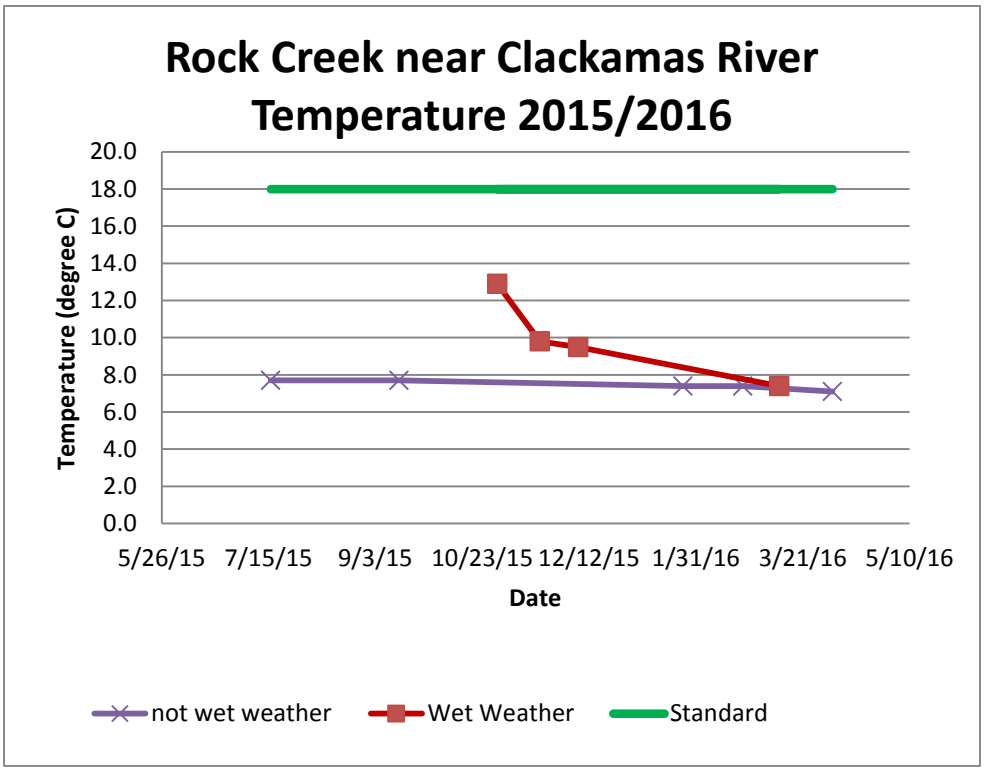
	Temperature (C)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	E coli (Counts/100 mL)	Total Copper (ug/L)	Dissolved Copper (ug/L)	Total Lead (ug/L)	Dissolved Lead (ug/L)	Total Zinc (ug/L)	Dissolved Zinc (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Orthophosphate (mg/L)	Hardness (mg/L)	pH
Monitored Storms (4 events)																		
Mean	9.9	9.1	1.59	714	2.53	1.2	0.66	0.06	11.0	3.3	636	474	1.0	0.03	0.05	0.06	43	7.3
Maximum	12.9	10.8	3.30	1730	50.40	2.0	42.71	0.08	194.0	4.0	2150	1820	3.5	0.09	2.40	0.08	57	7.7
Minimum	7.4	7.6	0.49	105	1.50	0.9	0.15	0.03	7.0	2.0	120	2	0.6	<0.05	<0.04	0.03	28	6.8
Exceedance of guidance value or criteria (# exceed/total)	0/4	0/4	0/4	3/4	1/4	0/4	3/4	0/4	1/4	0/4	NA	NA	NA	0/4	1/4	NA	NA	0/4
Other Weather Conditions (5 monitoring events)																		
Mean	7.5	9.6	0.99	104	0.96	0.6	0.20	0.03	4.2	2.6	117	4	0.4	0.03	0.04	0.05	47	7.5
Maximum	7.7	10.6	1.70	185	1.30	1.0	0.34	0.05	5.0	6.0	164	8	1.3	<0.05	<0.10	0.09	76	7.7
Minimum	7.1	8.8	0.41	46	0.60	0.4	0.06	0.01	3.0	1.0	83	1	0.1	<0.05	0.04	0.03	29	7.1
Exceedance of guidance value or criteria (# exceed/total)	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	NA	NA	NA	0/5	0/5	NA	NA	0/5

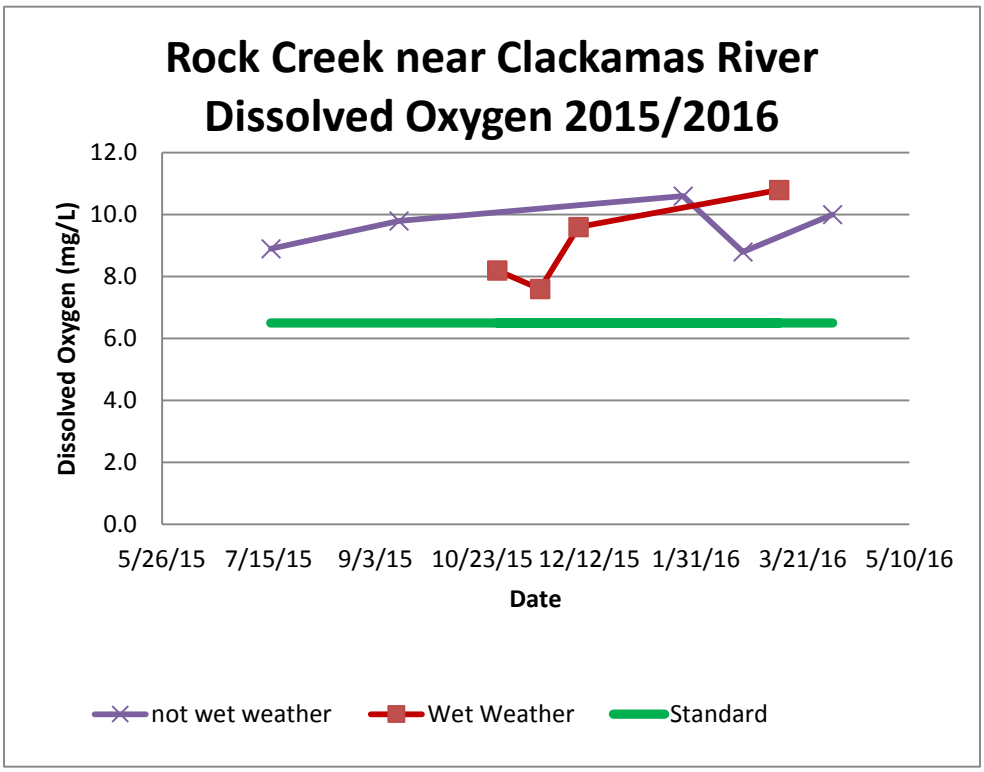
Note: Exceedance totals for metals data is based on exceedances of chronic guidance values and chronic criteria, not acute guidance values and acute criteria.

Also Note: The geometric mean value is shown for E. coli in the row titled "Mean"

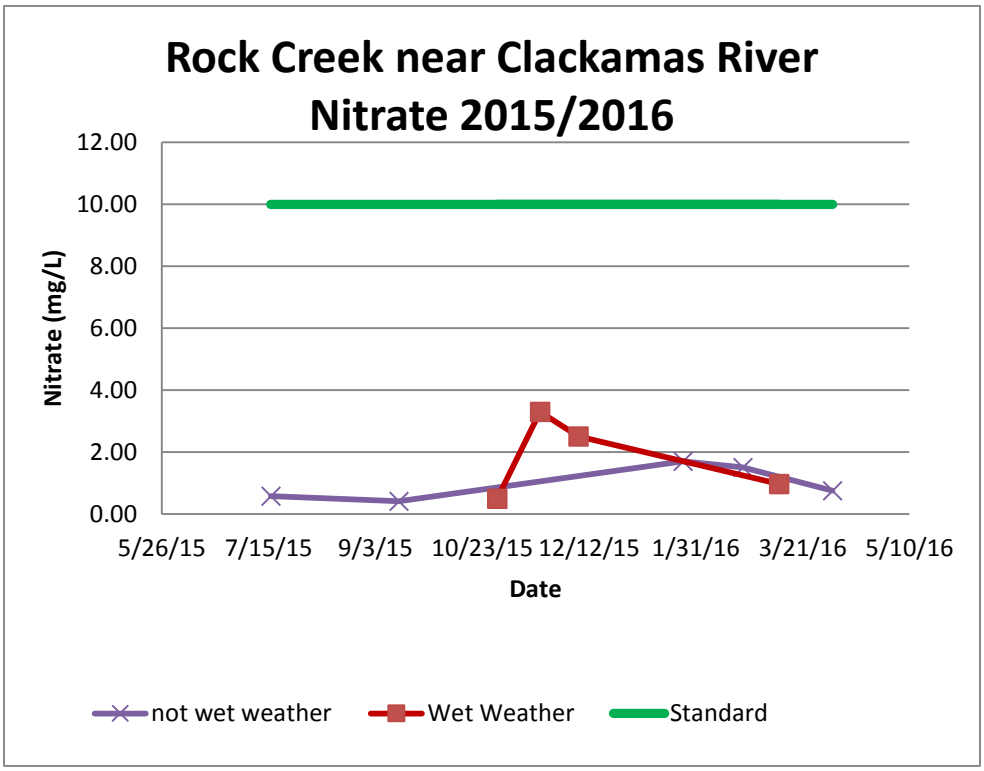
2015/2016 Monitoring Results (provided in graphical format)

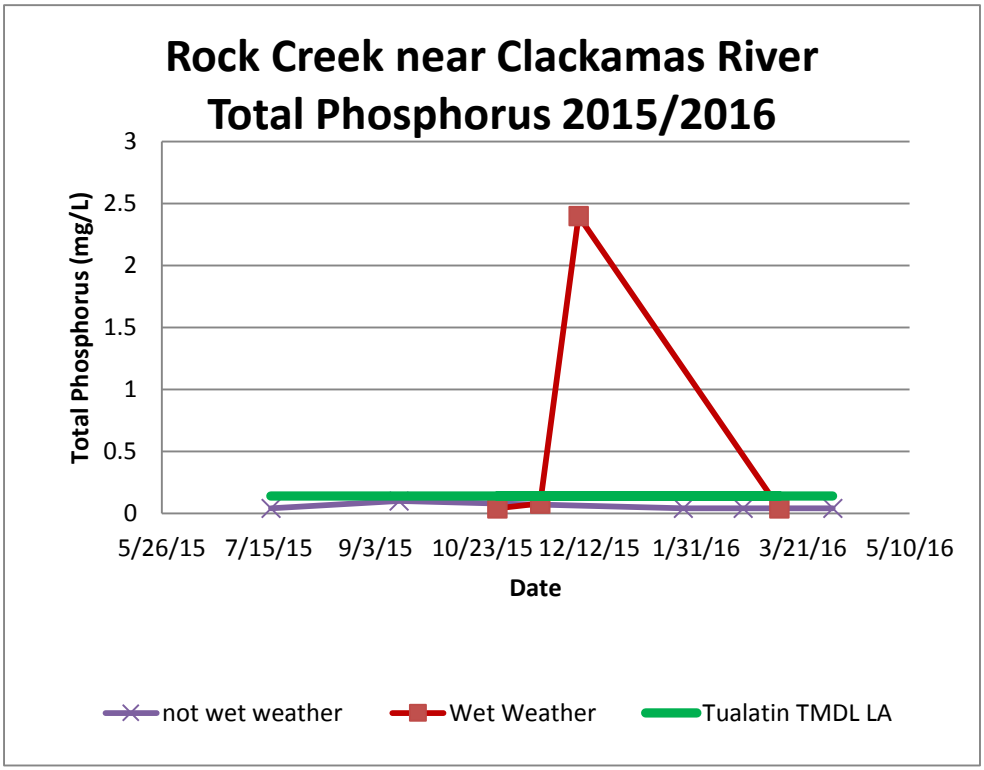
Monitoring results for select parameters have been plotted to indicate either adherence to the water quality standard (where standards apply) or to indicate whether data are in a “healthy” range as referenced in the attached Clackamas County Water Quality Index (Attachment 1). In cases where the monitoring result is less than the method's detection limit, the plotted value is the method's detection limit.



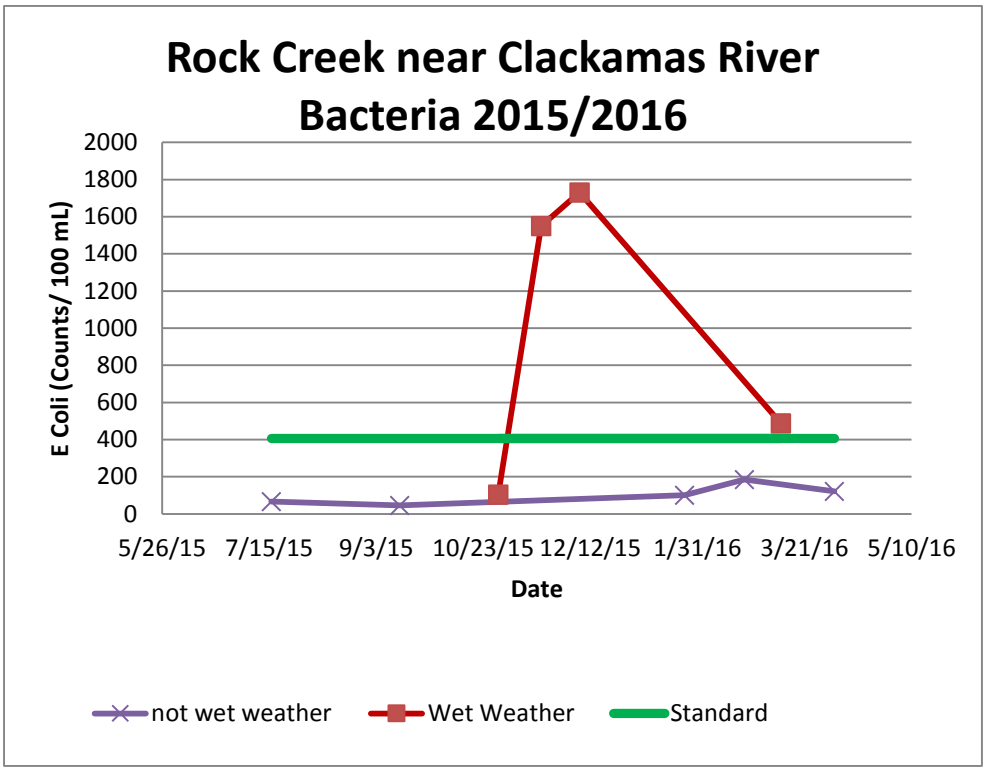


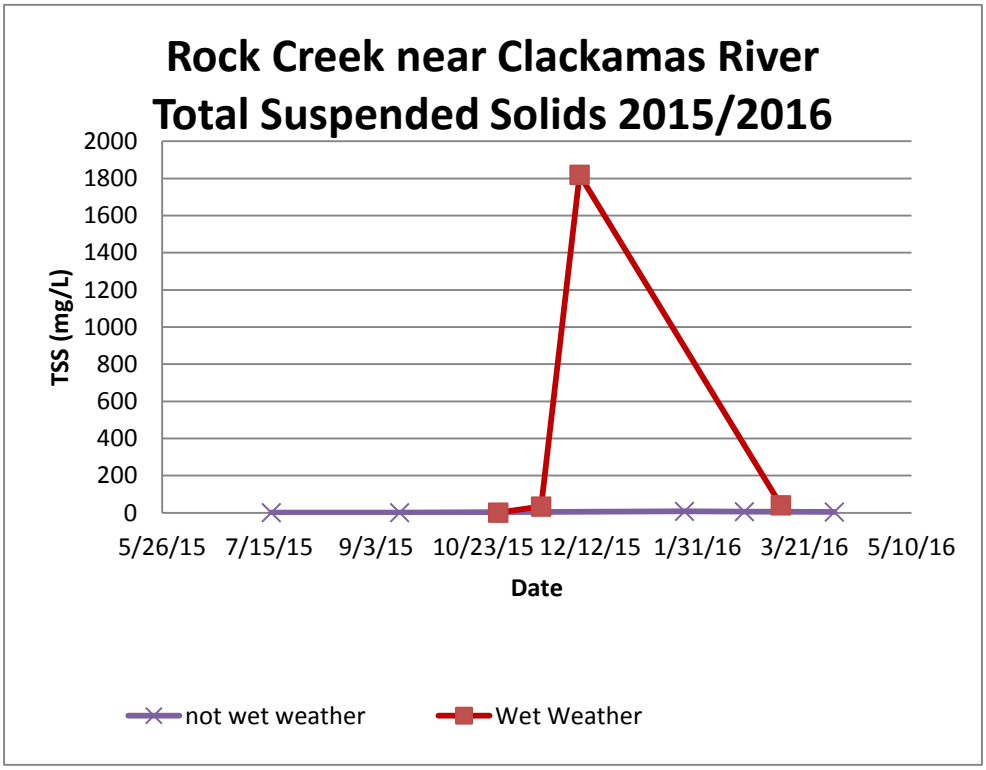
Note: For dissolved oxygen, the standard is a minimum concentration that the samples should not drop below.





Note: The comparison is made here to the Load Allocation for total phosphorus in the Tualatin TMDL, for the Clackamas River watershed does not have a specific guidance value for instream total phosphorus


Rock Creek near Clackamas River
Bacteria 2015/2016
E Coli (Counts/ 100 mL)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
5/26/15
7/15/15
9/3/15
10/23/15
12/12/15
1/31/16
3/21/16
5/10/16
Date
not wet weather
Wet Weather
Standard


Rock Creek near Clackamas River
Total Suspended Solids 2015/2016
TSS (mg/L)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
5/26/15
7/15/15
9/3/15
10/23/15
12/12/15
1/31/16
3/21/16
5/10/16
Date
not wet weather
Wet Weather

2015/2016 Monitoring Results Discussion

Measured pH levels were between 6.5 and 8.5, which is protective of watershed health, during all monitoring events. The lowest recorded dissolved oxygen level was 7.6 mg/L, which is also protective of watershed health. The 406 colonies/100 ml standard for E. coli was exceeded on 3 occasions (all 3 of these monitoring events occurred during storms).

During the exceptionally large storm event on December 7, 2015 (see Table #2), the total phosphorus level was 2.4 mg/L, which is ~17 times greater than the 0.14 mg/L guidance value. Total phosphorus levels were below 0.1 mg/L during the other 8 monitoring events. During the exceptionally large storm event on December 7, 2015, the total suspended solids (TSS) value was 1,820 mg/L, which is very high. This TSS value and this total phosphorus value were the highest TSS and total phosphorus values which were recorded at any of our monitored creeks or MS4 outfalls during the 2015-2016 year. Rock Creek's watershed is primarily comprised of rural residential lands, and the resulting low *impervious* area (ie. pavement and roof) and high pervious area percentages might explain these high pollutant concentrations. Another possible explanation is erosion from construction sites in this rapidly urbanizing watershed. Rock creek's flow during this monitoring event was greater than 705 cubic feet per second, which is a very high flow rate for Rock creek.

The State of Oregon's instream criteria for total copper were exceeded during 2 of the 4 monitoring events which occurred during storms. The State of Oregon's instream criteria for dissolved zinc and dissolved lead were not exceeded during any of the year's 9 monitoring events. The guidance values for dissolved copper were not exceeded during any of the year's 9 monitoring events. Guidance values for the following parameters were exceeded, however:

- total lead (during 3 of the 4 storms)
- total zinc (during 2 of the 4 storms)

Drainage Characteristics

- Tributary to the Clackamas River
- Dominant Land Use = Industrial (Clackamas Industrial Area)

Monitoring Location

Cow Creek is typically monitored at the point where it flows under the Western end of SE Last Road in Clackamas. However, the creek bed here was dry on July 16, 2015, due to a preceding period of warm, dry weather, so that day's monitoring event was conducted in Cow Creek at SE Fish Hatchery Road in Clackamas, which is roughly 2/3rds of a mile downstream, since flow was present there.

2015/2016 Monitoring Results (provided in tabular format)

Instream monitoring data collected during the 2015/2016 MS4/TMDL reporting year were sorted based on whether the data were collected during storm event conditions or not. Four monitoring events were conducted during storms and the other 5 monitoring events were not.

Data were analyzed and comprehensive results are provided below for storm and non-storm event conditions. Where water quality standards exceedances are indicated, the basis for that determination is provided in the attached Clackamas County Water Quality Index (Attachment 1). Although not reflected in the table below, water flow rate, total dissolved solids, and conductivity were also measured.

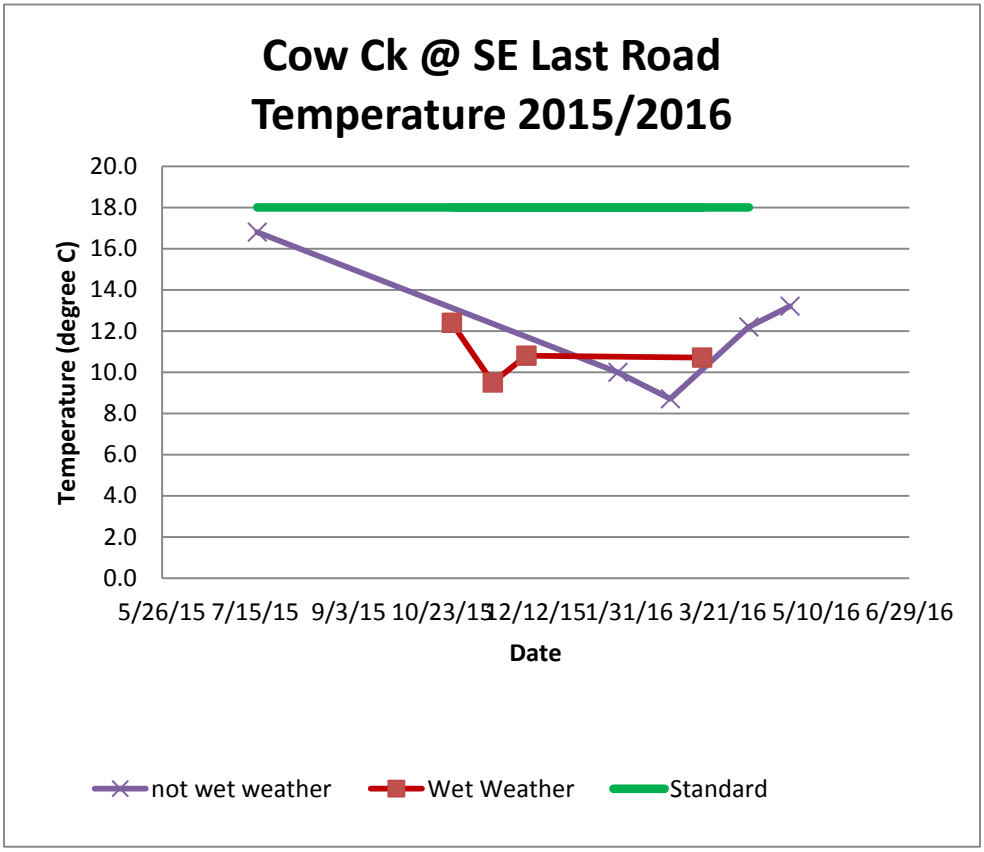
	Temperature (C)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	E coli (Counts/100 mL)	Total Copper (ug/L)	Dissolved Copper (ug/L)	Total Lead (ug/L)	Dissolved Lead (ug/L)	Total Zinc (ug/L)	Dissolved Zinc (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Orthophosphate (mg/L)	Hardness (mg/L)	pH
Monitored Storms (4 events)																		
Mean	10.9	9.7	0.27	269	6.88	2.6	1.42	0.13	82.3	42.8	85	28	2.3	0.08	0.05	0.04	21	6.7
Maximum	12.4	10.3	0.35	1730	10.40	4.8	1.84	0.16	105.0	58.0	102	70	5.2	0.19	0.09	0.06	37	7.1
Minimum	9.5	9.4	0.22	24	3.40	1.5	1.26	0.09	52.0	30.0	56	7	0.9	<0.05	<0.04	0.03	14	6.6
Exceedance of guidance value or criteria (# exceed/total)	0/4	0/4	0/4	2/4	3/4	2/4	4/4	0/4	4/4	3/4	NA	NA	NA	0/4	0/4	NA	NA	0/4
Other Weather Conditions (5 monitoring events)																		
Mean	12.2	8.2	0.44	337	3.06	1.7	0.91	0.09	42.2	27.4	156	19	2.2	0.03	0.05	0.04	68	7.2
Maximum	16.8	9.1	0.72	>2420	5.00	3.3	1.84	0.11	65.0	44.0	211	63	7.5	0.07	0.14	0.07	88	7.5
Minimum	8.7	7.4	0.12	15	1.40	0.8	0.33	0.06	13.0	6.0	109	4	0.2	<0.05	<0.04	0.03	46	6.9
Exceedance of guidance value or criteria (# exceed/total)	0/5	0/5	0/5	2/5	0/5	0/5	0/5	0/5	1/5	0/5	NA	NA	NA	0/5	0/5	NA	NA	0/5

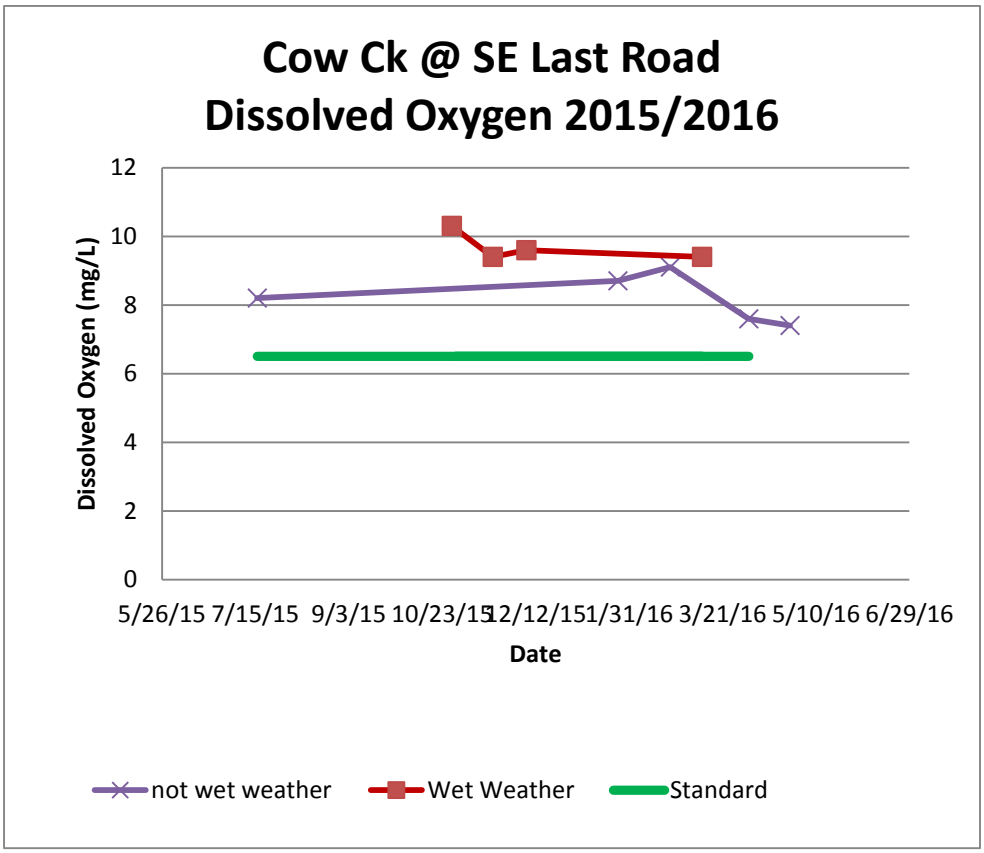
Note: Exceedance totals for metals data is based on exceedances of chronic guidance values and chronic criteria, not acute guidance values and acute criteria.

Also Note: The geometric mean value is shown for E. coli in the row titled "Mean"

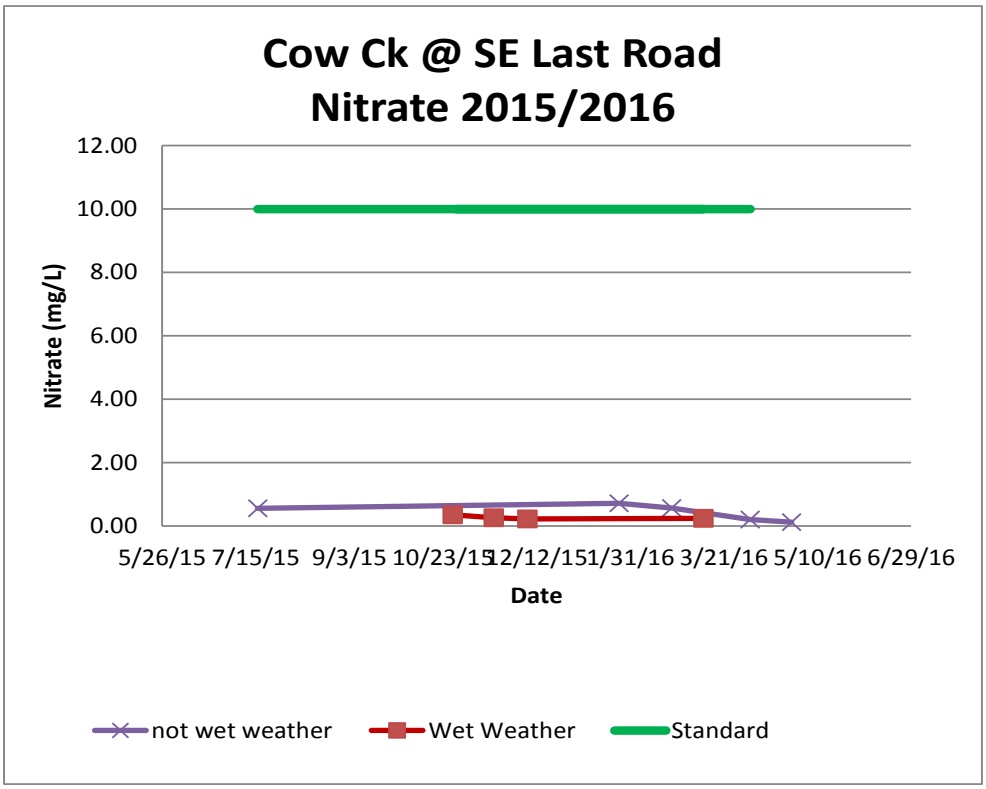
2015/2016 Monitoring Results (provided in graphical format)

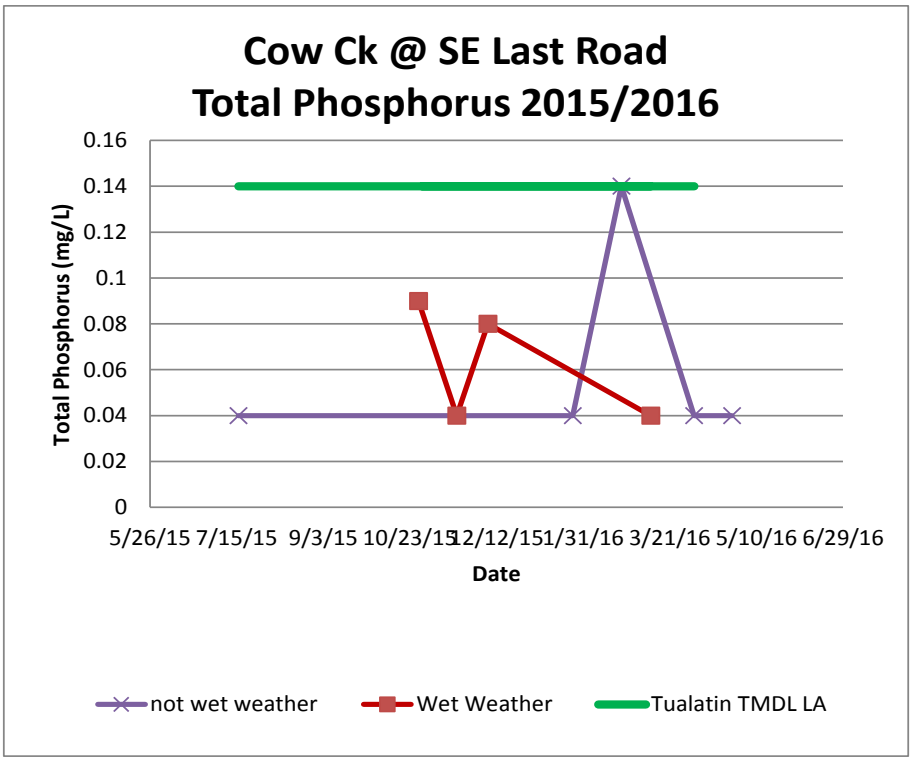
Monitoring results for select parameters have been plotted to indicate either adherence to the water quality standard (where applicable) or to indicate whether data are in a "healthy" range as referenced in the Clackamas County Water Quality Index (Attachment 1). In cases where the monitoring result is less than the method's detection limit, the plotted value is the method's detection limit. **Note: Data from the July 16, 2015 monitoring event (shown in the "not wet weather" lines on the following six charts) are from Cow Creek at SE Fish Hatchery Road in Clackamas, OR).**



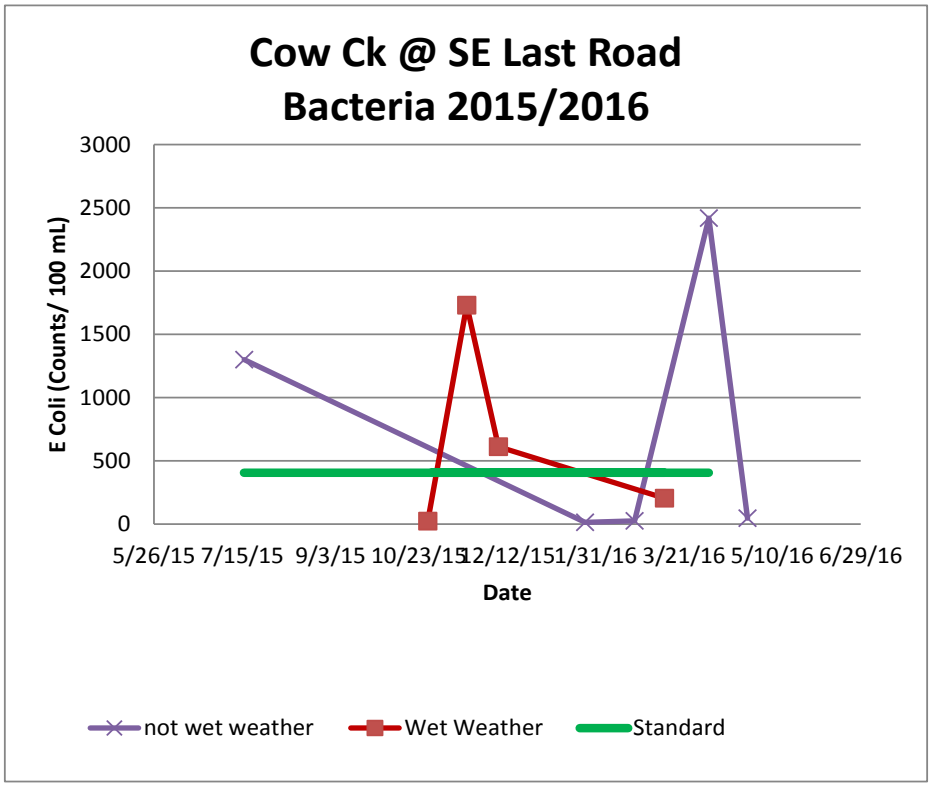


Please note that for dissolved oxygen, the standard is a minimum concentration that the samples should not drop below.

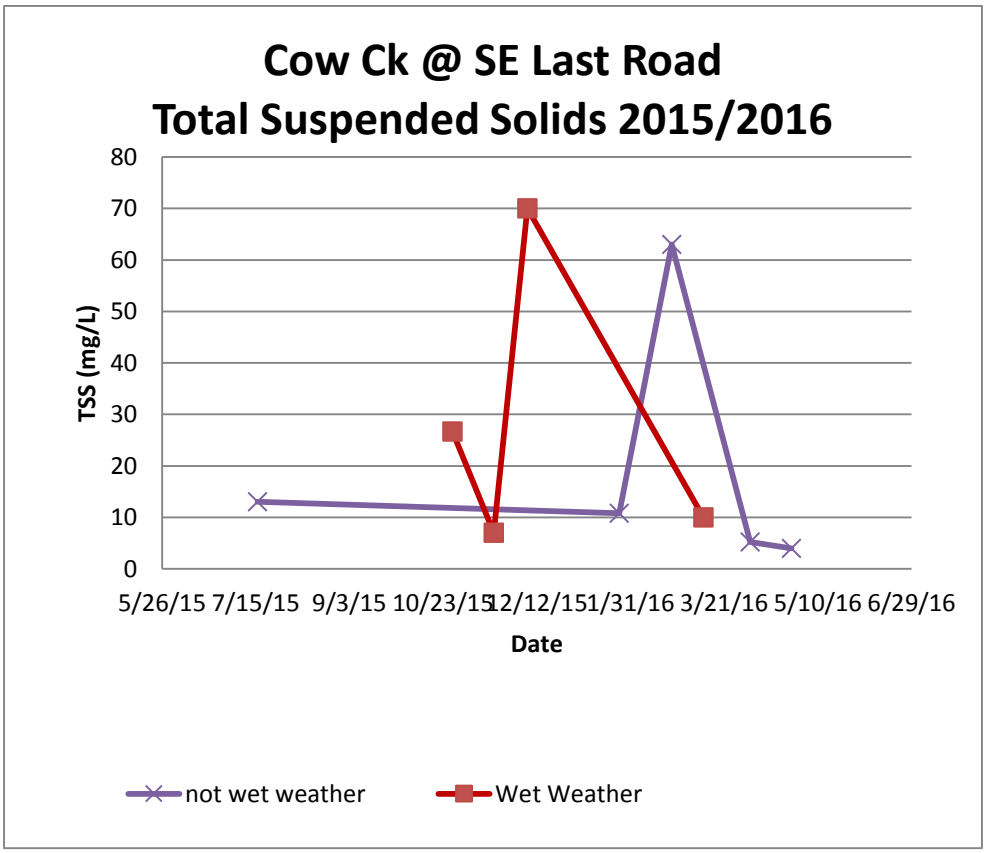




Note: The comparison is made here to the Load Allocation for total phosphorus in the Tualatin TMDL, for the Clackamas River watershed does not have a specific guidance value for instream total phosphorus



Note: The >2420 bacteria value is charted as 2420 colonies/100ml



2015/2016 Monitoring Results Discussion

The 406 colonies/100 ml standard for E. coli was exceeded during 4 of the 9 monitoring events. Measured pH values were protective of watershed health during all 9 monitoring events. Dissolved oxygen levels were above 8.0 mg/L, which is protective of watershed health, during all 9 monitoring events. Total phosphorus concentrations were at or below the 0.14 mg/L guidance value during all 9 monitoring events. The year's highest total suspended solids value (70 mg/L) was recorded during the exceptionally large storm event on December 7, 2015 (see Table #2). Cow creek's flow during this monitoring event was greater than 28.7 cubic feet per second, which is a very high number for this monitoring site.

Ammonia concentrations in monitored creeks in CCSD#1 and in the SWMACC's Pecan Creek are typically very low or undetectable. The highest concentration of ammonia that was measured in any of the 9 monitored creeks in CCSD#1 and the SWMACC during the monitoring year (0.19 mg/L) was documented in Cow Creek at SE Last Road during the storm on October 28, 2015. Although this is the highest concentration which was recorded in a creek during the monitoring year, this concentration of ammonia is quite low and is protective of watershed health.

The State of Oregon's instream criteria for total copper and dissolved zinc were both exceeded during 3 of the 4 monitoring events which occurred during storms. Guidance values for the following parameters were also exceeded:

- Total lead (During all 4 of the monitored storms)
- Total zinc (During all 4 of the monitored storms)
- Dissolved copper (During 2 of the 4 monitored storms)

Temporary Modification Made to the Monitoring Plan

As was mentioned on the first page of the Cow Creek Fact Sheet, although Cow Creek is typically monitored at the point where it flows under the Western end of SE Last Road in Clackamas, we elected to modify our monitoring plan for the year's first required monitoring event (July 16, 2015), and collect samples from Cow Creek at SE Fish Hatchery Road. This is due to the fact that Cow Creek's bed was dry at the SE Last Road monitoring site on that day. Flow was present in Cow Creek at SE Fish Hatchery Road on that day, however. The SE Fish Hatchery Road site in Clackamas is roughly 2/3rds of a mile downstream from the SE Last Road monitoring site. Since one of the year's nine required monitoring events wasn't conducted at the monitoring location which is specified in the Comprehensive Clackamas County NPDES MS4 Stormwater Monitoring Plan (Plan), updated on June 30, 2013, we are thus obligated to notify the Department of Environmental Quality here in this annual report, in accordance with MS4 Permit Schedule B(2)(e) and B(2)(f), that our Plan was temporarily modified due to climatic conditions. This temporary Plan modification did not reduce the minimum number of data points which was collected during the year, and it did not eliminate any pollutant parameters identified in the applicable Table B-1.

SE PHEASANT COURT OUTFALL FACT SHEET

Drainage Characteristics

- Dominant Land Uses = Mixed use, including industrial, highway/arterial, and commercial.

NPDES Monitoring Locations:

- The SE Pheasant Ct. outfall discharges to a Union Pacific Railroad-owned ditch at SE Pheasant Court. This ditch drains into Mt. Scott Creek.

2015/2016 Monitoring Results (provided in tabular format)

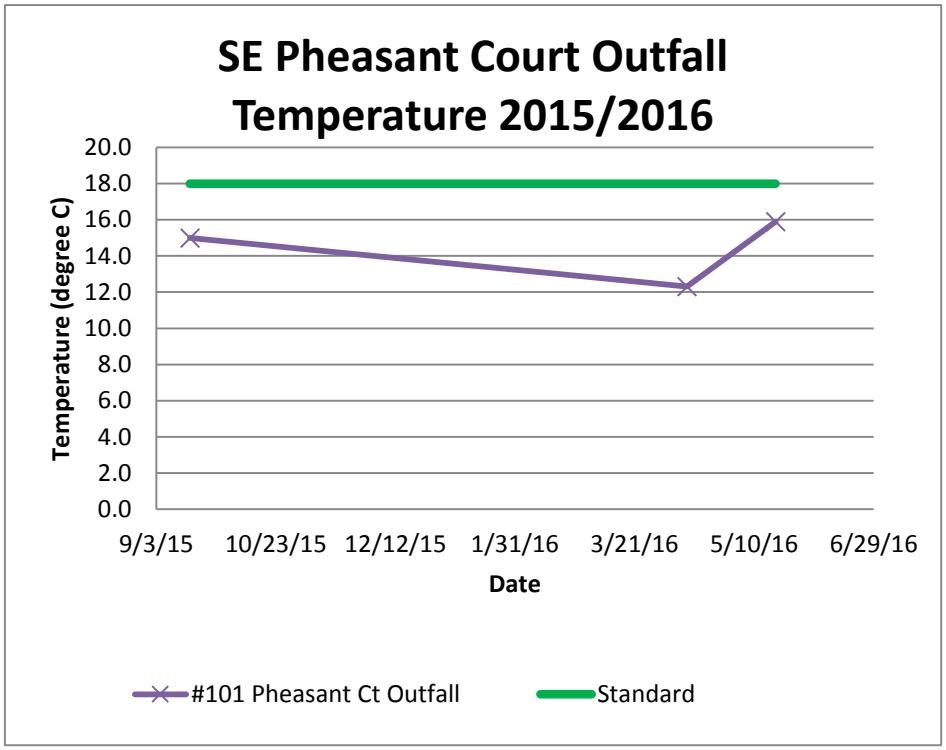
Outfall monitoring data collected during the 2015/2016 MS4 permit reporting year are provided in the following table. A total of 3 storm monitoring events were conducted during the permit year. Data were analyzed and comprehensive results are provided below. Where water quality standards or guidance value exceedances are indicated, the basis for that determination is provided in the attached Clackamas County Water Quality Index (Attachment 1). Although not reflected in the table below, water flow rate, total dissolved solids, and conductivity were also measured at both locations.

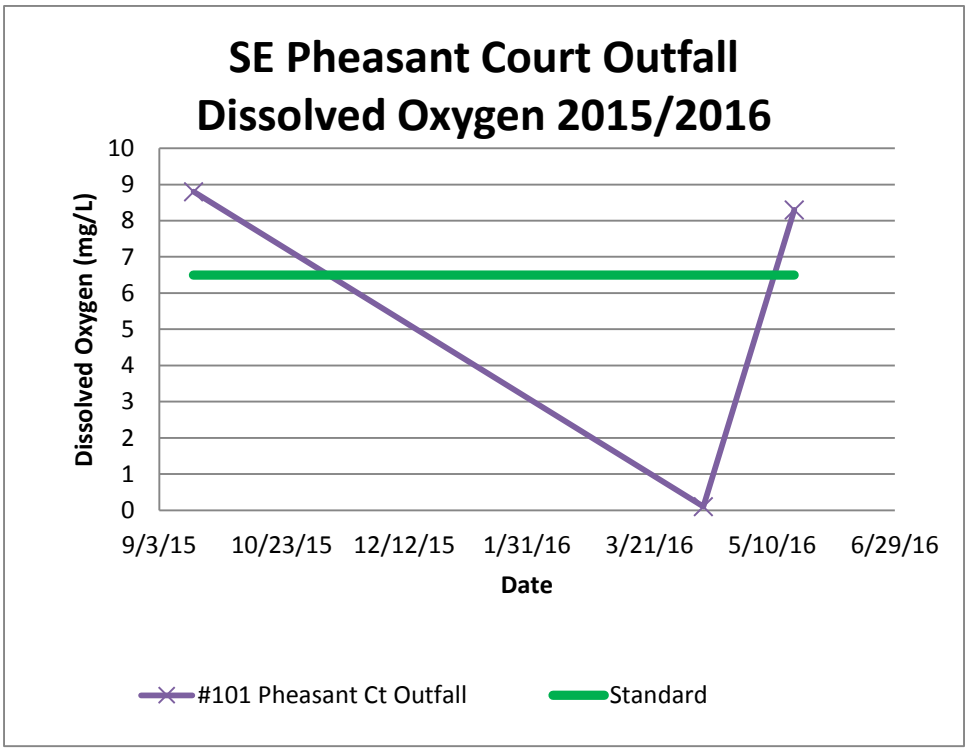
	Temperature (C)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	E coli (Counts/100 mL)	Total Copper (ug/L)	Dissolved Copper (ug/L)	Total Lead (ug/L)	Dissolved Lead (ug/L)	Total Zinc (ug/L)	Dissolved Zinc (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Orthophosphate (mg/L)	Hardness (mg/L)	pH
SE Pheasant Court Outfall (site #101): 3 storms																		
Mean	14.4	5.7	0.36	434	27.53	17.0	2.72	0.37	206.0	152.0	117	32	9.9	0.46	0.20	0.08	20	6.2
Maximum	15.9	8.8	0.51	>2420	61.30	39.2	4.64	0.76	392.0	312.0	157	57	20.0	1.20	0.31	0.10	38	6.6
Minimum	12.3	0.1	0.24	24	8.40	5.7	1.14	0.16	87.0	65.0	79	7	4.8	0.06	0.11	0.05	6	5.9
Exceedance of guidance value or criteria (# exceed/total)	0/3	1/3	0/3	2/3	3/3	3/3	3/3	1/3	3/3	3/3	NA	NA	NA	0/3	2/3	NA	NA	2/3

Note: Exceedance totals for metals data is based on exceedances of chronic guidance values and chronic criteria, not acute guidance values and acute criteria. Also note: The geometric mean value is shown for E. coli in the row titled "Mean"

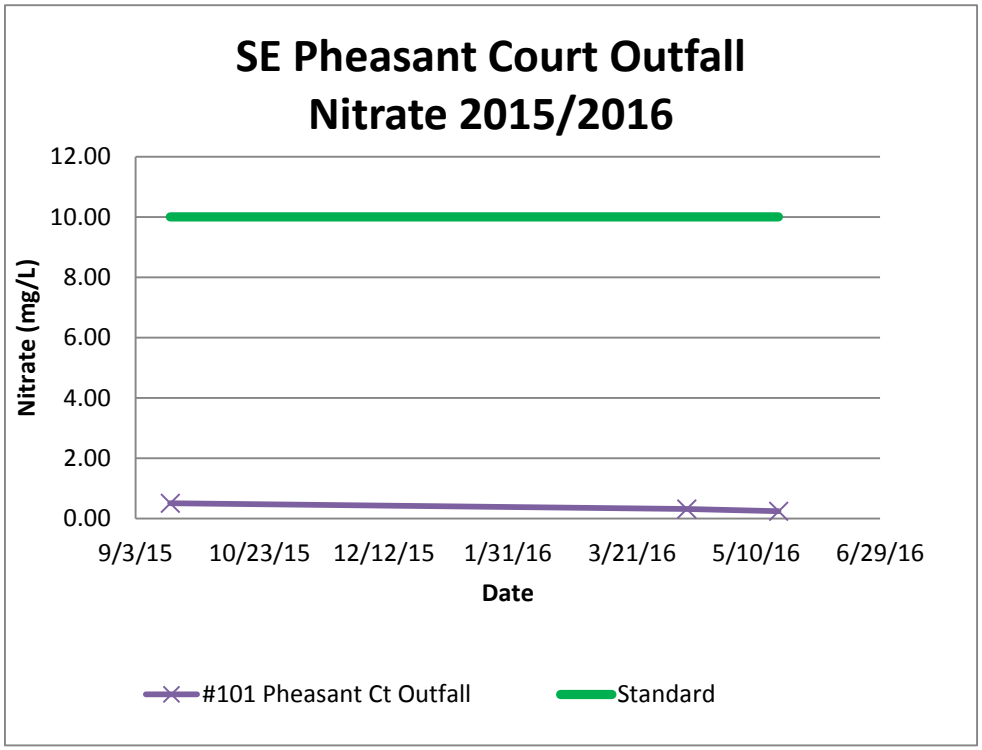
2015/2016 Monitoring Results (provided in graphical format)

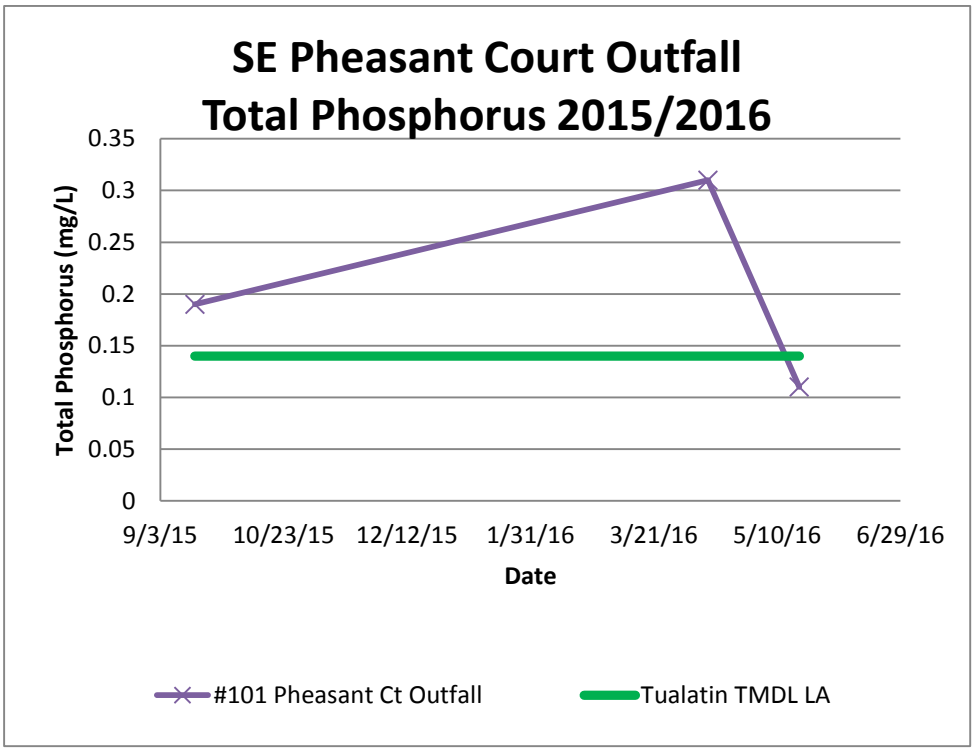
Monitoring results for select parameters have been plotted to indicate either adherence to the water quality standard (where standards apply) or to indicate whether data are in a "healthy" range as referenced in the attached Clackamas County Water Quality Index (Attachment 1). In cases where the monitoring result is less than a laboratory method's detection limit, the plotted value is the laboratory method's detection limit.



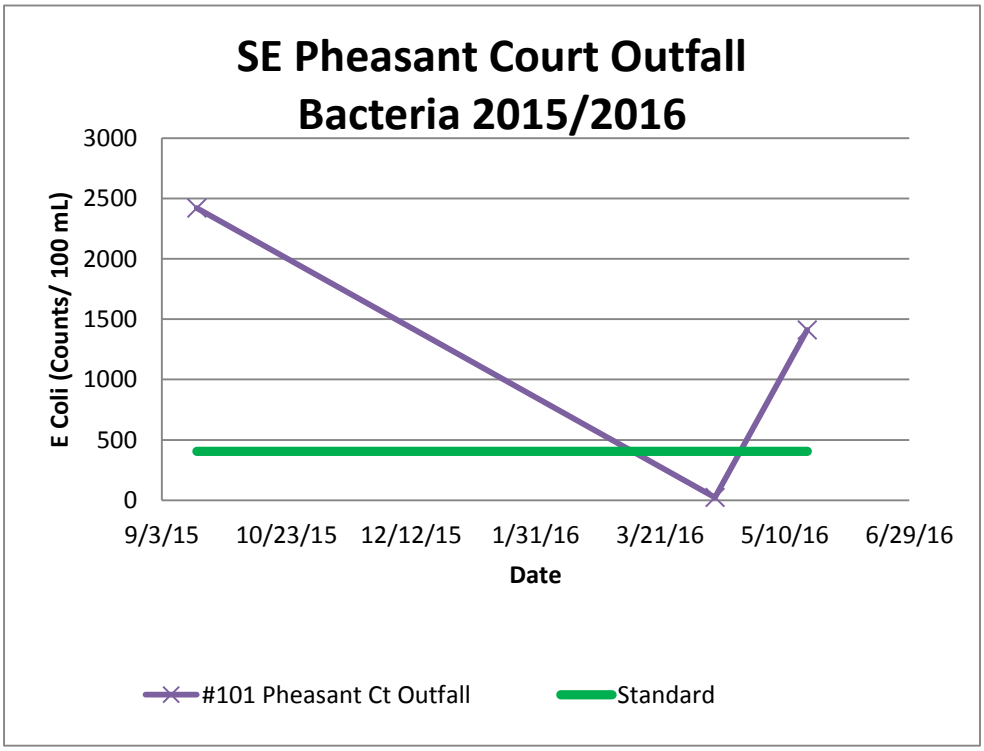


Note: For dissolved oxygen, the standard is a minimum concentration that the samples should not drop below.

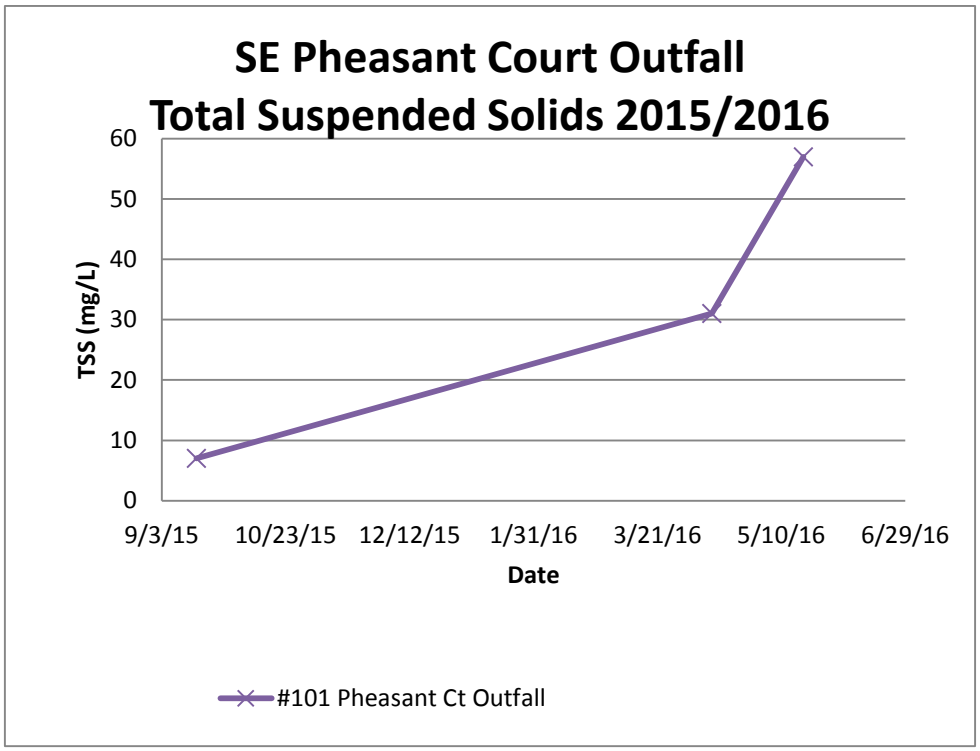




Note: The comparison is made here to the Load Allocation for total phosphorus in the Tualatin TMDL, for the Kellogg-Mt. Scott watershed does not have a specific guidance value for instream total phosphorus



Note: The >2420 bacteria value is charted as 2420 colonies/100ml



2015/2016 Monitoring Results Discussion

The SE Pheasant Court outfall discharges directly to a vegetated ditch which is owned by the Union Pacific railroad, so the levels of some of the pollutants, such as ammonia, are expected to be reduced as the stormwater runoff flows ~2,000 feet through the ditch. In this Monitoring Results Discussion section, although stormwater quality data is compared to instream water quality criteria and guidance values, it is important to be aware that some pollutant levels will have been lower by the time the stormwater runoff flows through the ditch and enters Mt. Scott Creek. In addition, rapid mixing of the stormwater runoff in the waters of the creek should quickly reduce pollutant concentrations if the levels of the pollutant in the creek are lower.

The 406 colonies/100 ml standard for E. coli was exceeded during 2 of the 3 storm monitoring events. The pH levels during two of the storms were below 6.5, which is not protective of watershed health. During two of the monitored storms, dissolved oxygen levels were above 8.0 mg/L, which is protective of watershed health. Unfortunately, the dissolved oxygen level was close to zero (<0.1 mg/L) during the storm on April 12, 2016. The dissolved oxygen level was 8.3 mg/L on May 19, 2016, so the very low dissolved oxygen level which was recorded on April 12, 2016 appears to not be an ongoing problem.

The total phosphorus concentration was above the 0.14 mg/L guidance value during 2 of the 3 storms (the highest concentration was 0.31 mg/L).

The highest concentration of ammonia that was measured in any of the 9 monitored creeks and 5 MS4 outfalls in CCSD#1 and the SWMACC during the monitoring year (1.2 mg/L) was documented at the SE Pheasant Court outfall. This elevated ammonia level was measured during the storm on September 17, 2015. Although this is the highest concentration which was recorded in a creek or at an outfall during the monitoring year, this concentration of ammonia isn't toxic to aquatic life. The level of ammonia probably decreased before the stormwater runoff entered Mt. Scott Creek. Since

this outfall discharges directly to a vegetated railroad-owned ditch, the levels of some of the pollutants, such as ammonia, are expected to be reduced as the stormwater runoff flows through the ditch.

The State of Oregon's instream criteria for total copper and dissolved zinc were both exceeded during all 3 monitoring events. The State of Oregon's instream criteria for dissolved lead was exceeded during all 1 monitoring event. Guidance values for the following parameters were also exceeded:

- Total lead (During all 3 of the monitored storms)
- Total zinc (During all 3 of the monitored storms)
- Dissolved copper (During all 3 of the monitored storms)

This MS4 outfall was monitored during storms on September 17, 2015, April 12, 2016 and May 19, 2016. These storms did have an Antecedent Dry Period, as defined by MS4 permit Schedule B(3)(b)(ii), but significant amounts of rain fell during these storms before monitoring was initiated (see Table 2 for more information). Although section 5.2.2 in the monitoring plan (Comprehensive Clackamas County NPDES MS4 Stormwater Monitoring Plan) says *"...sample collection will be initiated towards the beginning of the storm event...",* it was not possible to adhere to this section of the monitoring plan during these storm monitoring events.

SE OREGON TRAIL DRIVE OUTFALL FACT SHEET

Drainage Characteristics (Located in the Sieben Creek Watershed)

Dominant Land Use = Commercial

NPDES Monitoring Locations:

The SE Oregon Trail Drive outfall, which receives drainage from a shopping mall at the intersection of SE Sunnyside Road and 147th Avenue, discharges into an un-named tributary of Rose Creek. Rose Creek is Sieben Creek's largest tributary. Sieben Creek is in the Clackamas River watershed. The outfall near the Happy Valley Public Library at 13793 SE Sieben Park Way.

2015/2016 Results (provided in tabular format)

Outfall monitoring data collected during the 2015/2016 MS4 permit reporting year are provided in the following table. A total of three monitoring events were conducted during storm event conditions. Data were analyzed and comprehensive results are provided below. Where water quality standards or guidance value exceedances are indicated, the basis for that determination is provided in the attached Clackamas County Water Quality Index (Attachment 1). Although not reflected in the table below, water flow rate, total dissolved solids, and conductivity were also measured.

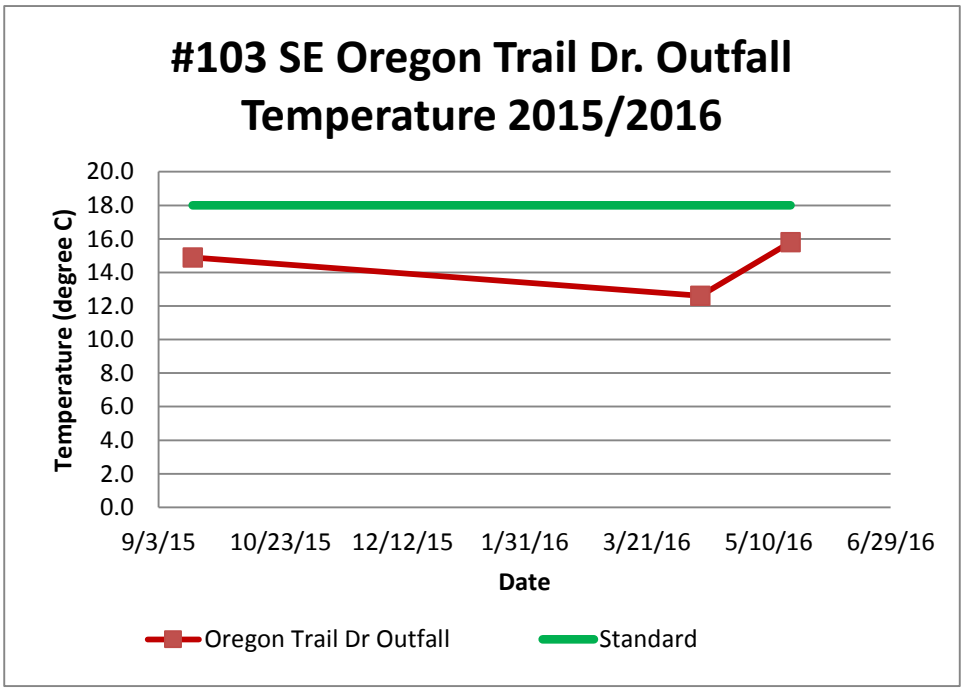
	Temperature (C)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	E coli (Counts/100 mL)	Total Copper (ug/L)	Dissolved Copper (ug/L)	Total Lead (ug/L)	Dissolved Lead (ug/L)	Total Zinc (ug/L)	Dissolved Zinc (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Orthophosphate (mg/L)	Hardness (mg/L)	pH
Oregon Trail Dr Outfall (site #103): 3 storms																		
Mean	14.4	8.0	0.52	184	10.77	7.1	1.31	0.22	134.7	91.3	124	22	13.7	0.32	0.14	0.05	27	6.2
Maximum	15.8	9.0	0.62	>2420	15.70	11.6	2.08	0.43	247.0	170.0	184	29	>35.0	0.77	0.28	0.07	46	6.5
Minimum	12.6	6.3	0.39	32	8.10	4.3	0.75	0.07	75.0	51.0	86	14	2.3	<0.05	<0.04	0.04	14	5.7
Exceedance of guidance value or criteria (# exceed/total)	0/3	1/3	0/3	1/3	3/3	3/3	3/3	0/3	3/3	3/3	NA	NA	NA	0/3	1/3	NA	NA	2/3

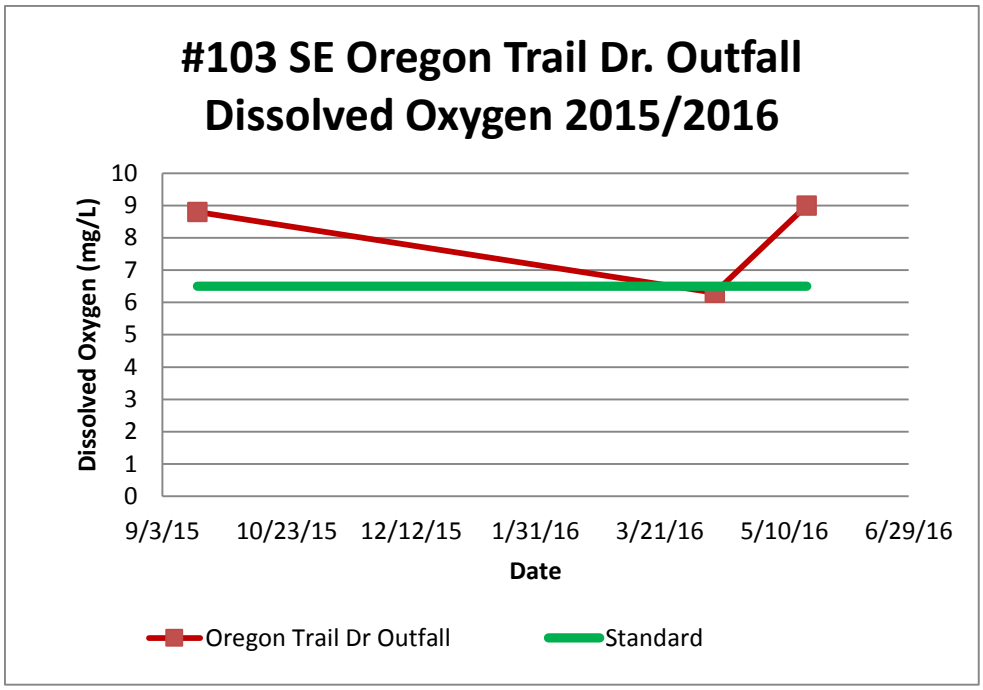
Note: Exceedance totals for metals data is based on exceedances of chronic guidance values and chronic criteria, not acute guidance values and acute criteria.

Also note: The geometric mean value is shown for E. coli in the row titled "Mean"

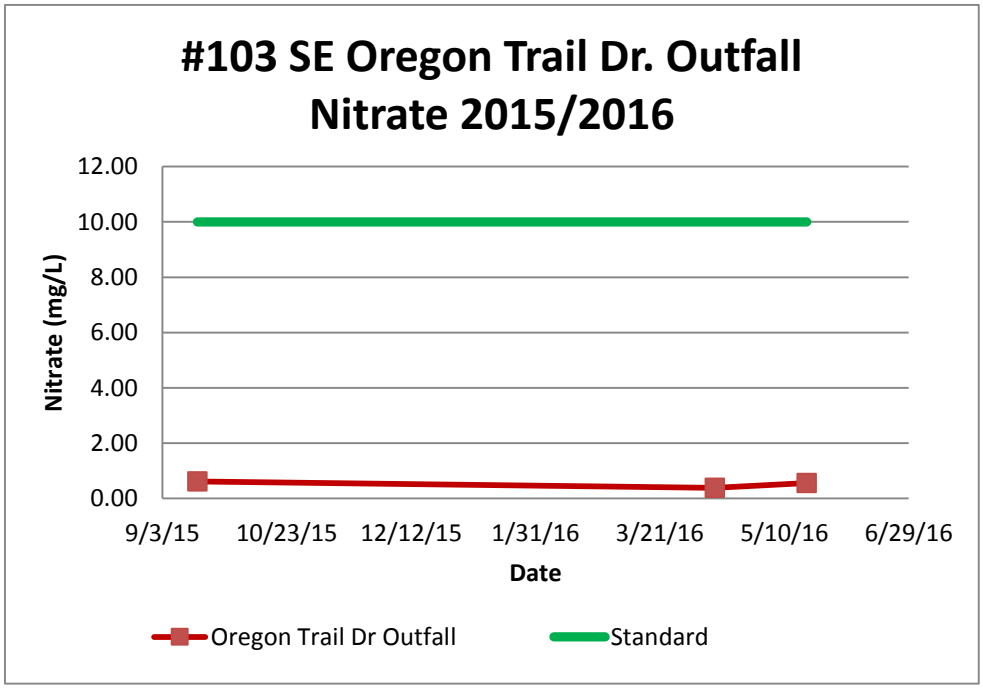
2015/2016 Monitoring Results (provided in graphical format)

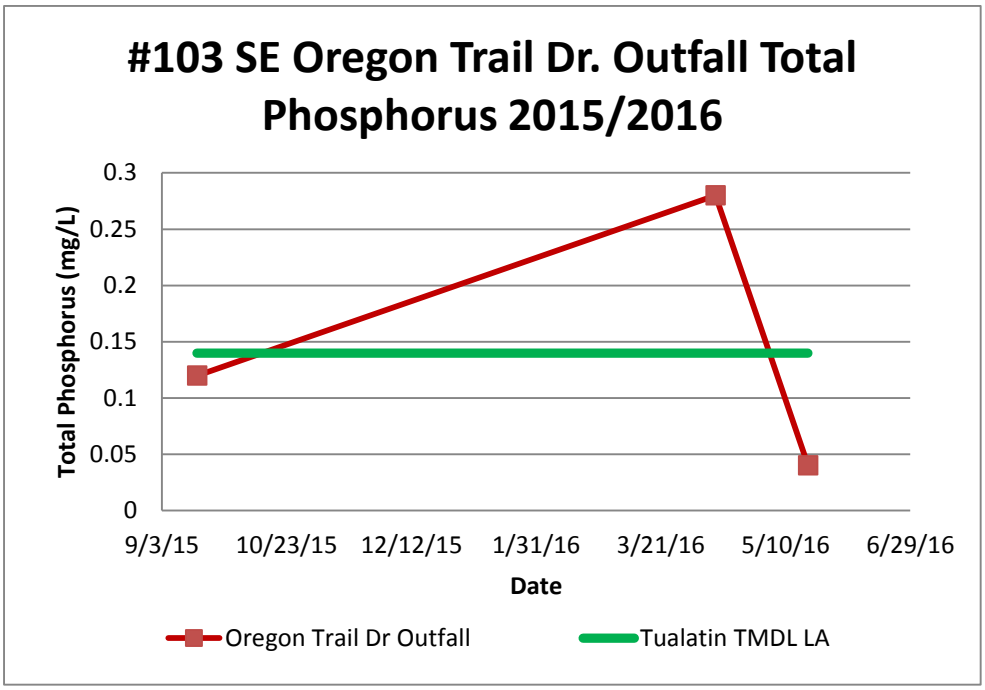
Monitoring results for select parameters have been plotted to indicate either adherence to the water quality standard (where standards apply) or to indicate whether data are in a "healthy" range as referenced in the attached Clackamas County Water Quality Index (Attachment 1). In cases where the monitoring result is less than a laboratory method's detection limit, the plotted value is the laboratory method's detection limit.



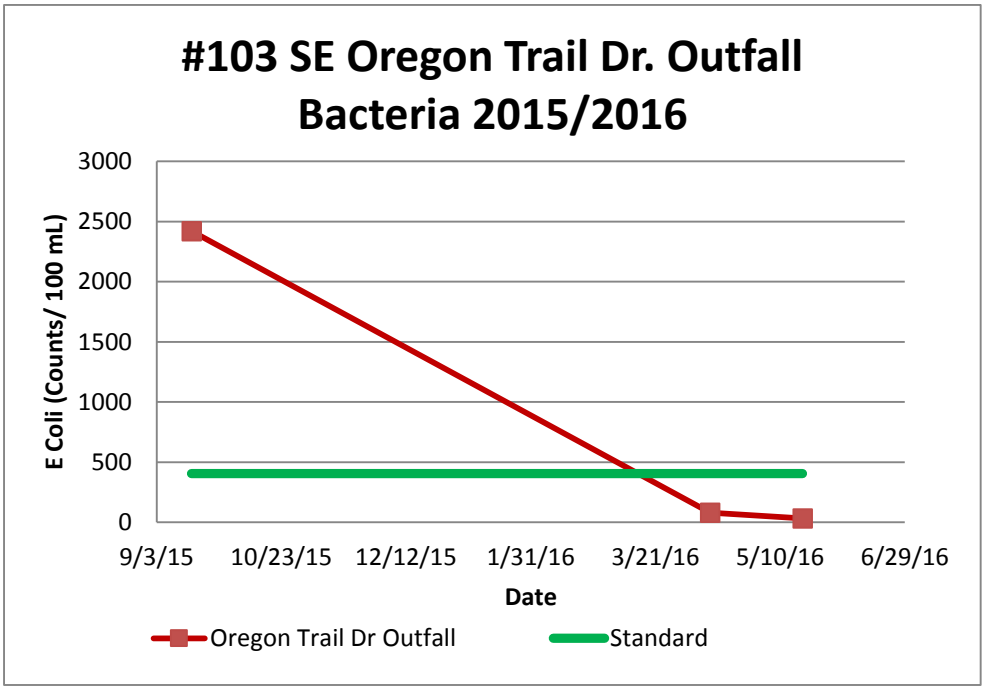


Note: For dissolved oxygen, the standard is a minimum concentration that the samples should not drop below.

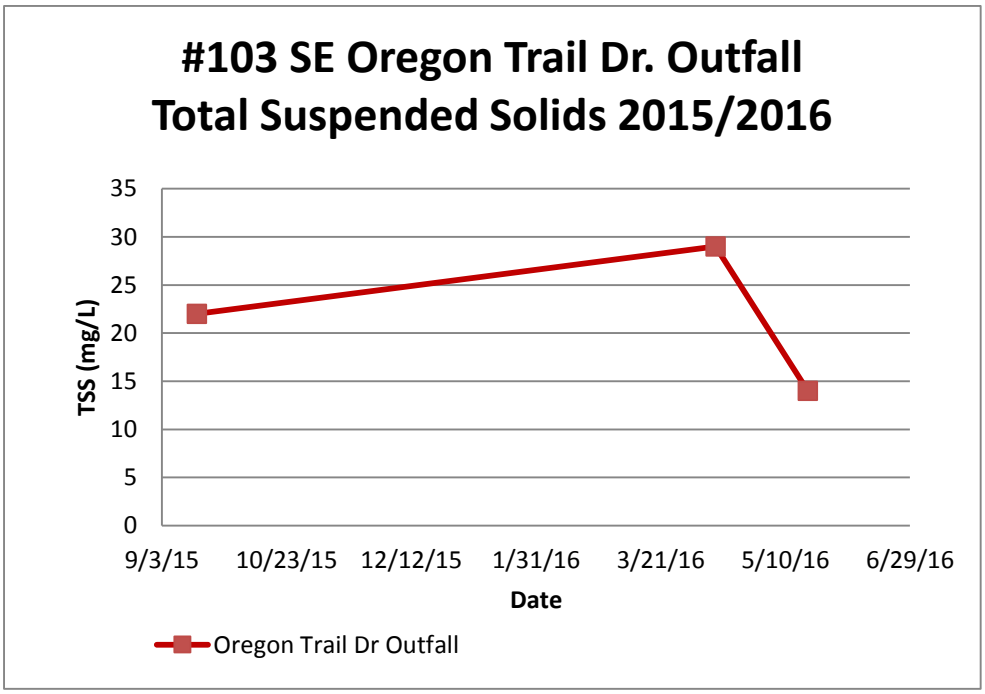




Note: The comparison is made here to the Waste Load Allocation for total phosphorus in the Tualatin TMDL, for the Clackamas River watershed does not have a specific guidance value for instream total phosphorus



Note: The >2420 bacteria value is charted as 2420 colonies/100ml



2015/2016 Monitoring Results Discussion

Several pollutants were at elevated levels at the SE Oregon Trail Drive outfall during the April 12, 2016 storm, including:

- The biochemical oxygen demand (BOD) concentration was >35 mg/L, which is unusually high, although the concentration was down to a low level (2.3 mg/L) during the storm which was monitored about a month later (May 19, 2016), so the elevated BOD concentration doesn't appear to be an ongoing issue.
- The total phosphorus concentration was 0.28 mg/L, which is twice the 0.14 mg/L guidance value. The concentration was down to an undetectable level (<0.04 mg/L) during the May 19th storm so the elevated total phosphorus concentration doesn't appear to be an ongoing issue.
- The ammonia concentration was 0.77 mg/L. Although this level is elevated, it is a low level and is protective of watershed health. This concentration is far below the State of Oregon's instream water quality criteria. The ammonia concentration was down to an undetectable level (<0.05 mg/L) during the May 19th storm so the elevated ammonia concentration doesn't appear to be an ongoing issue.
- The dissolved oxygen (DO) concentration was 6.3 mg/L. The concentration was all of the way back up to 9.0 mg/L, which is protective of watershed health, during the May 19th storm so the low DO level which was measured on April 12th doesn't appear to be an ongoing issue.
- Copper, lead, and zinc. See below for more information about these pollutants.

Discussing the monitoring results from other storms, the 406 colonies/100 ml standard for E. coli was exceeded during the storm on September 17, 2015. The pH level during two storms was below 6.5, which is not protective of watershed health, but the pH level during the storm on April 12, 2016 was exactly 6.5, which is protective of watershed health.

The State of Oregon's instream criteria for total copper and dissolved zinc were both exceeded during all 3 monitoring events. Guidance values for the following parameters were also exceeded:

- Total lead (During all 3 of the monitored storms)
- Total zinc (During all 3 of the monitored storms)
- Dissolved copper (During all 3 of the monitored storms)

This MS4 outfall was monitored during storms on September 17, 2015, April 12, 2016 and May 19, 2016. These storms did have an Antecedent Dry Period, as defined by MS4 permit Schedule B(3)(b)(ii), but significant amounts of rain fell during these storms before monitoring was initiated (see Table 2 for more information). Although section 5.2.2 in the monitoring plan (Comprehensive Clackamas County NPDES MS4 Stormwater Monitoring Plan) says *"...sample collection will be initiated towards the beginning of the storm event..."*, it was not possible to adhere to this section of the monitoring plan during these storm monitoring events.

SE WEBSTER ROAD OUTFALL FACT SHEET

Drainage Characteristics (Located in the Kellogg Creek Watershed)

Dominant Land Use = Single-family urban residential

NPDES Monitoring Locations:

The SE Webster Road outfall discharges into Kellogg Creek at the place where SE Webster Road crosses the creek.

Results (provided in tabular format)

Outfall monitoring data collected during the 2015/2016 MS4 permit reporting year are provided in the following table. A total of three monitoring events were conducted during storm event conditions. Data were analyzed and comprehensive results are provided below. Where water quality standards or guidance value exceedances are indicated, the basis for that determination is provided in the attached Clackamas County Water Quality Index (Attachment 1). Although not reflected in the table below, water flow rate, total dissolved solids, and conductivity were also measured.

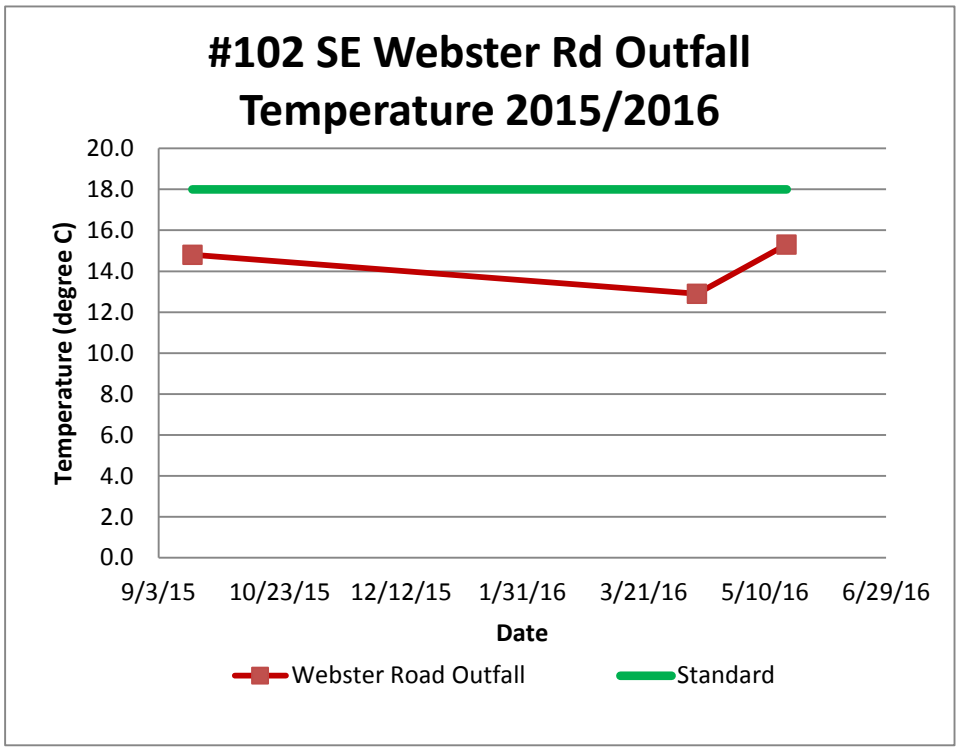
	Temperature (C)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	E coli (Counts/100 mL)	Total Copper (ug/L)	Dissolved Copper (ug/L)	Total Lead (ug/L)	Dissolved Lead (ug/L)	Total Zinc (ug/L)	Dissolved Zinc (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Orthophosphate (mg/L)	Hardness (mg/L)	pH
SE Webster Road Outfall (site #102): 3 storms																		
Mean	14.3	8.6	0.52	622	19.10	14.0	1.45	0.27	382.7	308.3	106	19	7.5	0.33	0.17	0.07	17	6.4
Maximum	15.3	9.0	1.00	>2420	37.30	30.3	2.07	0.47	964.0	808.0	134	32	14.0	0.79	0.24	0.09	26	6.7
Minimum	12.9	8.2	0.19	50	9.20	5.7	1.01	0.16	84.0	49.0	78	11	3.8	0.07	0.06	0.04	11	6.1
Exceedance of guidance value or criteria (# exceed/total)	0/3	0/3	0/3	2/3	3/3	3/3	3/3	0/3	3/3	3/3	NA	NA	NA	0/3	2/3	NA	NA	2/3

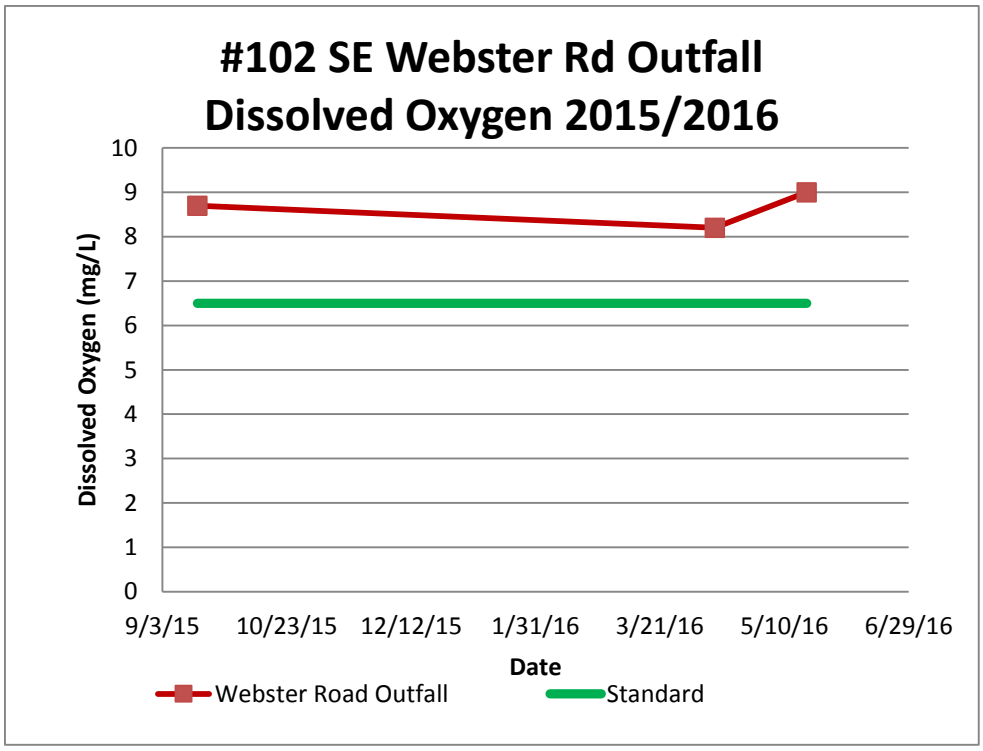
Note: Exceedance totals for metals data is based on exceedances of chronic guidance values and chronic criteria, not acute guidance values and acute criteria.

Also note: The geometric mean value is shown for E. coli in the row titled "Mean"

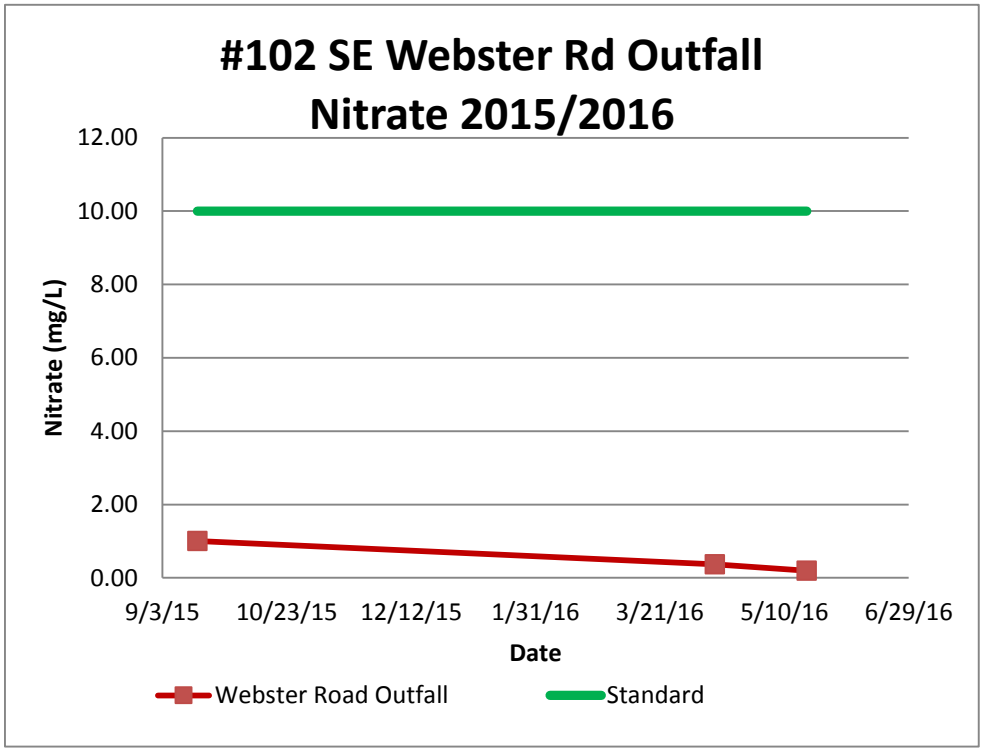
2015/2016 Monitoring Results (provided in graphical format)

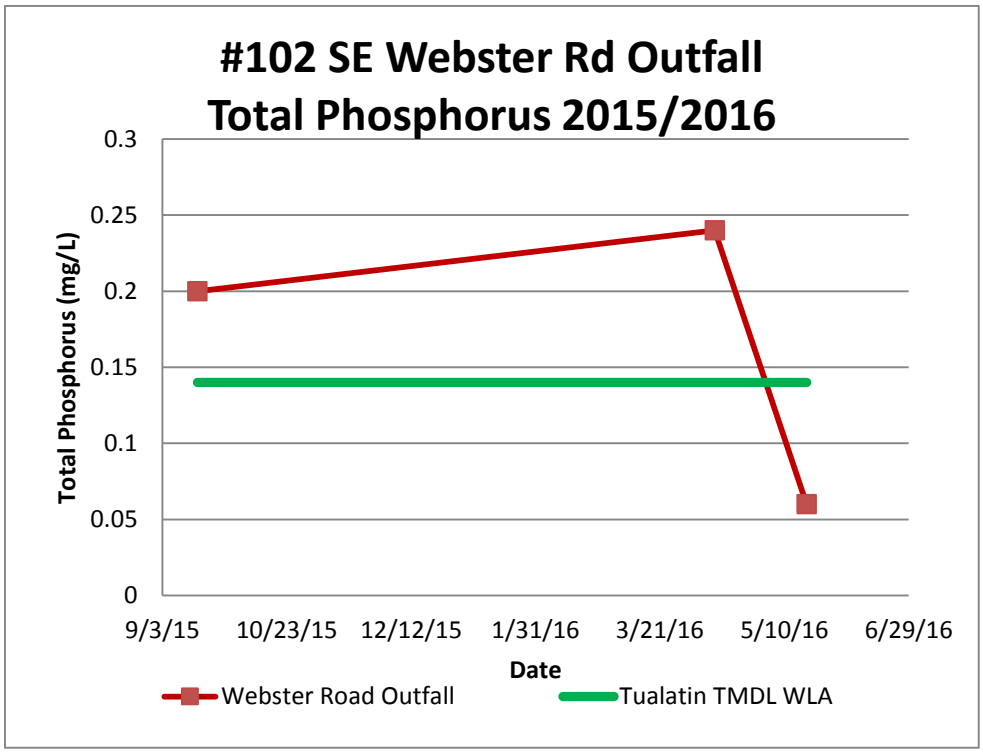
Monitoring results for select parameters have been plotted to indicate either adherence to the water quality standard (where standards apply) or to indicate whether data are in a "healthy" range as referenced in the attached Clackamas County Water Quality Index (Attachment 1). In cases where the monitoring result is less than a laboratory method's detection limit, the plotted value is the laboratory method's detection limit.



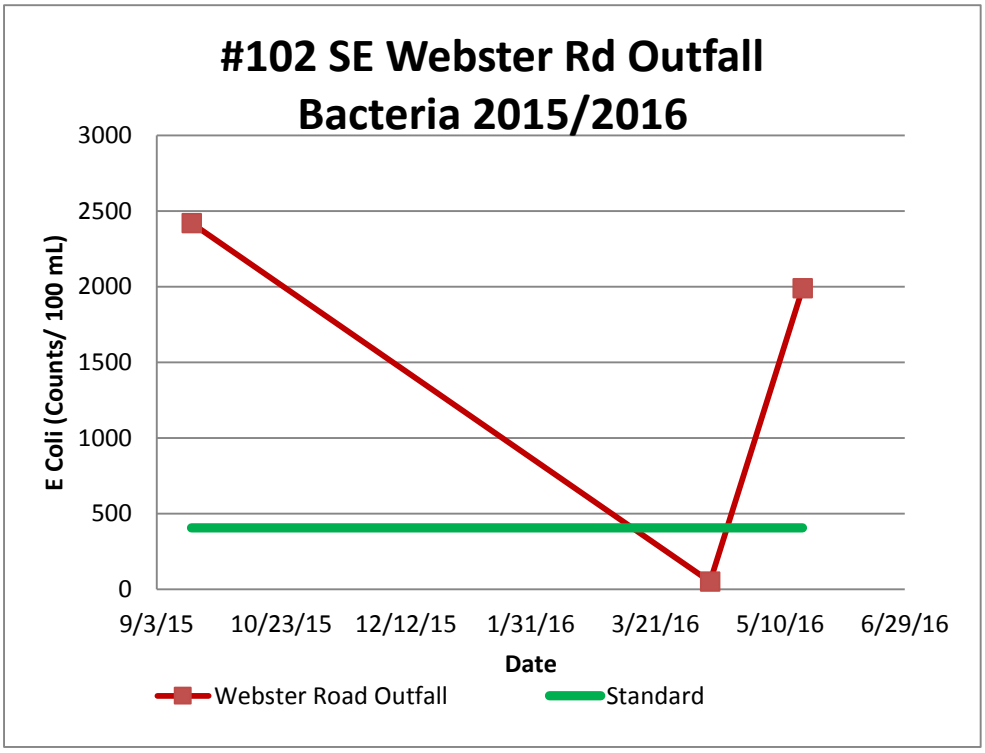


Note that for dissolved oxygen, the standard is a minimum concentration that the samples should not drop below.

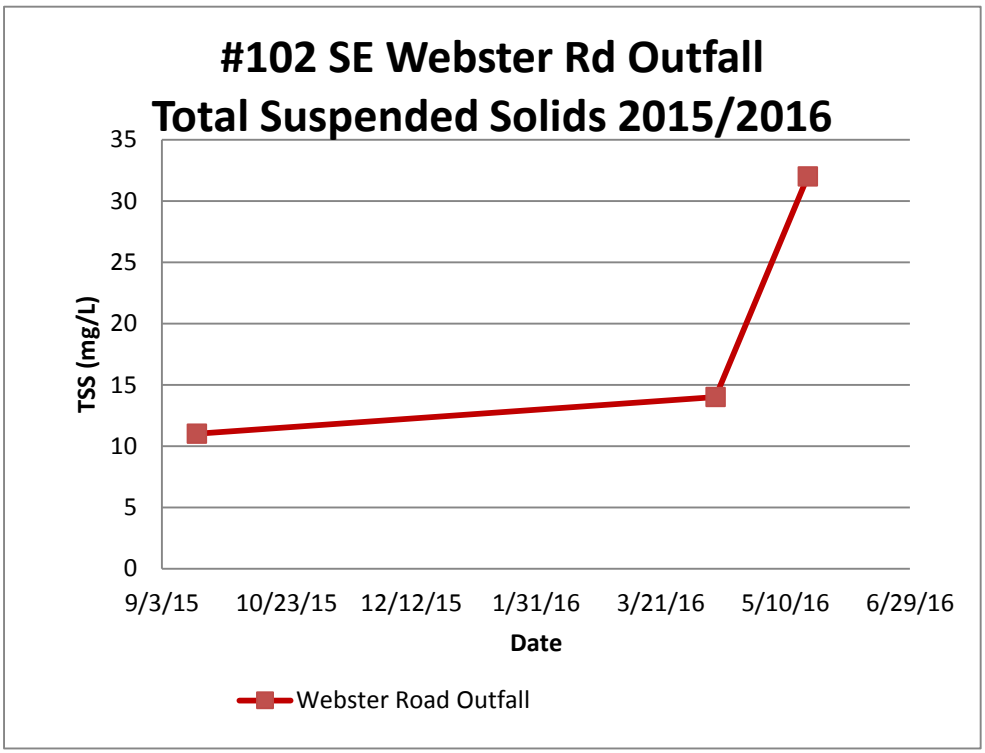




Note: The comparison is made here to the Waste Load Allocation for total phosphorus in the Tualatin TMDL, for the Kellogg Creek watershed does not have a specific guidance value for instream total phosphorus



Note: The >2420 bacteria value is charted as 2420 colonies/100ml



2015/2016 Monitoring Results Discussion

Several pollutants were at elevated levels at the SE Webster Rd outfall during the April 12, 2016 storm, including:

- The biochemical oxygen demand (BOD) concentration was 14 mg/L, although the concentration was down to a low level (3.8 mg/L) during the storm which was monitored about a month later (May 19, 2016), so the elevated BOD concentration doesn't appear to be an ongoing issue.
- The total phosphorus concentration was 0.24 mg/L, which is above the 0.14 mg/L guidance value. The concentration was down to a low level (0.06 mg/L) during the May 19th storm so the elevated total phosphorus concentration doesn't appear to be an ongoing issue.
- The ammonia concentration was 0.79 mg/L. Although this level is elevated, it is a low level and is protective of watershed health. This concentration is far below the State of Oregon's instream water quality criteria. The ammonia concentration was down to a low level (0.07 mg/L) during the May 19th storm so the elevated ammonia concentration doesn't appear to be an ongoing issue.
- The pH level was 6.4, which is not protective of watershed health.
- Copper, lead, and zinc. See below for more information about these pollutants.

Discussing the monitoring results from other storms, the 406 colonies/100 ml standard for E. coli was exceeded during the storms on September 17, 2015 and May 19, 2016. During the May 19, 2016 storm, the pH level was 6.1, which is not protective of watershed health.

The State of Oregon's instream criteria for total copper and dissolved zinc were both exceeded during all 3 monitoring events. Guidance values for the following parameters were also exceeded:

- Total lead (During all 3 of the monitored storms)
- Total zinc (During all 3 of the monitored storms)
- Dissolved copper (During all 3 of the monitored storms)

Additional discussion about Zinc at the SE Webster Road outfall: Elevated concentrations of *total* zinc were measured by WES in stormwater discharges from the SE Webster Road outfall to Kellogg Creek in CCSD#1 during the storms on November 29, 2012 (524 ug/L) and January 28, 2014 (1,358 ug/L). The concentrations of *dissolved* zinc during these storms were also elevated (1,207 ug/L on January 28, 2014, for example). These elevated zinc concentrations are potentially harmful to aquatic life in Kellogg Creek. In an attempt to locate the significant source or sources of zinc, samples were collected from the outfall and from locations in three different upstream branches of this large storm sewer system on May 8, 2014, but the highest concentration of *total* zinc on May 8, 2014 was 96 ug/L. The concentration of *total* zinc was much lower - at or below 210 ug/L - during the six storms which were monitored at the SE Webster Road outfall from February 27, 2014 to September 17, 2015. *Dissolved* zinc concentrations were also much lower during this time. Since zinc concentrations were much lower during this twenty month-long period, WES chose to not collect samples from the monitoring locations in the various upstream branches of this large storm sewer system a second time. However, elevated concentrations of *total* zinc (964 ug/L) and *dissolved* zinc (808 ug/L) were measured at the SE Webster Rd outfall during the storm on April 12, 2016. However, the levels of these pollutants were much lower at the SE Webster Road outfall during the storm on May 19, 2016: *total* zinc was 84 ug/L and *dissolved* zinc was 49 ug/L.

In a renewed effort to trace the outfall's occasional high levels of *total* and *dissolved* zinc to their source, additional stormwater samples will be collected in the future from the previously monitored locations in the upstream branches of this large storm sewer system. This monitoring work is described in a special, short-term monitoring plan which was published by WES on May 20, 2016 (copies of this plan are available upon request).

Section 5.2.2 in the monitoring plan: This MS4 outfall was monitored during storms on September 17, 2015, April 12, 2016 and May 19, 2016. These storms did have an Antecedent Dry Period, as defined by MS4 permit Schedule B(3)(b)(ii), but significant amounts of rain fell during these storms before monitoring was initiated (see Table 2 for more information). Although section 5.2.2 in the monitoring plan (Comprehensive Clackamas County NPDES MS4 Stormwater Monitoring Plan) says *"…sample collection will be initiated towards the beginning of the storm event…",* it was not possible to adhere to this section of the monitoring plan during these storm monitoring events.

Drainage Characteristics

- Dominant Land Use = Multi-family residential.

NPDES Monitoring Locations:

The Sunnyside Village Apartments outfall, which receives drainage from the Sunnyside Village Apartment complex at 14480 SE Sunnyside Road, discharges into an un-named tributary of Rose Creek. Rose Creek is Sieben Creek's largest tributary. Sieben Creek is in the Clackamas River watershed. The outfall is near the Happy Valley Public Library at 13793 SE Sieben Park Way.

2015/2016 Monitoring Results (provided in tabular format)

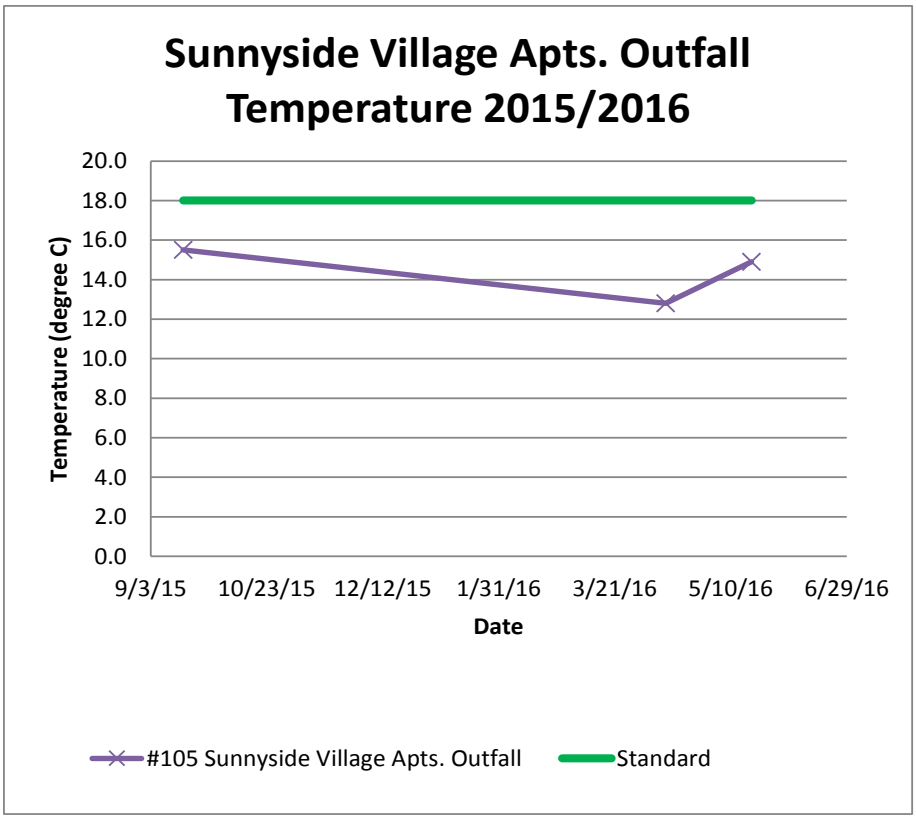
Outfall monitoring data collected during the 2015/2016 MS4 permit reporting year are provided in the following table. A total of three runoff sampling events were conducted at each location during storm event conditions. Data were analyzed and comprehensive results are provided below. Where water quality standards or guidance value exceedances are indicated, the basis for that determination is provided in the attached Clackamas County Water Quality Index (Attachment 1). Although not reflected in the table below, water flow rate, total dissolved solids, and conductivity were also measured at both locations.

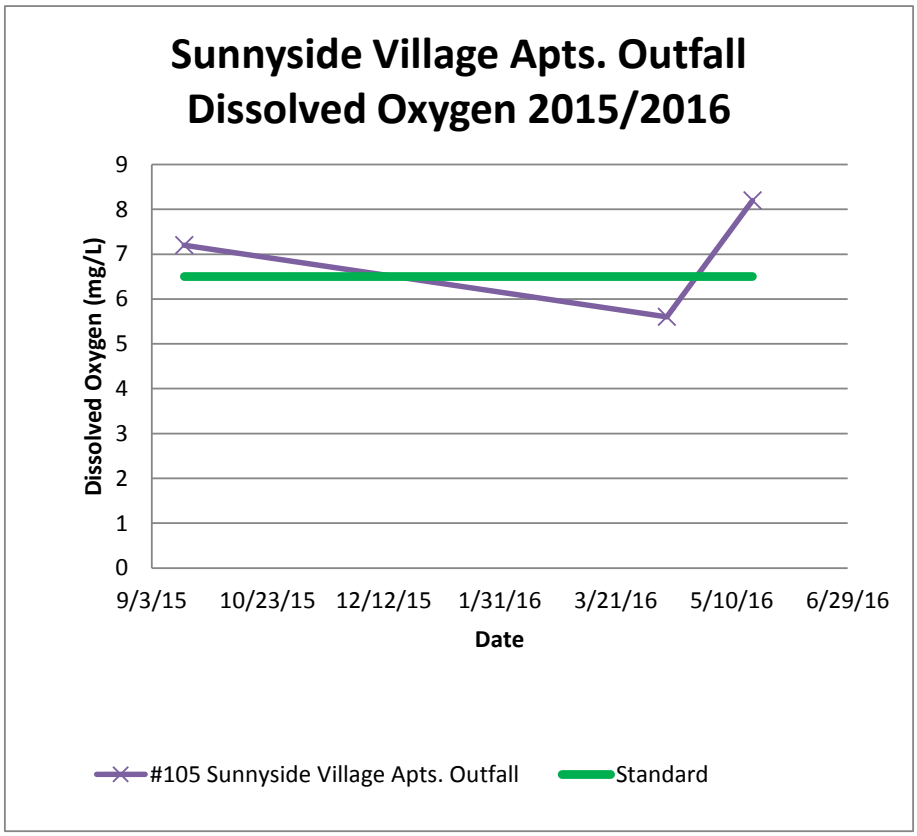
	Temperature (C)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	E coli (Counts/100 mL)	Total Copper (ug/L)	Dissolved Copper (ug/L)	Total Lead (ug/L)	Dissolved Lead (ug/L)	Total Zinc (ug/L)	Dissolved Zinc (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Ammonia (mg/L)	Total Phosphous (mg/L)	Orthophosphate (mg/L)	Hardness (mg/L)	pH
Sunnyside Village Apartments Outfall (site #105): 3 storms																		
Mean	14.4	7.0	0.46	472	59.23	44.7	0.66	0.10	62.7	47.3	123	13	14.4	0.39	0.15	0.08	25	6.4
Maximum	15.5	8.2	0.58	>2420	158.00	120.3	0.88	0.16	103.0	85.0	175	19	>36.0	1.00	0.31	0.18	34	6.6
Minimum	12.8	5.6	0.33	18	8.10	5.0	0.52	0.07	35.0	28.0	73	9	2.2	0.06	<0.04	0.04	15	6.1
Exceedance of guidance value or criteria (# exceed/total)	0/3	1/3	0/3	2/3	3/3	3/3	2/3	0/3	3/3	2/3	NA	NA	NA	0/3	1/3	NA	NA	1/3

Note: Exceedance totals for metals data is based on exceedances of chronic guidance values and chronic criteria, not acute guidance values and acute criteria. Also note: The geometric mean value is shown for E. coli in the row titled "Mean"

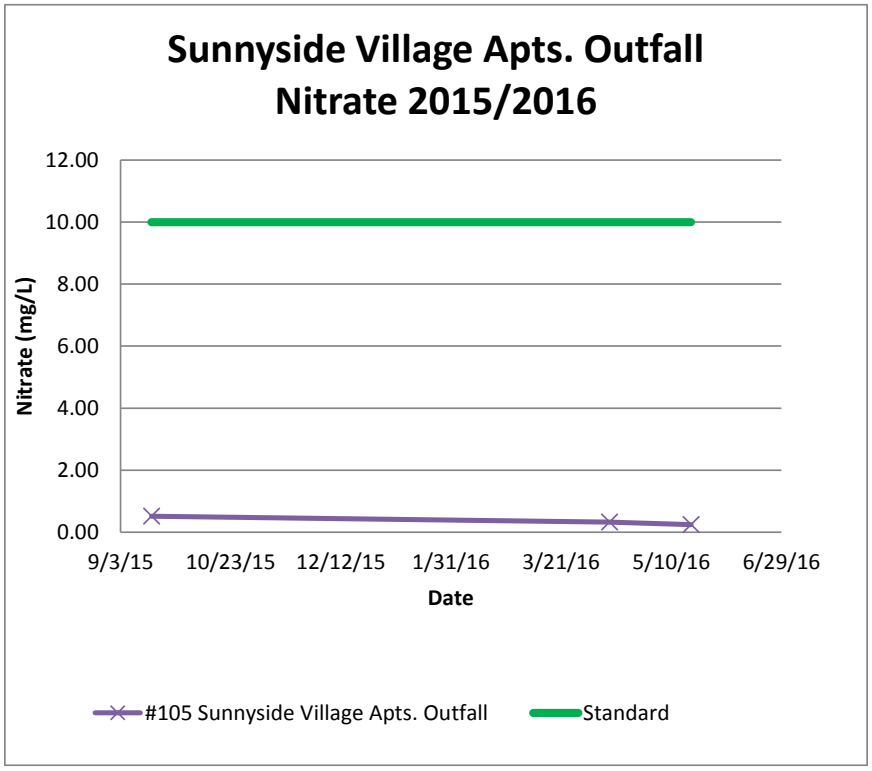
2015/2016 Monitoring Results (provided in graphical format)

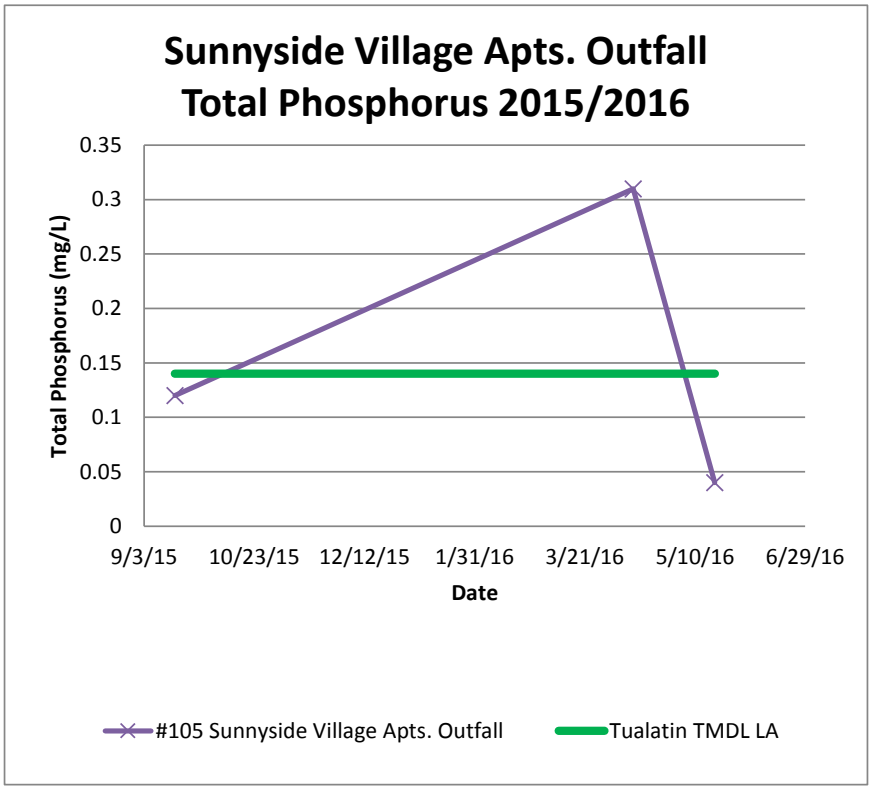
Monitoring results for select parameters have been plotted to indicate either adherence to the water quality standard (where standards apply) or to indicate whether data are in a “healthy” range as referenced in the attached Clackamas County Water Quality Index (Attachment 1). In cases where the monitoring result is less than a laboratory method's detection limit, the plotted value is the laboratory method's detection limit.


Sunnyside Village Apts. Outfall
Temperature 2015/2016
Temperature (degree C)
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
9/3/15
10/23/15
12/12/15
1/31/16
3/21/16
5/10/16
6/29/16
Date
#105 Sunnyside Village Apts. Outfall
Standard

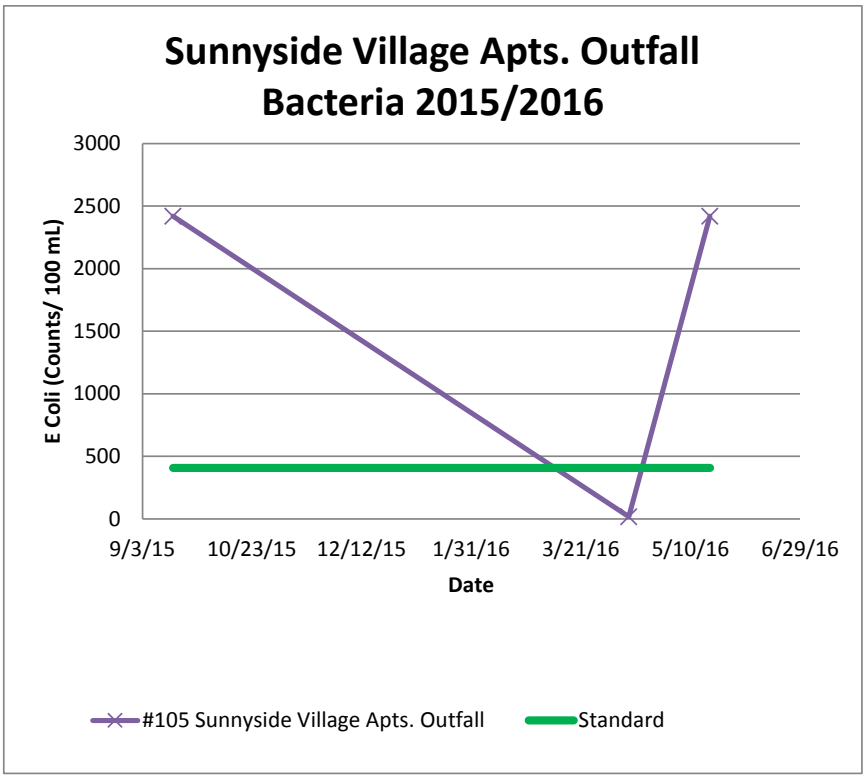

Sunnyside Village Apts. Outfall
Dissolved Oxygen 2015/2016
Dissolved Oxygen (mg/L)
9
8
7
6
5
4
3
2
1
0
9/3/15
10/23/15
12/12/15
1/31/16
3/21/16
5/10/16
6/29/16
Date
#105 Sunnyside Village Apts. Outfall
Standard

Note: For dissolved oxygen, the standard is a minimum concentration that the samples should not drop below.

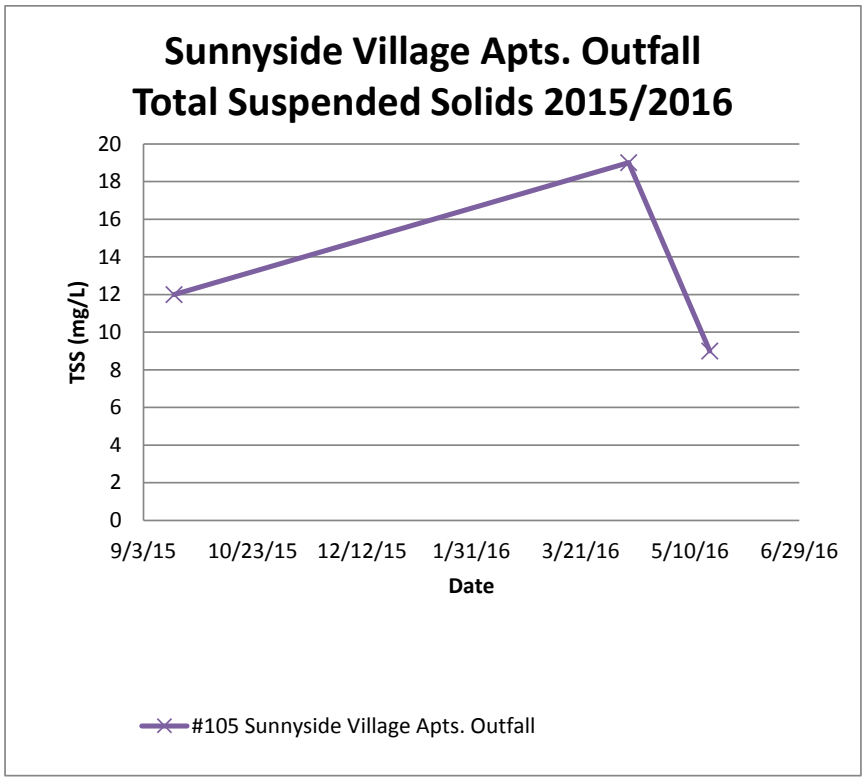




Note: The comparison is made here to the Load Allocation for total phosphorus in the Tualatin TMDL, for the Kellogg-Mt. Scott watershed does not have a specific guidance value for instream total phosphorus



Note: The two >2420 bacteria values are charted as 2420 colonies/100ml



2015/2016 Monitoring Results Discussion

Several pollutants were at elevated levels at the Sunnyside Village Apartments outfall during the April 12, 2016 storm, including:

- The concentrations of *total* copper (158 ug/L) and *dissolved* copper (120.3 ug/L) are the highest concentrations recorded during the 2015-2016 year at any monitored creek or MS4 outfall in CCSD#1 or the SWMACC. Concentrations of both pollutants were far lower during the other 2 monitoring events, including one which occurred on May 19, 2016, so the elevated concentration of *total* and *dissolved copper* observed on April 12th doesn't appear to be an ongoing issue.
- The biochemical oxygen demand (BOD) concentration was >36 mg/L, which is unusually high, although the concentration was down to a low level (2.2 mg/L) during the storm which was monitored about a month later (May 19, 2016), so the elevated BOD concentration doesn't appear to be an ongoing issue.
- The total phosphorus concentration was 0.31 mg/L, which is slightly more than twice the 0.14 mg/L guidance value. The concentration was down to an undetectable level (<0.04 mg/L) during the May 19th storm so the elevated total phosphorus concentration doesn't appear to be an ongoing issue.
- The ammonia concentration was 1.0 mg/L. Although this level is elevated, it is a low level and is protective of watershed health. This concentration is far below the State of Oregon's instream water quality criteria. The ammonia concentration was down to a very low level (0.06 mg/L) during the May 19th storm so the elevated ammonia concentration doesn't appear to be an ongoing issue.
- The dissolved oxygen (DO) concentration was 5.6 mg/L. The concentration was back up to 8.2 mg/L, which is protective of watershed health, during the May 19th storm so the low DO level which was measured on April 12th doesn't appear to be an ongoing issue.
- Copper, lead, and zinc. See below for more information about these pollutants.

Discussing the monitoring results from other storms, the 406 colonies/100 ml standard for E. coli was exceeded during the storms on September 17, 2015 and May 19, 2016. The pH level during the storm on May 19, 2016 was below 6.5, which is not protective of watershed health.

The State of Oregon's instream criteria for total copper were exceeded during all 3 monitoring events. The State of Oregon's instream criteria for dissolved zinc were exceeded during 2 of the monitoring events. Guidance values for the following parameters were also exceeded:

- Total lead (During 2 of the monitored storms)
- Total zinc (During all 3 of the monitored storms)
- Dissolved copper (During all 3 of the monitored storms)

This MS4 outfall was monitored during storms on September 17, 2015, April 12, 2016 and May 19, 2016. These storms did have an Antecedent Dry Period, as defined by MS4 permit Schedule B(3)(b)(ii), but significant amounts of rain fell during these storms before monitoring was initiated (see Table 2 for more information). Although section 5.2.2 in the monitoring plan (Comprehensive Clackamas County NPDES MS4 Stormwater Monitoring Plan) says *"…sample collection will be initiated towards the beginning of the storm event…",* it was not possible to adhere to this section of the monitoring plan during these storm monitoring events.

Temporary Modification Made to the Monitoring Plan: The SE Tolbert Street MS4 outfall (WES site #104) could not be monitored during the 2015-2016 monitoring year because this storm sewer system was in the process of being rebuilt as a result of Clackamas County's SE Tolbert Street Overcrossing project. This is a major transportation improvement project which will connect the SE Lawnfield/Mather Road industrial area with SE 82nd Drive, Highway 224, and I-205. Due to this construction project, we elected to temporarily modify our monitoring plan during the 2015-2016 monitoring year in accordance with MS4 Permit Schedule B(2)(e) and B(2)(f). Monitoring at the SE Tolbert Street MS4 outfall was discontinued and we initiated monitoring at the Sunnyside Village Apartments outfall (WES ID #105). This temporary monitoring plan modification did not reduce the minimum number of data points which was collected during the year, and it did not eliminate any pollutant parameters identified in the applicable Table B-1.

PECAN CREEK FACT SHEET

Drainage Characteristics

- A tributary to the Tualatin River. Dominant Land Uses = Rural residential, agriculture, and open space. A small amount of urban area is also present, but 100% of this area is located in the City of Lake Oswego. No acreage which is regulated by SWMACC's MS4 Permit is located in Pecan Creek's watershed.

Monitoring Location

This instream monitoring location is at SW Mossy Brae Road in SWMACC. This location is not within the Portland metro area's urban growth boundary, so it is not within the geographic area that is regulated by SWMACC's portion of the Clackamas County Phase I MS4 permit.

2015/2016 Monitoring Results (provided in tabular format)

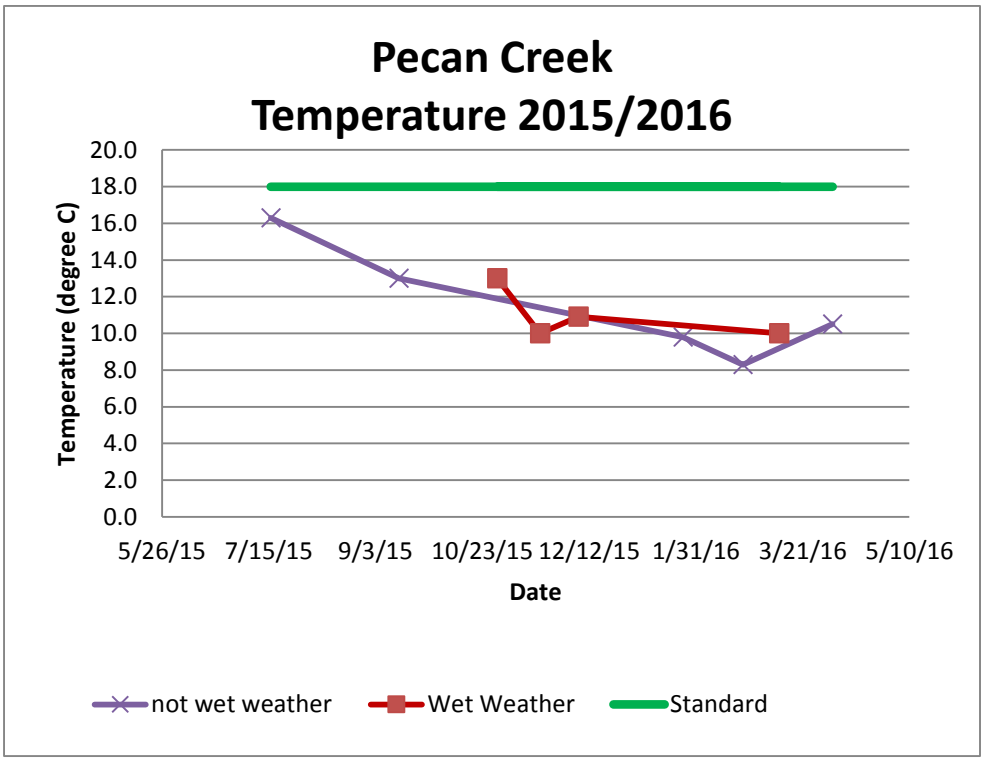
Instream monitoring data collected during the 2015/2016 MS4/TMDL reporting year were sorted based on whether the data were collected during storm event conditions or not. Four monitoring events were conducted during storms and the other five monitoring events were not. Data were analyzed and comprehensive results are provided below for storm and non-storm event conditions. Where water quality standards exceedances are indicated, the basis for that determination is provided in the attached Clackamas County Water Quality Index (Attachment 1). Although not reflected in the table below, water flow rate, total dissolved solids, total volatile solids, and conductivity were also measured.

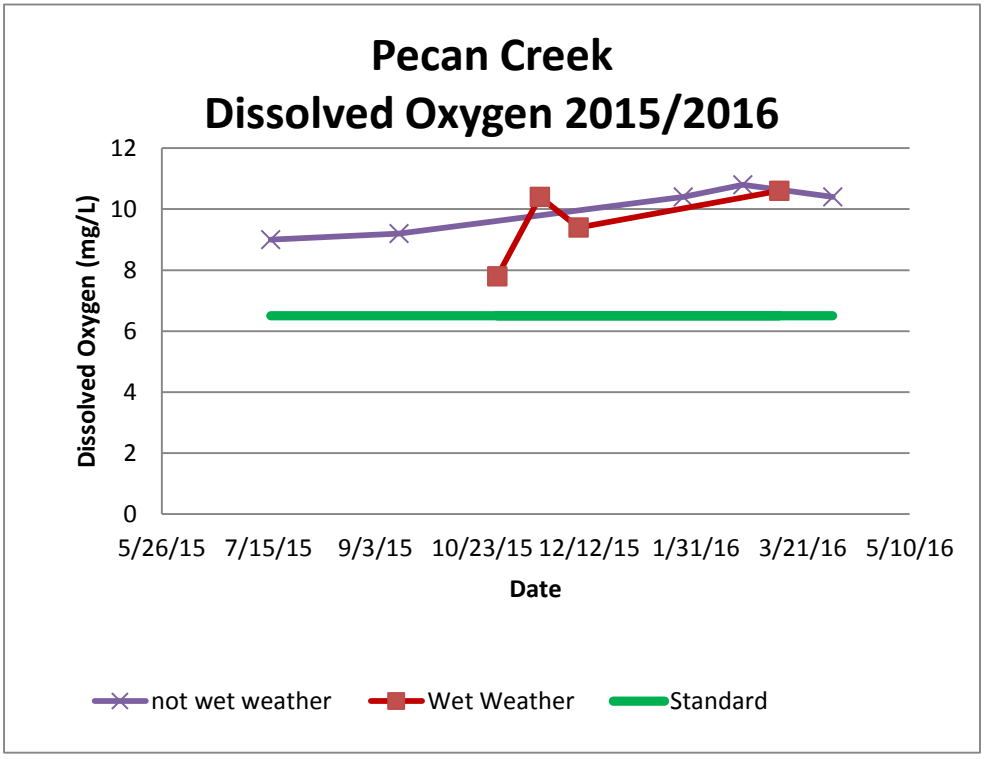
	Temperature (C)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	E coli (Counts/100 mL)	Total Copper (ug/L)	Dissolved Copper (ug/L)	Total Lead (ug/L)	Dissolved Lead (ug/L)	Total Zinc (ug/L)	Dissolved Zinc (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Orthophosphate (mg/L)	Hardness (mg/L)	pH
Monitored Storms (4 events)																		
Mean	11.0	9.6	0.99	791	11.35	2.1	7.2	0.09	51	3.8	534	346	1.6	0.03	0.50	0.07	32	7.1
Maximum	13.0	10.6	1.50	2420	35.60	3.0	27.3	0.17	180	6.0	1810	1810	4.4	<0.05	1.90	0.10	35	7.4
Minimum	10.0	7.8	0.46	156	2.10	1.1	0.3	0.03	6	2.0	101	101	0.3	<0.05	<0.04	0.04	29	6.9
Exceedance of guidance value or criteria (# exceed/total)	0/4	0/4	0/4	3/4	1/4	0/4	2/4	0/4	1/4	0/4	NA	NA	NA	0/4	1/4	NA	NA	0/4
Other Weather Conditions (5 monitoring events)																		
Mean	11.6	10.0	1.34	313	1.96	1.3	0.3	0.04	5	1.8	125	5	0.5	0.03	0.04	0.05	41	7.2
Maximum	16.3	10.8	2.00	1050	5.50	3.8	0.8	0.08	8	4.0	185	10	1.5	<0.05	0.10	0.08	57	7.5
Minimum	8.3	9.0	0.68	72	0.80	0.6	0.1	0.01	2	<1.0	96	<1	0.1	<0.05	<0.04	0.04	30	6.8
Exceedance of guidance value or criteria (# exceed/total)	0/5	0/5	0/5	2/5	1/5	1/5	1/5	0/5	0/5	0/5	NA	NA	NA	0/5	0/5	NA	NA	0/5

Note: Exceedance totals for metals data is based on exceedances of chronic guidance values and chronic criteria, not acute guidance values and acute criteria. Also Note: The geometric mean value is shown for E. coli in the row titled "Mean"

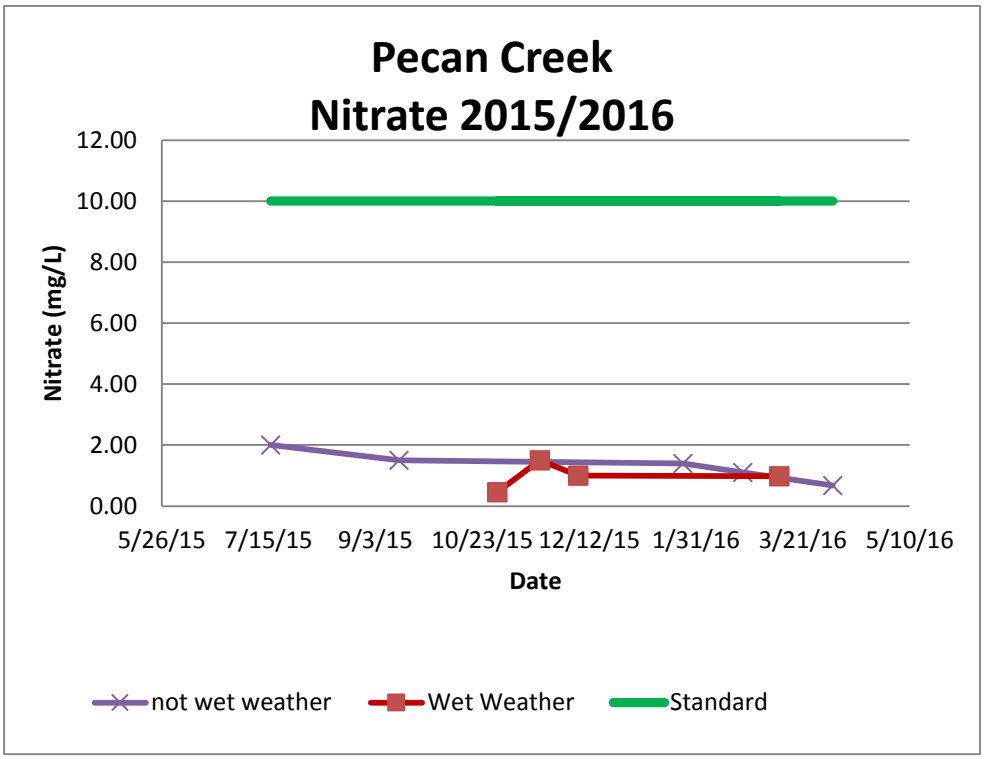
2015/2016 Monitoring Results (provided in graphical format)

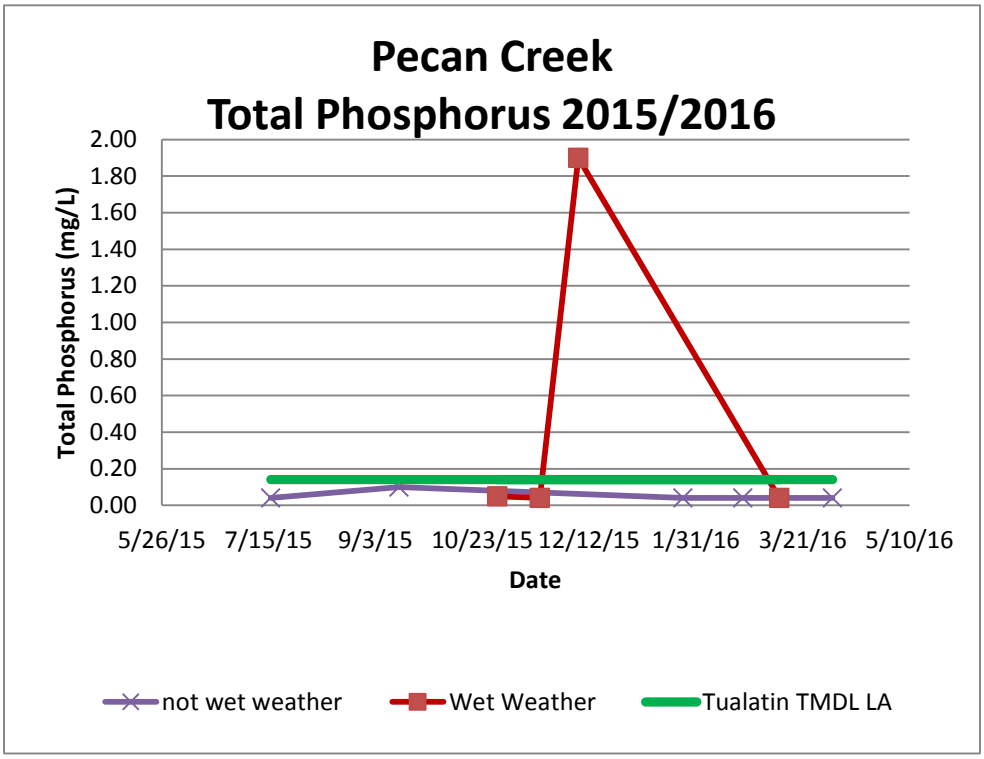
Monitoring results for select parameters have been plotted to indicate either adherence to the water quality standard (where standards apply) or to indicate whether data are in a “healthy” range as referenced in the attached Clackamas County Water Quality Index (Attachment 1). In cases where the monitoring result is less than the method's detection limit, the plotted value is the method's detection limit.



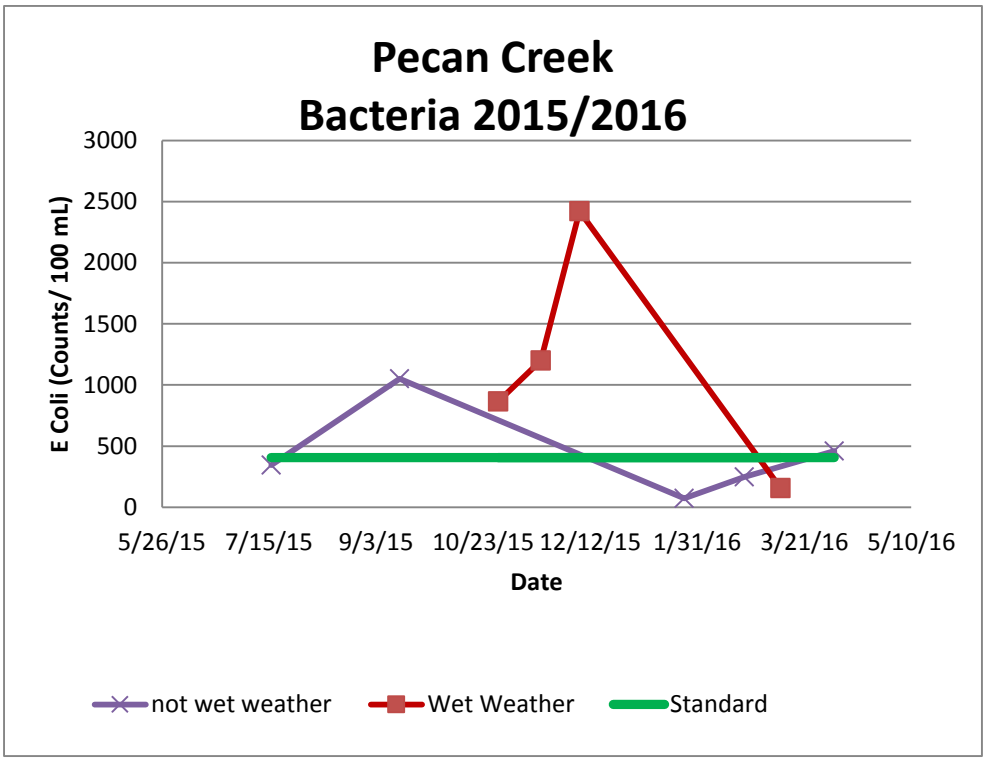


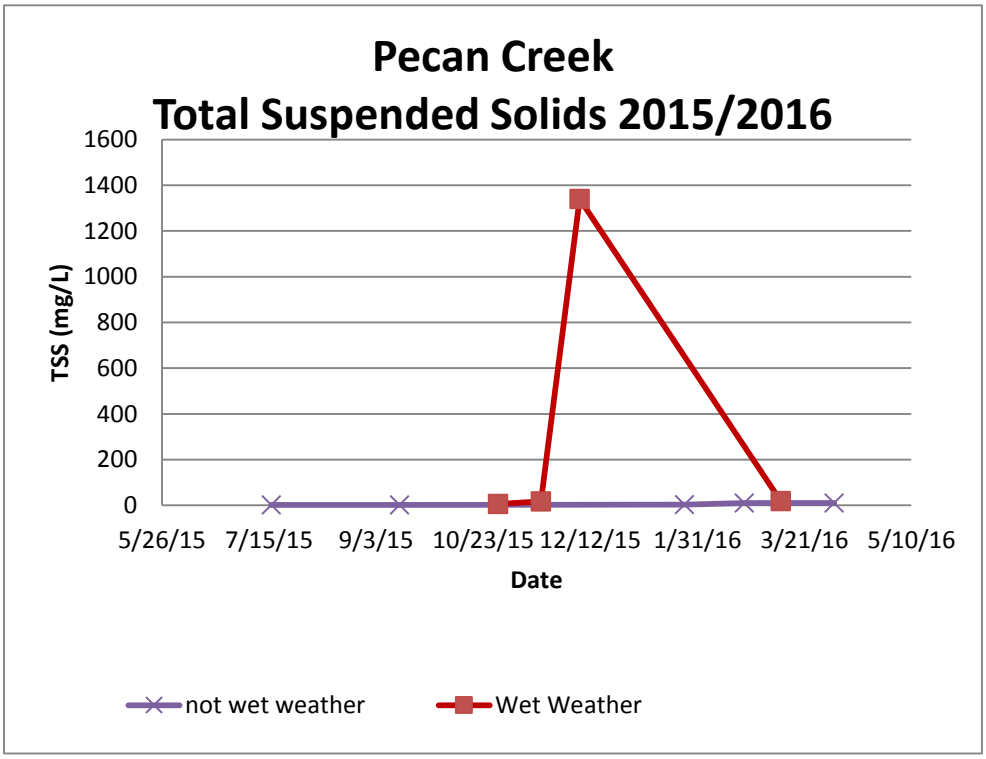
Note that for dissolved oxygen, the standard is a minimum concentration that the samples should not drop below.





TMDL LA = Total Maximum Daily Load's Load Allocation


Pecan Creek
Bacteria 2015/2016
E Coli (Counts/ 100 mL)
3000
2500
2000
1500
1000
500
0
5/26/15
7/15/15
9/3/15
10/23/15
12/12/15
1/31/16
3/21/16
5/10/16
Date
not wet weather
Wet Weather
Standard


Pecan Creek
Total Suspended Solids 2015/2016
TSS (mg/L)
1600
1400
1200
1000
800
600
400
200
0
5/26/15
7/15/15
9/3/15
10/23/15
12/12/15
1/31/16
3/21/16
5/10/16
Date
not wet weather
Wet Weather

2015/2016 Monitoring Results Discussion

During the exceptionally large storm event on December 7, 2015 (see Table #2):

- The total phosphorus concentration was 1.9 mg/L, which is more than 13 times greater than the 0.14 mg/L Tualatin Total Maximum Daily Load (TMDL) Load Allocation (LA). Note: the phosphorus TMDL LA only applies during the May 1st – October 31st "Summer" season, so this elevated concentration didn't exceed what is allowed by the TMDL.
- The total suspended solids (TSS) value was 1,340 mg/L, which is very high.
- This storm's TSS and total phosphorus concentrations from Pecan Creek were the 2nd highest TSS and total phosphorus concentrations which were recorded at any of our monitored creeks or MS4 outfalls during the 2015-2016 year. Only the TSS and total phosphorus concentrations from Rock Creek in CCSD#1 on December 7, 2015 were higher.

Pecan Creek's watershed is primarily comprised of rural residential lands, and the resulting low *impervious* area (ie. pavement and roof) and high *pervious* area percentages might explain these high pollutant concentrations. Impervious surfaces will not erode during heavy rainfall events, but pervious surfaces might, especially those with disturbed soil.

Discussing the water quality data from other monitoring events in Pecan Creek during 2015-2016, total phosphorus levels were below 0.1 mg/L during the other 8 monitoring events (see above for total phosphorus concentration during the Dec. 7th storm). The measured pH levels were between 6.5 and 8.5, which is protective of watershed health, during all monitoring events. The lowest recorded dissolved oxygen (DO) level during any monitoring event was 7.8 mg/L; higher DO levels such as these are also protective of watershed health. However, the 406 colonies/100 ml standard for E. coli was exceeded during 5 of the 9 monitoring events.

The State of Oregon's instream criteria for total copper were exceeded during 2 monitoring events. The State of Oregon's instream criteria for dissolved zinc and dissolved lead were not exceeded during any of the year's 9 monitoring events. Guidance values for the following parameters were exceeded, however:

- Dissolved copper (1 monitoring event)
- total lead (during 3 monitoring events)
- total zinc (during 1 monitoring event)

RIVERGROVE BOAT RAMP STORM SEWER SYSTEM OUTFALL FACT SHEET

Drainage Characteristics

- Dominant Land Use = Single-family urban residential

NPDES Monitoring Location

This storm sewer system outfall to the Tualatin River is located between the houses at 5638 SW Dogwood Dr. and 5600 SW Dogwood Dr. in the City of Rivergrove (the outfall is also located in the SWMACC).

2015/2016 Monitoring Results (provided in tabular format)

Outfall monitoring data collected during the 2015/2016 NPDES MS4 reporting year are provided in the following table. A total of three runoff sampling events were conducted during wet weather conditions.

Data were analyzed and comprehensive results are provided below. Where water quality standards or guidance value exceedances are indicated, the basis for that determination is provided in the attached Clackamas County Water Quality Index (Attachment 1). Although not reflected in the table below, water flow rate, total dissolved solids, total volatile solids, and conductivity were also measured.

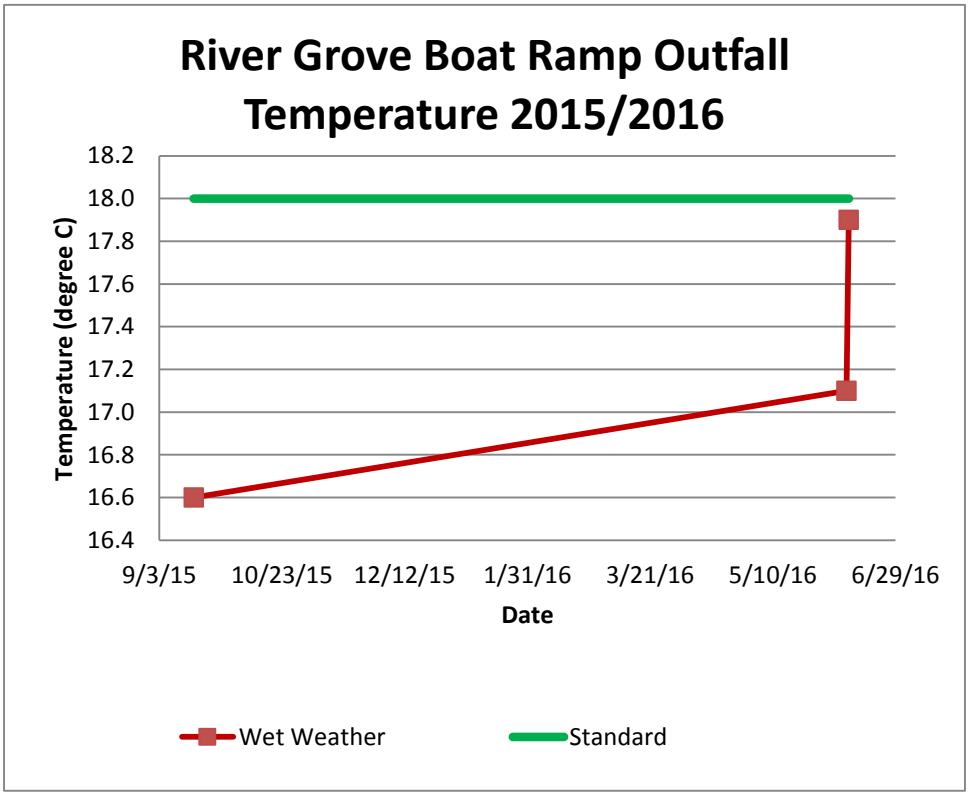
	Temperature (C)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	E coli (Counts/100 mL)	Total Copper (ug/L)	Dissolved Copper (ug/L)	Total Lead (ug/L)	Dissolved Lead (ug/L)	Total Zinc (ug/L)	Dissolved Zinc (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	BOD (mg/L)	Ammonia (mg/L)	Total Phosphorus (mg/L)	Orthophosphate (mg/L)	Hardness (mg/L)	pH
Monitored Storms (3 events)																		
Mean	17.2	7.8	2.32	458	6.23	3.0	3.0	0.09	33	17.7	208	35	3.4	0.06	0.14	0.07	56	6.8
Maximum	17.9	8.1	3.10	>2420	7.00	5.9	5.9	0.21	43	29.0	262	262	4.4	0.10	0.17	0.10	83	7.0
Minimum	16.6	7.6	1.50	109	4.90	1.5	1.5	0.03	23	7.0	111	111	2.6	<0.05	0.08	0.05	16	6.7
Exceedance of guidance value or criteria (# exceed/total)	0/3	0/3	0/3	1/3	1/3	1/3	1/3	0/3	1/3	1/3	NA	NA	NA	0/3	2/3	NA	NA	0/3

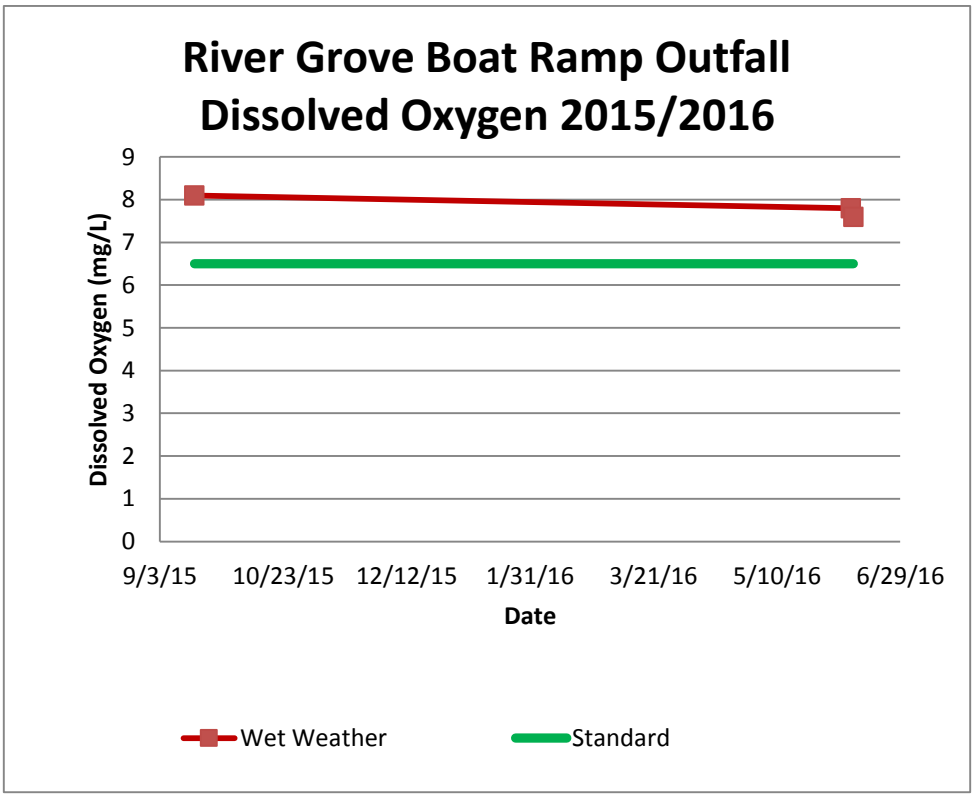
Note: Exceedance totals for metals data is based on exceedances of chronic guidance values and chronic criteria, not acute guidance values and acute criteria.

Also note: The geometric mean value is shown for E. coli in the row titled "Mean".

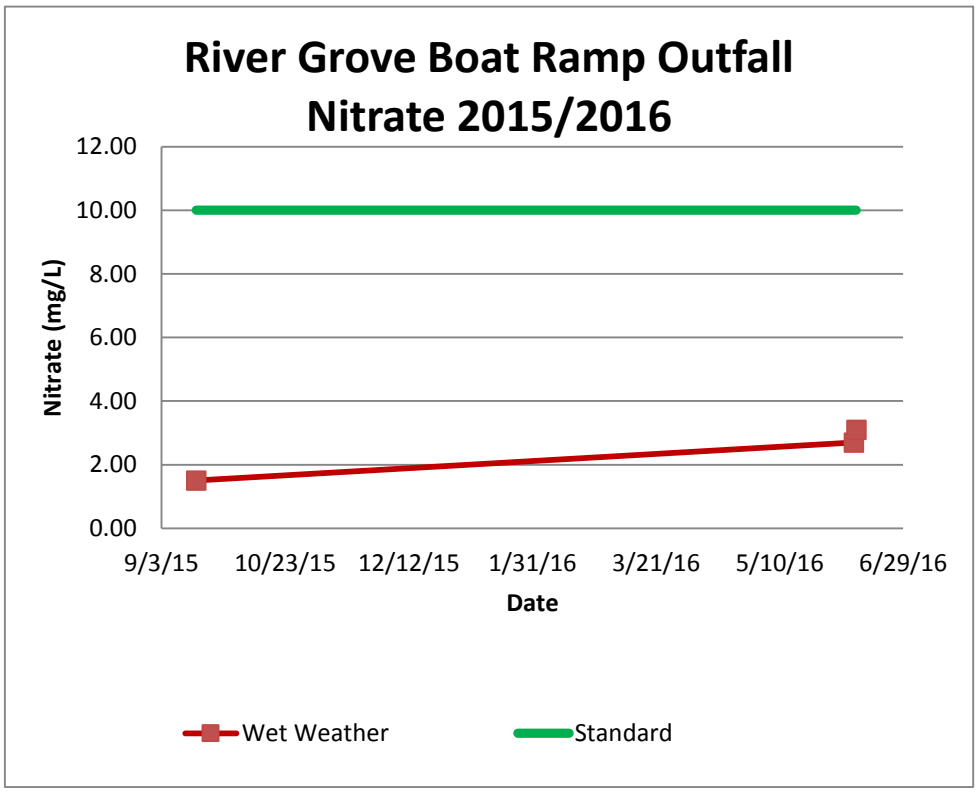
2015/2016 Monitoring Results (provided in graphical format)

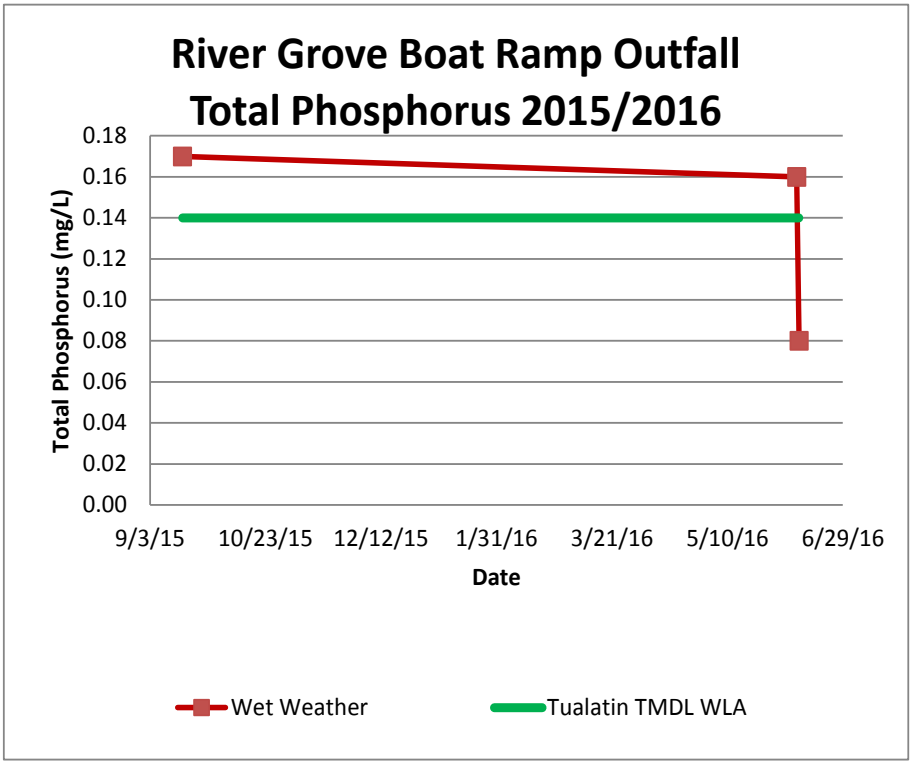
Monitoring results for select parameters have been plotted to indicate either adherence to the water quality standard (where standards apply) or to indicate whether data are in a "healthy" range as referenced in the attached Clackamas County Water Quality Index (Attachment 1). In cases where the monitoring result is less than the method's detection limit, the plotted value is the method's detection limit.



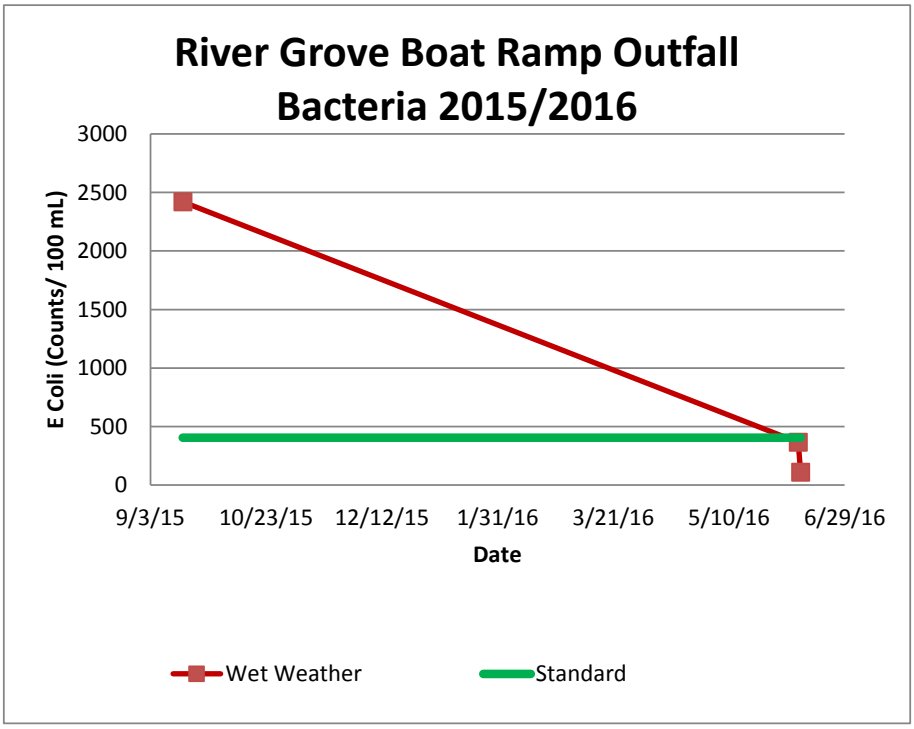


Note: For dissolved oxygen, the standard is a minimum concentration that the samples should not drop below.

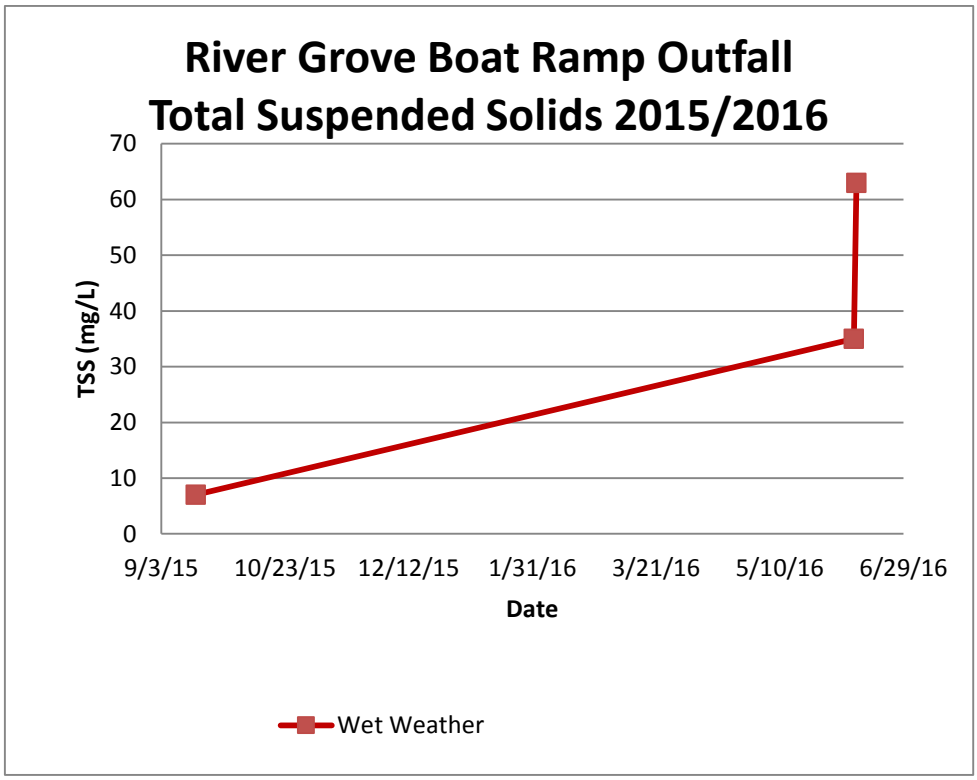




TMDL WLA = Total Maximum Daily Load's Waste Load Allocation



Note: The >2420 bacteria value is charted as 2420 colonies/100ml



2015/2016 Monitoring Results Discussion

<u>MS4 Permit Schedule B(3)(b)(i):</u>
The Rivergrove Boat Ramp Outfall was monitored during the following 3 storms in the 2015-2016 MS4 Permit year:

- September 17, 2015
- June 9, 2016
- June 10, 2016

MS4 Permit Schedule B(3)(b)(i), which pertains to monitoring water quality during storms at MS4-permitted outfalls, says *"All water quality samples must be collected during a storm event that is greater than 0.1 inch of rainfall".* Unfortunately, the storms on June 9th and June 10th did not generate 0.1 inch of rainfall. See Table 2 for more information about the size of these two storms.

<u>Monitoring Results Discussion:</u>
The 406 colonies/100 ml water quality standard for E. coli bacteria was exceeded during one storm. Total phosphorus concentrations were slightly above 0.14 mg/L, the Total Maximum Daily Load (TMDL) Waste Load Allocation for the Lower Tualatin River, during two of the monitoring events. Measured pH values were protective of watershed health during all three monitoring events. Dissolved oxygen levels were in the range between 7.6 mg/L to 8.1 mg/L during the 3 storms, which is protective of watershed health. Concentrations of ammonia were very low or undetectable during the 3 monitored storms.

The State of Oregon's instream criteria for total copper and dissolved zinc were both exceeded during one monitoring events. Guidance values for the following parameters were also exceeded:

- Total lead (During one monitoring event)
- Total zinc (During one monitoring event)
- Dissolved copper (During one monitoring event)

It is important to note that when stormwater enters the Tualatin River from the Rivergrove Boat Ramp outfall, it quickly mixes in the waters of the Tualatin River, so any toxicity which might be present quickly drops because the Tualatin River is large and typically has much higher hardness values than the stormwater which is discharged by this outfall. Higher hardness values are relevant because aquatic life toxicity from copper, lead, and zinc is lower for any given concentration of copper, lead, and zinc if hardness values are higher.

APPENDIX B PARTNER REPORTS

SUMMARY OF RIPARIAN RESTORATION PROJECTS FOR MS4 REPORT FY 2015-16

River Health Stewardship Program grants funded a total of:

# projects or sites	91
# volunteers participated	1324
# students participated	2138
# volunteer stewardship or student learning hours	4,048
length of stream worked on, linear feet	28,057
acres of project area	62
acres invasives removed	35.95
# trees planted	3,090
# shrubs planted	7,631

WES projects, separate from RHSP:

# projects or sites	2
# volunteers participated	100
# volunteer stewardship or student learning hours	300
length of stream worked on, linear feet	1,800
acres of project area	9.92
acres invasives removed	9.63
# trees planted	5,225
# shrubs planted	19,075

NARRATIVE SUMMARY OF MS4 PROJECTS

#	Project Name	Organization	Project description
1	Ecology in Classrooms and Outdoors (SWMP BMP 10; MS4 requirement A4.d.ii)	Bilquist Elementary School Parent Teachers Association	Provide a hands-on, ecology-based science program at Bilquist Elementary for grades K through 5 during the 2015-2016 school year.
2	Engaging Students & Local Citizenry in Watershed Stewardship (SWMP BMP 10; MS4 requirement A4.d.ii)	Clackamas River Basin Council	Provide salmon carcass toss activity for District high school students.
3	Wenzel Park Estates Riparian Restoration (MS4 requirement A6.c)	Clackamas River Basin Council	Restoration on 0.57 ac., along 250 feet of stream.
4	Rock Creek Partnership Property Maintenance (MS4 requirement A6.c)	Clackamas River Basin Council	Stewardship on 8 previously planted sites totaling 7.45 acres and nearly 1 mile of streams.
5	Pfeifer Ridge HOA (MS4 requirement A6.c)	Clackamas River Basin Council	Restoration on 0.77 ac, along 760 feet of stream.
6	Rock Creek Partnership Watershed Wide Event and Landowner Outreach (SWMP BMP 10; MS4 requirement A4.d.ii)	Clackamas River Basin Council	Funding toward Rock Creek Partnership Watershed Wide Planting event.

#	Project Name	Organization	Project description
7	Clackamas County Watershed Stewardship 2016 (MS4 requirement A6.c)	Friends of Trees	Stewardship on 10 previously planted sites totaling 22.8 acres and 5,000 feet of streams.
8	Rose Creek Oregon Trail Engagement 2016 (SWMP BMP 10; MS4 requirement A4.d.ii)	Friends of Trees	Classroom lesson, planting and monitoring with 5th grade classes at Oregon Trail Elementary. Covers 2.2 ac, 720 feet of stream.
9	Rock Creek Headwaters Phase II (MS4 requirement A6.c)	Friends of Trees	Planting and stewardship of site previously cleared of invasive species, 1.5 ac along 1,200 feet of stream.
10	Johnson Creek Environmental Education and Service Learning in SD#1 (SWMP BMP 10; MS4 requirement A4.d.ii)	Johnson Creek Watershed Council	Provide 4 service learning and outreach events: Johnson Creek cleanup, Science Talk, AmeriCorps intern Watershed Wide Event.
11	Maintenance of Existing Streamside Stewards Program Sites (MS4 requirement A6.c)	North Clackamas Urban Watersheds Council	Stewardship on 67 previously planted sites totaling 21 acres and 2.25 miles of streams.
12	New Sites for the Streamside Stewards Program (MS4 requirement A6.c)	North Clackamas Urban Watersheds Council	Restoration on approx. 7 ac, along approx. 2,000 of streams.

#	Project Name	Organization	Project description
13	Outreach and Education (SWMP BMP 10; MS4 requirement A4.d.ii)	North Clackamas Urban Watersheds Council	Provide outreach to landowners via direct contact, web, annual report and articles. Conduct events including boat tour, Celebrating Water, Science Talk, volunteer events.
14	SOLVE Community Maintenance in Clackamas County's Mt. Scott & Rock Creeks (MS4 requirement A6.c)	SOLVE	Stewardship on 5 previously planted sites totaling 6 acres and 1,780 feet of streams.
15	Rock Creek – Troge Maintenance (MS4 requirement A6.c)	SOLVE	Stewardship on 4 previously planted sites totaling 4 acres and 1,500 feet of stream.
16	The Student Restoration Monitoring (STRM) project (SWMP BMP 10; MS4 requirement A4.d.ii)	Student Watershed Research Project	Implement middle-high school watershed health curriculum, generate useful bio-monitoring data for current and planned stream restoration sites.
17	Hearthwood Hydrology and Ecological Health Assessment	The Wetlands Conservancy	Assess ecological function & hydrology of 16.5-acre Hearthwood wetland, provide outreach and identify retrofit opportunities.
18	WES-CCSD1 Cedar Way Stream Stabilization Project (MS4 requirement A6.c)	WES	Maintenance on previously installed project that stabilized the channel by laying back banks and installing boulder weirs, along with placing new bed material in key areas.

#	Project Name	Organization	Project description
19	WES-CCSD1 Rock Creek Confluence Restoration Project (MS4 requirement A6.c)	WES	Maintenance on previously installed project that improved fish & wildlife habitat and water quality in the lower 1,800 linear feet of Rock Creek by 1) installing LWD, 2) floodplain reconnection and 3) replacing invasive vegetation with native plants. Activities primarily consisted of weed control, inter-planting to replace vegetation, and monitoring. Continued use of site for environmental study by local schools in Watershed Health Ed Program.
20	WES-CCSD1 Happy Valley Park Stream Restoration Project (MS4 requirement A6.c)	WES	In-stream restoration project including headcut repair, replacing culvert with bridge, LWD, invasives control and planting.

NARRATIVE SUMMARY OF PROJECTS

#	Project Name	Organization	Project description
1	Rock Creek Partnership Property Maintenance (MS4 requirement A6.c)	Clackamas River Basin Council	Maintenance on 7 sites totalling 6.85 acres and nearly one mile of streamside. Funding for activities necessary to establish trees and shrubs in a "free to grow" state (plants large and healthy enough to out-compete invasive weeds), including weed control, mulching and infill planting by volunteers. Specific methods include mechanical (cutting and trimming) and chemical (herbicide) treatments performed by licensed professional restoration contractors, supervised by CRBC staff. Staff will engage the community in this project by hosting volunteer work events. Funds will also be used to continue to monitor project sites. Over $6,100 match provided.
2	MacMillan new restoration site (MS4 requirement A6.c)	Clackamas River Basin Council	The .42-acre McMillan project includes approximately 415 linear feet of riparian habitat along Rock Creek. The riparian area is dominated by reed canary grass, Himalayan blackberry, and Japanese knotweed. The project is to manage invasive species and plant native vegetation. This project addresses high priority invasives high up in the watershed, where treatment is most effective, and builds upon an existing project located directly across Rock Creek. Over $4,600 match provided.
3	Rock Creek Partnership Watershed Wide Event & Landowner Outreach (MS4 requirement A6.c)	CRBC, FOT, SOLVE	Partial funding toward Rock Creek Partnership Watershed Wide Planting event, held each year based at Pendarvis Farm. Funds will be used for event planning, volunteer coordination, planting at three sites on the day of the event and outreach to recruit new landowners. Over $9,200 match provided.
4	Clackamas Co. Watershed Stewardship (maintenance) (MS4 requirement A6.c)	Friends of Trees	Maintenance of existing project sites ensuring establishment of plants installed during the past 5 years, infill plantings within existing project sites to attain desired species diversity and plant densities, and limited maintenance support of key FOT historic sites. Includes one infill planting event; one tree care event with mulching; using sub-contractors to complete weed control: mowing and spot spraying at 6 sites; and very limited maintenance visits to 4 historic planting sites. Covers 21.5 ac, 4,500 lf streamside and over $5,800 match.

5	Rock Creek Headwaters Native Revegetation (MS4 requirement A6.c)	Friends of Trees	Site preparation and initial planting of native trees and shrubs along Rock Creek and three upper tributaries on four private properties. Builds on work previously done on an adjacent site; locations ranked 'High Priority' in the WAP, and addresses the upper Rock Creek watershed, where restoration is most effective. Includes sub-contractors for initial invasive species removal, two volunteer planting events installing approximately 1,600 native plants, and complete spring and early summer maintenance to help establish the newly planted natives. Covers 3 ac, 1,700 lf streamside and provides over $12,000 match.
6	Rose Creek-Oregon Trail Elementary (SWMP BMP 10; MS4 requirement A4.d.ii)	Friends of Trees	Conduct classroom lesson on native vs invasive plants to the 5th grade classes at Oregon Trail Elementary (OTE); infill planting along Rose Creek with 5th graders, tentatively in conjunction with Sabin-Schellenberg High School forestry class; and lead students in monitoring previously planted areas within the Rose Creek natural area and asses their success. Covers 2.2 ac, 720 lf streamside and provides over $300 match.
7	Streamside Stewards Program—maintenance (MS4 requirement A6.c)	North Clackamas Urban Watersheds Council	Maintain 50 existing sites in the Streamside Stewards Program (SSP). The goal of the SSP is to improve riparian conditions by enhancing streamside wildlife habitat and improving water quality, while fostering an ethic of stewardship and empowerment in property owners. Funding includes the tasks, tools, and time of the NCUWC restoration contractor and the NCUWC Coordinator. Includes discussions and agreements with property owners. Tasks include weed removal using a variety of methods; plant native plants; mulch, water, and weed installed plants; and provide information. Covers 14 ac and 1.8 mi streamside.
8	Streamside Stewards Program-new sites (MS4 requirement A6.c)	North Clackamas Urban Watersheds Council	Fund 10 new, strategically located riparian restoration project sites. Property owners will receive a site assessment with a restoration expert, a site plan, a packet of educational print resources, and no-cost weed control and riparian vegetation. These sites will be selected in high priority reaches and as connections to existing sites in the SSP. Includes SSP yard signs with WES logo. Provides $24,700 match.
9	Johnson Creek Watershed Assessment (MS4 requirement A6.c)	Johnson Creek Watershed Council	Analyze currently available monitoring data and prepare a watershed-wide condition assessment report, which could be compared to watershed assessments completed in 1994 and 2001. This is the top recommendation of the 2015-25 Johnson Creek Watershed Restoration Action Plan. The Monitoring Strategy completed so far includes data from 22 organizations, a summary of 30 fixed stations where 2,300 cumulative samples per year are taken for water quality, hydrology, aquatic habitat, and biota (with continuous sampling counted only once). Results will help prioritize future restoration work. Funds 9% of entire project, provides $75,800 match.

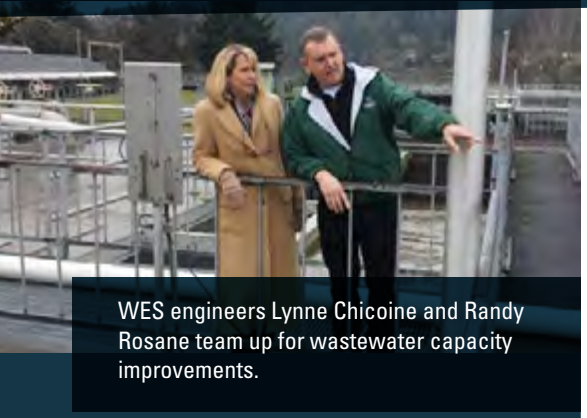
10	Johnson Creek Riparian Reforestation (MS4 requirement A6.c)	Johnson Creek Watershed Council	This project will enhance riparian vegetation on several properties along Johnson Creek within CCSD#1 The Johnson Creek Watershed Council will work with jurisdictional partners, private landowners, contract crews and volunteers to remove invasive vegetation (such as English ivy, Armenian blackberry, clematis, etc.) and replace it with native trees, shrubs and ground cover to provide better riparian habitat. Covers 1.58 ac, 520 lf streamside and provides over $7,100 match.
11	SOLVE Clackamas County Maintenance-Phillips & Rock Creek sites (MS4 requirement A6.c)	SOLVE	Maintenance activities needed to control invasive species and install in-fill plantings on 6 sites, covering 9 ac and 2,250 lf of streamside property along Mt. Scott, Phillips and Rock Creeks. Invasives include Japanese knotweed, purple nightshade, English ivy, Himalayan blackberry and others. Much of the work will incorporate students and one Community tree planting event is planned. Work includes extensive communication with property owners and service learning for high school students. Over $14,600 match provided.
12	SOLVE Clackamas County Restoration-Mt Scott & Troge (MS4 requirement A6.c)	SOLVE	Control of invasive species and new plantings on 6 sites, covering 9 ac and 2,250 lf of streamside property along Mt. Scott, Phillips and Rock Creeks. The main project extends previous work on property adjacent to the Pleasant Valley Nursery, on a stream reach that is very incised and low gradient in this section. Work includes communication with property owners and service learning for high school students. Over $56,800 match provided.
13	NCUWC Outreach and Education Programs (SWMP BMP 10; MS4 requirement A4.d.ii)	North Clackamas Urban Watersheds Council	Outreach and education programs include activities aimed at educating the residents of the Kellogg - Mt Scott watersheds about watershed health, enrolling participants in the Streamside Stewards Program, and engaging people in volunteer actions. Activities include outreach to enroll property owners in the Streamside Stewards Program, website updates, a community education event to be designed in cooperation with partners, participation in Celebrating Water-CWET-and Water Resource Program Guide, restoration planting with students at Rowe Middle School on Kellogg Creek and conducting volunteer planting-mulching-and cleanup events. $4,200 match.
14	Outreach and Education (SWMP BMP 10; MS4 requirement A4.d.ii)	Clackamas River Basin Council	Outreach and education programs aimed at educating the residents of the Clackamas River watershed about watershed health.

15	Ecology in Classrooms and Outdoors Project (SWMP BMP 10; MS4 requirement A4.d.ii)	Bilquist Elementary School Parent Teachers Association	Provide a science enrichment program at Bilquist Elementary for grades K through 5 during the 2014-2015 school year. Two Scientists in Residence will deliver hands-on, ecology-based science lessons to align with Oregon educational standards and provide students the opportunity to study local watersheds, wildlife, geology, and botany. Lessons are structured to connect students to the natural world, within the context of the Kellogg Creek watershed. Program will build science literacy and environmental awareness. Provides over $10,700 match.
16	Volunteer & Community Engagement (SWMP BMP 10; MS4 requirement A4.d.ii)	Johnson Creek Watershed Council	Outreach and education programs include activities aimed at educating the residents of the Johnson Creek watershed about watershed health. Activities include Watershed Wide Event, Johnson Creek Clean Up and a Johnson Creek Science talk held within CCSD#1. Pays for a portion of work within CCSD#1, providing over $17,300 match.
17	WES-CCSD1 Rock Creek Confluence Restoration Project (MS4 requirement A6.c)	WES	Improve fish & wildlife habitat and water quality in the lower 1,800 linear feet of Rock Creek by 1) installing LWD, 2) floodplain reconnection and 3) replacing invasive vegetation with native plants. Leverage existing partnerships and programs to control weeds, plant veg and conduct monitoring. Continue use of site for environmental study by local schools in Watershed Health Ed Program.
18	WES-CCSD1 Cedar Way Stream Stabilization Project (MS4 requirement A6.c)	WES	This steep reach of the Cedar Way tributary to Mt. Scott Creek has been significantly impacted by urbanization and hydromodification. An increase in flow, compared to historic, pre-development conditions, combined with a lack of coarse sediment supply to the channel due to upstream and downstream culverts, has resulted in channel incision, widening, and overall instability. This project stabilizes the channel by laying back banks and installing boulder weirs, along with placing new bed material in key areas.
19	Verne Duncan Elementary (detention basin & outdoor classroom plantings) (SWMP BMP 10; MS4 requirement A4.d.ii)	WES	Worked with students and educators to install plants in a new outdoor classroom/garden and an existing detention pond adjacent to school. Incorporated into the WES Watershed Health Education Program.
20	Clackamas High School (rain garden) (MS4 requirement A6.c)	WES	Coordinated with North Clackamas School District Facilities staff and CHS principal and staff. Constructed rain garden to capture flow from driveway area at school. Worked with students and educators to install plants after contractor work completed. Incorporated into the WES Watershed Health Education Program.

APPENDIX D PUBLIC OUTREACH, ARTICLES, AND NEWSLETTERS FOR CCSD#1 AND SWMACC

Water Environment Services

newsletter



WES engineers Lynne Chicoine and Randy Rosane team up for wastewater capacity improvements.

New WES engineer plays key role in solids handling capacity project

New WES Capital Program Manager Lynne Chicoine plays a key role in addressing the lack of wastewater solids handling capacity for the Tri-City Service District and Clackamas County Service District No. 1.

"The capital program manager position is critical to solving our region's urgent need for increased capacity to process solids at the Tri-City Wastewater Treatment Facility," said WES Director Greg Geist. "I feel very fortunate to have found someone with so much talent and experience to fill this vital role at WES."

Chicoine brings more than 30 years of experience in planning and designing wastewater collection and treatment facilities. Prior to WES, Chicoine worked for every major wastewater provider in the Willamette Valley.

Chicoine also served as Vice President and Principal Project Manager for leading engineering firm CH2M Hill.

"I am excited about joining Greg and his team to build a capital program that provides reliable service and good value for ratepayers now and into the future," said Chicoine. "It's a privilege to serve as a steward of Clackamas County's water environment."

Water Environment Services raises awareness about risks to public health, environment, and economic future

WES Director Greg Geist shares information with a KGW television news reporter about the importance of treating wastewater during a recent tour of the Tri-City plant in Oregon City.

Water Environment Services (WES) is raising public awareness of a serious problem that affects 150,000 customers and puts public health and the environment at risk.

The county's two largest sewer service districts are dealing with a lack of capacity to handle and treat "solids," which are a by-product of sewage from homes and businesses.

A catastrophic failure of the solids handling system could send untreated water into the Willamette River.

WES Director Greg Geist is now speaking to community groups about the cost-effective strategy to solve the problem.

Growth and a doubling of the population in the last 30 years have contributed to the problem. Geist says an equitable co-investment strategy involving Clackamas County Service District No. 1 and Tri-City Service District can help solve the problem, while keeping rates as low as possible.

- Clackamas County Service District No.1 (CCSD#1) serves Milwaukie, Happy Valley, Boring, Hoodland, Johnson City, Fischer's Forest Park, the western edges of Damascus, and unincorporated Clackamas County.
- Tri-City Service District (TCSD) serves the cities of Gladstone, Oregon City and West Linn.

Combined, the two districts' treatment plants process more than six billion gallons of sewage every year. Initially operated separately, the two districts now routinely share facilities.

"The districts have a long history of working together to save ratepayer dollars," said Geist. "This partnership is perfectly suited to support construction of additional capacity at the Tri-City Plant for both districts to share, which will also support future economic growth in the county."

WES Director Greg Geist explains the cost-saving solution to the solids handling capacity shortage during a recent presentation to a community group.

To learn more about WES and the solids handling capacity project, visit Clackamas.us/wes, follow us on Facebook, Twitter, YouTube and sign up for email updates.

WATER ENVIRONMENT SERVICES

Protecting PUBLIC HEALTH AND THE ENVIRONMENT

clackamas.us/wes

What We Do

- We collect and clean billions of gallons of wastewater every year!
- We turn waste into energy
- We turn "flush" into fertilizer
- We serve over 150,000 people in the community

Who We Serve

- Clackamas County Service District No. 1
- Tri-City Service District

How to Get Involved

- Call or visit us
- Take a tour of our facilities
- Join an advisory group
- Attend a committee meeting

Yard and garden chemicals can contaminate our community's water

THE RIVER STARTS HERE

Pesticides, herbicides and fertilizers can help control pesky weeds and insects, but every chemical (including organic) has some level of toxicity to non-targeted, beneficial organisms, such as honey bees, earthworms, aquatic bugs, fish and people. Chemicals sprayed on a windy day can drift onto neighboring property or into a creek. Chemicals applied before it rains can wash into a storm drain that connects to a local waterway.

"Please do your part. Carefully read pesticide label precautions and requirements to understand the potential risks to waterways and the wildlife living there," said WES Surface Water Manager Ron Wierenga.

If a spill of a chemical occurs on a sidewalk or driveway, please sweep it up prior to watering or a downpour. It's a small practice that can make a BIG difference to protect both public health and the environment.

For more information concerning the use of pesticides, herbicides and fertilizers, go to the National Pesticide Information Center's website at http://npic.orst.edu/ or go to RiverHealth.org.

WATER ENVIRONMENT SERVICES

Protecting WATERSHED HEALTH

clackamas.us/wes

What We Do

- We keep polluted storm runoff out of streams
- We plant thousands of trees to improve water quality
- We restore habitat for fish and wildlife
- We engage the community to protect watershed health

Who We Serve

- Clackamas County Service District No. 1
- Surface Water Management Agency of Clackamas County

How to Get Involved

- Sign up for a planting event
- Join an advisory group
- Only rain down the drain
- Visit RiverHealth.org and take the Watershed Health Pledge

Dozens of musicians set to entertain at Pickathon July 31 to August 2

PHOTO BY LIZ DEVINE
Attendees will see over 60 musicians throughout the three-day Pickathon music festival.

PHOTO BY JASON REDMOND
Each year, Pickathon stages evoke a unique experience with innovative designs.

By CINDY FREE-FETTY

In 1999, Pickathon was a modest, one-day event where about 90 people gathered together with musicians and engaged in a "small, kind of disruptive festival that played a bit like Lollapalooza," explained Zale Shoenborn, founder of the annual event.

Today, Pickathon is an innovative collaboration; "a way to explore the nexus between music, design, art, community, food and drink and sustainability," he explained.

Last year over 7,000 people attended the three-day event at Pendarvis Farm, located just off 172nd Avenue in Happy Valley. Each year the event not only grows in numbers of people, but "we spend countless time tipping the scale from the year before — creating the 'wow' factor for the next festival."

While admittedly, Shoenborn says maybe only 10 to 20 percent of concert-goers will know the musicians in the line-up, he maintains that Pickathon has been directly responsible for catapulting artists to national levels and creating super-fans.

"Our music line-up is one of the best, and we have a really peculiar style of music," explained Shoenborn.

"We approach our musician selection through a rigorous process and look for the most amazing thing that is going on in a typical music scene each year. We look for musicians that are in their 'moment' of creativity so they just blow people away."

There are six performance venues that wind throughout the property, each one thoughtfully presented to evoke a unique experience for the viewers and musicians alike.

"This year we have focused on a design style called Diversion Architecture, where we take something old and make something new from it. We enlisted students from the Portland State University Architecture program to assist in stage design," said Shoenborn.

"No stage is just a normal stage at Pickathon," he explained. "This is something that sets us apart from any other music festival."

This year, one stage will be made out of 100 percent reconstructed pallets that will sit the musicians a mere 18 inches from the ground, creating an intimate performance experience.

A second stage will be constructed from Sonotubes, a high-strength, cardboard tube, used in concrete forms, that will be laid out in a giant array of patterns creating a visually unique stage. "After the festival all Sonotubes will be collected by Pacific Papers to use for their clients," said Shoenborn. "This is a wonderful, impactful experience."

A third stage, the Mountain Stage, will be constructed with over 200 yards of fabric, pulled to tension with over 12 miles of rope.

"This stage takes over three weeks to build and is 600 by 600 square feet, creating a sculptural vision of Mt. Hood," Shoenborn said.

Winding between stage venues are over 4 miles of trails, guiding campers through lighted pathways to their next destination. Food and beverage vendors are on-site serving local favorites in one of two sustainable ways.

"We have a strong commitment to reduce as much garbage and waste as possible," said Shoenborn. For this reason, food is served on either self-brought dishware or reusable Pickathon dishware for just $10.

The commitment to sustainability also includes no plastic on-site, solar generated energy for concert goers, recycling and compost sites, and alternative transportation, including access to shuttles and carpools.

Shoenborn encourages people to come to the event and enjoy what he describes as the sum of all the parts put together between music, food and drink, innovative design and community.

"This is what I want Pickathon to be thought of," he said.

"Not just one thing, but a culmination of abstract ideas that creates an overall experience. That's what we stand for."

For information on Pickathon musicians, camping, kids' activities and more, visit pickathon.com.

COMMUNITY*SAFETY*

CITY OF HAPPY VALLEY

At press time Clackamas Fire District #1 had declared "Extreme" Fire Danger. All wood-burning recreational fires are prohibited until the fire danger level has been downgraded. This includes personal fire pits, campfires, and all other burning.

RECREATIONAL FIRES

Restricted due to fire danger

During the summer many people choose to enjoy outdoor recreational and cooking fires. In order to stay safe, Clackamas Fire District #1 recommends following these tips to keep you and your family safe while enjoying campfires.

- Only the burning of seasoned, cut firewood is allowed. No trash or yard debris!
- Build campfires where they will not spread, away from dry grass and leaves. Place rocks in a circle around your fire area.
- Keep plenty of water and a shovel nearby to douse the fire when you're done. Stir it and douse it again with water.
- NEVER leave campfires unattended.
- Don't let children or pets play near the fire.
- If your clothes catch on fire—Stop, Drop, and Roll!
- Recreational fires are prohibited during EXTREME Fire Danger. To find out if you are able to have a campfire, please call our Fire Prevention Office at 503-742-2660.

DREAMSTIME PHOTO

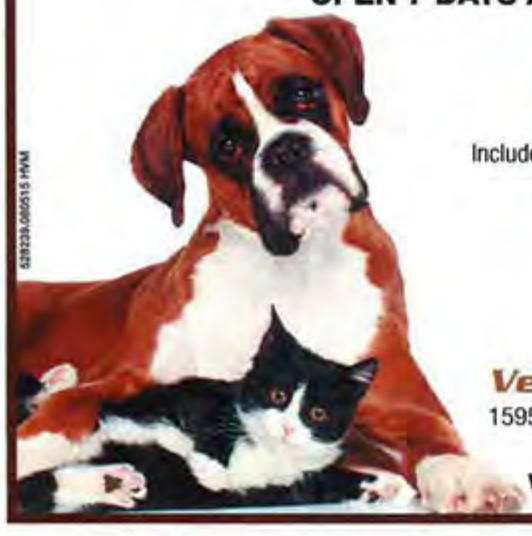
Please remember to
BURN SAFELY!

If your fire gets out of control,
DIAL 9-1-1!

Your Pet protected, safe, loved

Conveniently located in Happy Valley next to the New Seasons Market!

OPEN 7 DAYS A WEEK



FREE First Visit

Includes exam and consultation with the Vet!

Mention this ad. Expires 9.5.2015

Happy Valley

Veterinary Hospital

15957 SE Happy Valley Town Center Dr.

503-395-1649

www.happyvalleyvet.net

COMMUNITY*NEWS*

CITY OF HAPPY VALLEY

ERODING MT. SCOTT CREEK

WES and Happy Valley begin rehabilitation

The City of Happy Valley and Clackamas County Water Environment Services (WES) work together to protect watershed health and water quality in our area. WES monitors our local streams and found that some are severely eroded causing damage to stream channels, steep banks, and vegetation loss. Sections of Mt Scott Creek within Happy Valley are in this degraded condition.

Later this summer, WES will begin a project to repair parts of the creek in Happy Valley Park. This project includes the installation of boulders to support the streambed, four log structures to stabilize the banks, and a new bridge across the stream to allow it to better connect with its floodplain. The site will be replanted with native plants and shrubs in the newly constructed areas during the rainy months after this summers' in-stream work is completed.

Public Works Director, Chris Randall, is pleased the existing bridge will be replaced. "The bridge installation is an added bonus to the overall project. The ability to have a free flowing stream channel with no obstructions will improve the overall health of the waterway. A stream stabilization project with a substantial barrier removal; what a win for the environment."

This project will prevent Mt Scott Creek from further eroding in the park and prevent the existing problems from moving upstream, which will then protect culverts and other infrastructure within and upstream of the park. Gail Shaloum, WES Project Manager, explained that Happy Valley Park and its wetlands are the headwaters of Mt Scott Creek.

"Being the start of the creek, it's a good place to start getting the channel into good condition. The location in a park where flooding structures is not an issue, also makes it a good place to allow excess runoff to spread out during big storms. Adding logs to the stream also adds roughness to the creek, which helps to slow down the flow and allow sediment in the water to settle out," said Shaloum.

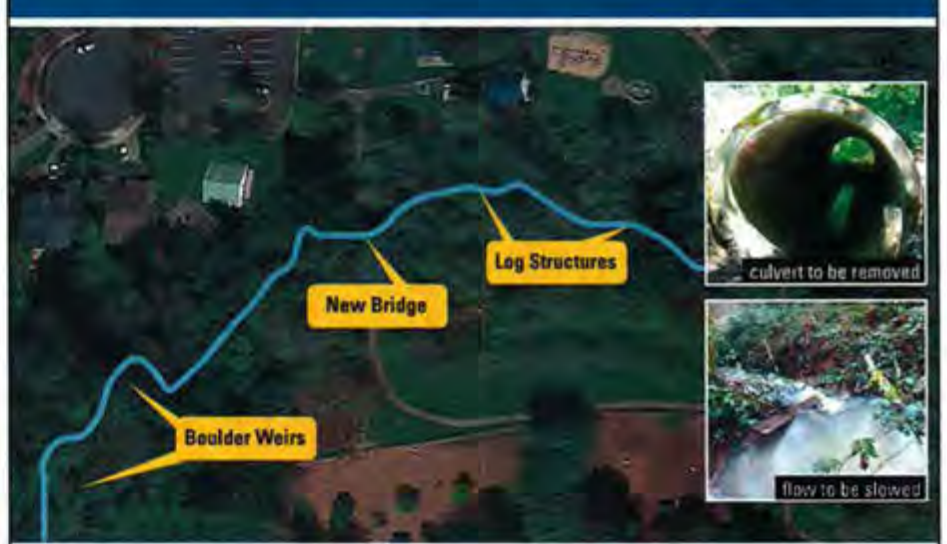
Invasive weed removal and in-stream activities will occur between late August and September with native plants to be installed this coming winter.

To keep visitors safe, the section of the pathway that crosses the creek near the off-leash area will be closed during construction. The off-leash area will be accessible by the path near Picnic Area A and children's play area. Heavy construction equipment will be in use along the park entry road, in the far southwestern parking lot, and on SE 134th Ave. along the dead end street. Construction hours are limited to 7 a.m. to 6 p.m. on weekdays, 8 a.m. to 5 p.m. on weekends.

WATER ENVIRONMENT SERVICES

MT SCOTT CREEK
STABILIZATION PROJECT

Clackamas County Service District No. 1 has partnered with the City of Happy Valley to improve stream stability of Mt Scott Creek where it is severely eroded with unstable banks in the southwest portion of Happy Valley Park. In-stream work will happen in late summer 2015. Native plants and shrubs will be installed in winter 2016.



Improvements on the way:
- Two boulder weirs
- Four log structures
- A new bridge

This project will return the stream to a more natural state and help prevent future damage to the stream and surrounding infrastructure while improving water quality and wildlife habitat. Please access the off-leash area by Picnic Area A and **avoid the path during construction for safety.**

WATER ENVIRONMENT SERVICES | WATERWAYS CONSULTING, INC. | HAPPY VALLEY, OR

For more information contact
WES Community Relations Specialist at info@riverhealth.org

SUMMERCONCERTS

CITY OF HAPPY VALLEY

Summer Concert Recap

Happy Valley's summer concert series "Concerts in the Valley" had a stellar season this year. From the first concert to the final one, there was a great turnout for each show. Many attendees were Happy Valley locals, but the word is clearly out that talented bands consistently put on great shows at Happy Valley Park.

Every concert stayed dry (maybe not a big surprise this summer) and most were comfortably warm. This made it easier for parents to bring their kids out for a fun night. Once there, between the splash pad, the new playground, and fun games during the band's break, the kids had a blast.

The wonderful concert sponsors, ***Country Financial, Pacific Foot*** and ***Ankle Clinic***, and ***Sun Glow Heating & Air Conditioning***, not only supported the series, but they gave-away a few amazing prizes this summer. ***Papa Murphy's*** and ***Steam-Werkz*** made it easy for families to grab a quick dinner (and treat) at the park and ***Valley Growlers*** provided an adult beverage selection that made everyone happy.

It has been a great summer at the park and we are sad it is over. Thank you for being a great crowd and we'll see you next year!

David Golobay, of Sun Glow, Inc., presents a Green Mountain Smoker to raffle winner.

Lucky concert goer poses with Bart Hafeman of Hit Machine and James Maciokas of Country Financial, after winning an electric guitar at the concert.

Rob Struthers and the Pacific Foot and Ankle team, a concert sponsor, provides games and prizes at their booth during the concert.

Your Comfort. Our Community.

IdealComfort

Keeping area families and businesses comfortable since 1972.

SUN GLOW INC.
HEATING & AIR CONDITIONING
OWNER: HAPPY VALLEY RESIDENT

503-253-7789 CCB#48131

info@sunglowinc.com www.sunglowinc.com

facebook.com/SunGlowInc @sunglowinc NW Natural Carrier

480825.100114 HVM

WATER ENVIRONMENT SERVICES

Clackamas County WES announces Greg Eyerly as its new Water Quality Manager

The Water Quality Manager provides oversight for all wastewater operations and maintenance, process control and administrative and regulatory functions for treatment facilities and conveyance systems to ensure facilities and systems are in compliance with stringent water quality requirements.

Greg Eyerly was the Wastewater Division Manager for the City of Salem, and previously the Utilities Operations & Maintenance Manager and later Flood Recovery & Reinvestment Director for the City of Cedar Rapids, Iowa. Eyerly is an active member of the Oregon Association of Clean Water Agencies, having co-founded and served as chairman of the Utilities Management Committee.

"I have no doubt Mr. Eyerly will do an outstanding job in his new role," said WES Director Greg Geist.

UPDATE: Happy Valley Park Stream Stabilization Project

Construction is underway to help restore parts of Mt. Scott Creek in Happy Valley Park to a more natural flow. Urbanization of the surrounding area created stormwater runoff that caused erosion of the creek's banks. In-stream work will be completed by the end of September and a timber bridge will be installed by early November. To date, the rock weirs and riffles have been completed, logs placed and excavation completed for the new bridge abutments. The pathway in this area will remain closed until the bridge is installed. Thank you for your patience as we repair the creek!

Visit RiverHealth.org to learn more.

CLACKAMAS COUNTY RiverHealth

You'll notice the difference. ColumbiaBank

We put our money where our heart is: the community.

- Community minded, community made.
- We volunteer in the communities we serve.
- Our employees are empowered to give back.

Clackamas 503-387-4040
Happy Valley 503-489-1920
ColumbiaBank.com

Member FDIC Equal Housing Lender

526234.090215 HVM

WATER ENVIRONMENT SERVICES

You're invited to a magical place where Rock Creek joins the Clackamas River and happy fish live in Happy Valley!

Please join Clackamas County Water Environment Services, Clackamas River Basin Council, and SOLVE for an educational event and work party at Rock Creek - an important tributary of the Clackamas River and home to salmon, beaver and osprey - where you and your friends and family can take advantage of this rare opportunity to see this beautiful site and help protect our watershed.

Discover Rock Creek

Saturday, November 7th
9 a.m. to noon

14974 SE Hwy 212
Clackamas, OR

Contact solveoregon.org to learn more and register today!

Visit RiverHealth.org to learn more.

CLACKAMAS COUNTY RiverHealth

543160.100715 HVM

COMMUNITY*NEWS*

CITY OF HAPPY VALLEY

Happy Valley embraces SOLAR SOLUTIONS

On August 18, City Council voted to expand the scope of Happy Valley's solar home program, HV Solar, by further reducing barriers to solar installation. Effective now through March 2016, the City will waive building permit and plan review fees for citizens and businesses obtaining standard solar permitting, a change that will save citizens hundreds of dollars in out-of-pocket costs. Electrical permit fees will still be collected by Clackamas County.

"Anything we can do to reduce carbon footprints and reduce our dependence on foreign oil is good for the city," Michael Morrow, Council President, said as City Council deliberated methods of encouraging solar activity in the community.

Through HV Solar, the City hopes to complete 50 rooftop solar installations in existing homes and 10 solar installations in new construction within the next six months. Currently, rooftop solar installations are eligible for federal tax credits. Due to federal budget uncertainty, solar installers encourage homeowners to explore solar energy now while tax credits remain active.

To further increase citizens' access to rooftop solar energy, the City will be hosting two fun, free and educational workshops in October. HV Solar workshops will guide homeowners and citizens through the process of going solar: determining whether a particular home is well-suited for rooftop solar energy, finding the right solar contractor and navigating available federal and local subsidies.

The first HV Solar workshop will be held at Happy Valley City Hall on Thursday, Oct. 1, 2015 at 7:00 p.m.. The second workshop will be held at Happy Valley Library on Saturday, Oct. 17 at 10:30 am. Workshops will be approximately 90 minutes long. A Solar Home Tour will be offered immediately following the Oct. 17 workshop.

In partnership with the City's efforts to increase solar activity, four local solar installers are offering special solar deals exclusively to Happy Valley residents for the duration of the HV Solar program: Prestige Power Systems, Neil Kelly, SolarCity and Sunlight Solar Energy. Additional information about each company's installation special is available on the City's solar webpage, and installers will be available following each HV Solar workshop to answer questions.

Stay tuned for more information about the HV Solar Home Program, informational materials and upcoming workshops. Additional information is available on www.happyvalleyor.gov, or you can email program manager Jaimie Lorenzini directly at jaimiel@happyvalleyor.gov.

Why lease solar? Owning your system is an affordable investment!

We are a family owned business located right in Happy Valley.

Solar Installation • Electrical Contracting • Energy Efficiency

Call us today for a free estimate!

Discount Pricing for Happy Valley Residents

Visit our community page at hvgosolar.org

Prestige Power Systems, LLC
CCB License #206095
Trade Ally of EnergyTrust of Oregon
Creating a greener city

How Much Does Solar Cost?

$13,585 = Full retail price for a 3.57 kilowatt system

- State Tax Incentive - $6,000
- Federal Tax Incentive - $3,324
- PGE Customer Incentive - $2,502
- Actual Cost to you: $1,759

That's a savings of $11,826

Pricing reflects Happy Valley discount which includes premium high watt Made in Oregon SolarWorld Mono modules

542486.100715 HVM

503-498-1843 · prestigepowersystems.com

EMPLOYEE*SPOTLIGHT*

CITY OF HAPPY VALLEY

Doug Jones

Adult Services Librarian

Doug has been working as a librarian at the Clackamas Corner Library and now the Happy Valley Library for 20 years. His go-to books are Dune by Frank Herbert, Foundation by Isaac Asimov, and books by Louis L'Amour.

"The people are my favorite and the most important part of my work, even those I only encounter once. I love how people can surprise you with the depth of their minds and hearts, especially when you least expect it. It always makes me feel lucky to have met someone like that."

We Treat Sports Injuries! · Heel Pain · Tendonitis · Shin Splints · Stress Fractures

Pacific Foot and Ankle Clinic, LLC

NOW **2** CONVENIENT LOCATIONS!

6542 SE Lake Rd., Suite 102 • Milwaukie, OR 97222
5493 Amy St • West Linn, OR 97068
503-659-6686 • www.mannymoydpm.com

549904.100715 HVM

Discover Rock Creek

Event on Nov. 7 offers rare access to natural area

Newly restored site provides scenic wildlife experience in urban area.

The public is invited to Discover Rock Creek, an educational event and volunteer work party to help improve fish and wildlife habitat in a rarely visited section of the Clackamas River Watershed on Saturday, Nov. 7 from 9 a.m. to noon at 14974 SE Hwy 212 in Happy Valley, Ore. Parking will be available at Nature's Country Store located nearby at 15252 SE Hwy 224. This event is presented by partners Clackamas County Water Environment Services, Clackamas River Basin Council, and SOLVE.

Visit: clackamas.us/wes

Rock Creek is an important tributary of the Clackamas River and home to salmon, beaver, osprey and other fish and wildlife. Discover Rock Creek offers an opportunity to explore and improve wildlife habitat and natural areas around Rock Creek near its confluence with the Clackamas River, a site usually closed to the public.

Discover Rock Creek celebrates the Rock Creek Confluence Project that began in 2013. The project included the removal of over 12 acres of invasive weeds, the planting of 18,000 native trees and shrubs, and the placement of over 25 large wood structures, 200 repurposed Christmas trees and numerous boulders into the creek. This work increases stream complexity and provides protection for juvenile salmon before they migrate to the ocean.

"People will be surprised that we did a big construction project here, because it looks natural. But if you can't tell where we worked, that means the project was a success. I hope neighbors will take advantage of this infrequent opportunity to access the site and learn about this gem of a habitat right at the edge of the city," said Gail Shaloum, Clackamas County Water Environment Services Environmental Policy Specialist.

Participants can tour the site's new in-stream construction and native plant restoration work. Education stations will feature fun and family-friendly hands-on activities and information about stream insects, soil, water quality, Clackamas River fish runs and their habitat, and plant care. Attendees will also have an opportunity to meet with experts and students who are studying the aquatic life at this site to determine how aquatic life is responding to the changes brought about by restoration.

The Rock Creek Confluence Project was funded by Clackamas County Water Environment Services, Metro's 2006 Natural Areas bond measure, Oregon Watershed Enhancement Board, The Nature Conservancy's PGE Habitat Fund, and the Clackamas River Basin Council's Shade Our Streams program.

For more information and to register for the Discover Rock Creek event contact solveoregon.org or call (503) 844-9571 x332. Tips to help improve the Clackamas River watershed can be found online at clackamas.us/wes.

Young volunteer studies the salmon lifecycle from egg to post-spawned carcass.

WES Director Greg Geist presents
solution to wastewater treatment capacity shortage

Clackamas County Water Environment Services (WES) Director Greg Geist kicked off a series of presentations to community groups designed to raise awareness of a threat to public health and the environment in the county's two largest service districts. The issue also puts the county's economic future at risk. Geist also presented a cost-sharing solution to the problem of a lack of capacity for solids handling, which is a vital part of the wastewater treatment process.

Geist explained to members of the Clackamas County Business Alliance and Rotary Club of Oregon City that an equitable co-investment involving both districts is the most cost-effective way to solve the capacity problem. Geist said that building additional capacity at the Tri-City facility in Oregon City for the Tri-City Service District and Clackamas County Service District No. 1 to share would save money for ratepayers in each district and help to maintain the exceptional WES service customers are used to receiving. Geist's presentations were well-attended and featured lively question-and-answer sessions.

WATER ENVIRONMENT SERVICES

To find an upcoming presentation in your area or to schedule a presentation for your group, contact WES Policy Analyst Matt Glazewski at mglazewski@clackamas.us or call 503-742-4566. To learn how Water Environment Services is protecting public health and the environment at the most economical cost, and to watch the new WES video "A Solid Plan for the Future," go to clackamas.us/wes.

RiverHealth Stewardship Grant proposals
due April 27 for up to $30,000

Grant funding is available to groups who want to improve the health of Clackamas County Service District No. 1 watersheds. Citizen groups, businesses, schools, nonprofits, student groups, faith organizations, neighborhood or business associations, and service groups within the Portland Metropolitan area and Clackamas County are welcome to apply. Preference will go to project proposals that improve watershed health, are visible to the general public, show a clear community benefit, and include one or more of the following features:

RAINWATER INFILTRATION - Install rain gardens, stormwater planters, pervious paving, and eco-roofs

RESTORATION - Remove invasive plants, plant native vegetation, and maintain restoration sites in riparian areas

PAVEMENT REMOVAL - Remove pavement and replace it with permeable surfaces to restore natural hydrology and reduce stormwater runoff

For more information and to apply, contact WES Environmental Policy Specialist Gail Shaloum at 503-742-4597 gshaloum@clackamas.us or go to RiverHealth.org.

RESOLUTIONS DON'T END IN JANUARY

This year I will...

snap FITNESS·24-7

$29.95/Mo

OREGON CITY
19703 S Highway 213 Ste. 120
(503) 656-2580 | snapfitness.com/oregoncity
Located in the Haggen Marketplace

CANBY
1109 SW 1st Ave
503-266-5515 | snapfitness.com/canby
Located next to Dutch Bros.

MILWAUKIE
4200 SE King Rd
503-353-7627 | snapfitness.com/milwaukieor
Located in the Safeway Shopping Center

snapfitness.com /snapfitness247 @snapfitness

538751.020316 HVM

SATURDAY, MARCH 12

Sign up at RockCreekPartnership.org

Come celebrate and protect the Rock Creek Watershed together with neighbors, friends and family!

Full service animal clinic
including grooming, boarding, behavior counseling, and geriatric pet services

Happy Valley Veterinary Hospital
OPEN 7 DAYS A WEEK

FREE first visit
Coupon expires 3.3.2016

Includes exam and consultation with the Vet!
15957 SE Happy Valley Town Center Dr.
503-395-1649
www.happyvalleyvet.net
Conveniently located in Happy Valley next to the New Seasons Market!

536658.020316 HVM

We're busy as a Bee getting ready for Spring!

TERRA CASA®
distinctly different.

- Home
- Pottery
- Fountains
- Furniture
- Gifts
- Accessories

19995 SE Hwy. 212, Damascus | 503-577-8242 | www.terracasa.com
Mon - Sat 10am - 6pm | Sun 11am -5pm

536681.020316 HVM

Mayor: *The future and growth of our 'Happy' community*

■ *From Page 1*

think that is amazing," DeRemer said.

In 2015, some Damascus residents de-annexed from Damascus and later annexed to the city of Happy Valley. In May, Damascus voters could decide to disincorporate the city entirely. What does that mean to Happy Valley in terms of planning?

"If they do disincorporate, then we will have to seriously look into the comprehensive planning for a portion of that area," DeRemer said. "If they don't, we will have to consider how we partner in this transition area between the cities. Either way, we have planning to do. As a city, we are waiting to see what happens, and are prepared for the results in May."

"This is my goal, to find a perfect balance between residential and business growth, to help create more jobs and allow residents to enjoy moving to this city and enjoying everything it has to offer."

Lori DeRemer, Mayor

The 2015 Youth Council and Mayor DeRemer visit with a staff member in Representative Kurt Shrader's office while in DC for the National League of Cities Conference.

As Happy Valley continues to be the fastest-growing city in Oregon, new housing development and business projects are moving forward. Looking ahead to 2016 and beyond, "growth is tremendous," DeRemer said.

"The housing market is in full swing," she said. "This residential growth is part of a large, strategized, comprehensive plan, and all Happy Valley partners are ready. From sewer, fire, water, schools and more, every partner is on board and ready to take this on. Of course, there are concerns related to growth, but we plan for this, too."

On the business-growth side, "we are excited to see the Fred Meyer project breaking ground. We've been working with Fred Meyer since 2004, and this is an $85 million investment on the part of all the business partners. It's been great to see development partners come together," DeRemer said.

Another hot topic that the city is preparing for is a November vote on whether the city should issue recreational marijuana business licenses.

"When Oregon Measure 91 passed last year, the voters within the city of Happy Valley were a 'no' majority," DeRemer said. Currently, the council agreed to wait for the vote before issuing any licenses.

"In November, we will let our citizens vote. If they opt-in, we will have dispensaries, and if they opt-out, we won't," she said.

In the meantime, the council is developing regulations if the voters choose to opt-in, allowing marijuana businesses to open their doors.

"This also gives us a chance to see how other cities are regulating this new type of business," DeRemer said.

Regardless of the type of business, DeRemer stressed the importance of business development in Happy Valley, especially as the city approaches 20,000 residents.

"Business helps drive the opportunity to both live and work in one's community," DeRemer said. "It is my goal to continue to keep those jobs coming to Clackamas County and Happy Valley."

"The Fred Meyer development, (which is projected to open Nov. 4; See page 14), for example, is bringing in 200 new jobs. This allows people to stay and work here, people shouldn't have to drive away from their families to work," she said. "Being close to home also gives them access to invest directly back into their community by supporting other businesses and being able to enjoy the amenities that Happy Valley offers.

"I was driving by, and the skate park and basketball courts were packed. I've heard more great feedback about our facilities and things like continuing free concerts in the park. Our celebrations are so well-attended, even on rainy days," DeRemer said.

"A few days ago, a new resident named Dimeji Onafuwa approached me. He and his family just moved here from Charlotte, N.C., and he told me he really wanted to find ways to get involved in our community and volunteer," DeRemer said.

"This is my goal, to find a perfect balance between residential and business growth, to help create more jobs and allow residents to enjoy moving to this city and enjoying everything it has to offer."

Youth Council, mayor take part in National League of Cities Conference

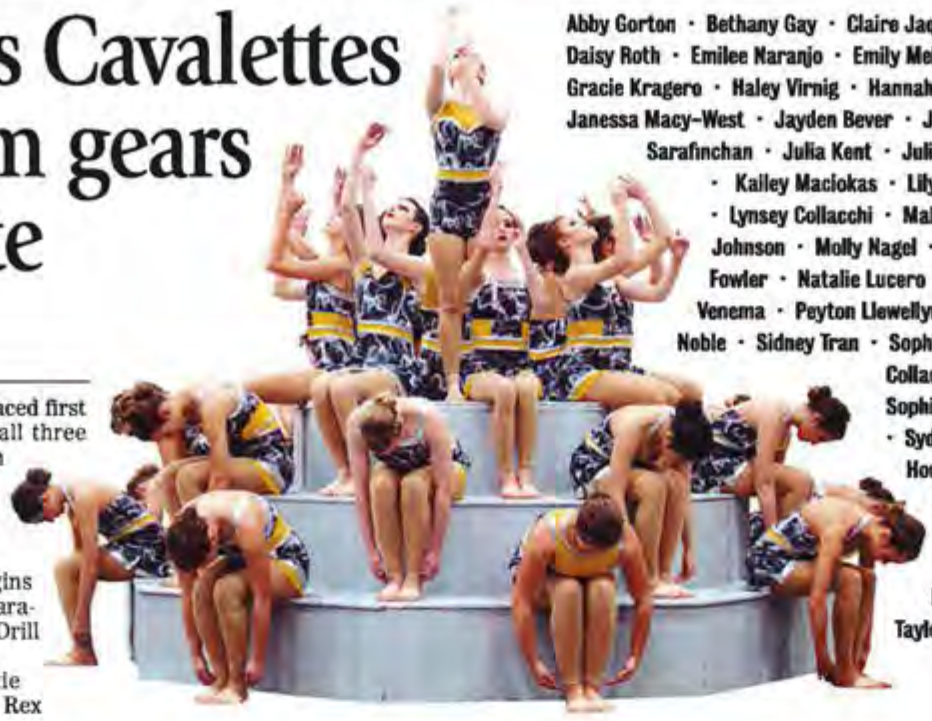
The Happy Valley Youth Council and Mayor Lori DeRemer will travel from Oregon to Washington D.C., March 4 through 9. They will visit with youth leaders from around the country and discuss shared community issues, as well as solutions that can benefit communities.

The Happy Valley Youth Council is an advisory board serving as teen advocates in their community. Youth Councilors collaborate on ideas and information and look to the City Council for mentorship and assistance.

The Youth Council encourages community members to join their events and attend their monthly council meetings.

Clackamas Cavalettes dance team gears up for state

By RAYMOND RENDLEMAN
Pamplin Media Group



Abby Gorton · Bethany Gay · Claire Jaqua · Daisy Roth · Emilee Naranjo · Emily Melchior · Gracie Kragero · Haley Virnig · Hannah Parks · Janessa Macy-West · Jayden Bever · Josie Sarafinchan · Julia Kent · Julia Medera · Kailey Maciokas · Lily Stephens · Lynsey Collacchi · Makeana Johnson · Molly Nagel · Morgan Fowler · Natalie Lucero · Olivia Venema · Peyton Llewellyn · Sami Noble · Sidney Tran · Sophia Collacchi · Sophia DiNucci · Sydney Houston · Sydney Johnson · Taitum Kurasz · Taylor Olsen

The Clackamas Cavalettes placed first in the Show Division, and all three North Clackamas high schools placed well at Canby's Winter Festival of Dance 2016 on Jan. 30, the first competition for the state championship season.

The second half of the season begins with dance teams competing in preparation for the Oregon State Dance and Drill Championships on March 17-19.

In the 5A Division, the Milwaukie Pony Prancers placed first, and the Rex Putnam Royal Crowns were second.

COMMUNITY*CALENDAR*

March 2016

1 City Council Work Session
6:00 p.m. | City Hall Council Chamber

1 City Council Meeting
7:00 p.m. | City Hall Council Chamber

8 Happy Valley Garden Club
9:30 a.m. | Tuffa Rocks and Alpine Plants Speaker: T. Jensen
Happy Valley Baptist Church
RSVP to **jenb@bussmold.com**

8 Planning Commission
7:00 p.m. | City Hall Council Chamber

10 Traffic and Public Safety
7:00 p.m. | City Hall Council Chamber

12 Mindful Eating Practices by Surja Tjahaja
1:30-3:00 p.m. | Happy Valley Library

15 City Council Work Session
6:00 p.m. | City Hall Council Chamber

15 City Council Meeting
7:00 p.m. | City Hall Council Chamber

23 HV Business Alliance Meeting
7:30 a.m. | New Seasons Market

23 Design Review Board Meeting
7:00 p.m. | City Hall Council Chambers

30 Kids Town Hall
3:00 p.m. | Happy Valley Library (see article on page 9 for more details)

Looking for volunteers for two fun planting events

STORY BY CINDY FREE-FETTY

Rock Creek is an important tributary of the Clackamas River, which provides high quality drinking water to more than 300,000 people and provides critical habitat for many sensitive species of plants, fish and wildlife.

The Rock Creek Partnership was formed in 2011 and is a collaboration between the Clackamas River Basin Council, Friends of Trees, and SOLVE (Stop Oregon Litter and Vandalism) and is supported with funding from Clackamas County Water Environment Services, on behalf of Clackamas Service District No. 1.

There are two events this month, Planting Day at the Rock Creek Troge and the 5th Annual Watershed Wide Event.

Fifth Annual Watershed Wide Event at Pendarvis Farm

Join the Rock Creek Partnership on Saturday, March 12 from 9 a.m. to 1 p.m. in Happy Valley for the 5th Annual Watershed Wide Event held at Pendarvis Farm, 16581 S.E. Hagen Road.

Volunteers will be planting a wide diversity of native trees and shrubs to create a hedgerow on the property that will attract native pollinators and contribute to watershed health. No experience is necessary, and families, neighbors and friends are all welcome.

"The farm is a perfect venue," said Kennett. "They are a natural supporter of the community and the environmental mission of our partners."

Volunteers for the event are encouraged to sign up online at **solveoregon.org** and clicking on the link for the Rock Creek Watershed Wide Event 2016. They will meet at the Happy Valley City Hall and then will be shuttled to Pendarvis Farm. There will be breakfast, hot coffee, tea and music. The day will wrap up with fun raffle prizes. Gloves, tools and supplies are provided.

Planting Day at the Rock Creek Troge

On Saturday, March 5 from 9 a.m. to 12 p.m., volunteers from the SOLVE group at Clackamas High School, the Mt. Scott Elementary Green Team and others will serve the community by planting native shrubs and trees, cleaning out invasive weeds and installing coffee bags as a weed barrier and mulching.

According to Steve Kennett, Team Up program coordinator for SOLVE, there are all kinds of volunteer opportunities, and this event typically sees about 20 volunteers. "This is a great way for students to get out of the normal classroom at serve the community."

Volunteers will meet at Pleasant Valley Nursery, 11822 SE 172nd Ave. and then walk to the adjacent property to the planting site. Register at **solveoregon.gov.**

Families and friends
gather to improve Rock Creek Watershed

More than 130 volunteers of all ages joined the Rock Creek Partnership to plant a hedgerow of 1,650 native trees and shrubs along Rock Creek in Happy Valley in March. The newly planted trees help improve water quality, provide habitat for wildlife, and attract pollinators for a healthier watershed.

The Rock Creek Partnership includes Friends of Trees, SOLVE, the Clackamas River Basin Council, and Water Environment Services. Visit www.RockCreekPartnership.org or www.RiverHealth.org to learn how you can help protect our valuable watersheds.

WATER ENVIRONMENT SERVICES

Thank you for helping to protect public health and the environment
www.clackamas.us/wes

Earth Day Event
Happy Valley Park

FRIENDS of TREES

Add your contribution to the environment on Friday, Apr. 22 from 9 a.m. to 12 p.m. at an Earth Day event sponsored by Friends of Trees and the City of Happy Valley. This event will focus on adding mulch to newly planted areas.

Residents of all ages and experience levels are encouraged to participate. Volunteer leaders with planting expertise will train small groups of volunteers and help throughout the morning. These volunteer events are a fun way for families, service groups, or individuals to get outside and help improve their local natural area. Friends of Trees will provide morning refreshments, tools, and gloves. Please come dressed for the weather and wearing sturdy, closed-toe shoes. Preregistration for individuals is not required. If you plan to bring a group of five or more volunteers or have any questions, please contact Jenny or Randi at Friends of Trees (503-595-0213) or visit www.FriendsofTrees.org.

This event is part of an ongoing partnership between the City of Happy Valley and Friends of Trees to improve water quality and wildlife habitat at Happy Valley Park.

EVENT DETAILS

DATE: Friday, April 22
CONTACT: Jenny or Randi
PHONE: 503-595-0213
VISIT: www.FriendsofTrees.org.

Mulch is valuable for new plant health because:

- Mulch insulates the soil helping to provide a buffer from heat and cold temperatures.
- Mulch retains water helping to keep the roots moist.
- Mulch keeps weeds out to help prevent root competition.
- Mulch prevents soil compaction.

Work party events such as this are a great way for families to give back to the community and to gain a better understanding of the environmental importance of Happy Valley's wetland areas.

SPRING into SOLAR

PRESTIGE POWER SYSTEMS
503-498-1843
ccb# 206095 www.prestigepowersystems.com
EnergyTrust

$15,428 - Estimated cost for a 4.06 kw system
State Tax Credit - $6,000
Federal Tax Credit - $3,897
PGE Incentive - $2,436
Actual Cost to you - $3,094
You save - $12,333

SPRING SPECIAL $500 OFF INSTALLATION

Locally owned and operated in Happy Valley.
The Happy Valley Solar Home Program has ended, but our discount pricing to our neighbors has not!
We use only the highest quality products and locally made SolarWorld modules.
Act now and get installed before summer!
Limited time special, get one free solar panel.
Have an electrical project? We can do that too.

CALL TODAY FOR YOUR FREE CONSULTATION

Having many volunteers allows the project team to cover a lot of ground in a small period of time. No need to bring equipment with you; tools and planting materials will be supplied at the event.

Now is your time to *enjoy* life!

socializing.
dining.
learning.
exercising.
laughing.
growing.
staying well.

Miramont Pointe
A Senior Living Community

A Platinum Service® Community Managed by The Goodman Group

11520 SE Sunnyside Rd, Clackamas · MiramontPointe.com · (503) 698-1600

MAYOR'S MESSAGE:

Governor's Transportation Vision Panel

The City Council and I have always felt that it's important for Happy Valley to be represented in regional and state discussions that impact our local community. As Mayor, I've done my best to be at the table to influence decisions in a positive way for our city.

One of the issues I know many of you care about deeply is the future of our transportation system. In March, I was asked to attend and speak on behalf of the City to the Governor's Transportation Vision Panel. My goal was to bring attention and resources to addressing transportation needs in Happy Valley.

The Governor's Transportation Panel was formed in 2014 for the purpose of developing a long-term vision for the transportation network throughout the State of Oregon. This panel has established a set of key priorities such as reducing roadway bottlenecks, investing in freight infrastructure and pedestrian facilities, and improving the resiliency of our roads and bridges in case of an earthquake. All of these are great goals.

In Happy Valley, one of the primary transportation concerns is related to commute travel time and congestion as further development occurs. Happy Valley residents will be happy to know specific projects have been proposed with the aim to improve their daily drive. To address this issue, two of the most critical transportation investments on state facilities are additional lanes on I-205 near congestion points and the extension of the Sunrise Corridor project near Highway 212. Specifically, the Sunrise Corridor extension will not only reduce congestion on Highway 212, it will improve access to underdeveloped employment lands. As the entire state struggles with transportation infrastructure needs, these projects will only happen with a strong partnership between the City, Clackamas County, and the Oregon Department of Transportation.

The City Council has continually advocated for these projects. We will remain committed to ensuring we have a seat at the table to influence regional and state decisions that impact our local community.

COUNCIL CORNER

Community Involvement

This month we are introducing a new article series, "Council Corner," which will provide citizens with an inside look at issues we are discussing, community events that are important, and ways to get involved.

One of the many things that makes Happy Valley such a great community is the dedication of all those who get involved to make this a better place ... even in the rain! Last month, was the fifth annual Rock Creek Watershed Wide Event at the Pendarvis Farm supported by the Clackamas River Basin Council, Clackamas County Water and Environmental Services, SOLVE, and Friends of Trees. This fun event reminded us of the importance of community involvement.

Council President, Michael Morrow, and his wife Diane, a Traffic and Public Safety Committee member, spent a fun, although wet and muddy Saturday at the Rock Creek Watershed Wide Event, held at Pendarvis Farms.

It was great to see so many people volunteering. 1,650 native trees and shrubs to restore the Rock Creek watershed were planted with the help of over 130 local volunteers. Rock Creek is an important tributary of the Clackamas River, which we all depend on for drinking water.

While a great excuse to get dirty, the event was also about getting involved in the community and having fun with friends. We encourage all families in Happy Valley to volunteer. Whether your passion is to improve the environment, feed the hungry, shape the growth of our City, or improve local parks, there are plenty of opportunities to help make our community better.

Happy Valley has been shaped by the dedication of volunteers in the community. As a governing body, we rely on community input to set future policy direction. As a community, we depend on the service of others to restore watersheds, improve local parks, and pick up litter. Plus, all of these activities are great ways to have fun, meet your neighbors, and make friends.

For all of you who came to the Rock Creek Watershed Wide Event in the rain, thank you! It is during events like this that remind us why this is a great community to call home. We are proud to serve as your elected leaders and continue to work with the community to make Happy Valley a place people chose to be.

Lori DeRemer, *Mayor*, (503) 367-6821
Michael Morrow, *Council President*, (503) 347-2020
Markley Drake, *Councilor*, (503) 290-6023
Brett Sherman, *Councilor*, (503) 783-3800
Tom Ellis, *Councilor*, (503) 783-3800

HAPPY VALLEY CITY COUNCIL *Council Meetings are held 1st and 3rd Tuesdays of the month at 7 p.m. at City Hall*
16000 SE Misty Drive | Happy Valley, OR 97086 | (503) 783-3800 | www.happyvalleyor.gov

Happy Valley Monthly is a special publication of

Clackamas Review

6605 S.E. Lake Road, Portland, OR 97222
503-684-0360 | www.clackamasreview.com

Publisher's Note: *Happy Valley Monthly is always on the lookout for story ideas and suggestions from our readership. If you know of an interesting local story or a person deserving of community recognition, please forward tips to afox@clackamasreview.com and include your name and phone number for contact information.*

PUBLISHER

Angela Fox
afox@clackamas review.com

DESIGN

Molly Filler
mfiller@ PamplinMedia.com

COMMUNITY WRITER

Lyndsey Hewitt
lhewitt@ pamplinmedia.com

CITY WRITER

Chelsea Radich
chelsear@ happyvalleyor.gov

ADVERTISING

Kathy Schaub
kschaub@clackamas review.com

To advertise in the next issue of the ***Happy Valley Monthly***, contact Kathy Schaub at:
503-546-0779
KSchaub@ClackamasReview.com

Ad Deadline: April 19

HAPPY VALLEY HKBA BUSINESS ALLIANCE

Community is our business

www.hvba.biz

BUSINESSSPOTLIGHT

TJM TRAINING CONCEPTS, LLC

"When seconds count, help is just minutes away. What are you going to do while you wait?"

~ TJ Milashouskas

TJM Training Concepts™ is a training and consulting business specializing in safety solutions. We are a U.S. Marine Corps veteran owned and operated company.

Inherently we know that everyone wants to be safe - and we also know that our safety is easily taken for granted - until something happens. Keeping you, your family and/or business and employees safe is an area we are experts in.

Drawing on over two and a half decades of professional hands on experience, we offer classes that ensure clients at all levels will walk away with the skills and/or knowledge necessary to accomplish their goals. Classes are custom tailored to the specific needs of our clients in order to create a positive and realistic experience.

When faced with the unthinkable, only you can make the decision that is right for you based on the situation you are faced with.

TJM Training Concepts
TJ Milashouskas
503-349.2736
www.tjmtrainingconcepts.com

554714_060616 HVM

Do something with Dad on *Father's* Day

Instead of a gift, this year spend quality time on an activity

STORY BY LYNDSEY HEWITT

Finding something to do for Dad on Father's Day can be a daunting task — do you do the same old thing or try hard to find something new?

While a gift — perhaps upgrading the old weed whacker that Dad has had for 20 years — can be nice, finding an activity to do with him enables time for actual bonding.

But there's always the problem of time; we're busy bees and once the workday is done, the last thing we want to do is contemplate plans and arrangements, so here are a few ideas to get you going. And if you're really off the radar from being aware of holidays and such things, Father's Day this year falls on Sunday, June 19.

Sah-Hah-Lee Golf Course

Golf with Dad is tried and true, even if neither of you are any good at it. In fact, being terrible can make it more fun.

A must for golf this month, particularly, is at Sah-Hah-Lee Golf Course, 17104 S.E. 130th Ave., Clackamas, which is **celebrating its 25th anniversary on June 12,** but has happenings going on all month. The 18-hole course is great for both skilled players and beginners — something owners Steve and Tracy Lisac pride the course on.

"This is a great course for learning and growing," Steve Lisac said.

Another perk at Sah-Hah-Lee, and for those looking for activities that aren't too time-consuming, is that it doesn't take a lot of time. "You can play nine holes in an hour and a half," Steve Lisac said.

The course also has "foot golf," if you're feeling adventurous — a blend of soccer and golf. Tee times are after 3 p.m. Monday through Saturday, and after noon Mondays and Thursdays.

For more information, check out **sah-hah-lee.com** or call them directly at 503-655-9249.

Eagle Landing Golf Course

Also consider going to the seventh annual Father's Day Pig Roast and BBQ at Eagle Landing Golf Course from 11 a.m.-2 p.m. Sunday, June 19.

The block party will feature plenty of games, snacks and vendors along with Par 3 mini-golf and soccer golf. Visit **theaerleateagelanding.com/golf** for more details.

Hike

Pick a day that's nice — or even if there's a little mist — and get in a little workout with Dad.

Even if he's not interested in an intensive hike, there's a multitude of easy trails around the area. Getting a breath of fresh air is always good for the mind; you'll feel great afterward, in addition to having a nice bonding experience.

MOUNT TALBERT - WEST RIDGE:
A 4-mile loop good for all skill levels.

SCOUTERS MOUNTAIN NATURE PARK:
A 1-mile hike with scenic views.

MOUNT SCOTT NATURE TRAIL:
A 1.1-mile path.

SCOTT CREEK TRAIL:
A .9 mile hike.

Dinner and a Movie

OK, maybe this one sounds a little too romantic for Dad, but who cares?

This is a great way to get some quality time in with Pops — even if during the theater part, you can't chat. Sharing laughs before at dinner and post-movie discussions are always great. Sports on Tap is a good spot for the father figure in your life — their menu is tasty, plus there are plenty of great brews. See **PAGE 7** for more details on Sports on Tap and their new chef.

Clackamas Town Center Century Theater offers a variety of movies and showtimes, with as many as 24 titles — plus 3-D.

Check **clackamastowncenter.com** for the full list.

Lisa Bettendorf
Reviewing Principal Broker
Keller Williams Portland Central
503.341.0275 Cell
lisabettendorf@yahoo.com
5 Star Agent Past SIX Years by Portland Monthly

Charming Milwaukie Home
$299,900
3 Bedroom/1.5 Bath with over 1700 Square Feet

HUGE yard!

10114 SE 37th Ave.
Milwaukie

kw PORTLAND CENTRAL KELLERWILLIAMS

Call Lisa with questions at
503-341-0275

PRM PACIFIC RESIDENTIAL MORTGAGE
NMLS - 1477 / WA CL-1477

Natalie James MLO-392407
Mortgage Banker
4949 Meadows Rd, Suite 150
Lake Oswego, OR 97035
Direct: 503-887-0201
natalie.james@pacresmortgage.com

"Let me earn your business"

Dreams *Approved* Daily®

Volunteers needed!

ADVISORY BOARDS AND COMMISSIONS

Opportunities are available to serve on the Clackamas County **Aging Services Advisory Council.** The council advises the Clackamas County Area Agency on matters relating to the development and administration of the Area Plan and advises the Area Agency on Aging on plan operations, reviews all requests for funding, seeks client feedback of services funded under the Area Plan, and seeks opinions and advice from the general public on services needed and how to improve existing services.

It is a catalyst in the improvement and maintenance of existing service and in the generation of needed services for Clackamas County seniors. The council meets on the second Monday of each month from 9:30 a.m. – noon. The council has five openings. The application deadline is Aug. 27.

Board of Property Tax Appeals (BOPTA): This board has six openings for non-office-holding county residents who are available during business hours Monday through Thursday. Board members will hear property tax appeals between Feb. 1 and April 15 of next year. Terms of office end the following June 30. More information is available at www.clackamas.us/taxappeals/

Hundreds of Clackamas County property owners appeal to BOPTA each year. The board considers these appeals and makes a decision on each. Clackamas County offers reimbursement to these board members due to the time commitment involved. Board members meet for mandatory training prior to convening in February 2016. Application deadline is Thursday, Aug. 13.

If interested in applying for either council, complete and submit an online application at www.clackamas.us/miscapp/application.jsp, or pick up a printed copy at the Clackamas County Public Services Building, Public and Government Affairs office, 2051 Kaen Road, Oregon City.

Krupp's Korner

A message from Clackamas County Administrator Don Krupp

This month I want to talk about something that most people don't really think about as long as it's working well – our wastewater system. The wastewater treatment plants operate every day, around the clock. As a result of this process, public health and river water quality are preserved and protected. No matter where you live in the county, or who provides wastewater service, we all need to care about clean and safe services. Wastewater treatment is critical to our high quality of life, which is why I feel it's important for you to understand what's happening behind the scenes.

Once your wastewater drains from the sink, tub or washing machine or is flushed down the toilet, it goes through a network of below-ground pipes that transport the wastewater to treatment plants where liquids and solids are separated. The liquids are cleansed of pollutants before being released back into the Willamette River. The solids are carefully processed to meet state and federal regulations and converted into a useful, cost-effective fertilizer. Resource recycling through biosolids land application puts nutrients back into the soil instead of creating more solid waste for landfills.

Water Environment Services (WES) is responsible for making sure pipes and treatment facilities are maintained and operating every day. WES collects and cleans more than six billion gallons of wastewater annually at five treatment plants and recycles more than 21 million gallons of biosolids. The WES system serves homes and businesses across a combined service area population of more than 150,000.

Residents of the Tri-City Service District (TCSD) and Clackamas County Service District No. 1 (CCSD #1) rely on the treatment plants located in Oregon City and Milwaukie. The districts serve the cities of Oregon City, Gladstone, Happy Valley, West Linn, Milwaukie and Damascus. Recent upgrades at the TCSD plant improved our ability to process and treat liquids from both districts. However, our system is in dire need of a new digester to increase capacity to process solids and continue to serve current and future county residents and businesses. We must be able to accommodate ongoing and expected growth since some of Oregon's fastest growing cities are in Clackamas County.

It's not just about capacity. Our digesters are now over capacity and rely on full-time use of the backup system. Without a new digester, river health is at risk. If the overloaded system were to fail we would be forced to discharge untreated water into the river or spend significant dollars to truck our waste to a different disposal location. Neither response would be sustainable or responsible.

The Board of County Commissioners is asking cities in the two service districts to work with WES to reach a timely solution for increasing system capacity. Elected officials from these cities and representatives of unincorporated areas serve on the Regional Wastewater Treatment Capacity Advisory Committee, which has been asked to provide a recommendation by November 2015. The committee will discuss the need for a new digester, funding and partnering options for joint investments. We are working together to ensure continued public health, healthy streams and the economic vitality of Clackamas County.

Clackamas County wins awards from NACo

Clackamas County Commissioner Martha Schrader (right, with new NACo president Sallie Clark) attended the NACo national conference in July and accepted the county's Best in Category Award.
Photo – courtesy NACo

Clackamas County has been recognized with four Achievement Awards from the National Association of Counties (NACo). The awards honor innovative, effective county government programs that enhance services for residents. The awards Clackamas County received were:

Clackamas River Enforcement and Ecology Workgroup – CREEW; *Category: Civic Education and Public Information*

Complaints of alcohol use, litter, and aggressive behavior on the Clackamas River prompted the Clackamas County Board of Commissioners to amend the parks ordinance in 2013, leading to tighter enforcement of alcohol use in county parks. The Clackamas River Enforcement and Ecology Workgroup, or CREEW – representatives from county departments and partners – was formed to collaboratively work to identify goals and programs for the summer recreation season that helped further the positive results of the parks ordinance.

Community Rain Garden Partnership; *Category: County Resiliency: Infrastructure, Energy and Sustainability*

In 2013 Water Environment Services (WES) implemented a surface water management project called the Community Rain Garden Partnership to focus on improving water quality within the service district for public health and the environment. The results of the Community Rain Garden Partnership include beautiful, functional and sustainable rain gardens that raise awareness of the importance of watershed health throughout the District and the county.

Additionally, a WES staff member was invited to speak about this program at the NACo national conference in North Carolina in July.

Changing Lens of Transportation Safety – Combining a Health Assessment and Road Audit; *Category: Transportation*

Clackamas County Public Health, Traffic Engineering, and Transportation Planning and Clackamas Safe Communities completed a pilot project that paired a Health Impact Assessment (HIA) with a Road Safety Audit (RSA), along a stretch of McLoughlin Blvd., south of Milwaukie. The goals were to understand how transportation decisions affect health and safety, and to develop a strategy for considering health in the county's transportation engineering, planning and maintenance work.

Skills Groups in the Schools – A New Partnership; *Category: Criminal Justice and Public Safety*

The Clackamas County Juvenile Department Skills Group Program is dedicated to providing facilitated group learning opportunities with evidence-based curricula that focus on expanding the competencies of youth. Skills Groups address risk factors by providing youth with positive life and social experiences in local schools. This program was also awarded the honor of Best in Category by NACo.

Visit: www.naco.org.

TOURS OF WASTEWATER TREATMENT FACILITY INCREASE STEM EDUCATION

Water Environment Services offers tours for students at the Tri-City Water Pollution Control Plant in Oregon City to help increase their knowledge of Science, Technology, Engineering and Math (STEM). The tours feature wastewater scientists and experts who describe the complex treatment processes that clean and recover water that flows from toilets and drains from homes and businesses.

Public tours of the Tri-City Water Pollution Control Plant are available. For more information and to sign up, please email gjohnson2@clackamas.us

Kellogg Creek Water Pollution Control Plant to be renewed and renamed

Clackamas County Service District No. 1 has awarded a contract to Brown and Caldwell to design the renovation of the 41-year-old Kellogg Creek Wastewater Pollution Control Plant that is in urgent need of rehabilitation and upgrades. Along with the renovation, the facility will be renamed Kellogg Water Resource Recovery Facility due to the plant's focus on the recovery of valuable resources, such as energy, biosolids and clean water.

The Kellogg Creek plant was constructed in 1974 and designed to treat 25 million gallons per day (MGD), although the plant is only able to treat 21 MGD. One of the district's goals is to reclaim the lost treatment capacity. Identifying the restrictions and implementing a plan to eliminate them, in addition to completing work to maintain the current quality of treatment, will be part of this project to reclaim the original design capacity of the plant for the developing region.

Clackamas County Service District No. 1 estimates the total project cost to be $18 million. Brown and Caldwell recently began the design phase of the renovations. The project is scheduled to be completed by June 2018.

WATER IS VALUABLE
We *treat* it that way

SAVE-THE-DATE!

Discover Rock Creek – a volunteer work party and hands-on education event

- **Saturday, November 7, 2015**
- **9 a.m.– noon**
- **Rock Creek Confluence**
  14974 SE Hwy 212, Clackamas, OR

Stay tuned for more info at www.solveoregon.org

Sponsored by Water Environment Services

Avoid high water with our low rates!

Clackamas County Service District No. 1 (CCSD#1)
Business Owner,

Clean storm drains help reduce flooding and protect the health of our rivers and streams. Did you know that you can decrease the chances of high water on your property AND meet your annual CCSD#1 storm drain cleaning requirement?

On behalf of CCSD#1, Water Environment Services has negotiated an **exclusive discounted rate** of $45 per storm drain with a local company. The discounted rate is for storm drain cleaning only.

RiverHealth

DEADLINE TO SIGN UP FOR THE DISCOUNTED RATE:
November 1, 2015

To sign up and for more information visit RiverHealth.org, email info@RiverHealth.org, or call 503-742-4616

Clackamas River is vulnerable to surface water runoff - #1 cause of water pollution

HOW DOES THE RIVER START?

The Clackamas River starts at 4,909 feet in elevation on the western side of the Cascade Range in the Mt. Hood National Forest. Forty-seven miles of this river are federally protected by the National Wild and Scenic Rivers System. The Clackamas River Watershed collects water from nearly 940 square miles of forests, meadows, farms, neighborhoods, commercial and industrial areas before flowing into the Willamette River. More than 300,000 Oregonians depend on the Clackamas River for clean drinking water and hydroelectric power, and to enjoy the river's beauty and abundance of outdoor recreation activities, which is shared by visitors year round.

HOW DOES IT GET POLLUTED?

The Clackamas River Watershed, in its natural state, filters and cleans the water as it flows through tributaries, wetlands, seeps through ground water and into aquifers, then slowly makes its way down to the river. Water pollution occurs when bacteria from animal waste, chemicals, grime and grease get into the water or are collected along compacted soil and hard surfaces, such as streets, sidewalks, parking lots, roofs, driveways then contaminate our streams through storm drains. It happens on farms and along forest roads too.

HOW CAN WATER POLLUTION BE PREVENTED?

"We really want to keep pollution out of storm runoff in the first place," said Water Environment Services Surface Water Manager Ron Wierenga.

Photo by Ryan Gahris

"Everyone needs to remember that if something is on the ground it will eventually make its way into our water - the river starts with me and you," Wierenga explained.

A few simple things that everyone can do to help prevent water pollution:

- Use natural gardening practices rather than pesticides, herbicides and fertilizers
- Regularly service vehicles to eliminate leaks and recycle motor oil
- Disconnect downspouts where appropriate or find other ways to keep runoff out of storm drains
- Pick up pet waste and dispose of it in the trash
- Wash cars at commercial car washes, not in driveways
- Only rain down the storm drain!

Learn more at **www.clackamas.us/wes/**.

Water Environment Services addresses infrastructure challenge to protect public health, environment, and economy

Increasing digester capacity at Tri-City Water Pollution Control Plant will save ratepayers millions of dollars.

Many may not know what happens to wastewater after it's flushed down a toilet or drains from a shower or sink - most don't give it a second thought. Much of the county's wastewater system is managed and operated by Water Environment Services (WES). WES staff works effectively and responsibly so that residents and businesses don't have to think about it.

North Clackamas County areas served by WES are comprised of two service districts, the Tri-City Service District and Clackamas County Service District No. 1. Historically, the districts have worked together to share costs associated with building new infrastructure. However, recent delays by the districts to increase Clackamas County's wastewater solids handling capacity now puts public health, river quality, and the region's economy at risk, and could result in higher monthly bills for ratepayers if the districts each go it alone.

This infrastructure upgrade is needed to serve 150,000 affected customers who live in the cities of Oregon City, Gladstone, Happy Valley, West Linn, Milwaukie, unincorporated North Clackamas County, Johnson City, and parts of Damascus.

The Tri-City Water Pollution Control Plant in Oregon City and the Kellogg Creek Water Pollution Control Plant in Milwaukie serve both of these districts. Although separate entities, they routinely partner to share resources to provide outstanding service to customers in both districts at some of the lowest rates in the region.

A continued equitable partnership between the districts offers a great opportunity to solve the capacity shortage issues while saving ratepayers millions of dollars.

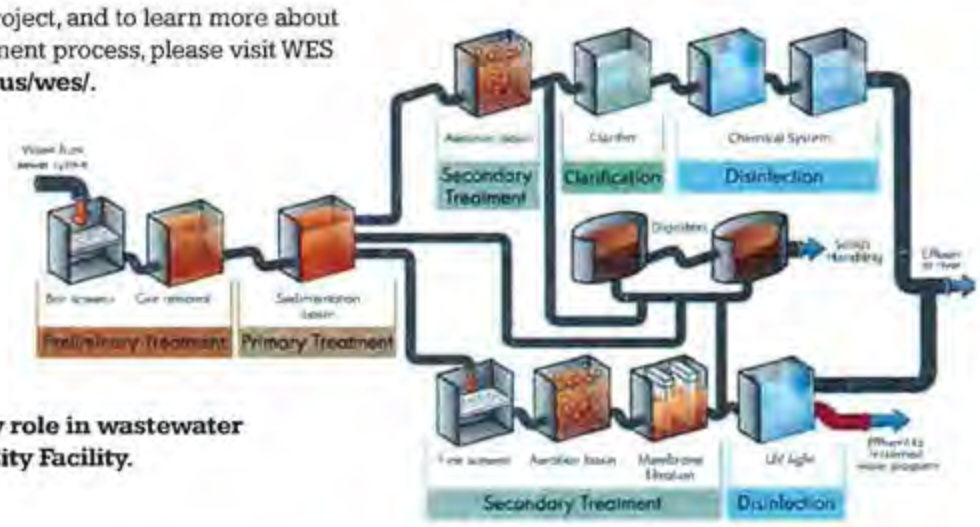
WES is committed to ensuring that the wastewater systems in North Clackamas County continue to run smoothly and efficiently.

For updates on this project, and to learn more about the wastewater treatment process, please visit WES at **www.clackamas.us/wes/**.

The Solids Handling Capacity Challenge

After decades of use, the plants are operating beyond their useful design. The Tri-City Plant now relies on fulltime backup systems for handling "solids," a sewage byproduct.

- Digesters process sludge (please see graphic) and need increased capacity
- Not adding capacity could lead to violations of the Clean Water Act permit
- Failure to increase capacity could lead to a moratorium on new buildings in the county, which threatens the region's economy



Digesters play key role in wastewater treatment at Tri-City Facility.

Water Environment Services

New engineer will play key role in solids handling capacity project

Clackamas County Water Environment Services (WES) Director Greg Geist is pleased with his decision to bring Lynne Chicoine on as capital program manager to play a key role in helping solve one of the most pressing problems confronting the county: the lack of wastewater solids handling capacity.

WES engineers Lynne Chicoine and Randy Rosane team up for wastewater capacity improvements.

"The capital program manager position is critical to solving our region's urgent need for increased capacity to process solids at the Tri-City Wastewater Treatment Facility," said Geist.

Solids are the by-product of sewage from homes and businesses. "Lynne's management capabilities are well-grounded in hands-on experience as a design engineer, cost estimator and client manager," said Geist. "I feel very fortunate to have found someone with so much talent and experience to fill this vital role at WES."

Chicoine's first task was to complete a scope of work for a technical evaluation of the solids handling capacity project. The scope for the first phase of the project includes tasks to confirm the need for the expansion of the solids facilities, define the required size of the expansion and evaluate process options.

Chicoine said it is very important to ensure that the project is inclusive and transparent.

"We are including workshops at key milestones to which member cities' technical staff are invited," she said. "The workshops will also include senior technologists from an area service provider and outside consulting firms. The goal of the first phase of the project will be to set out on a path that will provide solids processing capacity at the best value for the ratepayers in a manner that builds trust and consensus among stakeholders."

Chicoine began her role in October and brings more than 30 years of experience in planning and designing wastewater collection and treatment facilities. During her career, Chicoine worked for every major wastewater provider in the Willamette Valley, leading multi-disciplinary teams on complex wastewater projects and conveying technical concepts to officials and the public.

Chicoine also served as Vice President and Principal Project Manager for CH2M Hill, a leading engineering company that provides design, construction and operations services for corporations and governments.

"I am excited about joining Greg and his team to build a capital program that provides reliable service and good value for ratepayers now and into the future," said Chicoine. "It's a privilege to serve as a steward of Clackamas County's water environment."

STORM EVENTS TEST SURFACE WATER SYSTEM AND LANDSCAPE

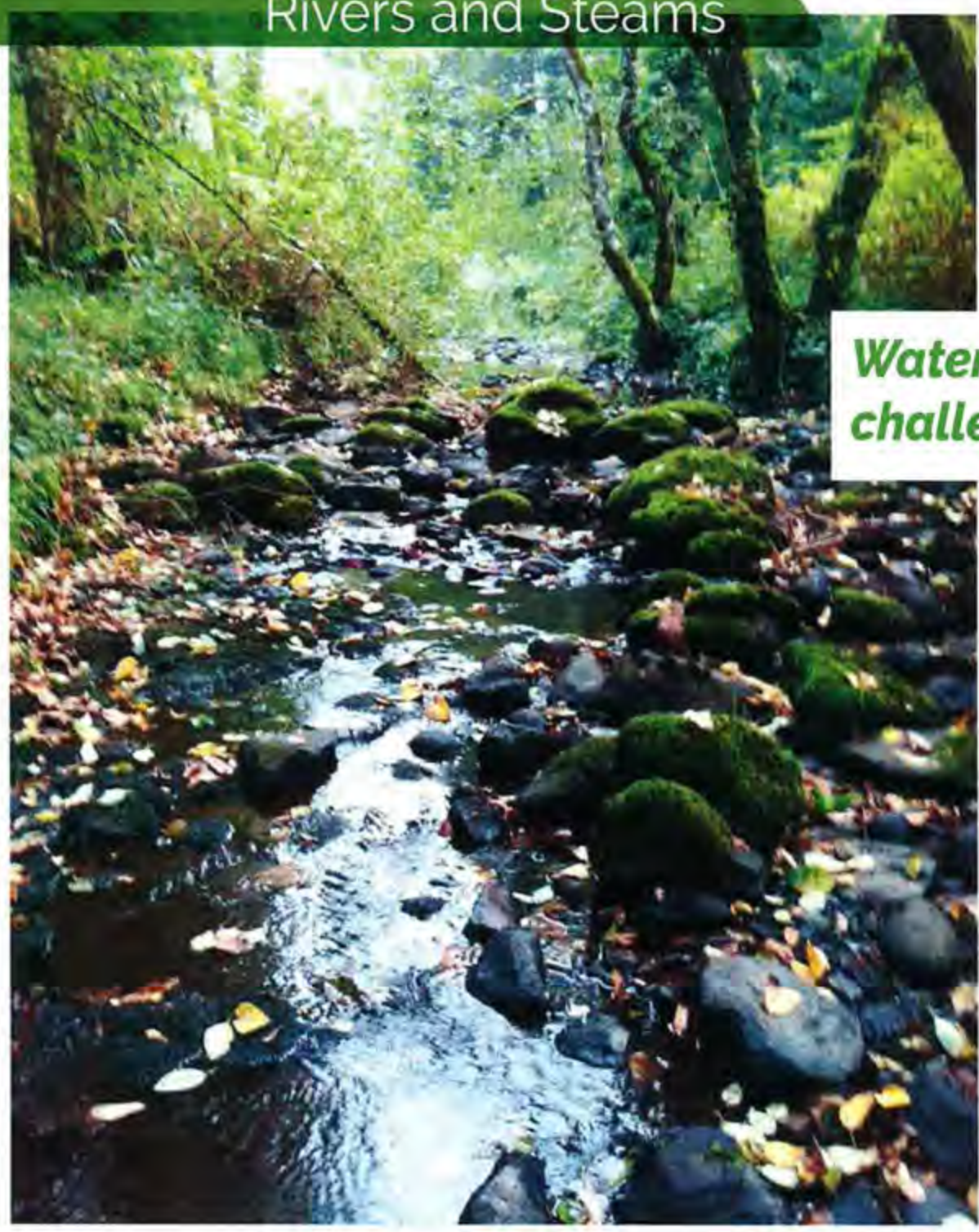
This winter's high water events tested our storm infrastructure and caused damage to local homes, roads and businesses. Rainstorms require all hands on deck for Clackamas Water Environment Services staff, city and county road operations staff, as well as the community. Home and business owners can protect themselves and the community by keeping the storm system clear of leaves and debris on their properties to safely avoid high water.

www.clackamas.us/wes

www.riverhealth.org

Stormwater runoff is now our number one source of water pollution. When it rains, pollutants from your home, car, and garden wash into our rivers and streams. Learn how you can help protect our water at theriverstartshere.org

Protecting Our Rivers and Steams



A healthy network of streams and wetlands protects water quality, provides fish and wildlife habitat, and enhances the beauty and livability of our communities. We in Clackamas County are fortunate to have our rivers and hundreds of small creeks to enjoy.

Waterways provide beauty, challenge and opportunity

A "riparian buffer" is the technical term for the plants and soils found along rivers and streams that provide wildlife habitat, stabilize banks from erosion, and protect our valuable water supply from pollution.

When storm runoff sweeps across surfaces such as farmlands, fields, roads and developed properties, it picks up pollutants and debris, washing them directly into waterways. This polluted runoff can contain contaminants such as chemicals, fertilizers and oil, which negatively impact public health and the environment. Riparian buffers act like a sponge to absorb these contaminants. A riparian buffer dense with native trees and shrubs is most effective.

If you own streamside property, you can help protect and improve important natural resources by controlling erosion, managing invasive plants and cultivating a healthy native landscape.

Follow these tips to help protect water quality:

1. Remove invasive vegetation, such as English ivy and Himalayan blackberry, from your streamside buffer. Continue to watch for and control these invasive plants.
2. Plant native trees and shrubs that naturally grow in the area, choosing plants suited for the sun exposure, soil conditions and amount of space available, then plant in fall or spring. Consult experts at your local nursery for native plant options.
3. Maintain your native landscape by watering the first few summers to help plants get established. Native plants generally do not require fertilizers.
4. Get help controlling erosion if you have bare spots on the streambank where vegetation won't grow. The Clackamas County Soil and Water Conservation District is a great place to start.
5. Keep dead trees as standing "snags" if they do not present a hazard because they provide rare and valuable habitat for wildlife!

For more information about caring for streamside properties, check out www.riverhealth.org

https://conservationdistrict.org/

'WES presents plan for solving wastewater treatment capacity problem' // cont'd from page 1

Geist told committee members that Phase 1 of MWH's scope of work represents a significant step in the process as it will provide:

- Updated population growth forecasts
- Future flows and loads projections
- Defined existing and future capacity needs
- Screen technologies and alternative technologies
- A 15 percent conceptual design

Geist said information gathered during Phase 1 will help determine how much additional capacity is needed for each district, how much it will cost to build that extra capacity, and will also assist in the evaluation of solids handling technologies.

Since the MWH scope is based on a co-investment strategy by both districts, Phase 1 will also provide valuable information on how to equitably apportion the costs between current and future ratepayers in the districts. The final report is due in June.

Chosen from among the top engineering firms in the world, MWH specializes in wastewater systems and has extensive knowledge about Tri-City Treatment Plant operations. MWH Global was selected through an extremely thorough and competitive process.

WES and technical staff from cities and communities in the districts took part on evaluation panels and committees during the selection process.

The Regional Wastewater Treatment Capacity Advisory Committee plans to meet again in March to review progress on the solids capacity expansion project.

Visit www.clackamas.us/wes/advisorycommittees.html to learn more and join the discussion. Please read Krupp's Korner on Page 2 to learn more about wastewater treatment service in northern Clackamas County.

REPORT POLLUTION ENTERING STORM DRAINS AND WATERWAYS

Water Environment Services (WES) protects public health and the environment within the unincorporated urban areas of Clackamas County and Happy Valley by preventing certain sources of pollution from being unlawfully discharged or accidentally spilled into storm drains, such as paint waste, chlorinated pool/hot tub water, automotive fluids, and chemicals such as pesticides, herbicides and fertilizers.

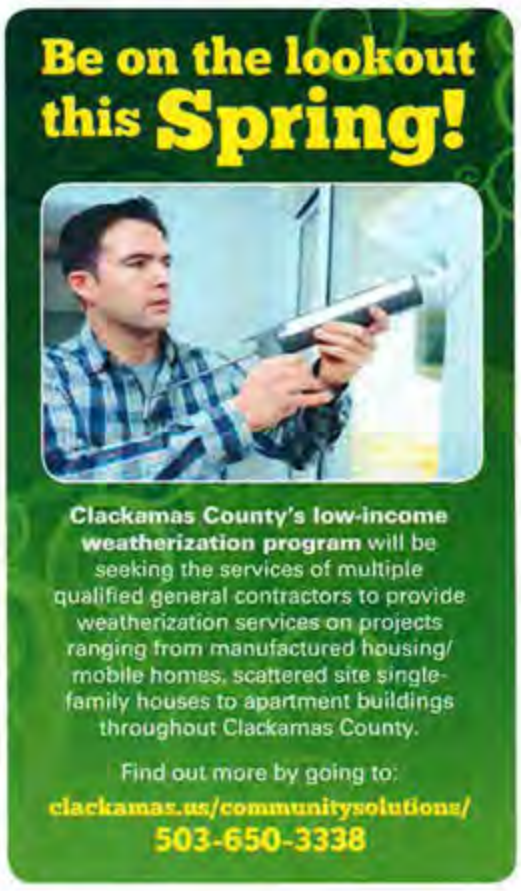
Storm sewer systems typically provide little or no treatment for spills which can pass directly into a local waterway. If you become aware of a significant spill or inappropriate discharge into a storm sewer system, please contact WES at 503-742-4567 from 7:30 a.m. to 5:30 p.m., Monday through Thursday. All other times, please call the county dispatch center at 503-655-8211 (non-emergency number) and ask the dispatcher to notify WES. Visit **www.clackamas.us/wes** to learn more about protecting water quality.

Take the 2016 Community Survey!

- continued from page 1

- The overall value of the services we provide (county parks, law enforcement, responding to disasters).
- The interest level in, and quality of, this very publication (*Citizen News*).
- How we can better communicate with you about all things the county does.

Interested? We would love to hear from you! The online survey will be open until April 30, and we'd like as many responses as possible. Simply visit the front page of our website, **www.clackamas.us**, and click on the image below. Your responses are anonymous, and results will be shared publicly and with the Board of County Commissioners for planning purposes.



Commissioners set May advisory vote on road maintenance funding

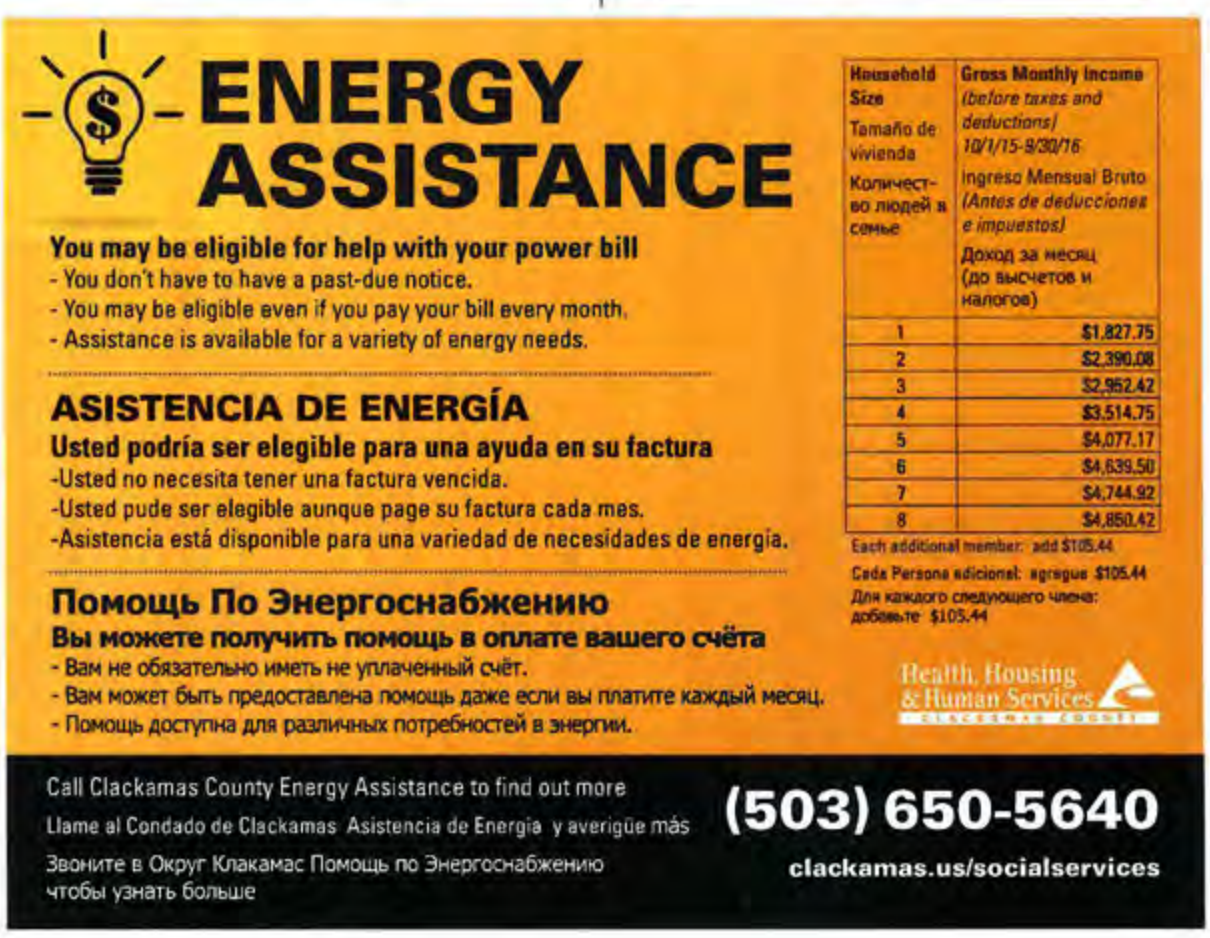
- continued from page 1

The board agreed that any options put forward would be for a limited time and would include a list of the specific maintenance and safety projects that would be accomplished with the funds generated.

Clackamas County is responsible for 1,400 miles of roads, and more than half of them are in fair-to-poor condition. The county is not allowed to pay for road maintenance with property tax revenue and road funding revenue has remained nearly static for more than 20 years, so there is now a $265 million gap between the amount of county road maintenance needed and available funds.

The county relies on three primary sources of revenue for road maintenance – state gas taxes, state heavy-weight mile taxes (from trucks) and state vehicle registration/title fees.

More information about road maintenance is available at **www.TheRoadAhead.us.**



Protecting Our Rivers and Streams

"We're flushing the idea that wastewater is waste. Wastewater is not waste – it's water, nutrients, and energy wasted only when we don't recover them."
–WES Biosolids Supervisor Chanin Bays

WES conserves, generates and recovers vital resources from sewage process

Flush and forget. That's what most people do. Not so with the staff of Clackamas County's Water Environment Services (WES). WES Biosolids Supervisor Chanin Bays, who leads WES' resource recovery team, describes a necessary yet hidden wastewater industry that has changed over the decades along with the world.

"It may be difficult to imagine working in an industry that for many years effectively had the goal of being invisible, said Bays, "The wastewater industry had that goal. People don't want to know what happens once they flush their toilets, they just want to flush and make it all go away."

Society has increasingly become aware of limited natural resources and the industry is actively adjusting its public image. WES is now helping to educate the public about its sustainable work to protect public health and the environment.

"We're flushing the idea that wastewater is waste. Wastewater is not waste – it's water, nutrients, and energy wasted only when we don't recover them," said Bays, who pointed out that the mission throughout WES facilities is to recover these vital resources. "Our focus is on conservation, generation and recovery."

Biogas, biosolids and clean water are three primary resources that the two largest WES facilities (in Oregon City and Milwaukie) work to conserve, generate and recover.

Wastewater treatment processing produces heat and biogas – the gaseous mix of methane and other gases produced from bacterial decomposition of organic wastes. WES captures these fuels and uses them to generate electricity at both facilities.

Additionally, WES recovers vital nutrients from nutrient-rich biosolids derived from the solids-handling process during wastewater treatment. Once treated to meet state and federal regulations, biosolids can be beneficially used as a fertilizer to help plants grow. WES works with approved growers to apply this fertilizer to agricultural fields.

Most importantly, WES facilities recover and treat over six billion gallons of water every year then return this cleaned water to the Willamette River.

"Wastewater and its components – both solid and liquid – may have an 'ick factor' but they play a vital role in soil management, energy production and maintaining clean water sources," said Bays. "At WES, we're responsibly and sustainably taking the 'ick' out of your resources and returning them to the community."

To learn more about how WES and the wastewater industry take the waste out of wastewater, visit **www.clackamas.us/wes.**

WHAT TO FLUSH OR NOT TO FLUSH? Clackamas County 4th and 5th graders learned that toilets are not trash cans during the annual springtime Clackamas County Water Education Team's Celebrating Water event in March - where North Clackamas high school students did the teaching.

TOILETS ARE NOT TRASHCANS

QUESTIONS AND ANSWERS CONCERNING CAUSES OF SEWER BACKUPS

Q: Should I flush wipes down the toilet, especially products marked "flushable"?

A: DO NOT FLUSH ANY WIPES DOWN THE TOILET! Wipes are made to be strong and do not fall apart like toilet paper. Wipes can collect within sewer pipes and can cause raw sewage to back up into homes and businesses.

Q: Will pouring hot water down the drain dissolve oil or grease?

A: Hot water doesn't help flush the grease out. Temporarily melted grease will travel down the drain and eventually flow into a sewer pipe where it then cools and coats the inside of the pipe. Grease buildup clogs pipes and can cause raw sewage to back up into homes and businesses.

Q: If a sewer backs up, who fixes it?

A: Property owners are responsible for the sewer pipes on their property to the point where their pipes reach the pipes connected to the district sewer pipes. Educating property owners of the causes of sewer backups can help save property owners money and protect public health and the environment.

Learn more about protecting public health and the environment at **www.clackamas.us/wes.**