

**City of Portland, Oregon**

**National Pollutant Discharge Elimination System (NPDES)  
Municipal Separate Storm Sewer System (MS4) Discharge Permit**

**Permit Number: 101314**

**ANNUAL COMPLIANCE REPORT NO. 17**

**Fiscal Year 2011-2012  
(July 1, 2011 – June 30, 2012)**

Prepared for:

**OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY**

**NOVEMBER 1, 2012**

Submitted by:

*City of Portland  
Port of Portland*





— CITY OF PORTLAND —  
**ENVIRONMENTAL SERVICES**



1120 SW Fifth Avenue, Room 1000, Portland, Oregon 97204 ■ Dan Saltzman, Commissioner ■ Dean Marriott, Director

November 1, 2012

Benjamin Benninghoff  
Municipal (MS4) Stormwater Coordinator  
Oregon Department of Environmental Quality  
811 SW Fourth Avenue  
Portland, OR 97204

Dear Mr. Benninghoff:

On behalf of the City of Portland and the Port of Portland, I am pleased to submit the enclosed *NPDES Annual Compliance Report No. 17*. This report fulfills reporting requirements for the Portland NPDES Municipal Separate Storm Sewer System (MS4) Discharge Permit. It identifies accomplishments for the 17<sup>th</sup> fiscal year of the permit program (July 1, 2011 through June 30, 2012).

The report demonstrates the co-permittees' progress toward meeting the permit requirements and stormwater program goals for the past year. Each co-permittee's section of the report (Section II for the City of Portland and Section III for the Port of Portland) details the activities implemented, program status, and any initiated or proposed program changes. A Monitoring Compliance Report that summarizes monitoring activities and results is included as Section IV. The raw monitoring data are available upon request on CD-ROM.

Please call me at 503-823-5275 if you have any questions concerning this report.

Sincerely,

Patrice Mango  
Stormwater Program Manager

cc: Dorothy Sperry, Port of Portland



Portland, Oregon  
National Pollutant Discharge Elimination System  
Municipal Separate Storm Sewer System Discharge Permit  
Permit Number: 101314

**ANNUAL COMPLIANCE REPORT**

**Fiscal Year 2011-12**

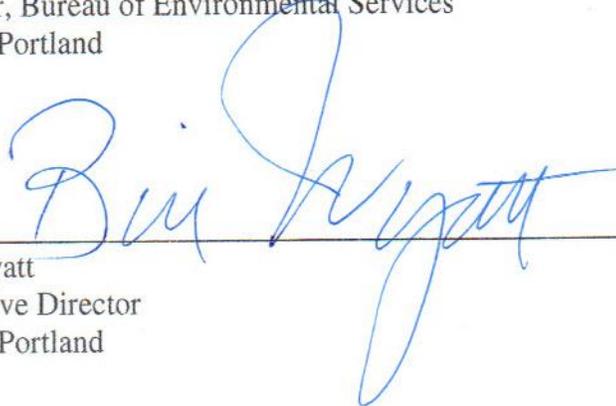
(July 1, 2011 – June 30, 2012)

We, the undersigned, hereby submit this annual compliance report for the Municipal Separate Storm Sewer System Discharge Permit No. 101314, in accordance with Schedule B, Section 5 of that permit. We certify, as required by 40 CFR Section 122.22, under penalty of law, that this document was prepared under our direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated 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.



---

Dean Marriott  
Director, Bureau of Environmental Services  
City of Portland



---

Bill Wyatt  
Executive Director  
Port of Portland



## Permit Holder Information

Co-Permittee: City of Portland  
Bureau of Environmental Services  
Address: 1120 SW Fifth Ave., Room 1000, Portland, OR 97204  
Contact Person: Patrice Mango  
Telephone No.: 503-823-5275  
E-mail Address: [patrice.mango@portlandoregon.gov](mailto:patrice.mango@portlandoregon.gov)

Co-Permittee: Port of Portland  
Address: 7200 NE Airport Way, Portland, OR 97218  
P.O. Box 3529  
Portland, OR 97208  
Contact Person: Dorothy Sperry  
Telephone No.: 503-415-6641  
E-mail Address: [dorothy.sperry@portofportland.com](mailto:dorothy.sperry@portofportland.com)



## **REPORT CONTENTS**

### **EXECUTIVE SUMMARY**

<b>I.</b>	<b>GENERAL INTRODUCTION</b>	<b>I-1</b>
<b>II.</b>	<b>CITY OF PORTLAND</b>	<b>II-1</b>
<b>III.</b>	<b>PORT OF PORTLAND</b>	<b>III-1</b>
<b>IV.</b>	<b>MONITORING COMPLIANCE REPORT</b>	<b>IV-1</b>



## **EXECUTIVE SUMMARY**



# EXECUTIVE SUMMARY

## INTRODUCTION

This 17<sup>th</sup> *Annual Compliance Report* is submitted to the Oregon Department of Environmental Quality (DEQ) to fulfill reporting requirements for the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Discharge Permit (hereinafter referred to as the stormwater permit or permit) issued to the City of Portland and the Port of Portland (the co-permittees) by DEQ on January 31, 2011. The report provides information about activities that have been accomplished in accordance with the co-permittees' *Stormwater Management Plans* (SWMPs) during fiscal year (FY) 2011-12 (July 1, 2011 through June 30, 2012). It also includes a monitoring compliance report that summarizes monitoring activities conducted during FY2011-12.

## CITY OF PORTLAND

Key activities and accomplishments for permit year 17 are summarized below and further described in Section II of this annual report.

- Conducted public involvement/education activities as a significant element of the Stormwater Program. Key activities included providing Clean Rivers Education Programs to students, awarding community stewardship grants, involving community participants in events and activities, and participating in the Regional Coalition for Clean Rivers and Streams.
- Conducted ongoing assessment, cleaning, maintenance, and repair of MS4 components.
- Continued to follow the best management practices outlined in ODOT's *Routine Road Maintenance Water Quality and Habitat Guide Best Management Practices* as guidance for transportation-related maintenance activities.
- Inspected, and maintained as necessary, all stormwater and stormwater containment and pollution prevention facilities in City maintenance yards annually.
- Inspected and administered NPDES industrial stormwater permits for industries (and associated tenants) with stormwater discharge to the MS4.
- Continued to identify, investigate, control, and/or eliminate illicit discharges through the Illicit Discharges Elimination Program, Industrial Stormwater Management Program, and Spill Response Section.
- Conducted 3,092 erosion control-related inspections of private construction sites (citywide). Inspected 230 active public construction projects (citywide) with erosion control components.

- Continued to implement the City's *Stormwater Management Manual* for new development and redevelopment. Permitted approximately 20 public works projects and 1,000 private projects subject to SWMM requirements.
- Continued to implement the Stormwater Management Facility Maintenance Inspection Program (MIP) for private stormwater management facilities. Inspected 476 tax lots with 1,063 associated stormwater management facilities.
- In accordance with *Stormwater Management Manual* requirements, signed off on permits for approximately 853 source control measures at sites with high-risk characteristics or activities.
- Continued the design and construction of multiple structural stormwater management facilities.
- Completed conversion of 2,180 linear feet of roadside ditches to swales or porous shoulder.
- Continued to provide technical assistance and grant funding for projects that incorporate green building principles, including stormwater pollution prevention and management.
- Continued Clean River Rewards to promote private stormwater management. At the end of FY11-12, a total of 35,604 utility ratepayers with active accounts have registered for stormwater discounts: 34,349 single-family residential ratepayers (accounting for a total of 76,304,658 square feet of impervious area managed for stormwater) and 1,255 multifamily, commercial, and industrial ratepayers (accounting for a total of 47,835,496 square feet of impervious area managed for stormwater).
- Acquired approximately 203 acres of natural area through the Grey to Green Land Acquisition Program.
- Under the Watershed Revegetation Program, planted approximately 139,506 plants (including 36,752 trees) on 245 acres. The program currently manages 1,752 project acres on both public and private property.

## **PORT OF PORTLAND**

The Port's annual report for permit year 17 fulfills the requirements of Section B(5) in the current MS4 permit (dated January 31, 2011). Section 7.0 of the Port's annual report describes the Port's specific stormwater management efforts during this permit year in accordance with implementation tasks, tracking measures, and measurable goals outlined in its April 1, 2011 SWMP. Key accomplishments are summarized below.

- The Port implemented a new adaptive management approach based on the guidelines submitted to DEQ in November 2011. This process facilitated face to face meetings with operations personnel responsible for implementing each BMP in our SWMP. These conversations were beneficial in reinforcing the thought process behind the BMPs, associated tracking measures, and measurable goals. They also started some very productive

discussions regarding improved technology and implementation efficiencies available to the program. This process will effectively reinforce the Port's commitment to reduce pollutant loading to the maximum extent practicable.

- The Port continues to conduct annual maintenance of the storm sewer system components, structural controls, and regular street sweeping on specific Port-managed properties.
  - This effort included maintaining over 1,532 catch basins, inspection and maintenance of Port-owned water quality treatment facilities, cleaning 34,227 feet of storm line, and 3,959 hours of street sweeping. Together, these tasks diverted 425.34 tons (850,680 pounds) of potential pollutants from Port receiving waters.
  - Marine Facilities Maintenance (MFM) completed 73% of the required catch basin maintenance in FY2011 due to equipment and timing constraints. An unusually wet year severely limited MFM's ability to discharge catch basin decant water in compliance with the Port's sanitary batch discharge permit, thereby reducing the number of catch basins that could be cleaned per day. New equipment has been made available for MFM's use, and increased decant box capacity is planned to ensure that this goal can be consistently met in the future.
- The Port of Portland continues to coordinate with the City of Portland with regard to monitoring and compliance with MS4 deliverables, in addition to the annual report.
- Port staff implemented the Illicit Discharge Detection and Elimination Program. The program involves dry-season field screening of priority outfalls and investigation of potential illicit discharges.
  - Dry-weather field screening inspections were conducted at 75 outfalls Port-wide. As a result, 13 potential illicit discharges were investigated and resolved.
- Port staff continued to implement the Industrial Facility Inspection Program, inspecting a total of 21 priority industrial facilities Port-wide in 2011-12. Staff provided technical assistance during these visits, while also setting timelines for correction of any deficiencies, where appropriate.
- Port operating area staff received training on a variety of stormwater-related subjects, including pesticide application, stormwater pollution prevention, spill response, and erosion prevention. In addition, all new employees are trained on the importance of preventing pollutants from entering stormwater as part of the Port's new employee orientation program.
- The Port continued its support of organizations that work to promote watershed health, including the Columbia Slough Watershed Council, the Regional Coalition for Clean Rivers and Streams, and Friends of Trees.



**Section I**  
**GENERAL INTRODUCTION**



## Section I GENERAL INTRODUCTION

This 17<sup>th</sup> *Annual Compliance Report* is submitted to the Oregon Department of Environmental Quality (DEQ) to fulfill reporting requirements for the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Discharge Permit (hereinafter referred to as the stormwater permit or permit) issued to the City of Portland and the Port of Portland (the co-permittees). The report provides information about activities that have been accomplished in accordance with the co-permittees' *Stormwater Management Plans* (SWMPs) during the fiscal year (FY) 2011-12 (July 1, 2011 through June 30, 2012). It also includes a monitoring compliance report that summarizes monitoring activities conducted during FY2011-12.

DEQ issued the current (third-term) NPDES MS4 permit on January 31, 2011. The City and Port submitted final SWMPs, which are consistent with the permit requirements and are adopted by reference into the permit, to DEQ on April 1, 2011. This annual report reports on the best management practices (BMPs) and measurable goals contained in the April 2011 SWMPs.

The monitoring requirements in the current permit came into effect on July 1, 2011, when DEQ gave conditional approval to Portland's monitoring plan (which the City submitted to DEQ June 1, 2011). The monitoring compliance report included in this *Annual Compliance Report* reports on monitoring activities conducted in accordance with the July 1, 2011 monitoring requirements.

### PERMIT AREAS

The permit areas for the two co-permittees are described below.

- **City of Portland:** Approximately 14,848 acres within the City of Portland's urban services boundary drain to a separate storm sewer system. Portland's MS4 permit does not cover:
  - Stormwater areas that flow to sumps
  - Stormwater areas that flow to combined sewers
  - Natural stream systems
  - Direct stormwater discharges from private property to natural stream systems (without entering the MS4)
  - Areas with no public stormwater infrastructure
  - Areas with individual, general, or industrial stormwater permits
- **Port of Portland:** The Port owns approximately 5,484 acres within the City of Portland's urban services boundary. Much of this property drains to the Port's municipal separate storm sewer system and is regulated by the MS4 permit. This acreage includes Portland International Airport (PDX), four marine terminals, several industrial parks occupied by commercial tenants, mitigation sites, and undeveloped land.

## PERMIT BACKGROUND

DEQ issued the first stormwater permit for the MS4 within the Portland urban services boundary on September 7, 1995. DEQ renewed the permit for a second permit term in March 2004 and subsequently revised and reissued that permit on July 27, 2005. The co-permittees submitted a permit renewal package for the third permit term to DEQ on September 2, 2008, and DEQ issued the third-term permit on January 31, 2011.

## PROGRAM COORDINATION

The co-permittees share information about program development and implementation, BMP effectiveness, monitoring, public involvement through the Regional Coalition for Clean Rivers and Streams, and other issues related to the permit. This coordination avoids duplication and promotes cost-effective use of resources. To further ensure ongoing collaboration and efficiency, the City and Port have an Intergovernmental Agreement that allocates responsibilities and resources.

The co-permittees coordinate and address stormwater permit implementation issues with other jurisdictions in the state through the Oregon Association of Clean Water Agencies (ACWA). Co-permittee representatives participate in ACWA's water quality, stormwater, and groundwater committees.

## REPORT ORGANIZATION

This 17<sup>th</sup> annual report covers implementation actions and accomplishments that occurred during FY 2011-12 alone (i.e., it is not cumulative), unless otherwise noted. The report is organized as follows:

- **Executive Summary:** A summary of significant program activities and program status for both of the co-permittees
- **Section I: General Introduction:** An overview of the permit areas, permit background, program coordination, and report organization
- **Section II: City of Portland Compliance Report**
- **Section III: Port of Portland Compliance Report**
- **Section IV: Monitoring Compliance Report**

The report's goal is to convey clear, succinct program information that complies with the annual reporting requirements of the NPDES permit. The report also provides other interested parties with a status overview of the co-permittees' stormwater programs.

**Section II**  
**CITY OF PORTLAND**



**Section II**  
**CITY OF PORTLAND**

<b>CONTENTS</b>
-----------------

	<b>Page</b>
INTRODUCTION	1
Program Organization and Coordination	1
Adaptive Management	1
Permit-Required Actions	2
Urban Growth Boundary Expansion Areas	3
Separated Stormwater Outfalls	3
City Budget and Funding	4
BMP PI-1	6
BMP OM-1	14
BMP OM-2	16
BMP OM-3	18
BMP IND-1	21
BMP IND-2	23
BMP ILL-1	26
BMP ND-1	29
BMP ND-2	31
BMP STR-1	33
BMP NS-I	39
BMP PM-1	43



## INTRODUCTION

This annual report fulfills reporting requirements of the City of Portland's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Discharge Permit No. 101314. It identifies the activities the City has conducted to implement the City's April 1, 2011, *Stormwater Management Plan* (SWMP) during the 17<sup>th</sup> fiscal year (July 1, 2011 through June 30, 2012) of the permit program.

The SWMP does not include monitoring BMPs; rather, the City has a separate monitoring plan, as required by the permit. The monitoring compliance report is provided separately in Section IV of this *Annual Compliance Report*.

### PROGRAM ORGANIZATION AND COORDINATION

#### **Program Authorization**

The Portland City Council passed a resolution supporting the NPDES MS4 permit application in June 1995. In that resolution, the Council designated the Bureau of Environmental Services (BES) as the lead for the City's implementation of the stormwater program.

#### **Legal Authority**

The City of Portland continues to maintain legal authority to implement the programs outlined in the SWMP, as initially demonstrated in Part 1 of the City's original 1991 NPDES MS4 permit application.

#### **City Management and Coordination**

BES's Stormwater Program Manager is responsible for overall project management, compliance reporting, policy development, and coordination within the City of Portland, as well as for co-permittee coordination. BES staff members serve as leads for the BMPs contained in the SWMP. Because the permit is citywide, many City staff members outside BES are also involved with stormwater program development, implementation, and reporting.

### ADAPTIVE MANAGEMENT

The City submitted its adaptive management approach to DEQ on November 1, 2011. The City's approach includes two elements:

- An **annual process** to determine if the City's stormwater program is being implemented in accordance with the SWMP; determine if measurable goals are being met or progress is being made toward them (as applicable); and identify whether any program adjustments are needed.
- A more comprehensive process to identify proposed program modifications submitted as part of the City's **permit renewal** package (due to DEQ on July 30, 2015), including the modification, addition, or removal of best management practices (BMPs) incorporated into the SWMP and associated measurable goals.

As part of the annual adaptive management process, the City reviewed permit requirements and assessed program implementation. During reporting year 17, all measurable goals were met except the goal under BMP IND-1 to inspect all facilities with industrial stormwater permits annually. Of the 132 facilities that discharge stormwater to the MS4 and have active permits, 18 were not inspected during FY11-12. This is because staff resources were needed to review Stormwater Pollution Control Plans (SWPCPs) for all permittees as part of the permit renewal process. The facility inspections were prioritized; the 18 that were not inspected during the fiscal year were assessed to be of low risk, based on site conditions, compliance history, and a review of monitoring records. These 18 facilities were subsequently inspected by November 1, 2012. Because SWPCP review for all facilities is not an annual occurrence, programmatic adjustments are not needed.

## **PERMIT-REQUIRED ACTIONS**

The 2011 permit identifies activities that must be implemented by specified dates. The City completed the following activities to meet these requirements:

- Schedule A.4.a.ii of the permit requires documentation of enforcement response procedures by November 1, 2011. The City's enforcement response procedures are detailed in City Administrative Rules ENB-4.15 - Stormwater Discharge Enforcement, adopted in 2007. Portland City Code Chapter 17.39 Storm System Discharges authorizes enforcement actions (Section 17.39.110). City Council adopted code updates in October 2011 to clarify City permitting and enforcement authority for the administrative rules. The City provided this information to DEQ in a letter dated November 1, 2011.
- In accordance with Schedule A.4.a.iii of the permit, the City submitted its pollutant parameter action levels and rationale to DEQ on November 1, 2011, in a document entitled *Illicit Discharge Detection and Elimination Action Levels*.
- In accordance with Schedule D.4 of the permit, the City submitted a description of its adaptive management approach to DEQ on November 1, 2011.
- In accordance with Schedule D.6.h of the permit, the City continued to conduct "sweeps" of industrial facilities in the Interstate 5 to Martin Luther King Blvd Target Area; expanded the sweep area to the Whitaker Slough area. Issued permits and no exposure certifications where applicable.
- In accordance with Schedule D.6.d of the permit, the City completed and began to implement the materials management section of the Portland Bureau of Transportation—Maintenance Operations (PBOT) training guide. This was reported in the City's November 1, 2011 NPDES MS4 Annual Compliance Report No. 16, under BMPs OM-1 (pages II-11 and II-12) and OM-2 (pages II-13 and II-14).
- In accordance with Schedule A.4.a.iv of the permit, the City completed its revised list of priority outfalls, as reported under ILL-1 of this annual report.

- In accordance with Schedule D.6.a of the permit, the City convened the Portland Watershed Management Plan (PWMP) Stakeholder Committee to provide input into the update of the PWMP, which included consideration of stormwater management issues, as reported under PI-1 of this report.
- In accordance with Schedule D.6.j of the permit, the City expanded the Eco-Logical Business Program into the car washing business sector, as reported in the City's November 1, 2011 NPDES MS4 Annual Compliance Report No. 16, under BMPs IND-2 (pages II-20 and II-21).

## **URBAN GROWTH BOUNDARY EXPANSION AREAS**

There were no expansions to Portland's urban growth boundary in permit year 17, and no expansions are expected in permit year 18.

## **SEPARATED STORMWATER OUTFALLS**

In FY11-12, the following 11 combined sewer outfalls on the Willamette River were converted to stormwater-only outfalls:

1. Sellwood Basin Outfall #26 (SE Umatilla Street)
2. Insley Basin Outfall #28 (SE Insley Street)
3. Division Basin Outfall #31 (SE Division Street)
4. Alder Basin Outfall #33 (SE Clay Street)
5. Alder Basin Outfall #34 (SE Hawthorn Blvd)
6. Alder Basin Outfall #35 (SE Yamhill Street)
7. Stark Basin Outfall #37 (SE Stark Street)
8. Oak Basin Outfall #38 (SE Oak Street)
9. Sullivan Basin Outfall #40 (NE Lloyd Blvd)
10. Holladay Basin Outfall #41 (NE Holladay Street)
11. Essex Basin Outfall #44A (N. Randolph Street)

## CITY BUDGET AND FUNDING

The City of Portland has invested more than \$916 million in stormwater management services and facilities during permit years 1 through 17. The revenue requirements for permit year 17 totaled approximately \$91 million, allocated as follows:

<b>Major Program Category</b>	<b>Requirements</b>	<b>Percentage Share</b>
Enforcement and Development Review	\$ 6.7 million	7%
Watershed Program & Habitat Restoration	14.2 million	16%
Facilities Operations and Maintenance	23.2 million	25%
Capital Improvements*	47.0 million	52%
<b>Total Revenue Requirements</b>	<b>\$ 91.1 million</b>	
* Includes debt service, facilities planning and engineering, construction engineering, and construction contracts.		

Eighty-seven percent of these revenue requirements are financed through direct monthly user fees. The remaining revenue sources include direct charges for new private development (system development charges), service charges, permit fees, and regulatory charges and penalties. More details on City revenues are provided below.

In permit year 18, the City plans to invest \$100.1 million in stormwater management services and facilities. Direct monthly user fees will pay for 90 percent of these investments.

### Stormwater Management Charges

City Council approves revised stormwater monthly user fees and stormwater system development charges (SDCs) at the start of each fiscal year. Monthly user fees are adjusted to reflect operating, maintenance, and capital costs of the City's sanitary sewer and drainage system. The rate adjustments are based upon cost of service principles, ensuring equity by charging ratepayers according to the amount of sewer and drainage service they use.

The following table reports the monthly single-family stormwater management charge and the monthly stormwater rate per 1,000 square feet of impervious area for the last five permit years:

	<b>2007- 2008</b>	<b>2008- 2009</b>	<b>2009- 2010</b>	<b>2010- 2011</b>	<b>2011- 2012</b>
Single-Family Residential Charge	\$17.33	\$18.55	\$19.80	\$21.79	\$22.36
Residential rate per 1,000 square feet of impervious area	\$7.22	\$7.73	\$8.25	\$9.08	\$9.32
Non-residential rate per 1,000 square feet of impervious area	\$7.91	\$8.43	\$8.86	\$9.66	\$9.97

At the close of permit year 17 (FY 2011-2012), City Council increased the monthly stormwater management charge for single-family residences from \$22.36 to \$23.90. The residential rate increased from \$9.32 to \$9.96 per 1,000 square feet of impervious surface per month, and the commercial rate increased from \$9.97 to \$10.55 per 1,000 square feet of impervious area per month.

### **Stormwater System Development Charges**

The methodology for assessing system development charges (SDCs) for new development and significant redevelopment includes two components. One component represents the charge for stormwater facilities that handle runoff from individual properties. For permit year 17, this onsite portion was assessed based on \$164.00 per 1,000 square feet of impervious area. Riparian properties that drain directly to the Columbia Slough, Columbia River, or Willamette River are exempt from this portion of the SDC. The other portion represents the cost of stormwater facilities that handle runoff from public rights-of-way. This portion was assessed based on the use of the transportation system, using road frontage and vehicle trips to allocate the costs. For permit year 17, the rates were \$5.12 per linear foot and \$2.68 per vehicle trip. At the end of permit year 17, City Council held the rates for stormwater system development charges to \$164.00 per 1,000 square feet of impervious area, \$5.12 per linear foot of frontage, and \$2.68 per daily vehicle trip.

Discounts may be granted only for the “onsite” part of the charge for facilities constructed as part of new development. Discounts range from 80 percent for retention of the 100-year event to no discount for control of the 10-year storm.

**PI-1: Implement public information, education, involvement, and stewardship activities that will raise awareness, foster community stewardship, and promote pollution prevention and stormwater management.**

**KEY BMP ACCOMPLISHMENTS, PERMIT YEAR 17 (FY 11-12)**

**Clean Rivers Education Programs**

- Reached 7,974 students (grades K-12) with classroom programs that provide hands-on, interactive science education about stormwater and other environmental issues.

Columbia Slough:	1,404
Fanno/Tryon Creek:	566
Johnson Creek:	1,089
Willamette River:	4,915
<b>Total:</b>	<b>7,974</b>

- Involved 4,339 students (K-12) in education field programs that offer watershed investigations and field assessments, stormwater tours, boat tours, and restoration experiences. Of these, 1,495 students combined education with natural area restoration service projects.

Columbia Slough:	1,202
Fanno/Tryon Creek:	118
Johnson Creek:	1,300
Willamette River:	1,719
<b>Total:</b>	<b>4,339</b>

- Provided canoe trips to 543 students in the Columbia Slough and Willamette River watersheds. These included classroom studies and stewardship projects related to stormwater pollution.

- Checked out stormwater and watershed curriculum kits and field equipment to 9 Portland elementary and middle school teachers.

- Presented Stormwater - Soak It Up, a 75-minute classroom program for grades 4-12 and special interest groups, totaling 1,132 students and teachers.

Columbia Slough	151
Fanno/Tryon Creek:	12
Johnson Creek:	117
Willamette River:	852
<b>Total</b>	<b>1,132</b>

- Presented Tours of Stormwater Solutions to 56 students. Students visited bioswales, stormwater planters, ecoroofs, porous pavement, and creative downspout disconnections.

- Presented Watershed Awareness to 475 students, grades 3-6. This program focuses on common non-point sources of pollution and pollution prevention.
 

Columbia Slough:	20
Fanno/Tryon Creek:	90
Johnson Creek:	107
Willamette River:	258
<b>Total:</b>	<b>475</b>
- Continued the permanent storm drain curb marker program. Participating community and school volunteers also distributed doorhangers with stormwater pollution prevention messages and clean river tips to nearby residences. Number of participants: 43.
- Targeted schools with onsite stormwater facilities for extended outreach. Students learned about stormwater pollution prevention and their school’s sustainable stormwater facilities and participated in maintenance activities for their facilities.
- Presented *Futures Working for Clean Rivers* career education programs to 32 students in the Willamette River watershed.
- Continued quarterly Education Advisory Committee meetings to provide input and feedback for public education approaches and activities.

### **Community Stewardship Grants Program**

- BES’s Community Watershed Stewardship Program awarded the following 15 stewardship grants totaling \$95,500 in FY11-12, as shown on the table below
- The program also awarded 13 mini grants, totaling \$3,200, for native plants to help start or maintain projects beneficial to Portland watersheds, including stormwater management.

<b>Community Group</b>	<b>Project</b>	<b>Amount Funded</b>
<i><b>Columbia Slough</b></i>		
Columbia Slough Watershed Council	Wilkes Creek Natural Area Stewardship and Outreach	\$ 4,840
Friends of Force Lake	Education, Restoration, and Enhancement	\$ 5,500
GROW PORTLAND	Eastminster Community Garden	\$ 6,700
Heart of Wisdom Zen Temple	Heart of Wisdom Rain Garden	\$ 2,000
<i><b>Tryon Creek</b></i>		
Tryon Creek Watershed Council	Tryon Creek Restoration Mentors	\$ 8,000
<i><b>Johnson Creek</b></i>		
Groundwork Portland	Groundwork Portland Green Team	\$ 5,000
Our Happy Block	Our Happy Block's Parking Lot Depave and Planting	\$ 7,401
Xerces Society for Invertebrate Conservation	Understanding Freshwater Mussels in Urban Streams	\$ 5,000
<i><b>Willamette River</b></i>		
Bridger School PTA	Bridger Water Garden Downspout Disconnection & Revitalization	\$ 7,000
Depave	Escuela Viva Play Lot Regreening	\$ 10,000
Friends of Gateway Green	Gateway GREEN-IT Events	\$ 4,500
Grout Garden Committee	Grout Elementary Rain Garden	\$ 9,770
Immigrant and Refugee Community Organization (IRCO)	Intergenerational Community Garden	\$ 8,102
Portland State University	Mt. Tabor Middle School Green Street Maintenance	\$ 3,958
St David's	St David's Stormwater Solutions Gardens	\$ 7,729

## **Watershed-specific Education and Stewardship Activities**

### ***Columbia Slough Watershed***

- Co-sponsored and participated in numerous community events, including Slough 101, Wetlands 101, Groundwater 101, Explorando El Columbia Slough, four Canoe the Slough events, the Columbia Slough Regatta, Aquifer Adventure, the Columbia Slough Corps of Rediscovery, Soup on the Slough event, two watershed cycling events, one Wild in the City event, one Great Blue Heron Week Event, two Sunday Parkways events, and three neighborhood association gatherings where stormwater was a topic of instruction. The City was a co-sponsor of the Columbia Slough Watershed Awards program. The total participation was approximately 2,500 persons.
- Participated in Friends of Force Lake, Friends of Smith and Bybee Lakes, Let's Build Cully Park Committee, Columbia Biogas Community Advisory Committee, and Harbor Oil Superfund community advisory groups, providing stormwater, watershed, surface water, and pollution prevention education and professional guidance.
- Co-sponsored re:Streets public presentations and design charettes for city staff from 6 city bureaus on innovative approaches and uses of publicly owned streets for more than vehicular traffic; 160 participants.

### ***Willamette Watershed***

- Participated in over 30 community events, reaching over 1,500 citizens.
- Distributed over 5,750 copies of "Be a Partner for Watershed Health" brochure through citywide mailings and community events.
- Partnered with Southwest Neighborhood Inc. to provide information to citizens about watershed health in the Willamette Watershed.
  - Hosted 11 outreach events, reaching 309 people.
  - Gave 3 education presentations, with 74 participants.
  - Held 11 stewardship/friends group meetings and events, with 140 attendee hours.
  - Provided technical assistance to 14 landowners.
- Through a BES/Parks and Recreation partnership, involved citizens in their local natural areas, where 5,890 volunteers spent 11,352 volunteer hours on restoration activities; facilitated 11 Friends group meetings and 5 education events, reaching 200 people.

### ***Johnson Creek Watershed***

- Continued working with the Johnson Creek Watershed Council and streamside property owners to encourage watershed stewardship.

- Through the Johnson Creek Watershed Interjurisdictional Committee, worked with multiple agencies and jurisdictions throughout the Johnson Creek Watershed to conduct watershed-wide water quality and macroinvertebrate monitoring.
- Worked with the Johnson Creek Watershed Council to educate 230 elementary students and adult volunteers about watershed issues, protection, and restoration.
- Co-sponsored and participated in the Johnson Creek Watershed Council's 14<sup>th</sup> annual Johnson Creek Watershed-wide Restoration Event, where 385 volunteers planted 9,585 native trees and shrubs and participated in other watershed improvement activities.
- Gave presentations to a subcommittee of the SMILE Neighborhood Association, Eastmoreland Neighborhood Association, and Reed Neighborhood Association about culvert replacement projects, restoration projects, and stewardship along Crystal Springs Creek, with approximately 75 people attending.
- Participated in a workshop hosted by Portland State University and SMILE Neighborhood Association to discuss issues related to community health, natural resources, and public investments.
- Cosponsored with the Army Corps of Engineers an open house about a culvert replacement project, with approximately 25 people attending.
- Supported formation of the Crystal Springs Partnership, an organization of community members, agency and civic partners, and local experts working to engage, inspire, and educate the Crystal Springs community in long-term stewardship and advocacy for restoration in the Crystal Springs watershed.
- Worked with Audubon Society of Portland, the Crystal Springs Partnership, and USDA – Wildlife Services to provide outreach (tabling and leafleting) for an invasive animal removal project to improve water quality conditions in Westmoreland Park.
- Supported environmentally friendly farming and wetland education programs at Zenger Farm, which is the site of a renovated farmhouse with a zero net energy design and sustainable stormwater features. About 4,638 student visits were made from 115 schools and youth community organizations, and 139 students participated in the summer camps. Adult education classes were given in sustainable/environmental farming practices for a total of 1,225 adult visits, with about 10 percent of attendees coming from the Lents and Powellhurst-Gilbert neighborhoods.

### ***Fanno and Tryon Creek Watersheds***

- Conducted public involvement and information activities for Fanno and Tryon Creek watershed projects, including Multnomah Village green streets, Spring Garden stream daylighting, the Multnomah Art Center Lower Parking Lot retrofit, South Ash Creek Sewer Repair and Enhancement, roadside drainage improvements, garlic mustard control, TriMet Park and Ride stormwater retrofits and Stormwater Management at SW 26<sup>th</sup> and Interstate 5.
- Worked with Southwest Neighborhoods Inc. (SWNI), to provide public information about watershed improvement and pollution prevention efforts by the city and partner organizations. In FY 11-12, SWNI maintained a public involvement database of 9,501 records, attended or hosted 25 meetings and events, and published over 45 articles in its monthly newsletter, which is sent to over 9,200 homes.
- Worked with the Tualatin Basin Public Awareness Committee (TB-PAC), a partnership of agencies and non-profits working to educate and involve Tualatin Basin residents. Activities included:
  - Six Will Hornyak “Living Stream” presentations (1,350 total students/three schools)
  - Three Naturescaping for Clean Rivers workshops (72 total attendees)
  - One Rain Garden workshop
  - Street-to-Stream student video contest awards
  - Discovery Day & Rumba al Rio sponsorship
  - Student Watershed Research Project sponsorship
  - Bus funding for watershed field trips
  - Canines for Clean Water scarves and bag dispensers
- Hosted citizens at the SW Watershed Resource Center (WRC), located in the SW Community Center (SWCC) at Gabriel Park. Provided technical assistance and project support to neighborhood and Friends groups in the Fanno and Tryon Creek watersheds, including:
  - WRC room: open 833 hours with 508 visitors
  - 5 outreach events reaching 343 people (Collins View picnic, TCWC native plant sale, Trillium Festival, Friends of Marshall Park)
  - 6 education presentations with 150 participants
  - 16 stewardship/friends group meetings & events, with 217 attendees
  - 42 landowners received technical assistance
  - 2 outreach events reaching 190 people (Multnomah Days, BES Open House)
  - 8 educational presentations with 262 participants
  - 9 stewardship/partnership events, with 54 attendees
  - Applicant or adviser on 7 grants
- Through a BES/Parks and Recreation partnership, involved citizens in their local natural areas. In the Fanno Creek Watershed, 573 volunteers spent 1,775 volunteer hours at 33 restoration events. In the Tryon Creek Watershed, 84 volunteers spent 262 volunteer hours at 7 restoration events.

### ***Citywide***

- Provided staff support and resources through a contract with Friends of Trees (FOT) to foster recruitment, retention, and education of volunteers, with the purpose of maximizing tree planting, community involvement, and long-term survival of FOT-planted trees.
- Provided support for outreach staff through an interagency agreement with Portland Parks and Recreation, City Nature to foster recruitment, retention, and education of Neighborhood Tree Stewards, with the purpose of maximizing urban forest education and outreach, community involvement and awareness, and long-term stewardship of the urban forest.

### **Stormwater-related Information**

- Included inserts in City water/sewer bills mailed to 214,000 customers:
  - April/May/June 2012: “Portland CSO Program 1991-2011” provided information about combined sewer overflow control, green stormwater management infrastructure.
  - June/July/August 2012: “Working for Clean Rivers and Healthy Watersheds” provided information about traditional sewer improvements (grey pipe system), green stormwater management infrastructure, and green infrastructure.
- Updated and posted fact sheets, brochures, and educational materials on the BES website about the Sustainable Stormwater Management Program (331,277 page views), Treebate incentive for planting yard trees 12,127 page views), Green Street Stewards program (4,665 page views), Ecoroof Incentive program (18,556 page views), native plant resources (5,286 page views), and Brownfield Program (1,585 page views).
- In May 2012, the Green Street Steward Program increased outreach with the assistance of a full-time AmeriCorps member. Through June 2012, the program has reached about 200 individuals through tabling events, knock-and-talks, and trainings. Nine people have volunteered to become Green Street Stewards and adopt 21 Green Street facilities.
- Developed and distributed a variety of educational materials at community meetings and events.

### **Regional Coalition for Clean Rivers and Streams**

- In spring 2012, the coalition conducted a public awareness campaign, including contributing to KOIN TV’s “Do the Right Thing” campaign; placing advertisements with a variety of media sources, including radio, transit, social media, and outdoor advertising (billboards); and maintaining the Coalition’s existing website and social media accounts. The number of people reached by the campaign’s advertisements increased 74 percent over the previous year, and website visits increased by 27 percent.

## Advisory Committee

- BES convened *Portland Watershed Management Plan (PWMP)* Stakeholder Committee to provide input into the PWMP update, which included consideration of stormwater issues.

## MEASURABLE GOALS <sup>1</sup>

Measurable Goal	Status as of 6/30/2012
Provide outreach to approximately 15,500 K-12 students annually (classroom programs, education field programs).	Provided outreach to approximately 15,000 students.
Award at least \$50,000 in community stewardship grants annually.	Awarded 15 stewardship grants totaling \$95,500 in FY11-12.
Involve approximately 10,000 participants in community events, workshops, stewardship projects, and restoration events annually.	Involved over 19,500 participants citywide.
By May 2011, develop and distribute a public education bill insert to over 200,000 water and sewer customers.	Done (as reported in Annual Compliance Report No. 16)

---

<sup>1</sup> As defined in the MS4 permit, measurable goals are BMP objectives or targets used to identify progress of SWMP implementation.

**OM-1: Operate and maintain components of the municipal separate storm sewer system (MS4) to remove and prevent pollutants in discharges from the MS4.**

**KEY BMP ACCOMPLISHMENTS, PERMIT YEAR 17 (FY 11-12)**

- Made debris screen/inlet inspection/maintenance visits to 353 locations citywide (multiple visits to some locations after major rain events).
- Inspected all public stormwater management facilities (SMFs) at least once during the year. These include:
  - 154 proprietary BMPs (StormFilter, Vortech, Stormceptor, etc.)
  - 200 surface SMFs (swales, wetlands, ponds, sand filters, etc.)
  - 1,054 Green Streets
- Cleaned:
  - 127 SMFs
  - Approximately 12,082 catch basins and inlets
  - Approximately 66,976 linear feet of ditch and 30,829 linear feet of culvert
- Repaired 8 SMFs.
- Repaired or constructed 200 inlets and inlet leads and 4,061 linear feet of culvert.
- Continued development of “Prioritization Protocol for SMF Inspections.” Maintenance trigger and service standard information specific to facility type is being compiled from existing documentation, and gaps will be filled in as needed.
- Continued to incorporate newly constructed stormwater system components into the City’s inspection and maintenance database (Hansen).
- Portland Bureau of Transportation-Maintenance Operations (PBOT-MO) continued to pilot new materials and applications to protect water quality.
- 17 PBOT-MO staff members attended the Water Environment School at Clackamas Community College. Five staff members were trained on the use of the spider hoe, used primarily for stormwater facility maintenance. Vector truck operators were trained on operation of new Vector trucks.
- Continued to develop a training handbook PBOT-MO staff that will include guidance for maintenance procedural steps, preferred seasonality of work, and materials management.

**MEASURABLE GOALS**

<b>Measurable Goal</b>	<b>Status as of 6/30/2012</b>
<p>Develop a training handbook for PBOT-MO staff during the permit term.</p>	<p>Continued to develop the training handbook; in process of drafting various standard operating procedures. (The materials management section of the handbook was completed in FY10-11.)</p>
<p>Provide the following maintenance actions over the five-year permit cycle:</p> <ul style="list-style-type: none"> <li>- Clean 31,000 lineal feet of culverts.</li> <li>- Repair 10,000 lineal feet of culverts.</li> <li>- Clean 250,000 lineal feet of ditches.</li> <li>- Clean 38,000 inlets and catch basins.</li> <li>- Repair 1,500 inlets and inlet leads.</li> <li>- Clean 135 major stormwater management facilities/pollution reduction facilities.</li> <li>- Repair 40 pollution reduction facilities.</li> </ul>	<ul style="list-style-type: none"> <li>- Cleaned 30,829, lineal feet of culverts. [ 39,379 lineal feet]*</li> <li>- Repaired 4,061 lineal feet of culverts. [6,235 lineal feet]</li> <li>- Cleaned 66,976 lineal feet of ditches. [113,876 lineal feet]</li> <li>- Cleaned 12,082 inlets and catch basins. [24,470 inlets and catch basins]</li> <li>- Repaired 200 inlets and inlet leads. [374 inlets and inlet leads]</li> <li>- Cleaned 127 major stormwater management facilities/pollution reduction facilities. [244 facilities]</li> <li>- Repaired 8 pollution reduction facilities. [17 facilities]</li> </ul> <p>* Bracketed numbers show cumulative total to date during this permit term.</p>

**OM-2: Operate and maintain components of public rights-of-way, including streets, to remove and prevent pollutants in discharges from the municipal separate storm sewer system.**

**KEY BMP ACCOMPLISHMENTS, PERMIT YEAR 17 (FY 11-12)**

- Continued to implement BMPs within the right-of-way to protect water quality, including:
  - Following ODOT's *Routine Road Maintenance Water Quality and Habitat Guide Best Management Practices*.
  - Using the trenchless liner repair system.
  - Using bio-pillows for sediment control on impervious surfaces to trap sediment during all sediment-disturbing activities.
  - Using low-disturbance sign installation methods to avoid or minimize digging.
  - Using mild cleaners, with no solvents, to clean signs.
  - Monitoring weather conditions during asphalt grinding
  - Hand-applying asphalt where necessary to prevent these materials from entering the storm drain system
  - Using water-based asphalt emulsions and biodegradable asphalt release agents.
- Continued to pilot test alternative methods, products, and practices to reduce pollutant discharges to the MS4.
- All licensed pesticide applicators at PBOT Maintenance Operations must receive 40 hours of training over their five-year licensing period. In this reporting year, two applicators needed and received training.
- The PBOT Maintenance Operations mowing and brushing group reviewed equipment cleaning operations and other best management practices.
- Gave tour of Sunderland Yard Recycling Facility to sustainability coordinators from other City of Portland bureaus.
- Continued to develop a training handbook PBOT-MO staff that will include guidance for maintenance procedural steps, preferred seasonality of work, and materials management.
- The Bureau of Transportation continues to implement a leaf removal program in 30 leaf service areas (areas that have streets lined with large, mature trees). Under the program, PBOT schedules and implements one or two leaf collection days per zone.
- Swept major arterials six times during the year.

## MEASURABLE GOALS

<b>Measurable Goal</b>	<b>Status as of 6/30/2012</b>
Sweep arterials six times/year.	Done.
Develop a training handbook for PBOT-MO staff during the permit term.	Continued to develop the training handbook; in process of drafting various standard operating procedures. (The materials management section of the handbook was completed in FY10-11.)

**OM-3: Operate and maintain other City facilities and infrastructure (not included in OM-1 or OM-2) to remove and prevent pollutants in discharges from the municipal separate storm sewer system.**

**KEY BMP ACCOMPLISHMENTS, PERMIT YEAR 17 (FY11-12)**

- Continued to implement a program that requires the Water Bureau to submit requests to the Bureau of Environmental Services (BES) for discharges of potable water from flow tests of hydrants and tank and reservoir drains. Discharges are approved on a case-by-case basis with a letter of authorization. The authorization requires BMPs to reduce the impacts of flow rate, volume, and suspended solids from these activities, in addition to the state guidelines for chlorinated discharges. A report is required for each discharge in order to track volume and respond to any complaints.
- Continued to inventory discharges at various Water Bureau facilities. Engineering is developing a Basis of Design Report that will identify facilities that need discharge piping modification, site work, and improvements in order to have zero to acceptable impact to the MS4.
- The City engages in green purchasing best practices in order to spend public funds on goods and services that minimize negative impacts on human health and the environment. In FY11-12, Procurement Services continued to include environmentally preferable product and service specifications in City solicitations and resulting contracts. Procurement Services also continues to support City bureaus in selecting environmentally preferable goods and services. These actions contribute to the City's ongoing efforts to prevent pollution by buying less toxic, safer, and environmentally sound products and services.
- Continued to control discharges from non-emergency fire-fighting training by routing the discharges to the sanitary sewer system.
- Continued to collect data on a stormwater treatment facility (linear wetland system) at the Portland Bureau of Transportation-Maintenance Operations (PBOT-MO) Albina Yard that treats approximately two acres of impervious pavement used as a parking lot.
- Continued to investigate projects to reduce stormwater runoff from PBOT-MO yards, including diverting stormwater runoff from an employee parking lot (almost two acres) to vegetated planters and collecting rainwater off the roof of the Kerby Building for reuse.
- Continued to investigate a recycling facility for sweeper debris.
- Pollution Prevention (P2) teams met as needed to evaluate and track maintenance procedures, pilot test new products and techniques, evaluate work processes, and monitor developments in related fields. Topics relevant to stormwater quality protection included:
  - Water quality protection needs associated with vehicle and equipment washing.

- Evaluation of spill kit usage and appropriate absorbents.
  - Management of vehicle and equipment leaks in maintenance yards and parking lots.
  - Spill reporting requirements.
  - Ecoroofs
- Continued modifications of the facility where street sweepers are rinsed to accommodate new sweepers and improve treatment of rinse water.
  - Monitored the continued use of approved wash facilities at Albina Yard.
  - Inspected, and cleaned as necessary, all stormwater and water quality facilities in maintenance yards and lots. Continued to implement Phase I stormwater controls, which encompasses installation, inspection, and maintenance of filtration and absorbent media at selected stormwater inlets. Specific activities include:
    - Maintain the stormwater collection system in equipment parking areas and other selected inlets vulnerable to leaks and spills.
    - Store most collection bins for recycled materials indoors under cover.
    - Clean out subsurface vaults below the sweeper debris pile approximately two times per year.
    - Clean out debris from sweeper wash facility vaults as needed.
    - Clean debris vaults at the truck bed washout facility as needed.
  - Updated PBOT-MO’s safety manual, including sections on chemical handling and labeling, spill control procedures and prevention.
  - Installed larger cover over the asphalt equipment cleaning area at Albina Yard to reduce exposure to stormwater, and installed larger spill control pallets under containers.
  - Installed new sediment basins to capture additional sediment in stormwater runoff from the rock storage area at Albina Yard.
  - Continued to empty (monthly) the sump at Mt. Tabor Yard that captures the grass and dirt of Parks mowers when they clean off at the end of shift, helping to prevent that material from entering the storm system.
  - Continued to examine maintenance activities as part of annual compliance requirements for continued Salmon Safe certification, which includes Integrated Pest Management and using alternatives to pesticides. Completed formal recertification process.
  - Continued to maintain the drip irrigation system in Mt. Tabor Nursery, as well as turf strips to prevent erosion from watering and harvesting equipment. Increased the use of coarse wood chip mulches in the growing area, in part to decrease erosion.
  - Continued program with vendors to provide pesticides at individual golf course sites on an as-needed basis to reduce pesticide storage.

- Continued testing nutrient levels and the presence of pesticides in surface waters for all City golf courses on a twice-yearly basis. Results from testing continue to show that pest management and fertilization activities are not negatively impacting water quality.
- Continued the use of a specially formulated slow-release fertilizer on park turf, which possesses an ideal formulation of components that reduces leaching and waste elements in runoff. Water quality testing results confirm the efficacy of this formulation.
- Continued the standard use of special equipment for precise application amounts, timing, and distribution of fertilizer on all five City golf course fairways and greens.
- Maintained pesticide-free parks management at five parks.
- Continued a public/private partnership to fund new practices at key park sites to renovate athletic fields. These practices include aeration and overseeding to reduce fertilizer use and increase water infiltration.
- Continued to perform aeration, topdress, and overseed activities on 28 highly used sports fields at 20 different sites to achieve structural soil changes that improve plant health and optimize use of water and fertilizers.
- Continued to implement activities to reduce water usage on park sites. These included connecting parks irrigation to the Maxicom system; testing of two central irrigation control systems; and implementing a two-year pilot project to test a soil moisture sensing control system.
- Conducted two walk-throughs/site coordination meetings at each pesticide-free park with staff and volunteer community partners to ensure park standards are being met.
- Conducted a bureau-wide consultation with each Portland Parks & Recreation service zone to address challenges and assess adherence to park standards.
- Continued to use Mt. Tabor Yard as a Parks Bureau’s recycling collection point for used oil, used antifreeze, waste paper, scrap metal, dry cell batteries, and fluorescent lamps.

**MEASURABLE GOALS**

<b>Measurable Goal</b>	<b>Status as of 6/30/2012</b>
Inspect, and maintain as necessary, all stormwater and stormwater containment and pollution prevention facilities in City maintenance yards annually.	Done

**IND-1: Implement the Industrial Stormwater Management Program to control the discharge of pollutants from industrial and commercial facilities (both existing and those undergoing changes in operations) to the municipal separate storm sewer system.**

**KEY BMP ACCOMPLISHMENTS, PERMIT YEAR 17 (FY 11-12)**

- Administered NPDES industrial stormwater permits for 136 industries (and associated tenants) that discharge stormwater to the MS4. Four of these permits were terminated midway through the fiscal year, leaving a total of 132. Continued to perform annual compliance inspections and additional inspections, if warranted, to provide technical assistance or assess BMP implementation.
- Under an intergovernmental agreement with DEQ, administered 90 additional permits for facilities not discharging to the MS4. Seven of these were terminated midway through the fiscal year. Most are permits for direct dischargers, although some facilities discharge to the Port of Portland’s system or Multnomah County Drainage District managed waters.
- Continued to perform inspections and evaluate the need for stormwater permits for non-permitted industries (both those that do and do not discharge to the MS4). Performed 288 inspections of permitted and non-permitted facilities during permit year 17. Identified BMPs at these industries to minimize or remove exposure of industrial activities to stormwater. Required five facilities to apply for a stormwater permit.
- Collected and analyzed one sample from one non-permitted facility for investigative purposes.
- Issued six discharge authorizations under City Code to non-permitted sites that address concerns regarding potential spills and release of pollutants from industrial activities.
- Prompted 10 sites to remove stormwater exposure of industrial activities and other pollutant sources; as a result, these facilities were able to either terminate their permit or qualify for a no exposure certification (NEC).
- Continued to locate and map non-City outfalls (industrial and business) located in the riparian area that discharge directly to receiving streams and to identify the sources that drain to these outfalls.
- Continued to re-inspect industries that were previously identified as having no exposure and were not required to apply for a permit. Of the 38 industries that had a “no exposure certification” (NEC) expiring in FY 11-12, 11 were either no longer in business or had moved. The City reissued NECs to 22 facilities and issued new NECs to another 27 facilities.

- Continued to implement activities in the following categories of industrial controls: wastewater discharge permits, accidental spill prevention plans, Pollution Complaint Program, Buildings Plan Review Section, and Fire Bureau’s SARA Title III facility review.
- City Council adopted updated City Code Title 17.39, the Stormwater Discharge Code, to clarify City authority to control discharges to the MS4 and increase the City’s authority to enter private property.
- Continued to conduct “sweeps” of industrial facilities in the Interstate 5 to Martin Luther King Blvd Target Area; expanded the sweep area to the Whitaker Slough area. Issued permits and no exposure certifications where applicable.

**MEASURABLE GOALS**

<b>Measurable Goal</b>	<b>Status as of 6/30/2012</b>
Inspect all permitted (1200Z, 1200COLS) facilities once per year.	Inspected 114 of the 132 facilities that discharge stormwater to the MS4 and have active industrial stormwater permits. The remaining 18 facilities were subsequently inspected by November 1, 2012. (See Adaptive Management section on page 2 for more information.)
Review each permitted facility’s monitoring and annual report each year.	Done.
Survey 100 percent of newly identified facilities to determine the need for NPDES permits.	Done.
Every 5 years, inspect industries (individual sites) previously identified as having no exposure and not required to obtain a permit.	Done.
Complete revision of City Code Title 17.39 by 2012.	Done. City Council adopted code revisions in September 2011.

**IND-2: Provide educational programs and materials and technical assistance to reduce industrial and commercial pollutant discharges to the municipal separate storm sewer system.**

**KEY BMP ACCOMPLISHMENTS, PERMIT YEAR 16 (FY11-12)**

- Over 20 BMP fact sheets are posted on BES’s Pollution Prevention Services website, which is frequently visited by commercial and industrial site operators. During FY11-12, the most-viewed BMP materials related to catch basin maintenance (over 1,100 views), sand-blasting and painting operations (over 800 views), and stormwater monitoring for industry (over 500 views). Other BMP materials distributed include information on dewatering activities, developing emergency spill response and cleanup plans, and outside container storage and waste disposal.
- Continued to work with the Regional Pollution Prevention Outreach Team (P2O Team), Automotive Eco-Logical Advisory Subcommittee, and Landscape Eco-Logical Advisory Subcommittee for the Portland metropolitan region to certify businesses under the Eco-Logical Business Program. Eco-Logical Business Program activities in FY2011-12 included:
  - Five landscape service businesses were newly certified and one was recertified, bringing the total number of certified landscapers to 23.
  - Nine new car wash firms were certified, for a total of 12.
  - Two automotive shops were newly certified and two shops were lost from the program (bringing the total number of certified automotive shops to 39).
  - The Eco-Logical Business Program prepared for expansion into the stormwater facility maintenance sector and developed program materials for launch in the next program year. Participating organizations provided an educational symposium at the Oregon Landscape Contractor Conference, with over 120 contractors in attendance.
  - Continued a promotional campaign to raise awareness and communicate the importance of supporting businesses that operate environmentally responsible business practices. The campaign used newspapers, the Redirect Guide, the Chinook Book, and local news advertising to promote Eco-Logical Businesses.
  - Continued to participate in local environmental events, including the annual sustainability fair and the greener home and garden show, to promote the use of certified businesses.
  - Provided an informational table at the annual Oregon Landscape Contractors Association conference, and continued program negotiations with the International Society of Arborists (ISA local chapter) and the Oregon Association of Nurseryman (OAN).

- Coordinated with Portland State University on a grant to have students help with marketing and pollution reduction measurements related to Eco-Logical Business Program certification.
- Released an inaugural newsletter for almost 200 interested certified firms and program partners to share program updates, highlight pollution prevention success stories, and collect information about materials use.
- The BEST Business Center continued to assist Portland businesses with resources and information to help them green their operations. The center is run by the Bureau of Planning and Sustainability, in partnership with the Portland Water Bureau, Bureau of Environmental Services, Bureau of Transportation, Metro, Portland General Electric, Pacific Power, and the Energy Trust of Oregon. BEST conducted the following activities in FY11-12:
  - Conducted on-site assessments for 146 businesses.
  - Administered the annual BEST Awards, which recognize Portland’s most sustainable businesses. Seven businesses received the BEST Award for their efforts to reduce waste and toxics, conserve energy, develop green products and services, and promote sustainable food systems.
  - Administered Sustainability at Work Certification, recognizing businesses that have taken measurable steps to reduce their greenhouse gas emissions through energy efficiency, renewable power, transportation incentives, water conservation, recycling and waste prevention. To date, 56 businesses have been certified.
- Completed the ninth year of providing education and outreach to affected residents and businesses and one-on-one technical assistance to businesses to help them comply with requirements of the Columbia South Shore Well Field Wellhead Protection Program. Program requirements include structural and operational BMPs to reduce the occurrence of spills and minimize spill impacts. Technical assistance and outreach by the Portland Water Bureau, Columbia Corridor Association (CCA), and Columbia Slough Watershed Council during permit year 17 included:
  - Provided technical assistance to 30 businesses.
  - Published newsletter articles on the protection program.
  - Distributed free spill kits, required signs, secondary containment pallets, and stormdrain covers.
  - Maintained the CCA and PortlandOnline webpage on the protection program and requirements.
  - Sponsored a workshop for regulated businesses on new training requirements in the updated Columbia South Shore Well Field Wellhead Protection Program Reference Manual, with 34 businesses attending.

## MEASURABLE GOALS

<b>Measurable Goal</b>	<b>Status as of 6/30/2012</b>
Under the Eco-Logical Business Program, certify 10 additional auto shops and 20 additional landscape firms that provide services within the City Portland by 2015.	Certified five additional landscape firms, for a total of 13 firms that have been newly certified to date during this permit term.  Certified two additional automotive firms, for a total of two firms that have been newly certified to date during this permit term.
Evaluate one new business sector for implementation of the Eco-Logical Business Program.	Expanded the program into the car washing sector in FY10-11, and added nine new car wash firms in FY11-12, for a total of 12 to date during this permit term.  Prepared for expansion into the stormwater facility maintenance sector, and developed program materials for launch in the next program year.

**ILL-1: Identify, investigate, control, and/or eliminate illicit discharges (illicit connections, illegal dumping, and spills) to the municipal separate storm sewer system. Evaluate and, if appropriate, control non-stormwater discharges to the municipal separate storm sewer system.**

## **KEY BMP ACCOMPLISHMENTS, PERMIT YEAR 17 (FY11-12)**

- BES's Illicit Discharges Elimination Program (IDEP) conducted the following activities during FY 11-12:
  - Conducted 124 dry-weather inspections of 121 major City-owned outfalls (three outfalls were inspected twice).
  - Completed the revised list of priority outfalls.
- BES's Industrial Stormwater Program continued to address illicit discharges and connections as they were identified during stormwater inspections and as referred by other parties. During FY 11-12, 8 illicit discharges were identified and subsequently corrected and/or mitigated. Follow-up and/or enforcement letters were issued to responsible parties as appropriate, and penalties totaling \$968 were assessed. The program continues to address prohibited discharges and other non-stormwater discharges to the storm sewer system. Policies and appropriate control measures, if needed, are developed and implemented.
- Submitted the City's pollutant parameter action levels and rationale to DEQ on November 1, 2011.
- The Regional Spill Response Committee continued its coordination meetings, holding four quarterly meetings during permit year 17. The committee includes representatives from the Oregon Emergency Response System, Environmental Protection Agency Criminal Investigations (EPA CID), United States Coast Guard (USCG), Oregon Department of Environmental Quality (DEQ), Oregon Department of Transportation (ODOT), Clean Water Services (CWS), Water Environment Services (WES), Port of Portland, Portland Fire Bureau (PFB) Hazmat, City of Gresham, City of Milwaukie, City of Portland Water Bureau, and BES. BES chairs and attends all of the meetings.
- Continued to operate the BES Spill Response Hotline. Activities in FY 11-12 included:
  - Received and responded to approximately 1,500 daytime calls (citywide) regarding pollution complaints, spills, sanitary sewer overflows, and dye tests.
  - Received and responded to 453 after-hours complaint calls (citywide).
  - Received approximately 2,200 additional daytime information-only calls (citywide) and responded by providing agency referrals, industrial information, technical assistance, and regulatory information.

- BES and the Water Bureau continue to implement Columbia South Shore Well Field (CSSW) Protection Area signage. The signs list the BES spill response hotline number and read: “TO REPORT SPILLS CALL (503) 823-7180.”
- The BES Spill Section continued a communication protocol with the Portland Fire Bureau that automatically pages the BES duty officer for a two-alarm event. Upon receiving the page, the duty officer contacts the Fire Bureau to identify if the duty officer is needed by the fire responders. In FY 11-12, no two-alarm events resulted in pages to the duty officer.
- The BES Spill Section continued a communication protocol with the towing companies on the City of Portland towing contract. This notification ensures that BES will be contacted for auto fluid clean-up actions and for events that threaten to impact a stormwater facility (catch basin and downstream stormwater system). The duty officer may respond to events, depending on the reported information. In FY 11-12, 10 after-hours calls were received by the duty officer from towing companies. No enforcement actions were taken.
- Continued activities related to the Spill Response Program, Accidental Spill Prevention Program, tank farm policy, Hazardous Materials Response Team, hazardous substances, and Buildings Plan Review.
- Conducted training for new duty officer staff on the BES spill response hotline and staff response duties.
- The Industrial Stormwater Management Program administered 226 general NPDES stormwater industrial permits with requirements to maintain spill prevention and response procedures. The program evaluates permit compliance of industrial facilities to ensure that best management practices relating to spill prevention and reporting are properly implemented.
- The Industrial Stormwater Management Program required six stormwater and/or spill prevention plans from non-permitted sites that address concerns regarding potential spills or other exposure-based releases from industrial activities.
- Continued to implement disposal programs (curbside garbage, recycling, and yard debris and food scrap collection, as well as neighborhood cleanup collection events) to help prevent illegal dumping.
- Continued to implement measures to limit impacts from non-stormwater discharges related to City operations, per the Non-Stormwater Discharge Evaluation report submitted to DEQ in May 2006.
- City Council adopted the updated City Code Title 17.39, the Stormwater Discharge Code, to clarify City authority to control discharges to the MS4 and increase the City’s authority to enter private property.

## MEASURABLE GOALS

<b>Measurable Goal</b>	<b>Status as of 6/30/2012</b>
Conduct dry weather sampling at all major City-owned outfalls at least once annually.	Done.
Inspect the priority outfalls a minimum of three times a year.	In accordance with permit requirements, completed the revised list of priority outfalls by July 1, 2012; starting in FY12-13, these priority outfalls will be inspected three times per year.
Expand the IDEP program to include the CSO system below diversion structures, where the outfalls discharge stormwater only and should have no dry-weather flows. Currently, the program addresses all of the westside outfalls and 25 percent of the eastside outfalls. Expand the program to all eastside outfalls by December 2013.	Continued to update eastside storm system and outfall maps to reflect system changes resulting from the East Side Combined Sewer System Tunnel Project.
Maintain the spill response hotline 24 hours a day.	Done.

<b>ND-1: Control erosion, sediment, and pollutant discharges from active construction sites.</b>
--

**KEY BMP ACCOMPLISHMENTS, PERMIT YEAR 17 (FY 11-12)**

- There were 4,556 active private construction permits subject to erosion control inspection (citywide). The Bureau of Development Services (BDS) conducted 3,092 erosion control-related inspections of private construction sites (citywide). (Even though a permit is active, there may be times when no activities that require erosion control inspection are occurring.) This number includes only approved inspections.
- All private development sites with qualifying ground disturbance areas were inspected for temporary and permanent erosion control measures at the beginning and near or at completion of the project. At interim checks conducted during the course of regular building inspections, the inspector notes any identified erosion control deficiencies, and the site operator is required to implement corrective action.
- There were 230 active public construction projects (citywide) with erosion control components. In general, public sites are inspected daily during construction.
- Continued the pre-permit-issuance site meeting program, where the applicant's team can choose to meet with staff onsite to discuss erosion control and other sensitive site issues. No applicants requested a pre-permit-issuance site visit this fiscal year.
- Provided annual construction inspector training to BES and BDS staff.
- Tracked erosion control complaints (received through the complaint hotline or staff referrals) through the City's building permit tracking program, TRACS. A total of 16 cases were opened and responded to, with 14 cases closed (citywide).

**MEASURABLE GOALS**

<b>Measurable Goal</b>	<b>Status as of 6/30/2012</b>
Evaluate the <i>Erosion and Sediment Control Manual</i> and update as needed (at least once during the 2011-2016 permit cycle); conduct public involvement on updates.	No activity this fiscal year.
Inspect public sites with erosion control permits daily during construction.	Done.
Inspect 100 percent of active private development construction sites subject to erosion control requirements. At a minimum, inspections will occur (1) after initial temporary erosion control measures are installed, and (2) near completion of development after permanent erosion control measures are in place. Conduct interim checks as part of routine building permit inspections.	All private development sites with qualifying ground disturbance areas are inspected for temporary and permanent erosion control measures at the beginning and near or at completion of the project. Interim checks are conducted during the course of regular building inspections.

**ND-2: Implement and refine stormwater management requirements for new development and redevelopment projects to minimize pollutant discharges and erosive stormwater flows.**

**KEY BMP ACCOMPLISHMENTS, PERMIT YEAR 17 (FY11-12)**

- Continued to implement the 2008 *Stormwater Management Manual* (SWMM):
  - Conducted 385 land use reviews to determine compliance with SWMM requirements.
  - Responded to 149 early assistance requests, including pre-application conferences.
  - Permitted approximately 20 public works projects and approximately 1,000 private projects subject to SWMM requirements.
  - O&M agreements were signed for 77 new private stormwater management facilities on 47 private properties (tax lots).
- Redevelopment and new development projects during the fiscal year resulted in a total of 27.61 acres of replaced impervious area and 31.41 acres of new impervious area. Because stormwater from the replaced and new impervious areas is managed in accordance with SWMM requirements, there is no increase in effective impervious area.
- Conducted 150 land use reviews for source control measures at sites subject to SWMM requirements. Signed off on permits for approximately 853 source control measures at sites with high-risk characteristics or activities.
- Continued review of Chapter 4 of the SWMM to identify potential source control requirement updates.
- Conducted the following monitoring and evaluation activities:
  - Continued trials of different mulches to determine which provide the best performance in Green Streets facilities and which can be incorporated into general maintenance practices.
  - Continued to monitor sediment accumulation in a group of Green Streets facilities to document impacts on facility performance and refine maintenance requirements.
  - Continued to test and evaluate plants and trees for use in Green Streets facilities. Updated the Green Street plant list (plants and trees).
  - Continued to evaluate two Filterra water quality devices installed as a pilot project in southwest Portland.
  - Conducted stormwater monitoring of infiltration facilities (called Green Streets when managing the public right-of-way), flow-through (lined) facilities, and ecoroofs. The evaluated facilities are located throughout the City and represent a variety of facility types, configurations, ages, and land uses. The monitoring report for 2012 will be published in 2013.

- Continued to provide training and technical assistance on the SWMM to City staff and the development community.
- Inspected 517 private stormwater management facilities to ensure compliance with plans.
- The Maintenance Inspection Program (MIP) provides technical assistance to property owners on the operation and maintenance (O&M) of private stormwater management facilities. It ensures that property owners follow site-specific, BES-approved O&M agreements. The program also collects information on stormwater management facility deficiencies and corrective actions taken to address deficiencies. MIP activities in FY 11-12 included:
  - Inspected 476 tax lots with 1,063 associated private stormwater management facilities. This represents approximately 8.7 percent of the properties in the program. Technical assistance is provided during inspections to ensure that stormwater management facilities are sufficiently operated and maintained. Additionally, pollution prevention best management practices (BMPs) for site activities may also be evaluated during MIP inspections where needed.
  - Mapped MIP data, including MIP properties, facilities, inspections, and O&M plan and facility maintenance deficiencies.

## MEASURABLE GOALS

Measurable Goal	Status as of 6/30/2012
Inspect 1,500 private stormwater facilities or 450 properties annually. Use education and enforcement tools to ensure that stormwater management operations and maintenance plans are followed.	Under the Maintenance Inspection Program (MIP), inspected 476 tax lots with 1,063 associated private stormwater management facilities. Provided technical assistance and education to ensure facilities are sufficiently operated and maintained.
Revise the SWMM during the 2011-2016 permit term.	Continued review of Chapter 4 of the manual to identify potential source control requirement updates.
Track number, type, size, drainage area <sup>2</sup> and location of private facilities constructed annually.	Done as part of the Maintenance Inspection Program.

<sup>2</sup> Drainage area is tracked for all private stormwater management facilities subject to the SWMM (under an O&M plan).

**STR-1: Structurally modify components of the storm drainage system to reduce pollutant discharges. Implement structural improvements on existing development to reduce pollutants in discharges from the municipal separate storm sewer system.**

## **KEY BMP ACCOMPLISHMENTS, PERMIT YEAR 17 (FY 11-12)**

### **Citywide**

- Continued to implement retrofits to the existing storm drainage system, as identified during routine operations and maintenance activities. Completed conversion of a total of 2,180 linear feet of roadside ditches to swales or porous shoulder (all within the Fanno Creek Watershed).

### **Columbia Slough Watershed**

- Completed 60 percent design for the NE 148<sup>th</sup> Water Quality Facility, which will receive stormwater runoff from 180 acres in northeast Portland.
- Began construction of the Mason Flats project, which will improve in-stream, riparian, and wetland habitat; protect and improve water quality by providing additional stormwater treatment; and provide other groundwater, stream, and habitat benefits.
- Completed construction of the Wellhead Sump Retrofit project, which includes eight water quality planters along NE 122nd Avenue between NE Fremont and NE Shaver designed to treat stormwater runoff from 2.89 acres and 16 water quality swales along NE Fremont Street between 156<sup>th</sup> and 158<sup>th</sup> designed to treat stormwater runoff from 3.56 acres.
- Began predesign to treat stormwater runoff from City rights-of-way that currently discharge to the Slough. This will focus on commercial/industrial zones, high traffic, and unimproved roadways.

### **Johnson Creek Watershed**

- Continued work on the Luther Road Habitat Restoration project to address an exposed combined sewer/stormwater interceptor. The project will bury the sewer pipe crossing, restore a portion of Johnson Creek and its floodplain, improve stream habitat, provide stormwater treatment, and protect natural areas.
- Completed phase I construction of the East Lents Floodplain Restoration Project, which will reduce nuisance flooding while improving water quality.
- Continued to monitor existing floodplain restoration projects to ensure effectiveness at Brookside, Kelley Creek, Tideman Johnson, Errol Creek, and Schweitzer.

- Coordinated with the Army Corps of Engineers on design of the Springwater Wetlands Restoration Project, which will include water quality elements as part of a habitat restoration project.

### **Willamette Watershed**

- Continued pre-design of the Stephens Creek water quality treatment facility, which will detain and treat runoff from I-5 and SW Barbur Blvd. before it enters Stephens Creek (Willamette Watershed). The project will also address erosion on the hill slope from the I-5 outfall.
- Constructed the Willamette Park Boat Ramp Water Quality Facility. The project retrofitted an existing bioswale and improved the capacity to provide source control of auto and recreational vehicle-related pollutants from the parking area.
- Assessed the condition of stormwater culverts serving Leif Erikson Drive in Forest Park; performed engineering design for the replacement of five failing culverts.

### **Fanno and Tryon Creek Watersheds**

- Completed design for the Multnomah Arts Center Parking Lot Stormwater Retrofit. The planned facilities will detain and treat stormwater runoff from approximately 28,650 square feet of impervious area.
- Began construction of stormwater facilities to treat 2.75 acres of existing impervious area at the Tri-Met Park and Ride on SW Barbur Boulevard (In partnership with ODOT and TriMet).
- Completed 60 percent design for Interstate 5 at SW 26<sup>th</sup> Avenue Water Quality Facility to treat 26 acres of existing impervious area (in partnership with ODOT).
- Constructed five stormwater facilities to treat 1.5 acres of existing impervious area as part of the Multnomah Blvd. Stormwater Project.
- Completed 30 percent design for roadside drainage (ditch) and shoulder improvements on SW Stephenson between SW 35<sup>th</sup> and SW Boones Ferry Road and on SW Hamilton between SW Shattuck and SW 40<sup>th</sup>. About 4,700 feet of ditches are to be improved.
- Completed 60% design for two Green Streets along SW Capitol Hwy in Multnomah Village. The project will treat stormwater from a busy commercial parking area and street.
- Completed 30 percent design for a storm pipe daylighting project in Spring Garden Park in the upper Tryon Creek Watershed.
- Secured funding for a Green Street curb extension along SW Huber.

## **Stormwater System Plan**

- Continued work on the *Stormwater System Plan*, a multi-year effort to fully define and plan for the City's stormwater system needs. BES has nearly completed the first full pilot project for the *Stormwater System Plan* in the Stephens Creek basin in the Willamette River watershed. The *Stephens Creek Stormwater System Plan* will provide specific CIP recommendations, as well as operating and program-level actions. The pilot project is scheduled to be completed in October 2012. This integrated approach will then be reviewed, modified, and applied for the next priority areas of the separated stormwater system.

## **Green Streets**

- Completed construction of the following Green Street projects:
  - Four green street facilities along SW Multnomah Blvd from 45<sup>th</sup> to 68<sup>th</sup>, to manage 54,600 square feet of street runoff that was flowing directly into a storm sewer and into Vermont and Woods Creeks in the Fanno Creek Watershed.
  - Two infiltration swales along N. Lombard on either side of the Columbia Slough, to manage 14,300 square feet of runoff from the bridge that was flowing directly to the Columbia Slough.
  - Thirty-one green street planters along SW Moody associated with the Milwaukie Light Rail expansion, to manage 154,000 square feet of street runoff that was flowing into a storm sewer and into the Willamette River.
  - Two green street planters to manage 14,500 square feet of runoff from the Gibbs St Pedestrian Bridge over I-5 that was entering the ODOT storm system along I-5..

## **Technical Assistance, Incentives, and Grants Programs**

- Continued to provide technical assistance for projects that incorporate green building principles, including stormwater pollution prevention and management. In total 11 building construction and EcoDistrict development projects were served by the Bureau of Planning and Sustainability's Green Building and Development program in FY 11-12. Additional green building events and activities related to stormwater management included:
  - Sponsored the Build it Green! Tour of Homes, attended by about 1,000 people. The tour demonstrated green building techniques, including ecoroofs, bioswales, pervious paving, rainwater harvesting and other sustainable stormwater management strategies in new development, redevelopment, and remodeling projects.
  - Delivered 38 presentations to a variety of sustainability and building-related organizations. Audience numbers ranged from 2 to 125 people per event, reaching a total of approximately 994 people.
- Continued to coordinate and offer Fix-It Fairs, a free neighborhood-oriented event that offers workshops and exhibits on home and garden topics. At each fair, over 100 workshops and

exhibits provided residents with self-help information and resources on topics including stormwater management, Naturescaping, and water conservation. During permit year 17, 2,100 people attended three fairs.

- Continued to implement the Ecoroof Incentive Program (which offers a financial incentive to property owners and developers to construct ecoroofs). During FY11-12, program accomplishments included:

Total projects completed	24
Total square feet completed	46,166
Total acres completed	1
Total amount paid out	\$ 230,830

- Conducted ecoroof design and construction seminar for Portland professionals, with 70 attendees. Topics included structure, design, waterproof membranes, plants, soil, irrigation, permitting, and maintenance. For the first time, the 2011 seminar included ecoroof specifications used on BES Maintenance Facility roofs.
- Conducted the 2012 Ecoroof Symposium to create awareness of ecoroofs as a cost-effective tool for sustainable stormwater management and to promote the Ecoroof Incentive Program. The program featured nine speakers and presentations focused on the return on investment for green roofs. Over 150 people attended, representing over 90 companies and organizations working in the fields of architecture, development, and green roofs.
- Through the Sustainable Stormwater Management Program, fielded public requests for information and technical assistance and provided technical assistance to a variety of projects:
  - Received over 50 requests for tours and speaking engagements. Conducted tours for professional planners, designers, developers, politicians, and staff from national and international jurisdictions.
  - Received 35 requests for a green street.
  - Received more than 25 requests for assistance from non-profit groups, students, and other jurisdictions in the form of design review and information sharing.
  - Presented information at 12 local, regional, and national seminars and conferences.
  - Received over 422,900 hits on the Sustainable Stormwater Management Program website, almost twice the number from last fiscal year.
  - Updated the web page for the Green Street Steward Program home page and registration. The website received over 4,900 hits in its second year of operation.
  - Developed fact sheets, materials, and marketing tools for the Green Street Steward program, including a fact sheet translated from English into five other languages, bus tail advertisement, posters, and newspaper ads.
  - Expanded the Ecoroof Blog site to include information, examples, and announcements for all green infrastructure approaches.

- Through Clean River Rewards, the City’s stormwater discount program, provided information about stormwater management and eligibility for reductions in customers’ monthly utility bills for managing stormwater onsite.
  - Attended 15 public events on stormwater retrofits of existing development for residential, commercial and multifamily properties, contacting approximately 1,720 people.
  - Managed the Clean River Rewards website to provide information and technical assistance. The website registered approximately 63,700 external hits during FY11-12.
  - Provided technical stormwater retrofit and registration assistance to 143 people.
  - Verified stormwater discount registration at 203 active utility accounts, providing stormwater technical assistance on maintenance and stormwater facility improvements.

At the end of the fiscal year, a total of 35,604 utility ratepayers with active accounts have registered for stormwater discounts:

- 34,349 single-family residential ratepayers account for a total of 76,304,658 square feet of impervious area managed for stormwater.
- 1,255 multifamily, commercial, and industrial ratepayers account for a total of 47,835,496 square feet of impervious area managed for stormwater.

**MEASURABLE GOALS**

<b>Measurable Goal</b>	<b>Status as of 6/30/2012</b>
<p>Construct the following public facilities to provide treatment for stormwater runoff from approximately 336 acres:</p> <ul style="list-style-type: none"> <li>• Construct the NE 148<sup>th</sup> Avenue stormwater management facility by FY 2014-15.</li> <li>• Construct stormwater management facilities in the NE 122<sup>nd</sup> Ave subbasin by December 2012 (Columbia Slough Watershed).</li> <li>• Convert 5,000 linear feet of roadside ditches to swales or porous shoulder (Tryon Creek and Fanno Creek watersheds) during the permit term.</li> <li>• Construct stormwater management facilities along SW Beaverton-Hillsdale Highway and SW Barbur Blvd. and in commercial and multi-family residential areas (Tryon Creek and Fanno Creek watersheds) during the permit term.</li> </ul>	<ul style="list-style-type: none"> <li>• Completed 60 percent design for NE 148<sup>th</sup> Avenue Water Quality Facility</li> <li>• Completed. This project included construction of eight water quality planters along NE 122nd Avenue between NE Fremont and NE Shaver, designed to treat stormwater runoff from 2.89 acres.</li> <li>• Converted 2,180 linear feet of roadside ditches to swales or porous shoulder in the Fanno Creek watershed, managing approximately 1.0 acre of road runoff. [Total conversion to date during this permit term is approximately 3,835 linear feet, managing approximately 1.75 acres of road runoff, in the Tryon Creek and Fanno Creek watersheds.]</li> <li>• Constructed five stormwater facilities to treat 1.5 acres of existing impervious area as part of the SW Multnomah Blvd. Stormwater Project. [Total facilities constructed to date during this permit term treat a total of 12.8 acres.]</li> </ul>
<p>Track the number, type, drainage area, and location of public facilities constructed annually.</p>	<p>Done (using GIS to track this information)</p>

**NS-1: Protect and enhance natural areas and vegetation that help prevent pollutants from entering into the municipal separate storm sewer system.**

**KEY BMP ACCOMPLISHMENTS, PERMIT YEAR 17 (FY 11-12)**

**Land Acquisition and Protection**

- Acquired 203 acres of natural area through the Grey to Green Land Acquisition Program.

**River Plan Update**

- Continued work on the *River Plan/Central Reach*. During FY11-12, worked on policy development for the *Concept Plan for the Central City* (including the river) and on policy development for the *Central City N/NE Quadrant Plan*. Conducted stakeholder interviews focusing on issues that affect the Central Reach, continued the analysis of zoning regulations related to the river, and continued work on the Natural Resources Inventory for the Central Reach. Began scoping for the NW and SW quadrants of the *Central City 2035 Plan*.

**Tree Code**

- Adopted code changes recommended by the Citywide Tree Policy Review and Regulatory Improvement Project. When fully implemented (scheduled for 2013), the new codes will help protect, expand, and improve the quality of Portland's tree canopy. A consolidated new Portland City Code title (Title 11 Trees) establishes new tree preservation and planting requirements on development sites, and standardizes the City's tree removal permit system. The City also adopted amendments to the Zoning Code that will strengthen and clarify tree-related requirements on land division sites and in environmentally sensitive resource areas, including along stream corridors.

**Watershed Revegetation Program**

- Under the Watershed Revegetation Program, many businesses and other private landowners participated in and helped fund revegetation projects on their properties and neighboring properties. The program is currently managing 1,752 project acres on both public and private property. Activities in FY11-12 included:

Willamette River

- Planted 39,538 plants on 5,930 linear feet of riverbank and 72.4 acres. This included 12,000 deciduous trees, 1,230 coniferous trees, and 25,408 shrubs.

Columbia Slough

- Planted 5,781 plants on 2,510 linear feet of riverbanks and 6.5 acres. This included 778 deciduous trees and 5,003 shrubs.

Johnson Creek

- Planted 72,413 plants on 9,512 linear feet of streambank and 133.75 acres. This included 14,430 deciduous trees, 3,220 coniferous trees, and 54,763 shrubs.

Tryon Creek

- Planted 11,089 plants on 21 acres. This included 794 deciduous trees, 1,665 coniferous trees, and 8,630 shrubs.

Fanno Creek

- Planted 10,685 plants on 11.32 acres. This included 1,230 deciduous trees, 1,405 coniferous trees, and 8,050 shrubs.

**Partnerships with Other Organizations**

- BES supported SOLV’s Team Up for Watershed Health to engage community volunteers in riparian area restoration. The program conducted stream restoration projects (erosion reduction, invasive plant control, and native plantings) at 12 sites on private property. FY 11-12 accomplishments included:

Willamette River Watershed

- Planted 895 native plants, removed 60,405 square feet of invasive vegetation and 1,235 pounds of trash at five sites.

Johnson Creek Watershed

- Planted 180 native trees and shrubs, removed 7,400 square feet of invasive vegetation and 90 pounds of trash, and maintained native plantings at two sites.

Columbia Slough Watershed

- Monitored one site and treated invasive growth at site.

Tryon Creek Watershed

- Removed 1,300 square feet of invasive vegetation, treated knotweed, and educated youth about restoration at five sites.

- In partnership with Friends of Trees, planted 5,402 street trees and 2,381 yard trees in City of Portland right-of-way, on school properties, and in private yards.
- Through a BES/Parks and Recreation partnership, involved citizens in their local natural areas. Activities included invasive plant species removal and native plant installation.

<b>Fanno Parks Project Summary</b>	
<b>Restoration</b>	
# Restoration Events	33
# Plants	863

<b>Tryon Creek Parks Project Summary</b>	
<b>Restoration</b>	
# Restoration Events	7
# of Plants	None (other restoration activities were done)

<b>Willamette Watershed Parks Projects</b>	
<b>Restoration</b>	
# Restoration events	98
# Plants planted	5,898
Area of invasive removal	80,000 sq. ft.

- Co-sponsored the Johnson Creek Watershed Council’s 14<sup>th</sup> annual Johnson Creek Watershed-Wide Restoration Event, where 385 volunteers planted 9,585 native plants, removed 25 cubic yards of invasive plants, removed 25 bags of trash, and mulched 600 plants.

#### **Technical Assistance, Incentives, and Grants Programs**

- Under BES’s Community Stewardship Grants Program, awarded 15 stewardship grants totaling \$95,500 for projects that included planting native vegetation. (See PI-1 for project names and watershed location.) The grants program also awarded 13 mini-grants totaling \$3,200 in fiscal year 2011-2012. Mini-grants provided a variety of community groups and private property owners with native plant gift certificates for riparian and upland restoration and revegetation projects in all Portland watersheds.

#### **Urban Forest Management Plan and Portland Plan**

- Continued to implement the *Urban Forest Management Plan*.
- Completed the Portland Plan, which was adopted by City Council on April 25, 2012. The Plan provides policy guidance for the update to the City’s *Comprehensive Plan* and *Central City Plan* and focuses on a core set of priorities: prosperity, education, health and equity. The plan includes both 25-year policies and 5-year action plans to guide the physical, economic, social, cultural, and environmental development of Portland, including natural resource and green infrastructure goals and strategies.

## MEASURABLE GOALS

Measurable Goal	Status as of 6/30/2012
Plant 20,000 trees and initiate revegetation work on 70 acres by the end of the permit cycle.	<ul style="list-style-type: none"> <li>• Planted 36,752 trees (29,232 deciduous and 7,520 coniferous) on 245 acres.</li> </ul> <p>[Total to date during this permit term: Planted 78,201 trees (63,293 deciduous and 14,908 coniferous) on 389.5 acres]</p>
Acquire 50 acres of land by the end of the permit cycle.	<ul style="list-style-type: none"> <li>• Acquired 203 acres of land.</li> </ul> <p>[Total to date during this permit term: 416.4 acres]</p>
Update the <i>Portland Plan</i> (an update to the City's <i>Comprehensive Plan</i> ) by December 2013.	Completed. City Council adopted the <i>Portland Plan</i> on April 25, 2012.

**PM-1: Conduct program management, coordination, and reporting activities.**

**KEY BMP ACCOMPLISHMENTS, PERMIT YEAR 17 (FY 11-12)**

- Coordinated with numerous other City bureaus and jurisdictions to continue implementation of the *Stormwater Management Plan* (as reported under the individual BMPs).
- Coordinated permit implementation activities with the Port of Portland.
- Submitted the NPDES MS4 annual compliance report 16 for FY10-11 on November 1, 2011.

**MEASURABLE GOALS**

<b>Measurable Goal</b>	<b>Status as of 6/30/2012</b>
Submit annual reports by November 1 of each year.	Submitted the FY10-11 annual report on November 1, 2011.



**Section III**  
**PORT OF PORTLAND**





**PORT OF PORTLAND**

**National Pollutant Discharge Elimination System (NPDES)  
Municipal Separate Storm Sewer System Permit  
Permit Number 101314**

**ANNUAL REPORT NO. SEVENTEEN  
Fiscal Year 2011-12  
(July 1, 2011 – June 30, 2012)**

Prepared for:  
**Oregon Department of Environmental Quality**

**November 1, 2012**



## TABLE OF CONTENTS

<b>1.0 INTRODUCTION .....</b>	<b>1</b>
<b>2.0 PORT OF PORTLAND PERMIT AREA AND RESPONSIBILITIES.....</b>	<b>1</b>
2.1 MS4 Permit Area .....	5
2.1.1 Portland International Airport .....	5
2.1.2 Marine Terminals .....	6
2.1.3 Industrial Parks .....	6
2.1.4 Undeveloped Properties.....	6
2.2 MS4 Permit Responsibilities.....	6
<b>3.0 PORT OF PORTLAND ORGANIZATIONAL STRUCTURE.....</b>	<b>13</b>
<b>4.0 STORMWATER EXPENDITURES .....</b>	<b>13</b>
<b>5.0 DEMONSTRATION OF CONTINUED LEGAL AUTHORITY TO IMPLEMENT THE PROGRAMS OUTLINED IN THE SWMP .....</b>	<b>14</b>
<b>6.0 STORMWATER MONITORING .....</b>	<b>15</b>
6.1 Environmental Monitoring.....	15
6.2 Best Management Practice (BMP) Monitoring.....	15
6.3 Additional Stormwater Monitoring Activities .....	16
<b>7.0 ACCOMPLISHMENTS FOR PERMIT YEAR SIXTEEN (2010-11) .....</b>	<b>16</b>
7.1 SWMP Implementation.....	16
7.1.1 Element #1: Illicit Discharge Detection and Elimination .....	16
7.1.2 Element #2: Industrial and Commercial Facilities .....	20
7.1.3 Element #3: Construction Site Runoff Control .....	22
7.1.4 Element #4: Education and Outreach .....	22
7.1.5 Element #5: Public Involvement and Participation: .....	28
7.1.6 Element #6: Post-Construction Site Runoff Control.....	29
7.1.7 Element #7: Pollution Prevention for Municipal Operations.....	30
7.1.8 Element #8: Structural Stormwater Controls Operations and Maintenance .....	35
<b>8.0 ADAPTIVE MANAGEMENT PROCESS IMPLEMENTATION AND PROPOSED SWMP CHANGES .....</b>	<b>38</b>

## LIST OF FIGURES AND TABLES

Figure	1-1	Port of Portland MS4 Permit Area
Table	2-1	Port of Portland MS4 Permit Requirements and Responsibilities
Table	4-1	Summary of Port of Portland Stormwater Expenditures
Table	6-1	Monitoring Objective Matrix (Appendix A)
Table	7-1	Port of Portland Pesticide/Herbicide/ Fertilizer Use in 2011-12

## ACRONYMS

BMP – Best Management Practice

DEQ – Department of Environmental Quality

EMS – Environmental Management System

FOG – Fats, Oil, and Grease

HAZWOPER – Hazardous Waste Operations and Emergency Response

IDDE – Illicit Discharge Detection and Elimination

IGA – Intergovernmental Agreement

IPM – Integrated Pest Management

MEP – Maximum Extent Practicable

MFM – Marine Facilities Maintenance (MID's general maintenance group)

MID – Marine and Industrial Development

MS4 – Municipal Separate Storm Sewer System

NOAA – National Oceanic and Atmospheric Administration

NPDES – National Pollutant Discharge Elimination System

PDX – Portland International Airport

PIC – Portland International Center

SPCC – Spill Prevention Control and Countermeasure

SWMP – Stormwater Management Plan

SWPCP – Stormwater Pollution Control Plan

TMDL – Total Maximum Daily Load

USB – Urban Services Boundary

USCG – United States Coast Guard

## 1.0 INTRODUCTION

The Oregon Department of Environmental Quality (DEQ) regulates stormwater runoff from Port of Portland (Port) property through the Municipal Separate Storm Sewer System Discharge Permit No. 101314 (MS4 permit) and other National Pollutant Discharge Elimination System (NPDES) stormwater permits, including the 1200-Z, 1200-COLS and 1200-CA permits. This annual report describes activities specifically related to implementation of the Port's MS4 permit.

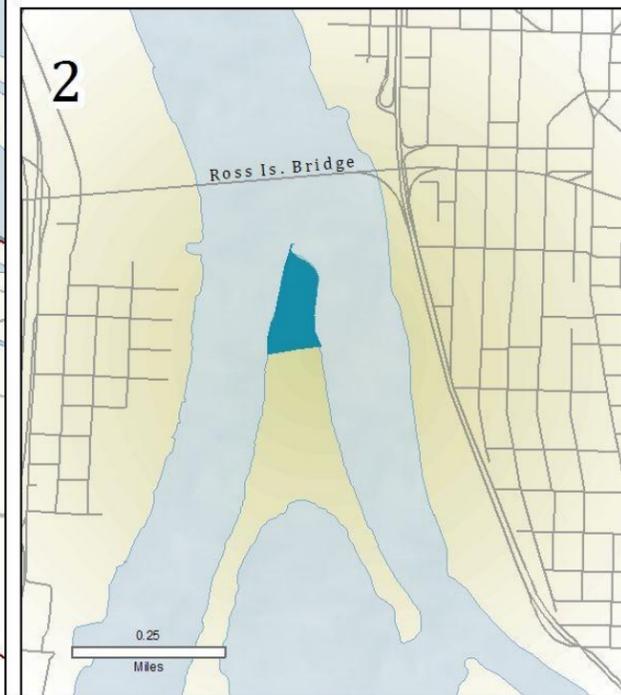
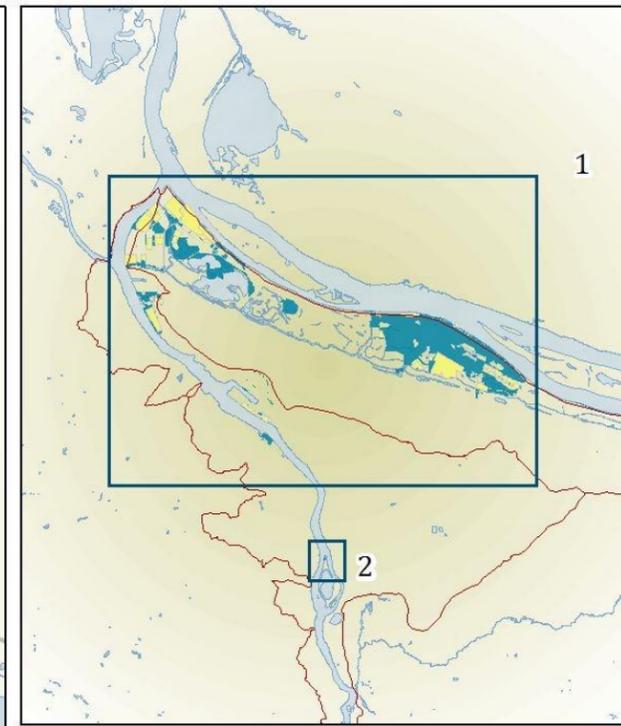
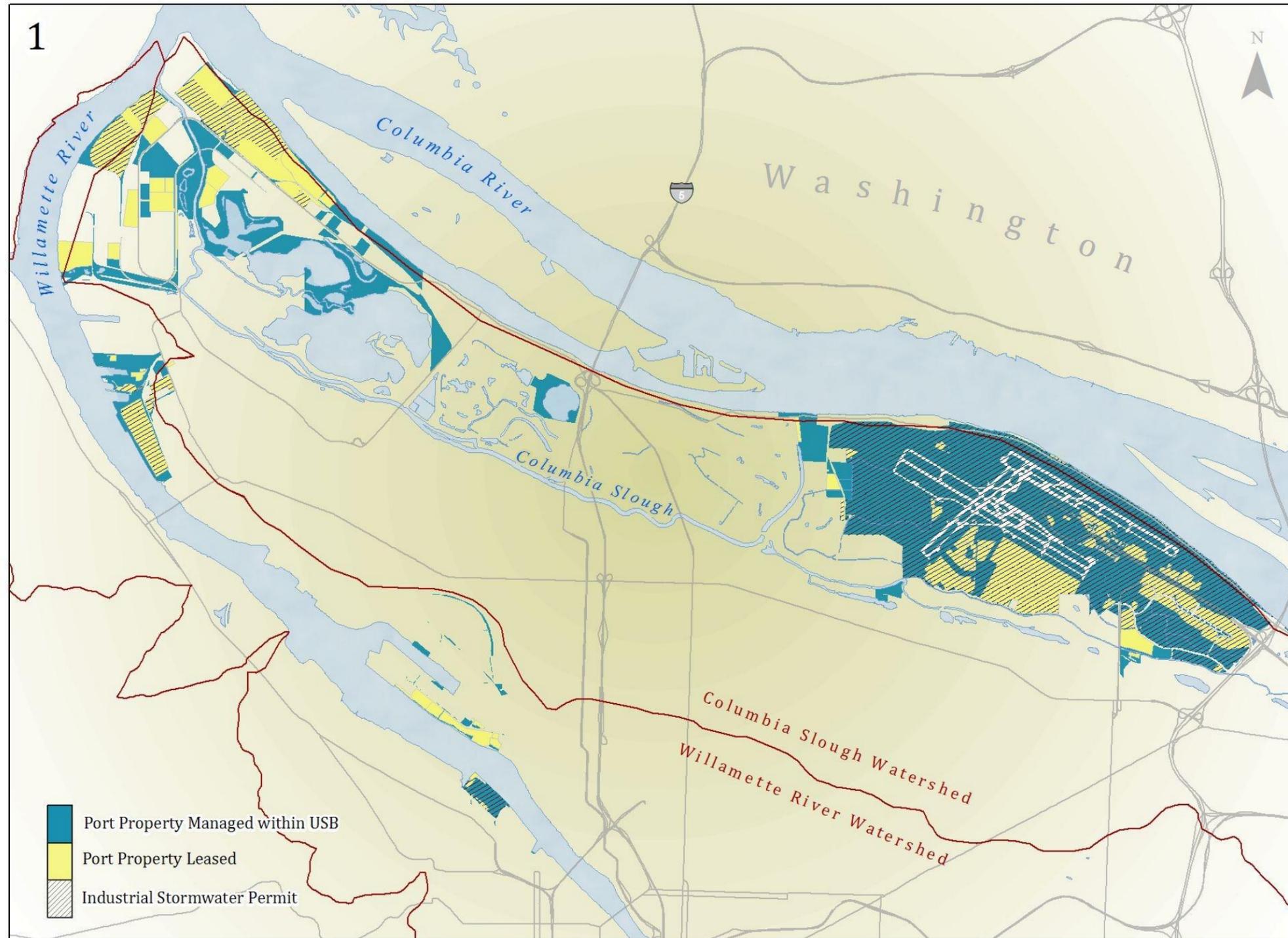
The Port and City of Portland are co-permittees on MS4 permit #101314. As required under Schedule B(5) of the permit, each co-permittee must submit an annual report. This report documents activity from July 1, 2011 to June 30, 2012 related to the Port's stormwater management efforts under the permit and associated April 1, 2011 Stormwater Management Plan (SWMP). The report emphasizes efforts and activities associated with individual Best Management Practices (BMPs) from the Port's SWMP (as summarized in Section 7.0). Schedule B(5)a-i of the permit states the specific annual reporting requirements. These requirements are addressed within the report as follows:

1. **Status of SWMP implementation:** Section 7.1.1 through 7.1.8
2. **Status of the public education evaluation:** Section 7.1.4
3. **Summary of the adaptive management process for FY2011:**Section 8
4. **Proposed changes to the SWMP:** Section 8
5. **Summary of stormwater program expenditures:** Section 4.0
6. **Summary of monitoring results:** \*See Section IV Monitoring Compliance Report of the combined report. Section 6.1 of this document explains the Port's monitoring coordination with the City.
7. **Proposed changes to the monitoring plan:** \*See Section IV Monitoring Compliance Report of the combined report. Section 6.1 of this report explains the Port's monitoring coordination with the City.
8. **Summary describing Port's Illicit Discharge Program:** Section 7.1.1
9. **Overview of planning, land use changes, and new development:** Section 2.1

## 2.0 PORT OF PORTLAND PERMIT AREA AND RESPONSIBILITIES

The Port of Portland owns approximately 5,484 acres within the City of Portland (City) Urban Services Boundary (USB). Port property is divided into two primary Business Lines under the Operations Division: 1) Aviation and 2) Marine and Industrial Development (MID). Within the City USB, the Aviation Business Line consists of Portland International Airport (PDX), and the MID Business Line includes Marine Terminals 2, 4, 5 and 6, as well as the following industrial parks: Swan Island, Mocks Landing, Rivergate, Cascade Station, and Portland International Center (PIC). Figure 1-1 (pg. 2) shows the Port's permit area, breaking out leased property and facilities with Industrial Stormwater General Permits.





- Port Property Managed within USB
- Port Property Leased
- Industrial Stormwater Permit

Port of Portland geospatial data is gathered, maintained and primarily used for internal reference and analysis, and is only updated as resources permit. Geospatial data refers to data and information referenced to a location on the Earth's surface such as maps, charts, air photos, satellite images, cadastre and land and water surveys, in digital or hard copy form. Geospatial data may be gathered and maintained by more than one person or department within the Port, and data distributed by one person or department may not reflect the most recent data available from the Port or from other sources. Port geospatial data is not intended for survey or engineering purposes or to describe the authoritative or precise location of boundaries, fixed human works, or the shape and contour of the earth. The Port makes no warranty of any kind, expressed or implied, including any warranty of merchantability, fitness for a particular purpose, or any other matter with respect to its geospatial data. The Port is not responsible for possible errors, omissions, misuse, or misrepresentation of its geospatial data. Port geospatial data is not intended as a final determination of such features as existing or proposed infrastructure, conservation areas, or the boundaries of regulated areas such as wetlands, all of which are subject to surveying or delineation and may change over time. No representation is made concerning the legal status of any apparent route of access identified in geospatial data.

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



**Port of Portland**  
 Portland, Oregon



Geographic Data Standards  
 Projected Coordinate System:  
 NAD 1983 HARN State Plane, Oregon N.  
 Projection: Lambert Conformal Conic  
 Units: International Feet

File:  
 N:\Projects\GIS\_Program\Work\20120910\_2012\_MS4\_Calculations\_Berg.MXD

**Port of Portland Properties in the City of Portland USB**

**Figure 1-1. Port of Portland MS4 Permit Area**

<b>Revised: September 15, 2012</b>	Prepared for: Jamey Berg Dept. Environmental Affairs Manager: Dorothy Sperry	Map No. 1 Sheet 1/1
------------------------------------	--	------------------------

**This page is intentionally blank**

The Port also owns a number of undeveloped properties within the USB including wetland mitigation sites, natural areas, and vacant tax lots. The Port is in a unique situation with regard to the typical municipal planning, permitting, and land use modification processes. The City of Portland is responsible for these activities and the Port complies with their process. For the purposes of this report, all reporting on these activities contained in section B(5)(i) will be satisfied in the City's section. With respect to the other requirements of B(5)(i), the Port estimates during the 2011-12 reporting period it had 2,142 acres of impervious surface. This represents 39% of total Port property within the City of Portland USB.

PDX, the marine terminals, and the industrial parks are partially occupied by tenants. The Port manages those tenant properties through lease agreements. Leased property represents approximately 30% of Port property within the USB. A more detailed description of Port operating areas is included in Section 2.1.

Property owned by the Port is primarily zoned for commercial and industrial use. Many of these areas accommodate industrial activities that require DEQ-issued NPDES general industrial stormwater permits (1200-Z and 1200-COLS permits) or individual permits addressing stormwater discharge. Sixty-seven percent of the Port's holdings within the USB are regulated under these permits. PDX and portions of Terminal 2 are operated by the Port under DEQ-issued industrial stormwater discharge permits. In addition, some tenants occupying leased property on Terminals 2, 4, 5, 6, and the industrial parks also operate under 1200-Z or 1200-COLS permits. For Port operations within these areas, several of the MS4 permit requirements are addressed through implementation of their industrial stormwater permit requirements, addressed in their Stormwater Pollution Control Plans (SWPCPs). Section 2.2 addresses how these activities are coordinated with the Port's MS4 permit responsibilities.

## **2.1 MS4 Permit Area**

### **2.1.1 Portland International Airport**

PDX comprises an area of approximately 2803 acres and is located in northeast Portland between the Columbia River and the Columbia Slough. The facility is owned and operated by the Port. However, numerous aviation-related tenants also conduct operations at PDX.

Stormwater runoff from PDX property discharges into the Columbia Slough through a series of pipes, open channels, and 9 major outfalls. These stormwater discharges are permitted under PDX's NPDES 1200-COLS Industrial Stormwater General Permit issued and administered by DEQ. The 1200-COLS permit is structured to specifically address Columbia Slough Total Maximum Daily Load (TMDL) parameters, including dissolved oxygen, pH, nutrients, bacteria, and toxics. With the exception of the Oregon Air National Guard and Yoshida Foods international, (who have their own 1200-COLS permit) PDX tenants whose operations trigger the need for a stormwater permit are required to be a co-permittee under PDX's 1200-COLS permit.

In addition to the 1200-COLS permit, PDX also holds an NPDES Construction Dewatering Waste Discharge Permit, a City of Portland Pre-treatment Permit, a Water Pollution Control

Facility (WPCF) 1700-B Wastewater Permit, a NPDES Anti-icing/Deicing Waste Discharge Permit and a pre-treatment permit issued by the City of Portland for deicing discharges to the sanitary system.

### **2.1.2 Marine Terminals**

The Port has four active shipping terminals that are managed by the Port's MID Business Line. The terminals collectively occupy approximately 1013 acres along the Willamette River (Terminals 2, 4, and 5) and Columbia River/Slough (Terminal 6). They handle the shipping, receiving, and temporary storage of finished goods, agricultural products, and raw materials.

The general industrial stormwater discharge permits required for Terminal 6 discharges into the Columbia River and the Columbia Slough are covered by corresponding 1200-Z and 1200-COLS permits held by the new tenant. The Port continues to hold a 1200-Z permit for the Port-managed area of Terminal 2. A number of properties located at Terminals 2, 4, and 5 are also leased to tenants. Several of these tenants hold 1200-Z or individual permits that are issued by DEQ and administered by the City.

### **2.1.3 Industrial Parks**

The Port's MID Business Line manage the Port-owned industrial parks, Swan Island, Mocks Landing, Rivergate, Cascade Station, and Portland International Center (PIC), totaling approximately 1502 acres. Several industrial park tenants also hold 1200-COLS or 1200-Z permits that are issued by DEQ and administered by the City.

### **2.1.4 Undeveloped Properties**

MID also manages approximately 1513 acres of undeveloped property within the City's USB. This does not include West Hayden Island, which is within the unincorporated USB and does not receive city services at this time. Stormwater management activities for undeveloped properties discharging into the Port's MS4 are conducted under the MS4 permit.

## **2.2 MS4 Permit Responsibilities**

Many of the requirements of the general industrial stormwater discharge permits overlap with requirements of the MS4 permit. A large proportion (67%) of the area included in the Port's MS4 permit area is also regulated under industrial stormwater permits, which have been issued to either the Port or its tenants.

The City is the lead permittee on the Port's MS4 permit. They regulate stormwater on a city-wide basis with some implementation overlapping the Port's MS4 area. The Port and City coordinate permit management activities through an intergovernmental agreement (IGA).

Table 2-1 (Permit Requirements and Responsibilities) was developed to explain the complex relationship between the Port's management of stormwater through its MS4 permit, the City's overlapping stormwater management activities through its MS4 permit, and DEQ's regulation of industrial stormwater on some Port property through other NPDES permits. This tool was included in the Port's 2011 SWMP to show specific program coverage for each MS4 permit requirement. Table 2-1 lists the SWMP requirements from the Port's MS4 permit along the left hand column. Responsibility descriptions for each SWMP requirement are split according to the

following two categories: (1) Port MS4 permit areas that do not have industrial stormwater permits (1200-Z or 1200-COLS permits), and (2) Port MS4 permit areas where the Port or its tenant has a general industrial stormwater permit (1200-Z or 1200-COLS permits). The two responsibility categories are further split between tenants and Port operations. For some tenants and Port operating areas (Terminals 2 and PDX) with an industrial stormwater permit, several of the MS4 permit requirements related to specific activities are addressed through implementation of the industrial stormwater permits. These requirements are shown shaded in gray on Table 2-1. In addition, permit requirements within the Port's jurisdiction covered by the City's stormwater management activities are also shaded in gray on Table 2-1. Areas left unshaded on Table 2-1 are addressed by BMPs in the Port's 2011 SWMP. These unshaded areas list the specific BMPs that meet each corresponding permit requirement.

Section 7.0 of this annual report outlines the BMPs listed in the Port's 2011 SWMP and specifies responsible parties for each BMP implementation task. In addition, Section 7.0 describes the Port's SWMP implementation during the permit year to address tracking measures and progress toward meeting measurable goals under each BMP.

**This page is intentionally blank**

**Table 2-1. Port of Portland MS4 Permit Requirements and Responsibilities** (Areas shaded in gray are MS4 permit requirements that are not addressed by BMPs in the Port’s SWMP because the requirements are either covered by the City of Portland, or are covered under an industrial stormwater permit. Unshaded Areas are covered by the Port’s SWMP BMPs listed below.)

MS4 Permit SWMP Requirements	MS4 Service Areas Not Covered Under Industrial Stormwater Permits		MS4 Service Areas With Industrial Stormwater Permits	
	Tenants	Port Operations	Tenants	Port Operations
<b>Schedule A.4.a Illicit Discharge Detection and Elimination.</b>				
i. Prohibit, through ordinance or other regulatory mechanism, illicit discharges	BMP: Implement the Illicit Discharge Detection and Elimination Program.			
ii. Describe enforcement response procedures.	BMP: Implement the Illicit Discharge Detection and Elimination Program.			
iii. Develop pollutant parameter action levels	BMP: Conduct Dry-Weather Field Screening.			
iv. Conduct annual dry weather inspection activities including field screening	BMP: Conduct Dry-Weather Field Screening.			
v. Identify response procedures to investigate portions of the MS4 where relevant information indicates the likely presence of illicit discharges.	BMP: Conduct Dry-Weather Field Screening.			
vi. Maintain a system for documenting and procedures for responding to illicit discharges	BMP: Conduct Dry-Weather Field Screening.			
vii. Appropriate action for illicit discharge removal.	BMP: Implement the Illicit Discharge Detection and Elimination Program.		Covered under 1200-Z and COLS permits <sup>1</sup>	
			BMP: Implement the Illicit Discharge Detection and Elimination Program.	
viii. Spill prevention and response	BMP: Implement a Spill Response Program for Port Operated Property.		Covered under 1200-Z and COLS permits <sup>1</sup>	
ix. Notify affected municipality of illicit discharge originating within the permittee's permit area	BMP: Implement the Illicit Discharge Detection and Elimination Program.			
x. Notify responsible municipality of illicit discharge affecting the permittee, originating outside of the permittee's permit area.	BMP: Implement the Illicit Discharge Detection and Elimination Program.			
xi. Maintain maps showing major MS4 outfalls	BMP: Conduct Dry-Weather Field Screening.			
xii. Unless identified as a significant source of pollutants, the following non-stormwater discharges are not considered illicit discharges (see Schedule A.4.a.xii)	BMP: Implement a Water Line Flushing Procedure			
<b>Schedule A.4.b Industrial and Commercial Facilities</b>				
i. Screen existing and new industrial facilities	BMP: Screen Existing and New Industrial Facilities		Already covered by an industrial stormwater NPDES permit.	
ii. Notify DEQ and facility if subject to an industrial NPDES permit.	BMP: Screen Existing and New Industrial Facilities		Already covered by an industrial stormwater NPDES permit.	
iii. Inspection of industrial or commercial areas identified as significant sources of pollutants.	BMP: Implement an Inspection Program for Significant Pollutant Source Areas			
<b>Schedule A.4.c Construction Site Runoff Control</b>				
i. Ordinance that requires erosion and sediment controls	Implemented through the City of Portland’s erosion control ordinance; may also be covered under a 1200-C permit.		Implemented through the Port’s 1200-CA Permit, the City of Portland’s erosion control program and related contract specifications.	
ii. Require construction site operators to develop site plans and implement erosion and sediment control BMPs.			Implemented through the City of Portland’s erosion control ordinance; may also be covered under a 1200-C permit.	
iii. Require construction site operators to prevent/ control non-stormwater waste				
iv. Erosion control site plan review				
v. Perform on-site inspections				
vi. Maintain enforcement response procedures				
<b>Schedule A.4.d Education and Outreach</b>				
i. Implement a documented public education and outreach strategy	BMP: Implement Public Education Measures to Protect Stormwater Quality.			
ii. Provide educational material to the community or conduct equivalent outreach activities	BMP: Implement a Tenant Stormwater BMP Program.		BMP: Implement a Tenant Stormwater BMP Program.	
	BMP: Implement Public Education Measures to Protect Stormwater Quality.		N/A	
iii. Provide public education on pesticide, herbicide, fertilizer, and other chemicals	BMP: Require Training and Licensing for Staff Conducting Pest Management Activities. BMP: Implement a Tenant Stormwater BMP Program.			
iv. Provide public education on proper operation and maintenance of privately-owned/ operated stormwater quality facilities	BMP: Implement a Tenant Stormwater BMP Program. BMP: Implement a Program for the Tracking and Maintenance of Private Structural Controls			
v. Provide notice to construction site operators regarding training for erosion and sediment control	BMP: Provide Erosion Prevention and Sediment Control Training for Construction Inspectors			

MS4 Permit SWMP Requirements	MS4 Service Areas Not Covered Under Industrial Stormwater Permits		MS4 Service Areas With Industrial Stormwater Permits	
	Tenants	Port Operations	Tenants	Port Operations
vi. Conduct/ participate in a public education effectiveness evaluation	BMP: Participate in a Public Education Effectiveness Evaluation			
vii. Include training for municipal employees involved in MS4 activities.	BMP: Implement a Spill Response Training Program. BMP: Implement a Municipal Staff Training Program for Stormwater Pollution Prevention BMP: Require Training and Licensing for Staff Conducting Pest Management Activities.		Covered under 1200-Z and COLS permits <sup>1</sup>	
viii. Promote, publicize, and facilitate public reporting of illicit discharges.	BMP: Implement the Illicit Discharge Detection and Elimination Program			
<b>Schedule A.4.e Public Involvement and Participation</b>				
e. Implement a public participation process for receiving and considering comments on the SWMP and TMDL benchmarks	BMP: Provide for Public Participation with SWMP and Benchmark Submittals			
e. Implement a public participation approach that provides opportunities for the public to effectively participate in the implementation of the co-permittee's stormwater management program.	BMP: Implement a Public Participation Approach that Provides Opportunities for the Public to Effectively Participate in the Implementation of the Stormwater Management Program.			
<b>Schedule A.4.f Post-Construction Site Runoff</b>				
i. Implement a post-construction stormwater pollutant and runoff control program.	BMP: Develop, Adopt, and Implement New Port-Specific Post-Construction Runoff Control Standards			
ii. Identify, and where practicable, minimize or eliminate ordinance, code and development standard barriers.	BMP: Develop, Adopt, and Implement New Port-Specific Post-Construction Runoff Control Standards			
iii. Develop or reference an enforceable post-construction stormwater management manual	BMP: Develop, Adopt, and Implement New Port-Specific Post-Construction Runoff Control Standards			
vi. Review, approve, and verify proper implementation of post-construction site plans.	BMP: Develop, Adopt, and Implement New Port-Specific Post-Construction Runoff Control Standards			
v. Require off-site stormwater management for locations limited in their ability for on-site stormwater capture and treatment or flow reduction.	BMP: Develop, Adopt, and Implement New Port-Specific Post-Construction Runoff Control Standards			
vi. Describe inspection and enforcement response procedures to address compliance issues with post-construction stormwater management performance standards.	BMP: Develop, Adopt, and Implement New Port-Specific Post-Construction Runoff Control Standards			
<b>Schedule A.4.g Pollution Prevention for Municipal Operations</b>				
i. Operate and maintain public streets, roads, and highways	The City of Portland is responsible for operation and maintenance of the public right-of-way. BMP: Implement a Street and Vehicle Maneuvering Area Cleaning and Maintenance Program.			
ii. Implement a program to control the use and application of pesticides	BMP: Limit Landscape Maintenance Activities Impact on Stormwater. BMP: Require Appropriate Training and Licensing for Pest Management Activities. BMP: Implement a Tenant Stormwater BMP Program.			
iii. Inventory, assess, and implement a strategy to reduce the impact of stormwater runoff from municipal waste facilities not already covered by a 1200 series permit.	No tenant properties currently accommodate municipal facility waste.	BMP: Implement a Street and Vehicle Maneuvering Area Cleaning and Maintenance Program. BMP: Implement a Stormwater System Cleaning and Maintenance Program (These BMPs include tasks to decant water from municipal wastes and discharge wastewaters to the sanitary system.)	Covered under 1200-Z and COLS permits <sup>1</sup>	Covered under 1200-Z and COLS permits <sup>1</sup>
iv. Implement controls to limit infiltration of seepage from the municipal sanitary system.	BMP: Implement a Program to limit infiltration from Port-owned sanitary sewer system to the MS4			
v. Implement a strategy to prevent or control the pollutant discharge from fire fighting training activities	The only fire fighting training facility is located at PDX, which is covered by a 1200-COLS permit.			
vi. Retrofitting flood control facilities.	The City of Portland manages water quality improvements on a master planning level.			
<b>Schedule A.4. h Structural Stormwater Controls Operations and Maintenance</b>				
i. Implement a program to verify structural control facilities and	BMP: Implement a Stormwater System Cleaning and Maintenance Program		Covered under 1200-Z and COLS permits <sup>1</sup>	Covered under 1200-Z and COLS permits

MS4 Permit SWMP Requirements	MS4 Service Areas Not Covered Under Industrial Stormwater Permits		MS4 Service Areas With Industrial Stormwater Permits	
	Tenants	Port Operations	Tenants	Port Operations
controls are inventoried, mapped, inspected, operated and maintained. Operate and maintain public streets, roads, and highways	BMP: Implement a Program for Tracking and Maintenance of Private Structural Controls			
ii. Develop and implement a plan or approach to guide the long-term maintenance and management of all publically-owned and privately owned stormwater facilities.	BMP: Implement a Stormwater System Cleaning and Maintenance Program BMP: Implement a Tenant Stormwater BMP Program.		Covered under 1200-Z and COLS permits <sup>1</sup>	Covered under 1200-Z and COLS permits
<b>Schedule A.6.c Stormwater Retrofit Project</b>				
ii. Identify one stormwater quality improvement project, at a minimum, to be initiated constructed and/or implemented during the permit term.	BMP: Develop, Adopt, and Implement New Port-Specific Post-Construction Runoff Control Standards			
<b>Schedule B1-B4 Monitoring Component Requirements</b>				
The Port must assist with monitoring efforts in conjunction with requirements as stated in Table B-1, Schedule B(1)(b)	Pursuant to an IGA, the Port of Portland and the City of Portland have a joint monitoring program conducted by the City to meet the requirements specified under Schedule B.			

Notes:

<sup>1</sup> Maintenance may be conducted by the Port as agreed upon in tenant leases.

**This page is intentionally blank**

### **3.0 PORT OF PORTLAND ORGANIZATIONAL STRUCTURE**

The Port's Environmental Affairs Department is responsible for administering the MS4 permit and the SWMP. The Environmental Affairs Manager serves as the MS4 permit manager. Staff from MID and Aviation Business Lines are responsible for implementing Port environmental programs to ensure permit compliance. As a means of coordinating Port-wide programs and policies, environmental program managers regularly meet with cross-functional teams that include Port operating area staff. One means of coordination between staff in Environmental Affairs, MID and Aviation is through the Water Resources Coordination Group (WRCG). This group includes staff from Environmental Affairs, Legal, Aviation, Marine and Industrial Development, Public Affairs, and Engineering. The WRCG meets monthly and is responsible for providing input on Port-wide stormwater policy issues, water quality, and permit implementation. The Environmental Affairs Manager serves as the lead for the WRCG.

With respect to implementation of the Port's general industrial stormwater discharge permits, Aviation Environmental staff prepares, updates, and ensures implementation of the PDX SWPCP in coordination with the co-permittees. Marine Environmental staff prepares, updates, and ensures implementation the SWPCP for Terminal 2. Tenants with industrial stormwater discharge permits are also required to prepare, maintain and implement SWPCPs. The City (DEQ's agent) coordinates directly with Port tenants holding these permits.

### **4.0 STORMWATER EXPENDITURES**

The Port's state-mandated mission is to enhance the region's economy and quality of life by providing efficient cargo and air passenger access to global and national markets. In support of this mission, the Port annually undertakes budget and business planning to identify areas of focus and actions needed to address them.

The Port derives almost all revenue from business transactions with the users and tenants of Port facilities. A small proportion (approximately three to four percent) of the Port's overall revenue is from property tax. Business transactions generally occur between the MID Business Line, the Aviation Business Line (Commercial Aviation and General Aviation), and associated users and tenants of those properties. Revenue from MID are primarily derived from fees, charges and leases with marine customers, leases with tenants of the Port's industrial parks, and sales of property at the industrial parks. The Port also receives revenue from the U.S. Army Corps of Engineers for dredging services.

Commercial Aviation (PDX) resources are derived primarily from charges to airline passengers and air cargo customers, airport parking, rental car revenue, passenger facility charges, Federal grants, and tenant fees. PDX resources cannot be comingled with any other resources of the Port and are restricted for use at Aviation facilities by bond ordinances and Federal Aviation Administration (FAA) regulations.

The Port annually budgets resources to fund projects and programs identified in the Strategic and Business Line Plans. Program expenses are allocated among Business Lines and departments

involved in implementation of the program. Specifically, stormwater resources are allocated among the MID and Aviation Business Lines (PDX), Environmental Affairs Department, Information Technology (IT) Department, Legal Department, and Engineering Department. Stormwater program expenditures include the cost of staff salary (including fringe costs), permit fees, contractor and consultant fees, stormwater infrastructure, City of Portland stormwater fees, disposal of collected material, sample analysis, stormwater training, and outreach materials.

Table 4-1, shows estimated stormwater program expenditures broken out by area and in total for fiscal year 2010-11 and 2011-2012. The decrease in estimated expenditures for the Aviation Business Line is due to the completion of the Port’s new Deicing System.

**Table 4-1. Summary of Port of Portland Stormwater Expenditures**

<b>Department</b>	<b>Estimated 2011-12 Stormwater Expenditures</b>	<b>Projected 2012-13 Stormwater Expenditures</b>
Marine and Industrial Development	\$658,700	\$692,594
Aviation (including deicing)	\$10,100,808	\$7,471,507
Engineering	\$868,120	\$1,001,500
IT	\$28,020	\$28,020
Legal	\$16,640	\$16,640
Environmental Affairs	\$150,678	\$194,572
<b>Totals</b>	<b>\$11,822,966</b>	<b>\$9,404,833</b>

## **5.0 DEMONSTRATION OF CONTINUED LEGAL AUTHORITY TO IMPLEMENT THE PROGRAMS OUTLINED IN THE SWMP**

The Port has authority to implement programs outlined in the SWMP through ordinance, permits, and contracts.

The Port has statutory authority to enact ordinances to regulate stormwater sewers that it owns, operates, maintains, or controls. The Port Commission adopted Ordinance No. 361 in 1992, which asserts the Port’s regulatory authority over its stormwater system and discharges into that system. Section 3 prohibits any person from making, causing, or allowing an illicit discharge into a storm sewer owned or operated by the Port. Section 4 requires written permission from the Port in order to make a connection to a Port storm sewer. Section 5 authorizes the Port to inspect Port-owned property for violations of the Ordinance or applicable law that governs the conveyance or disposal of stormwater. In addition, the Ordinance provides the Port with authority to control the contribution of pollutants to storm sewers owned or operated by the Port; the quality of stormwater discharged from the sites of industrial activity on land owned by the Port; and the discharge to storm sewers owned or operated by the Port of pollutants from spills, dumping, or the disposal of materials other than stormwater.

In addition to the Ordinance, the Port has legal authority to control the contribution of pollutants to the municipal storm sewer through contracts with Port tenants. Lease agreements require the

lessees to comply with the Port's MS4 permit. Through these regulatory and contractual mechanisms, the Port works with tenants and users of Port facilities to implement BMPs that control the contribution of pollutants to Port storm sewers.

## **6.0 STORMWATER MONITORING**

The Port's monitoring program consists of environmental and BMP monitoring elements. Activities within these groups are in place to meet Schedule B monitoring requirements, including the following MS4 monitoring objectives:

1. Evaluate the source(s) of the 2004/2006 303(d) listed pollutants applicable to the co-permittee's permit area;
2. Evaluate the effectiveness of BMPs in order to help determine BMP implementation priorities;
3. Characterize stormwater based on land use type, seasonality, geography, or other catchment characteristics;
4. Evaluate long-term trends in receiving water quality associated with storm water discharges;
5. Assess the chemical, biological, and physical effects of MS4 runoff on receiving waters;
6. Assess progress towards meeting TMDL pollutant load reduction benchmarks.

Table 6-1 (shown in Appendix A) explains how each monitoring program activity within the two elements relates to these objectives. A description of each monitoring program element is provided below.

### **6.1 Environmental Monitoring**

The Port satisfies the MS4 environmental monitoring requirements through an IGA with the City of Portland. The IGA specifies the terms and conditions regarding how the Port shares costs with the City for environmental monitoring efforts. The City's Quality Assurance Monitoring Plan (QAMP) consists of in-stream (event), in-stream (continuous), stormwater, pesticide, mercury, and macroinvertebrate monitoring elements. The plan can be downloaded at <http://www.portlandonline.com/bes/index.cfm?a=349082&c=37485>. A discussion of this program and its operations during FY2011 is included in City of Portland's Monitoring Compliance Report (Section IV of the Annual Report).

### **6.2 Best Management Practice (BMP) Monitoring**

The Port's BMP monitoring activities are described as tracking measures and measureable goals in the most recently approved SWMP, submitted to DEQ on April 1, 2011. These monitoring activities are specific indicator metrics that help document the completion of tasks and assess the relative effectiveness of BMPs. The implementation tasks, tracking measures, and measurable goals associated with each Port BMP are provided in Sections 7.1.1 through 7.1.8.

### **6.3 Additional Stormwater Monitoring Activities**

The Port collects and submits additional stormwater monitoring data to DEQ as required by the Port's various NPDES Stormwater permits. Data collected for these permits is not included in the MS4 permit annual report, but is available through DEQ upon request.

This monitoring provides useful data about stormwater discharges from Port industrial properties. Information resulting from these sampling events has been used to manage the stormwater programs at these facilities and may continue to be useful for understanding water quality impacts from different types of industrial sources.

The Port submitted stormwater monitoring data to DEQ for the following industrial stormwater discharge permits in FY2011:

- NPDES 1200-COLS Industrial Stormwater Discharge Permits, DEQ File No. 107220 (PDX)
- NPDES 1200-Z Industrial Stormwater Discharge Permit, DEQ File No. 114024 (Terminal 2)
- NPDES Deicing Permit No. 101647

## **7.0 ACCOMPLISHMENTS FOR PERMIT YEAR SEVENTEEN (2011-12)**

### **7.1 SWMP Implementation**

The annual report content and format is based on the SWMP submitted to DEQ in April 1, 2011. The SWMP is structured into eight major elements. These elements contain the necessary BMPs to address MS4 permit requirements included in Schedule A(4)(a-h). Reporting on tracking measures and progress towards associated measurable goals are shown in italics for each BMP below. Reporting regarding any task not addressed by the corresponding tracking measures or measurable goal response is addressed in italics directly under the task.

#### **7.1.1 Element #1: Illicit Discharge Detection and Elimination**

##### ***BMP: Implement the Illicit Discharge Detection and Elimination (IDDE) Program***

###### Implementation Tasks:

1. Continue to implement documented illicit discharge detection and elimination procedures (Responsibility: MID Environmental, Aviation Environmental).
2. Update the illicit discharge detection and elimination procedures by November 1, 2011 per provisions consistent with the MS4 NPDES permit language (Responsibility: Environmental Affairs).
3. Implement a reporting program for potential illicit discharges by maintaining spill notification signs throughout Port property (Responsibility: MID Properties Maintenance, Marine Facilities Maintenance (MFM), and PDX Maintenance).
  - ✓ *MID and Aviation staff continue to be trained on spill notification annually. Notification signage is maintained on both MID and Aviation properties.*

Tracking Measures:

1. Track the status of updating the illicit discharge detection and elimination procedures.
  - ✓ *Port Ordinance 361 provides the authority to prohibit illicit discharges. Port-wide rules ensuring consistent and timely enforcement of the ordinance were adopted and are effective as of Nov. 1, 2011.*
2. Track the number, type, location, and resolution of any illicit discharge investigations conducted.
  - ✓ *Aviation investigated seven potential illicit discharges in FY2011. (\*See summary under BMP: Conduct Dry-Weather Field Screening tracking measures.)*
  - ✓ *MID investigated six potential illicit discharges in FY2011. (\*See summary under BMP: Conduct Dry-Weather Field Screening tracking measures.)*

Measureable Goals:

1. Update the illicit discharge detection and elimination procedures by November 1, 2011.
  - ✓ *Completed FY2011, see tracking measure response above.*

***BMP: Conduct Dry-Weather Field Screening***

Implementation Tasks:

1. Conduct annual dry-weather field screening activities at all priority outfall locations (Responsibility: MID Environmental, Aviation Environmental).
2. Annually, as necessary, update Port data files related to outfall locations, in accordance with dry-weather field screening activities (Responsibility: MID Environmental, Aviation Environmental).
3. Update the dry-weather field screening procedures by June 30, 2012 to be in accordance with MS4 permit requirements (Responsibility: Environmental Affairs).

Tracking Measures:

1. Track the number and location of priority outfalls inspected during dry-weather field screening activities.
  - ✓ *Aviation inspected 13 outfalls.*
  - ✓ *MID inspected 62 outfalls.*
  - ✓ *The location of Port "Priority Outfalls" for dry-weather field screening is mapped in the Port's GIS system.*
2. Summarize dry-weather field screening inspection results and indicate outfalls requiring sampling or follow up activities.
  - ✓ *Aviation screening was conducted on 8/12/11.*
    - **Summary:** *Thirteen outfalls were inspected. Outfalls for PDX basins 1, 1C, 2, 3, 4, 6, and 8 displayed visible flow. Each of the seven outfalls with flow has been investigated in previous years and the source has been*

*determined to be groundwater infiltration and/or landscape irrigation water (both allowable discharges). This year each basin was inspected, visual observations were similar to those in the past, and no other potential source of the flow could be identified to indicate an illicit discharge. PDX has an extremely high water table; studies performed for the Port have documented significant groundwater infiltration into the Port's stormwater system.*

- ✓ *MID screening was conducted on 8/18/11, 8/19/11, 8/30/11, 9/9/11, 9/23/11.*
  - ***Summary:** Sixty Port outfalls were inspected. Five outfalls displayed visible flow requiring Port follow up. Additionally, two observed were referred to the City of Portland. The City followed up on outfalls (STSOUT 264, STSOUT 166). The results of these inspections should be included in the City's MS4 compliance report. Regarding Port outfalls that required follow up (STSOUT 207, STSOUT 268, STSOUT 269, STSOUT SI-E, STSOUT 275), drainage areas were inspected for signs of an unauthorized discharge. None were found. All were drips or very light flow with no visual observations indicating a potential illicit source. Based on this information, all were attributed to groundwater infiltration.*

3. Indicate the outcome and resolution of inspection activities conducted.

- ✓ **Aviation:**
  - **SP3:** *A very small flow was observed on 8/12/11. The flow did not have any distinguishing characteristics that would indicate it was illicit. The basin was driven to identify any potential sources. An irrigation water source was noted. Based on this observation, it was determined to be from an authorized source. Several other flows were observed from areas with known perforated pipe systems, after inspecting the basins to identify potential sources these were attributed to groundwater.*
- ✓ **MID:**
  - **STSOUT 207:** *A very small flow was noted from this outfall on 8/18/11. The outfall, drainage basin, and the loading docks for the Freightliner office buildings were inspected on 8/19/11. No evidence of a potential source was found. The discharge is likely either groundwater or potential air conditioner condensate or other condensate discharge that cannot be seen during observations of the exterior of the buildings.*
  - **STSOUT268:** *A steady stream was observed on 9/23/11. It did not display any notable physical characteristics indicating it was illicit in nature. However, samples were taken and analyzed for THM/chloroform and ammonia based on the Port's draft Illicit Discharge Action Level flow chart. Lab results were received on 9/27/2011 indicated the source of the flow is likely natural due to the low chloroform and ammonia levels shown in the results. No further action was taken.*
  - **STSOUT269:** *A small steady flow was observed on 8/18/11. A light white foam was noted in the discharge indicating a potential illicit discharge. Samples were*

taken on 9/9/11 and analyzed for THM/chloroform and ammonia. Results indicated the flow was likely from a natural source. No further action was taken.

- **STSOUT SI-E:** A very small flow was noted from this outfall on 8/18/11. It did not display any notable physical characteristics indicating it was illicit in nature. The outfall, drainage basin, and loading docks draining to this area were inspected on 8/19/11 while the flow was still in progress. No potential source was identified. The discharge is similar to those attributed in the past to groundwater. No further action was taken.
- **STSOUT 275:** A light flow was observed on 8/18/11. It did not display any notable physical characteristics indicating it was illicit in nature. The basin contributing to this outfall was inspected on 8/19/11 while the flow was still in progress. No potential source of identified. The discharge was similar to those attributed in the past to groundwater. No further action was taken.

#### Measureable Goals:

1. Update dry-weather field screening procedures, in accordance with permit requirements by July 1, 2012.
  - ✓ *Completed, FY2011 The Port-wide IDDE work instruction (mentioned above) was revised to incorporate the new permit requirements for notification of other jurisdictions, timing of resolution once a source has been determined, circumstances that require sampling, and pollutant parameter action levels.*
2. Inspect priority outfalls annually.
  - ✓ *A total of 75 priority outfalls were inspected Port-wide as part of dry-weather field screening activities in 2011-12.*

#### **BMP: Implement a Spill Response Program for Port Operated Property**

##### Implementation Tasks:

1. Implement the Port's spill response procedure and update as necessary (Responsibility: Marine Environmental).
2. Participate in the City's Spill Response Committee (Responsibility: Marine Environmental).
  - ✓ *Staff from MID Environmental continues to be active on the City of Portland's Regional Spill Committee and attend quarterly meetings when they are held.*
3. Ensure trained Port staff members are available for on-call spill response, in addition to ensuring current contracts with on-call spill response contractors (Responsibility: Marine Environmental).

##### Tracking Measures:

1. Track the number of spills of a reportable quantity in which a spill response was conducted.
  - ✓ *Aviation responded to four reportable quantity spills in FY2011.*

- ✓ *MID responded to zero reportable quantity spills in FY2011.*

Measureable Goals:

1. Implement the Port's Spill response procedures.
  - ✓ *The Port continues to train appropriate employees in order to properly implement effective spill response procedures. Reportable quantity spill cleanup is conducted by on-call contractors trained and equipped to minimize discharges to the environment. Incidental spill response is performed by trained employees.*

***BMP: Implement a Water Line Flushing Procedure***

Implementation Tasks:

1. Implement a water line flushing procedures to ensure appropriate disposal of chlorinated water (Responsibility: PDX Maintenance, MFM).

Measureable Goals:

1. Implement waterline flushing consistent with guidelines described in the BMP description included in the April 1, 2011 SWMP.
  - ✓ *MID and Aviation staff are aware of the requirements associated with this type of discharge and implement procedures to comply with the Port's work instruction ("Disposal of Chlorinated Water: Hydrant & Waterline Flushing") on the subject. This work instruction has been posted for operating area reference and is covered in stormwater pollution prevention training.*

**7.1.2 Element #2: Industrial and Commercial Facilities**

***BMP: Screen Existing and New Industrial Facilities***

Implementation Tasks:

1. Coordinate with the City of Portland over the permit term to develop a screening process for industrial facilities (Responsibility: Environmental Affairs).

Tracking Measures:

1. Track leaseholds that have an individual or industrial stormwater permit.
  - ✓ *The Port maintains a list of tenants who hold an individual Industrial Stormwater General Permit. These include: Yoshida Foods International Limited Partnership, International Container Terminal Services, Inc., Stevedoring Services America, Inc., Kinder Morgan Bulk Terminal 4, Toyota Logistics Services, Inc., Columbia Grain, Inc., Portland Bulk Terminal 5, Auto Warehousing Company (for Hyundai), and Swan Island Batch Discharge Plant (Rinker), and the Oregon Air National Guard.*

Measureable Goals:

1. Coordinate with the City of Portland on a process for screening industrial facilities over the permit term.

- ✓ *The Port is currently renegotiating an IGA with the City which will include specific responsibilities regarding screening of industrial facilities.*

### ***BMP: Implement an Inspection Program for Significant Pollutant Source Areas***

#### Implementation Tasks:

1. Conduct inspections of Priority Facilities annually, or more frequently if needed (Responsibility: Marine Environmental, Aviation Environmental).
2. If inspections identify conditions needing improvements, coordinate with tenant and Port property manager to ensure appropriate control measures to minimize pollutant loading from priority facilities (Responsibility: Aviation Environmental, Marine Environmental).

#### Tracking Measures:

1. Track the number of facilities inspected annually.
  - ✓ *Aviation conducted 12 inspections of Priority Facilities in FY2011.*
  - ✓ *MID conducted 9 inspections of Priority Facilities in FY2011.*
2. Track improvements made to Priority Facilities as a result of inspections.
  - ✓ *Inspection follow up letters are kept by Environmental Affairs documenting any issues that require attention. In FY2011 some of the issues addressed included preventing entrainment of pollutants generated under cover by stormwater run-on, maintaining spill and stormwater training documentation, updating Spill Prevention Control and Countermeasures plans, compliance with monthly inspection requirements, improper outdoor material storage, secondary containment requirements, conducting required good housekeeping measures, documentation of stormwater treatment facility maintenance documentation, and maintenance/cleanup of leaky equipment.*

#### Measureable Goals:

1. Coordinate with the City of Portland on a process for screening industrial facilities over the permit term. Conduct Annual Inspections at Priority Facilities.
  - ✓ *Complete for FY2011, (See Tracking Measures response above).*
2. Document the procedure and rationale for selection of “Priority Facilities”, by 11/1/2011.
  - ✓ *Priority facilities will be identified annually for MS4 industrial inspections based on consideration of the following criteria:*
    - *Industrial Stormwater General Permit holder*
    - *Past enforcement actions*
    - *Reportable quantity spill in the last 12 months*
    - *Hazardous material handling and storage areas*
    - *Known source of a target pollutant for the Port’s outreach program*

### **7.1.3 Element #3: Construction Site Runoff Control**

Construction projects on Port property comply with the MS4 permit's runoff control requirements through compliance with the NPDES 1200-CA Permit (for Port operations), NPDES 1200-C permits (for tenant projects) as required by DEQ, or the City of Portland's erosion control ordinance (for smaller tenant projects). In addition, these requirements are incorporated into contracts to the extent construction site operators are performing work for the Port. Therefore, control of construction site runoff is addressed independently from the Port's SWMP. Coverage for Port operations and tenants is outlined in Table 2-1.

### **7.1.4 Element #4: Education and Outreach**

#### ***BMP: Implement Public Education Measures to Protect Stormwater Quality***

##### Implementation Tasks:

1. During inspections conducted under BMP – “Implement Inspections of Significant Pollutant Source Areas”, and BMP – “Implement a Stormwater System Cleaning and Maintenance Program”, identify catch basins where it would be relevant and appropriate to apply “Dump No Waste, Drains to Stream” decals and apply decals (Responsibility: Aviation Environmental, Marine Environmental, MID Properties Maintenance, MFM, PDX Maintenance).
2. Include stormwater education materials at Port sponsored outreach events (Responsibility: Environmental Affairs).

##### Tracking Measures:

1. Track the number of “Dump No Waste, Drains to Stream” decals applied to catch basins.
  - ✓ *The Port applied 50 decals in FY2011.*
2. Track events where stormwater educational materials were made available.
  - ✓ *The list of stormwater-related topics and the events where each was addressed is presented below.*

*Used porous asphalt exhibit to discuss stormwater management at Port facilities:*

- Seaport Celebration, August 2011

*Incorporated information about stormwater management into various presentations on Port environmental management:*

- Quarterly presentations to new Port employees
- One annual presentation to Portland Community College
- Tabling at Columbia Slough Regatta, July 2011
- Tabling at RiverFest, September 2011
- Frequent tours of Port facilities, with special emphasis on new Headquarters building's green features (ecorooft, porous hardscapes at main entrance, native plantings)

*Presented information about deicing program and new treatment facility:*

- Facility dedication, October 2011

*Supported various efforts that contribute to improved stormwater quality:*

- Columbia Slough Watershed Council (financial sponsorship, volunteer assistance at events, in-kind filmmaking services, staff member serves on board)
- Friends of Trees (financial sponsorship)
- Other financial sponsorships include SOLVE, Climate Solutions, The Wetlands Conservancy, Northwest Environmental Business Council, The Nature Conservancy

*Additional outreach efforts:*

- Annual reporting on environmental objectives and targets, including emphasis on water resources management
- Numerous employee communications that included information water resources management program and/or water quality issues
- Online blog *Port Currents* discusses a variety of environmental and community issues including deicing and stormwater.
- Tenant outreach by Properties or environmental staff

Measureable Goals:

1. “Dump No Waste, Drains to Stream” decals will be applied to catch basins associated with all new Port construction annually (with the exception of FAA restricted areas).
  - ✓ *\*See the tracking measure response above.*
2. Provide stormwater education materials at outreach events.
  - ✓ *The Port continues to address stormwater issues in a broad variety of outreach events. The details are presented in the tracking measure response above. Moving forward, the Port intends to maintain some outreach to the general public at events. However, our primary focus will be on outreach to industrial/commercial tenants since the Port’s jurisdiction does not include any residential property. Education and outreach modules addressing target pollutants are in development for this target audience.*

***BMP: Implement a Tenant Stormwater BMP Program***

Implementation Tasks:

1. Maintain an inventory of all tenants or lease holders (Responsibility: Environmental Affairs, Aviation and MID Properties Management).
2. Provide technical assistance to the tenants regarding structural and non-structural/ source control stormwater BMPs (Responsibility: Marine Environmental, MID and Aviation Properties Management, Aviation Environmental).
3. Maintain an active property management role by conducting inspections of property vacated by tenants to ensure proper disposal of waste materials (Responsibility: Marine Environmental, Aviation Environmental, Aviation and MID Properties Management).

### Tracking Measures:

1. Compile/ update a leasehold inventory annually.
  - ✓ *MID and Aviation Properties provide an updated list of leaseholders annually. Tenant information is also updated on its own GIS layer within PortGIS, through a separate process. However, many of these leaseholds do not have any significant exposure to stormwater. Operating area environmental staff are familiar with the circumstances and needs of specific leaseholders. This information is taken into consideration when selecting priority facilities for inspection.*
2. Provide technical information related to structural and non-structural/ source control BMPs to tenants over the permit term.
  - ✓ *In FY2011, this was done during the Port's Priority Facility Inspections. \*See issues addressed under BMP: Implement an Inspection Program for Significant Pollutant Source Areas (pg. 15). The Port is developing stormwater BMP education and outreach modules targeting industrial properties. These will be used in conjunction with the industrial inspection program and distributed to a larger group of industrial/commercial entities within the Port's jurisdiction.*

### Measureable Goals:

1. Verify the completion and/ or update of a leasehold inventory.
  - ✓ *Completed in FY2011. \*See tracking measure response above.*
2. Track technical assistance documentation provided to tenants.
  - ✓ *Technical assistance was provided on all stormwater issues encountered during priority facility inspections. \*See a list of issues under BMP: Implement an Inspection Program for Significant Pollutant Source Areas (pg. 21).*
3. Describe property management activities for lease termination inspections.
  - ✓ *Inspections include a number of different areas including stormwater. The stormwater portion is focused on determining if the condition of the vacated property presents a source of potential stormwater contaminants. Any sources are identified and mitigated by the former tenant or by the Port and billed back to the responsible party. This means cessation of activities exposed to stormwater, such as outdoor storage. The stormwater system is surveyed and the tenant is asked to clean the catch basins if necessary. Sweeping or clean-up of surface staining can also be requested before a tenant is released from the lease.*

### ***BMP: Require Training and Licensing for Staff Conducting Pest Management Activities***

#### Implementation Tasks:

1. Require all pesticide applicators to obtain and maintain licenses issued by the Oregon Department of Agriculture (Responsibility: PDX Maintenance, PDX Landscape, MID Properties Maintenance, MFM).

Tracking Measures:

1. Track the Port employees who are ODA-licensed pesticide applicators.
  - ✓ *The following Port employees are ODA-licensed; Tim Cooper, Mark Griffith, Dustin Sandberg, Lyle Larson, Corrine Fritz, Don Goodman, Shawn Groom, Tim Guymon, Michael Sands, Luis Guevara, Marco Guevara, Jeff Morehead, Gary Tudor, Greg Croteau, Eric Dorrance.*

Measureable Goals:

1. All pesticide applicators will be licensed by the ODA.
  - ✓ *All pesticide applicators working on Port-operated properties are licensed by the ODA. This includes four groups within the Port operating areas who work with these materials (PDX Maintenance, PDX Landscape, Marine Facilities Maintenance (MFM), and Marine Property Maintenance/Landscape).*

***BMP: Provide Erosion Prevention and Sediment Control Training for Construction Inspectors***

Implementation Tasks:

1. Provide annual erosion prevention and sediment control training for all Port construction inspectors (Responsibility: Aviation Environmental).

Tracking Measures:

1. Track the number of employees receiving erosion and sediment control training.
  - ✓ *The Port provided a one hour training session to 14 staff members involved in construction inspection activities for Port projects. Staff trained through this process inspects projects regulated under the Port's 1200-CA permit.*

Measureable Goals:

1. Erosion prevention and sediment control training will be conducted annually for Port construction inspectors.
  - ✓ *Completed in FY2011. \*See the tracking measure response above.*

***BMP: Participate in a Public Education Effectiveness Evaluation***

Implementation Tasks:

1. Coordinate with other local, Phase I jurisdictions in providing/ compiling information regarding a public education effectiveness evaluation by November 1, 2014 (Responsibility: Environmental Affairs).

Tracking Measures:

1. Track related efforts annually.
  - ✓ *The Port would like to work with other Phase I jurisdictions to conduct a large scale Public Education Effectiveness Evaluation in order to maximize the resources available for this effort. The effort is likely to be spearheaded by the Association of*

*Clean Water Agencies (ACWA). Discussions regarding the most effective way to coordinate on this work have been initiated.*

Measureable Goals:

1. Coordinate with other local, Phase I jurisdictions regarding a public education effectiveness evaluation by November 1, 2014.
  - ✓ *\*See the tracking measure response above.*

***BMP: Implement a Spill Response Training Program***

Implementation Tasks:

1. Distribute updated emergency contact information and spill response procedures to employees responsible for responding to spills (Responsibility: Marine Environmental, Aviation Environmental).
2. Conduct general spill response training annually for designated employees (Responsibility: Marine Environmental, Aviation Environmental).

Tracking Measures:

1. Document spill response training activities.
  - ✓ *Environmental Affairs maintains documentation listing operations area personnel receiving annual spill response training. The criteria used to determine which employees receive training are explained under the second measurable goal below.*

Measureable Goals:

1. Annually train designated Port employees on spill response.
  - ✓ *MID provided spill response training for 70 employees*
  - ✓ *Aviation provided spill response training for 128 employees.*
2. Document the procedure to determine which employees will receive spill training by November 1, 2011.
  - ✓ *The Port provides Spill Response training annually to operations employees likely to encounter spills (Operations, Environmental, Maintenance, Security, Fire, and Landscape). They receive spill and stormwater training to understand clean up and notification procedures. Employees also receive on the job training regarding the appropriate clean up materials and disposal requirements for small spill clean-up. **\*All reportable quantity spills are cleaned up by one of the Port's on-call spill response contractors.***
  - ✓ *Other Port facilities that operate above ground oil storage tanks over the capacity of 1320 gallons are required to maintain a Spill Prevention Control and Countermeasures (SPCC) Plan and abide by SPCC requirements for training.*

### ***BMP: Implement a Staff Training Program for Stormwater Pollution Prevention***

#### Implementation Tasks:

1. Continue to conduct training for new employees during their orientation (Responsible Party: Environmental Affairs).
2. Provide targeted annual stormwater pollution prevention training for specific staff that conducts activities relevant to stormwater (Responsibility: MID Environmental, Aviation Environmental).
3. Port staff to attend conferences and educational presentations (Responsibility: MID Environmental, Aviation Environmental, Environmental Affairs).

#### Tracking Measures:

1. Document all staff training activities.
  - ✓ *Environmental Affairs maintains documentation for all annual stormwater training provided to existing employees, as well as the new employee stormwater training provided during orientation. The Port provided stormwater pollution prevention training to 198 existing employees and 59 new employees during FY2011.*
2. Document attendance at conferences.
  - ✓ *Environmental Affairs collects documentation of stormwater-related conferences attended by environmental staff. These conferences ensure Port staff is up to speed on relevant implementation, technology, and regulatory issues (examples include, Stormcon, Northwest Environmental Conference, ACWA Stormwater Summit, and various stormwater related training courses).*

#### Measureable Goals:

1. Participate in water quality organizations and stakeholder groups annually.
  - ✓ *The Port continues to participate as a member of the Columbia Slough Watershed Council, with a Port staff member sitting on the board. Other participation includes financial sponsorship, volunteer assistance at events, and in-kind services.*
2. Conduct annual training.
  - ✓ *Completed in FY2011. \*See the tracking measure response above.*
3. Conduct new employee training.
  - ✓ *Completed in FY2011. \*See the tracking measure response above.*

### **7.1.5 Element #5: Public Involvement and Participation:**

#### ***BMP: Provide for Public Participation with SWMP and Benchmark Submittals***

##### Implementation Tasks:

1. Provide opportunities for public comment on the SWMP and pollutant load reductions benchmarks for a minimum of 30 days prior to submittal of the permit renewal to DEQ (Responsibility: Marine Environmental, Aviation Environmental, Environmental Affairs).

##### Tracking Measures:

1. Report annually on public participation in these areas.
  - ✓ *No public participation opportunities were available in FY2011.*

##### Measureable Goals:

1. Provide for public participation on the SWMP revisions and pollutant load reduction benchmarks (developed for permit renewal).
  - ✓ *\*See the tracking measure response above. Pollutant load reduction benchmarks will not be prepared for public comment again until the renewal application is submitted 180 prior to the permit expiration date.*
2. Provide public access to the Port's most current MS4 Annual Report via its public website.
  - ✓ *The Port's annual reports are available on-line via a link (on the "Stormwater Management Page" of the Port's public website) to the City of Portland's website <http://www.portlandonline.com/bes/index.cfm?c=50289>.*

#### ***BMP: Implement a Public Participation Approach that Provides Opportunities for the Public to Effectively Participate in the Implementation of the Stormwater Management Plan***

##### Implementation Tasks:

1. Determine what projects are appropriate for public involvement (Responsibility: Aviation Environmental, MID Environmental, Environmental Affairs, Public Affairs).
2. Make the public aware of the selected involvement opportunities via the Port's website, and the Columbia Slough Watershed Council (Responsibility: Environmental Affairs, Public Affairs).
  - ✓ *In FY2011, the public was made aware of involvement opportunities via communications from the Environmental Outreach Coordinator using the website, email, and the Port's online newsletter, Port Currents. Information primarily related to the completion of construction of the Portland International Airport enhanced deicing system and subsequent commissioning period.*
3. Implement selected projects and document public involvement (Aviation Environmental, MID Environmental, Environmental Affairs, Public Affairs).

### Tracking Measures:

1. Describe any projects implemented where the public has opportunity to participate and the extent of public involvement for each.
  - ✓ *The following FY2011 events provided the opportunity for the public to participate in implementation of the Port's stormwater program:*
    - *Over the past several years, the Port has engaged a broad spectrum of public organizations including the Columbia Slough Watershed Council, Oregon Department of Environmental Quality, City of Portland, and the Oregon Air National Guard to provide comment and feedback regarding the construction and commissioning of the new deicing facility. In FY2011, the Port held an open house as part of the ongoing dialogue with stakeholders to demonstrate the Port's commitment to stakeholder input. The event included a guided tour, system overview, and demonstration of the Glycol Recovery Vehicles used to help protect the receiving waters at PDX.*
    - *Stormwater treatment facility maintenance (catch basin or other system) is often conducted by our tenants contingent on existing lease language. This is done in coordination with the Port BMP "Implement a Stormwater System Cleaning and Maintenance Program."*

### Measureable Goals:

1. Document what projects are identified as public involvement opportunities.
  - ✓ *In addition to those opportunities available this year. The following have been identified as possibilities for next year:*
    - *Port tenants have had the opportunity to provide input on the content of new modules for the Tenant Stormwater BMP Program. A survey was conducted in July 2012 to inform the Port's tenant outreach program development. This work will be reported in the FY2012 MS4 Annual Report.*

### **7.1.6 Element #6: Post-Construction Site Runoff Control**

#### ***BMP: Develop, Adopt, and Implement New Port-Specific Post-Construction Runoff Control Standards***

#### Implementation Tasks:

1. By January 1, 2014, adopt and implement Port-wide post-construction standards for development and redevelopment. Airport specific standards will be consistent with FAA and airport operations requirements. (Responsibility: Environmental Affairs)
2. By December 2012, update Intergovernmental Agreement (IGA) with the City of Portland to clarify responsibilities, so that one set of post-construction standards are applied to the Port's MS4, avoiding duplication and conflicting requirements (Responsibility: Environmental Affairs).

3. By end of permit term, design and initiate construction on a stormwater capital improvement retrofit to address at least one applicable TMDL pollutant of concern (Responsibility: Marine Environmental or Aviation Environmental).

Tracking Measures:

1. Adopt Port-wide post-construction development/ redevelopment standards by January 1, 2014.
  - ✓ *This work has been rolled into a Port-wide stormwater master planning contract. The Port started work on several key elements of this process in FY2011 (pollutant loading analysis and hydraulic capacity modeling). An update on the progress will be provided in the 20112-13 annual report.*
2. Update IGA with the City of Portland by December 31, 2012.
  - ✓ *The Port is in the process of renegotiating an IGA that will address the Port's ability to have their own projects regulated under the new post-construction development standards being developed.*
3. Design and initiate construction on a stormwater retrofit project to address a TMDL pollutant of concern.
  - ✓ *This project will be identified (by November 1, 2013) as part of the Retrofit Analysis.*

Measureable Goals:

1. Document the design, construction, and rationale for the retrofit project addressing a TMDL pollutant of concern.
  - ✓ *\*See the first tracking measures response.*

**7.1.7 Element #7: Pollution Prevention for Municipal Operations**

***BMP: Implement a Street and Vehicle Maneuvering Area Cleaning and Maintenance Program***

Implementation Tasks:

1. Sweep the McCarthy Park (Swan Island) parking lot annually (Responsibility: MID Properties Maintenance).
2. Sweep Port-managed areas of the marine terminals annually. If additional sweeping is needed, Marine Environmental will coordinate with MFM staff (Responsibility: Marine Environmental, MFM).
3. Sweep Airport Way, Frontage Road, and PDX employee parking lots twice per week in winter and once per week in summer (Responsibility: PDX Maintenance).
4. Maintain and repair roadway areas to minimize pollutant impacts to stormwater as needed (Responsibility: MFM, PDX Maintenance).
5. Follow manufacturer's recommendation for application of deicing products (Responsibility: MFM, PDX Maintenance, MID Properties Maintenance).

- ✓ *Operating area personnel apply pavement deicing materials per the manufacturer's requirements. Application equipment is calibrated by weight and volume to apply the material at the suggested rate in order to avoid over application.*
6. As necessary, decant street sweeping wastes in covered, water-tight drop boxes (Decant Water Collection Boxes) that drain to an approved sanitary sewer discharge point (Responsibility: PDX Maintenance, MFM).
    - ✓ *The revised MID work instruction for this activity was approved on 11/30/11. The new instruction combines the stormwater and waste disposal tasks. PDX Maintenance has a different configuration that does not require a cover or water tight box, since the boxes sit in a containment area plumbed to the sanitary system.*

Tracking Measures:

1. Track sweeping frequency at McCarthy Park.
  - ✓ *MFM contracts sweeping for McCarthy Park on the frequency of twice a month December through September, five times in October and four times in November.*
2. Track sweeping frequency at the marine terminals.
  - ✓ *Environmental sweeping was conducted at Terminals 2, 4, and 6 (according to lease requirements) monthly between March and October.*
3. Track sweeping frequency at Airport Way, Frontage Road, and the PDX employee parking lots.
  - ✓ *PDX Maintenance schedules sweeping for these areas based on the frequency outlined in the task.*
4. Report the amount of materials removed. Materials will include those collected from catch basins and other structural devices.
  - ✓ *Aviation removed 265 tons of material from catch basins and sweeping combined during FY2011. They also cleaned the Basin 2 quiescent pond, resulting in the removal of an additional 77.04 tons of sediment.*
  - ✓ *MID removed a combined 83.3 tons of material from catch basins and sweeping activities during FY2011.*

Measureable Goals:

1. Sweep McCarthy Park parking lot annually.
  - ✓ *Completed in FY2011. \*See tracking measure response above.*
2. Sweep Port-managed, accessible areas of the marine terminals annually.
  - ✓ *Complete in FY2011. \*See tracking measure response above.*
3. Sweep Airport Way, Frontage Road, and the PDX employee parking lots a minimum of once per week.
  - ✓ *Completed in FY2011. \*See tracking measure response above.*

## **BMP: Limit Landscape Maintenance Activities Impact on Stormwater**

### Implementation Tasks:

1. Apply pesticides and fertilizers, using an Integrated Pest Management approach to minimize impacts to stormwater (Responsibility: MID Properties Maintenance, MFM, PDX Maintenance, PDX Landscape).

- ✓ *MID Properties Maintenance staff is responsible for the landscaping and maintenance of the Port's industrial parks, marine terminals, and mitigation sites. Staff continued to implement the IPM and Work Schedules Program for Port-owned mitigation sites. This program identifies problem plant species at each site, provides a profile for each species, recommends control methods, and outlines monitoring protocol and schedules.*

*MID Environmental provided Port maintenance staff and Port-contracted workers with the Vegetation Management Plan. The plan gives information on the appropriate herbicides and use of those herbicides to control particular invasive plant species, and it identifies the locations where specific herbicides can be applied.*

*MFM conducted weed control activities at marine parking areas, rail yards, and specific vegetated areas at Marine Terminals 2, 4, and 6 on an as-needed basis.*

*PDX Landscape staff, responsible for landscaping at PDX facilities, continued to implement BMPs aimed at improving stormwater quality at the airport. Some of the issues they focused on included maintaining the integrity and proper function of the bioswales, limiting the impact on stormwater of pesticides/herbicides/fertilizers by reducing concentrations applied, and incorporating native plants into the landscaping to reduce water and chemical requirements.*

*PDX Maintenance staff apply pesticides on the airfield to comply with FAA requirements. They are reducing chemical usage by working with different pesticide combinations to achieve required conditions.*

2. Review the Port's program to control pesticides, herbicides and fertilizers annually, and update as appropriate (Responsibility: Environmental Affairs, MID Properties Maintenance, MFM, PDX Maintenance, PDX Landscape).

- ✓ *All four Port groups applying landscape chemical documented new approaches considered during FY2011. Some of the issues include: testing lower doses and different combinations of certain pesticides for efficacy, the use of porous ceramics to deal with wet soil conditions, and pH adjustment to increase adjuvant effectiveness on spray applications.*

3. Maintain an inventory of pesticides used on Port property and update annually (Responsibility: Environmental Affairs).

Tracking Measures:

1. Document the annual pesticide use update.

- ✓ *The amounts of each pesticide/herbicide/fertilizer used are presented below for each of the groups listed above.*

**Table 7-1 Port of Portland Pesticide/Herbicide/ Fertilizer Use in 2011-12**

<b><i>Airside Spraying (PDX Maintenance)</i></b>	
Payload	23.7 lbs.
Diuron	443.8 lbs.
Tordon 22K	3.9 gal.
Crossroads	15.8 gal.
Ranger Pro	32 gal.
SprayFast	2.4 gal.
NoFoam	0.5 gal.

<b><i>Marine Property Maintenance (Landscape)</i></b>	
Ranger Pro	26.1 gal.
Garlon 3A	48 oz.
Powerzone	217.6 oz.
Snapshot 2.5 TG	283 lbs.
Dimension 270G	255 lbs.
Dimension 2EW	614.4 oz.
Dimension Ultra YOWP	140 oz.
Simatrol 4L	16.8 gal.
Crossbow	30 oz.
Oust	2.18 lbs.
Surflan AS	27.9 gal.
Element 3A	1050 oz.
Casaron 4G	12 lbs.
Rodeo	15 oz.
10 AG Lime	11,100 lbs.
16-16-16 Fertilizer (50%) slow release N)	280 lbs
24-2-4 Fertilizer (50% slow release N)	1,615 lbs.
22-2-12 Fertilizer (60% slow release N)	3,610 lbs.
43-0-0 Fertilizer (100% slow release)	1,655 lbs

<b><i>PDX Landscape</i></b>	
Lada 2F Insecticide	0.5 gal.
Atrimmec Growth regulator	15 gal.
Casaron 4G Herbicide	100 lbs.
Surflan AS herbicide	7.5 gal.
Gallery Herbicide	1 lb.
Element 3A	2.5 gal.
Roundup Pro	18 gal.
Simtrol Herbicide	17.5 gal.
Crossroads	1 gal.
Summer Fertilizer 25-0-5 (40% slow release N)	12,000 lbs.
Ronstar 2G Granular Herbicide	100 lbs.
Freehand Granular Herbicide	50 lbs.
Pendulum Aquacap	25 gal.

<b><i>MFM (Labor Shop)</i></b>	
LI-700 Surfactant	9.25 gal.
Oust	106 oz.
Garlon 3A	30 gal.
Ranger Pro	39 gal.

Measureable Goals:

1. Annually update the Port's pesticide use inventory.

✓ *Completed for FY2011. \*See list above.*

***BMP: Require Training and Licensing for Staff Conducting Pest Management Activities (partial applicability)***

\*See section 7.1.4 for information on implementation of this BMP.

***BMP: Implement a Tenant BMP Program (partial applicability)***

\* See section 7.1.4 for information on implementation of this BMP.

***BMP: Implement a Program to Limit Infiltration from Port-Owned Sanitary Sewer System into the MS4***

Implementation Tasks:

1. Monitor pump stations electronically to ensure proper function of Aviation pump stations (Responsibility: PDX Maintenance).
2. Monitor pump stations through weekly inspections and audible/visual alarms to ensure proper function of MID pump stations (Responsibility: MFM).  
✓ *MFM staff documented these inspections for FY2011.*
3. Conduct annual pump station maintenance, including flushing, float and alarm testing, and debris removal for all pump stations (Responsibility: PDX Maintenance, MFM).  
✓ *Work orders are generated to ensure the completion of this work at PDX and MID operated sanitary lift stations.*
4. Clean Port-owned grease interceptor vaults at PDX on an annual basis (Responsibility: Aviation Facilities Maintenance).  
✓ *PDX maintains two large grease interceptor vaults as a back up to grease traps maintained by PDX concessions tenants under the FOG program. Documentation of this maintenance is provided to Environmental Affairs.*
5. Continue to implement the tenant FOG (fats/oils/grease) program to ensure proper handling of these materials at PDX (Responsibility: PDX Business/Properties).

Tracking Measures:

1. Maintain a list of Port tenants implementing the FOG program.  
✓ *Environmental Affairs maintains a list of tenants who are inspected as part of the effort to prevent fats, oil, and grease from clogging sanitary sewer lines. These are primarily concessions tenants located in the terminal. This relates to stormwater, as it prevents overflow in obstructed sanitary lines from entering the storm system.*

Measureable Goals:

1. Document completion of implementation tasks (2-4) associated with this BMP (with PDX Maintenance, Aviation Facilities Maintenance, MFM, and PDX Business/Properties)
  - ✓ *Completed for FY2011. Environmental Affairs maintains documentation for the lift station inspections/maintenance, grease vault cleaning and grease trap inspections (FOG program).*

***BMP: Implement a Stormwater System Cleaning and Maintenance Program  
(partial applicability)***

\* See section 7.1.8 for information on implementation of this BMP.

**7.1.8 Element #8: Structural Stormwater Controls Operations and Maintenance**

***BMP: Implement a Stormwater System Cleaning and Maintenance Program***

Implementation Tasks:

1. Continue to implement a stormwater system feature inspection and maintenance program (Responsibility: Marine Environmental, MFM, MID Properties Maintenance).
2. Inspect and clean catch basins (as necessary) annually in Port-managed areas of Marine and Industrial Development (Responsibility: MFM).
3. Conduct litter pickup and vegetation management activities to ensure adequate access and performance of all stormwater system features as needed (Responsibility: MFM, MID Properties Maintenance).
  - ✓ *MID Properties Maintenance staff maintained landscaped areas within the industrial parks at Swan Island and Rivergate and at the marine terminals. Crews removed and disposed of vegetative debris, scrap metal, and garbage. They also cleared vegetation around stormwater outfalls and associated stormwater conveyance system infrastructure on Port-owned industrial park properties to provide better access for inspections and illicit discharge monitoring.*
4. Coordinate updates of storm sewer system maps to include updated stormwater conveyance system features and Port-owned and operated structural controls (Responsibility: Marine Environmental, Aviation Environmental, Environmental Affairs).
5. By June 30, 2012, review and update the existing inspection and maintenance procedures for structural stormwater controls, in accordance with requirements outlined in the Port's MS4 NPDES permit.
6. As necessary, decant storm system and catch basin cleaning wastes in covered, water-tight drop boxes (Decant Water Collection Boxes) that drain to an approved sanitary sewer discharge point (Responsibility: MFM, PDX Maintenance).
  - ✓ *The MID work instruction has been rewritten to combine the stormwater and waste disposal tasks. PDX Maintenance has a different configuration that does not*

*require a cover or water tight box, since the boxes sit in a small area plumbed to sanitary.*

Tracking Measures:

1. Track number of catch basins cleaned annually.
  - ✓ *Aviation cleaned 1265 catch basins in FY2011.*
  - ✓ *MFM cleaned 267 catch basins in FY2011.*
2. Track cleaning frequency for the Port owned and operated structural stormwater controls by facility type.
  - ✓ *MID-operated water quality treatment facilities are inspected at least on a quarterly basis and cleaned as needed to maintain proper operation. MID also installed new structural controls (two oil/water separators and a Contech StormFilter®) as well as several upgraded lynch-style catch basins in FY2011 as part of the Terminal 6 Wharf Modernization Project.*
  - ✓ *Catch basins in MID-operated areas are scheduled to be inspected and cleaned (if necessary) on an annual basis.*
  - ✓ *Aviation-owned water quality treatment facilities (with the exception of quiescent ponds) are cleaned on an annual basis. The ponds are cleaned on a rotating basis. Basin 2 pond was cleaned in FY2011, resulting in the removal of 77.04 tons of material.*
  - ✓ *PDX has over 3,000 catch basins. Aviation inspects and cleans those associated with industrial activity on an annual basis. Many of these facilities also have catch basin inserts that are inspected and changed as needed on a monthly basis. The balance of Aviation-operated catch basins are cleaned on a 4-year rotating basis. If necessary, catch basins are moved to a more frequent cleaning schedule or fitted with an insert based on field observations.*
3. Track storm sewer system pipe cleaning activities annually.
  - ✓ *Aviation cleaned 34,227 feet of storm line during FY2011.*
  - ✓ *MFM cleaned or replaced 1,800 feet of storm line at Terminal 6 in FY2011.*
4. Track updates to the stormwater system features maps.
  - ✓ *The stormwater maps for PDX were revised in FY2011. All Port storm system maps are available to operations and administrative personnel through the PortGIS interphase located on Navigator (the Port's intranet).*
5. Report amount of materials removed. Materials will include those collected from catch basin cleaning and street sweeping.
  - ✓ *\*See BMP: Implement a Street and Vehicle Maneuvering Area Cleaning and Maintenance Program.*

Measureable Goals:

1. Inspect and clean all catch basins within the Port-managed areas not otherwise covered by a 1200-series industrial stormwater permit annually.
  - ✓ *PDX completed this work based on their schedule (listed above under tracking measure for this BMP).*
  - ✓ *MFM completed 73% of this work in FY2011 due to equipment and timing constraints. An unusually wet year severely limited MFM's ability to discharge catch basin decant water in compliance with the Port's sanitary batch discharge permit. Thereby reducing the number of catch basins that could be cleaned per day. New equipment has been made available for MFM's use and increased decant box capacity is planned to ensure that this goal can be consistently met in the future.*
2. Inspect and maintain all Port-owned and operated structural controls within the Port-managed areas not otherwise covered by a 1200-series industrial stormwater permit annually.
  - ✓ *Completed in FY2011. (See the Tracking Measure response above).*

***BMP: Implement a Program for the Tracking and Maintenance of Private Structural Controls***

Implementation Tasks:

1. Work with the City of Portland to establish and maintain an inventory of existing private structural control facilities on tenant properties by December 31, 2012 (Responsibility: Marine Environmental, MID Properties Management, Aviation Environmental, Environmental Affairs).
2. Develop a program in conjunction with the City of Portland to track private structural control facilities on tenant properties over the permit term (Responsibility: MID Environmental, Environmental Affairs).
3. By June 30, 2012, develop an updated inspection and maintenance procedure for structural stormwater controls for distribution to owners of private structural control facilities (Responsibility: MID Environmental, Aviation Environmental, Environmental Affairs).

Tracking Measures:

1. Track the number of existing and new private structural control facilities installed on Port-properties.
  - ✓ *The Port is renegotiating an IGA with the City of Portland which will address the inventory and tracking requirements.*

Measureable Goals:

1. Develop an inventory and mechanism for tracking of private structural controls on tenant properties.
  - ✓ *The Port is renegotiating an IGA with the City of Portland which will address the inventory and tracking requirements.*

***BMP: Implement a Tenant BMP Program (partial applicability)***

\* See section 7.1.4 for information on implementation of this BMP.

## **8.0 ADAPTIVE MANAGEMENT PROCESS IMPLEMENTATION AND PROPOSED SWMP CHANGES**

As it has, since permit year one, the Port continues to modify how its BMPs are carried out to find the most efficient approach and reduce pollutant loading to the maximum extent practicable. This process directly involves operating area personnel with knowledge of the program goals who provide suggested BMP modifications.

In permit year 17, an improved process to more broadly and actively solicit this input was used to ensure all ideas are heard, documented, and implemented, if viable. The process identified changes and to the catch basin and stormwater treatment facility maintenance documentation systems for Aviation and Marine operating areas. These changes will allow operations to more efficiently conduct maintenance activities and identify areas where a change in cleaning frequency is warranted. It also highlighted the potential to utilize GPS technology in the application of pesticides on the airfield. This approach would ensure the minimum amount is used to meet FAA vegetation management requirements.

The Port is not seeking any further SWMP revisions at this time.

**Section IV**  
**MONITORING COMPLIANCE REPORT**



# MONITORING COMPLIANCE REPORT

## Table of Contents

1. Introduction	IV-2
2. Revisions to the MS4 Quality Assurance Monitoring Plan or Monitoring Activities	IV-2
3. Objectives	IV-4
4. Required Monitoring Tasks	IV-4
4.1. Instream Monitoring	IV-4
4.2. Continuous Instream Monitoring	IV-8
4.3. Stormwater Monitoring	IV-9
4.4. Stormwater Monitoring - Pesticides	IV-11
4.5. Stormwater Monitoring – Mercury	IV-13
4.6. Macroinvertebrate Monitoring	IV-15
5. Illicit Discharges Monitoring	IV-16
6. Stormwater Management Facility Monitoring	IV-17

## 1. INTRODUCTION

The purpose of this *Monitoring Compliance Report* is to comply with Schedule B of Portland's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit. The report summarizes monitoring activities conducted by the City of Portland (hereinafter referred to as Portland) during fiscal year (FY) 2011-12 (permit year 17) and briefly discusses the results.

DEQ issued Portland's current (third-term) NPDES MS4 permit on January 31, 2011. The monitoring requirements in the permit became effective July 1, 2011, when DEQ gave conditional approval to Portland's *MS4 Quality Assurance Monitoring Plan (QAMP)*, which the City submitted to DEQ on June 1, 2011. This *Monitoring Compliance Report* is therefore the first report on monitoring activities that were conducted in accordance with the requirements of the 2011 permit. Monitoring procedures, locations, frequency, and other detailed information can be found the QAMP.

Table B-1 in Schedule B of the 2011 permit summarizes required monitoring types, locations, frequency, and analytic parameters. The required monitoring information is included in Section 4 of this *Monitoring Compliance Report*, in the order listed in Table B-1. Sections 5 and 6 of this report provide additional MS4 stormwater-related monitoring information that is not required by the permit.

The complete set of monitoring data is available on CD-ROM upon request.

## 2. REVISIONS TO THE MS4 QUALITY ASSURANCE MONITORING PLAN (QAMP) OR MONITORING ACTIVITIES

Schedule B.2 of the MS4 permit states:

- e. The monitoring plan may be modified without prior Department approval if the following conditions are met...
  - ii. The modification does not reduce the minimum number of data points, which are a product of monitoring location, frequency, and length of permit term, or eliminate pollutant parameters identified in Table B-1.

The City is reporting three modifications (2.1, 2.2, and 2.3 below) made during FY11-12, in accordance with Schedule B.2.f . These modifications met the conditions stipulated in Schedule B.2.e.ii and therefore did not require prior DEQ approval. The monitoring program continues to meet all applicable permit conditions.

### 2.1. QAMP ADDENDUM

The City submitted an addendum to the *MS4 Quality Assurance Monitoring Plan* to DEQ on November 1, 2011 to clarify the role of the monitoring program in the adaptive management of the stormwater program.

## 2.2. STORMWATER MONITORING LOCATIONS

The City's QAMP identifies the probabilistically selected locations where stormwater monitoring will be conducted each year (Section 17.4.3, Table 17.1). These locations, also used by the City's Underground Injection Control Systems (UIC) program, are divided into six panels, each of which contains 15 locations. The 2011 QAMP stated that Panel P2 would be monitored for MS4 analytes during FY 11-12. Instead, the City revised the monitoring order of the panels and monitored Panel P6 in FY11/12, for the following reason.<sup>3</sup>

In FY 11-12, stormwater monitoring changed from a small number of fixed locations to a large number of probabilistically selected rotating locations. This change created concerns with meeting the E. coli holding time of six hours. Sampling crews collect stormwater samples at a large number of monitoring locations throughout the City during one storm event. This means they are often in the field all day, which can make it challenging to meet the E. coli holding time limits. To help ensure the holding times were met, the City decided to monitor for E. coli and the other permit-required analytes at Panel P6 locations (the stationary panel) during the first MS4 monitoring season. The City has been sampling these locations five times each year for the past six years under the UIC Water Pollution Control Facility (WPCF) permit; crews are therefore familiar with the locations and are able to collect samples quickly. After the first year of E. coli monitoring, the City was able to resolve the holding time issue, and monitoring of the other panels will continue as described in the QAMP.

## 2.3. DISSOLVED OXYGEN (DO) SAMPLING

Schedule B, Table B-1 of the permit requires the City to collect 45 DO samples (15 sites, three storm events/year).

Because of staff error, DO was not sampled during three storm events when all other analytes were collected. Once this error was discovered, the City collected 45 DO samples, as follows:

- 17 DO samples were collected during two other spring storm events at the designated MS4 monitoring locations.
- 28 DO samples were collected during five spring storm events at other stormwater locations monitored as part of the City's UIC permit.

The City does not consider the modifications to the DO collection locations to be significant because:

- Stormwater is typically well oxygenated, and DO readings generally show little variability among sampling events and sampling locations. This is reflected in the City's FY 11-12 DO median concentration of 9.5 mg/L and the 10<sup>th</sup> and 90<sup>th</sup> percentiles of 7.3 mg/L and 10.5 mg/L, respectively.

---

<sup>3</sup> Panels 2 and 6 were monitored in accordance with the City's Underground Injection Control Systems (UIC) Water Pollution Control Facility Permit (WPCF). Pesticide results from that monitoring are discussed in Section 4.4.

- In past sampling, DO in stormwater did not correlate well with any other pollutant.
- The City conducted a statistical analysis (Kruskal-Wallis Test), which showed that the samples collected from the QAMP-specified locations and the additional sample locations do not differ statistically.

### 3. OBJECTIVES

Schedule of B.1.a of the 2011 MS4 permit lists six objectives the monitoring program must incorporate:

- Evaluate the source(s) of the 2004/2006 303(d) listed pollutants applicable to the co-permittees' permit area;
- Evaluate the effectiveness of Best Management Practices (BMPs) in order to help determine BMP implementation priorities;
- Characterize stormwater based on land use type, seasonality, geography or other catchment characteristics;
- Evaluate status and long-term trends in receiving waters associated with MS4 stormwater discharges;
- Assess the chemical, biological, and physical effects of MS4 stormwater discharges on receiving waters; and,
- Assess progress towards meeting TMDL pollutant load reduction benchmarks.

Section 4 of this report describes how monitoring activities address these objectives and summarize the monitoring results.

## 4. REQUIRED MONITORING TASKS

### 4.1. INSTREAM MONITORING

#### **Purpose**

Instream monitoring refers to the collection of water quality samples from streams that receive MS4 discharges. Instream monitoring contributes to monitoring objectives ii, iv, v, and vi identified in Schedule B.1 of the MS4 permit. Specifically, instream monitoring is critical for evaluating long-term trends in receiving waters with MS4 discharges, as well as for assessing the effects of MS4 discharges on receiving waters.

#### **Background**

The City has conducted a comprehensive ambient monitoring program at fixed locations since the early- to mid-1990s. The data collected have been used to help DEQ establish TMDLs in the Columbia Slough, Johnson Creek, Willamette River, Fanno Creek, and Tryon Creek. Sites are monitored under both dry-weather and wet-weather conditions. The City will continue this monitoring program at fixed locations at a reduced scale through the end of this permit term, while at the same time implementing the second year of a probabilistically based monitoring program that will allow for a better evaluation of overall watershed conditions. FY 10-11 was the first year instream data were collected using the probabilistic approach. The number of

monitoring locations, monitoring frequency, and analytical parameters are shown in Table B-1 of the 2011 permit.

## Results

### *Comprehensive Ambient Sampling – Summary*

Surface Water Body	No. of Locations <sup>1</sup>		Monitoring Frequency <sup>1</sup>	
	Fixed	Probabilistic	Fixed	Probabilistic
Columbia Slough <sup>2</sup>	2	5	bi-monthly	quarterly + 1 storm
Fanno Creek	3	3	monthly to quarterly	quarterly + 1 storm
Johnson Creek <sup>2</sup>	2	5	Most monthly	quarterly + 1 storm
Tryon Creek	3	2	Most monthly	quarterly + 1 storm
Willamette River Tributaries	0	4	---	quarterly + 1 storm
Willamette River <sup>3</sup>	3	0	monthly to quarterly	---

<sup>1</sup> The number of sampling locations and monitoring events are greater than shown in Table B-1 of the MS4 permit, but do not necessarily represent future sampling activities.

<sup>2</sup> Some sampling locations are outside the City of Portland urban services boundary (USB).

<sup>3</sup> There are no probabilistically selected monitoring locations in the Willamette River. The fixed locations consist of transects with three monitoring locations each.

### *Attainment of Selected Important Water Quality Standards/ Guidance Values*

Surface Water Body	Attainment of Water Quality Standards or Guidance Values <sup>1</sup>				
	Bacteria <sup>2</sup>		Dissolved Copper <sup>3</sup>	TSS <sup>4</sup>	Total Phosphorus <sup>5</sup>
	406 MPN/100 mL	126 MPN/100 mL	2 µg/L		
Columbia Slough	27/37	4/7	37/37	35/37	21/23
Fanno Creek	34/51	2/6	20/27	45/51	18/33
Johnson Creek	28/39	3/7	36/39	30/39	23/23
Tryon Creek	32/46	2/5	19/22	41/46	29/33
Willamette River	36/36	3/3	12/12	9/12	9/9

<sup>1</sup> Number of samples that attain standard/number of samples collected.

<sup>2</sup> 406 MPN/100mL is the single sample standard; 126 MPN/100mL is the 30-day geometric mean of  $\geq 5$  samples. (For this summary, the geometric mean of weekly or monthly data collected throughout the permit year was calculated for each monitoring location separately.)

<sup>3</sup> Based on the best available science and best professional judgment on the potential impact of dissolved copper on salmonids, a lower guidance value of 2 µg/L was used in FY 11-12, down from a value of 5 µg/L used in previous years.

<sup>4</sup> Guidance values: Columbia Slough – 25 mg/L; all other streams – 20 mg/L.

<sup>5</sup> Guidance value for Fanno Creek, spring to fall, is the Fanno Creek TMDL of 0.13 mg/L. Guidance value for all other streams, spring to fall, is the Columbia Slough TMDL of 0.155 mg/L.

Most streams meet most of the standards or guidance values most of the time.

Bacteria concentrations in the highly urbanized smaller tributaries are of some concern, with the single sample standard met between 67 and 73 percent of the time. The mainstem Willamette River met the single sample standard and the geometric mean standard all the time. The bacteria concentrations in the Columbia Slough were higher than usual because of a City of Gresham

leaking sewer that affected at least two of the seven monitoring locations for a number of months.

Except for the Columbia Slough and the Willamette River, all other streams exceeded the dissolved copper guidance value a few times. In general, tributaries to the Willamette River had higher concentrations than the Willamette mainstem.

Johnson Creek and the Columbia Slough met their respective TSS guidance values, established to meet the toxics TMDLs, 77 and 95 percent of the time, respectively. All other streams occasionally had TSS concentrations above the guidance level.

The Columbia Slough and Fanno Creek met their respective phosphorus TMDL concentrations across all locations 91 and 55 percent of the time, respectively. This attainment level is in line with previous years. Using the Columbia Slough TMDL as a guidance value for all other streams, only Tryon Creek had occasionally higher total phosphorus concentrations.

### ***Portland Water Quality Index (PWQI)***

The PWQI is designed to compile water quality data of importance to Portland's streams to a single value that can be tracked over time.

The PWQI has its roots in the Oregon Water Quality Index (OWQI) established and used by DEQ to track water quality at key locations in water bodies throughout Oregon. However, there are significant differences that make the PWQI more suitable for Portland's streams than the OWQI. The PWQI:

- Normalizes the score so that a score of 60 means that water quality standards, TMDL wasteload allocations, or other benchmarks are met.
- Puts greater emphasis on the health of aquatic species by including TSS, dissolved copper, ammonia, dissolved oxygen, and temperature.
- Focuses on human health by including mercury, for which DEQ will create a TMDL in the entire Willamette Basin in the near future.
- Continues to track pollutants of concern for contact recreation (E. coli) and aesthetics (phosphorus).
- Uses the 90<sup>th</sup> percentile of all available data as a measure protective of the beneficial uses most of the time, either at a specific location or at all locations throughout the water body.

The following two tables show PWQI scores based on the FY11-12 monitoring data.

***Portland Water Quality Index (PWQI) Scores – Summary of Fixed Locations***

<b>Analyte</b>	<b>CS<sup>1</sup></b>	<b>FC<sup>1</sup></b>	<b>JC<sup>1</sup></b>	<b>TC<sup>1</sup></b>	<b>WR<sup>1,2</sup></b>
Copper, dissolved	62	27	60	36	79
Dissolved Oxygen	65	57	85	86	93
E. coli	10	10	37	10	88
Mercury, total	25	26	18	33	15
Nitrogen, ammonia	74	90	98	94	97
Phosphorus, total	46	31	69	57	76
Solids, total suspended	50	70	40	84	48
Temperature	43	76	58	84	71
<b>PWQI</b>	<b>32</b>	<b>30</b>	<b>45</b>	<b>36</b>	<b>50</b>

<sup>1</sup> CS = Columbia Slough; FC = Fanno Creek; JC = Johnson Creek; TC = Tryon Creek; WR = Willamette River

<sup>2</sup> Based on one location (St. Johns Railroad Bridge) only

***Portland Water Quality Index (PWQI) Scores – Summary of Probabilistic Locations***

<b>Analyte</b>	<b>CS</b>	<b>FC</b>	<b>JC</b>	<b>TC</b>	<b>WR Tributaries<sup>1</sup></b>
Copper, dissolved	78	32	69	63	65
Dissolved Oxygen	47	75	84	38	83
E. coli	21	27	55	69	89
Mercury, total	52	27	17	24	18
Nitrogen, ammonia	91	99	97	99	99
Phosphorus, total	61	57	67	70	73
Solids, total suspended	81	42	28	53	84
Temperature <sup>2</sup>	71	83	75	91	89
<b>PWQI</b>	<b>52</b>	<b>44</b>	<b>45</b>	<b>52</b>	<b>56</b>

<sup>1</sup> Two locations in Stephens Creek and one location in Balch Creek

<sup>2</sup> Temperature is based on grab samples and not continuous monitoring and is not truly representative of watershed conditions throughout the critical summer period

The PWQI scores are based on one year of data collection and have the following limitations:

- Insufficient temperature data were available at the probabilistically selected monitoring locations; the scores do not reflect true temperature conditions in these streams.
- The mercury benchmark for the Willamette River mainstem is based on the mercury target established in the 2006 Willamette Basin TMDL. The mercury benchmark for the other Portland streams is based on best professional judgment. Both benchmarks are subject to change, which may result in changes in the PWQI scores.

Based on the monitoring data from FY 11-12, the following general observations can be made:

- Except for Johnson Creek, PWQI scores for the fixed locations are lower than for the probabilistic locations. Scores for individual analytes show even greater differences between fixed and probabilistic locations.

- Scores for dissolved copper in Fanno Creek were substantially lower than the scores for all other watersheds.
- Dissolved oxygen scores are above 60 in most watersheds.
- E. coli had the lowest or second lowest score at most locations, with only the Willamette River locations meeting the single sample standard. The low scores in the Columbia Slough were most likely caused by a leaking City of Gresham sewer pipe just outside the Portland city limits, which went unnoticed for some time.
- Total mercury concentrations at all locations were higher than the benchmark, as indicated by the PWQI scores of between 15 and 52.
- The scores for ammonia nitrogen in the fixed and probabilistically selected monitoring locations were well above the score of 60, indicating that the concentrations showed better water quality than the respective standards.
- Total phosphorus scores were lowest in the streams that have phosphorus TMDLs, the Columbia Slough and Fanno Creek.
- None of the fixed locations had a total PWQI score above 60, and the main drivers for the low scores were total mercury and E.coli.
- The total PWQI scores for the probabilistic monitoring locations in all streams were below 60. The main drivers were again total mercury and E. coli.

## 4.2. CONTINUOUS INSTREAM MONITORING

### **Purpose**

Continuous instream monitoring refers to ongoing physical stream monitoring at fixed locations within streams that receive MS4 runoff. It typically consists of stream gage and temperature measurement, as well as the calculation of stream flow, based on the cross section of the stream at the monitoring location. The U.S. Geological Survey (USGS) operates the monitoring sites, and the City provides partial funding via intergovernmental agreements (IGAs). USGS provides data management and storage and some limited data interpretation. Continuous instream monitoring contributes to monitoring objectives i, ii, iii, iv, v, and vi identified in Schedule B.1 of the MS4 permit.

### **Background**

The USGS operates stream gages in many Portland streams. Some sites have been monitored since 1940, but more typically, monitoring started in the 1980s. At a minimum, all gages provide gage height and discharge. Many gages also provide temperature monitoring, and a few, mainly in Johnson Creek, also measure turbidity.

## Results

### *Summary of Selected USGS Continuous Monitoring Stations*

Statistic	Discharge [cfs]			Temperature [°C]			SC [µS/cm]	Turb [FNU]
	FC	JC-1	WR	JC-1	JC-2	WR	WR	JC-1
Maximum	198	1,850	211,000	22.5	22.9	22.8	104	170
Date of Maximum	1/19/12	1/20/12	1/21/12	7/6/11	7/6/11	8/10/11	12/23/11	1/21/12
Minimum	0.07	16	NA	2.9	1.3	4.2	48	1.3
Date of Minimum	9/11/11	9/7/11		1/18/12	12/14/11	1/18/12	1/21/12	6/20/12

SC = Specific Conductance

Turb = Turbidity in Formazine Nephelometric Units (FNU)

FC = Fanno Creek at SW 56<sup>th</sup> Ave

JC-1 = Johnson Creek at Milwaukie (SE Milport Rd.)

JC-2 = Johnson Creek at Sycamore (SE 158<sup>th</sup> Ave.)

WR = Willamette River at Morrison Bridge

The highest discharge at all three stations occurred in the middle of January 2012, within two days of each other. The lowest discharges in Fanno Creek and Johnson Creek were observed in early September 2011. The temperature maxima in Johnson Creek and the Willamette River were about one month apart and occurred in early July and early August, respectively, while the temperature minima happened on the same day, January 18, 2012. The temperature minimum at JC-2 occurred much earlier than at JC-1 and was lower; this is because of the lack of a moderating influence by a source of water of fairly constant temperature water, as is present at JC-1. The temperature maxima in both Johnson Creek and the Willamette River were well above the respective biological criteria temperatures.

The conductivity minimum in the Willamette River occurred around the time when the highest discharge and the lowest temperature were observed.

The turbidity maximum in Johnson Creek appears to be correlated to the maximum flow, whereas the lowest turbidity value was observed more than two months prior to the lowest flow but at a time when no stormwater influence was present.

### 4.3. STORMWATER MONITORING

#### **Purpose**

Stormwater monitoring refers to the monitoring of stormwater discharges from a defined point in the stormwater system during defined storm events. Stormwater monitoring contributes to monitoring objectives i, ii, iii, iv, v, and vi identified in Schedule B.1 of the MS4 permit. More specifically, the City is interested in gaining a better understanding of the drivers of stormwater pollutant concentrations; this has proven very difficult to date because of the large size of the stormwater catchments sampled. Selecting smaller catchments limits the number of variables that must be considered when trying to determine the factors that influence stormwater quality.

## Background

The City began collecting stormwater samples from 10 land use-based monitoring locations in 1991 as part of a multi-jurisdictional effort coordinated by the Oregon Association of Clean Water Agencies (ACWA) to characterize stormwater. Monitoring at the 10 land use stations continued through 1997.

In 1997, a comprehensive stormwater land use characterization report was prepared that concluded that stormwater pollutant concentrations are related to similar land uses across all six participating jurisdictions. To date, this is still the most comprehensive stormwater characterization study conducted in Oregon. Beginning in 1997, stormwater monitoring was gradually reduced, and funds were shifted to other aspects of the MS4 program, including BMP effectiveness and surface water monitoring. Until January 2011, when the City's MS4 permit was renewed for the third permit term, three representative locations were being monitored. With the implementation of the 2011 QAMP, the City changes MS4 stormwater monitoring locations from outfalls to UICs.

## Results

### *Stormwater Monitoring - Summary*

Statistic	E. coli MPN/100 mL	Dissolved Copper µg/L	TSS mg/L	Total Phosphorus mg/L
Number of Samples	45	45	45	45
Detection [%]	98	100	100	98
< 1000 ADT Median <sup>1</sup>	767	1.53	18	0.085
< 1000 ADT 90 <sup>th</sup> Percentile	24,000	3.63	130	0.68
> 1000 ADT Median <sup>1</sup>	445	2.00	41	0.136
> 1000 ADT 90 <sup>th</sup> Percentile	3,680	5.12	144	0.37
Standard or Guidance Value <sup>2</sup>	406 / 126	2.00	20	0.155
Ratio Median: >1000 ADT / <1000 ADT	0.58	1.3	2.3	1.6

ADT = Average Daily Trips

<sup>1</sup> Geometric mean of all data collected throughout the year was calculated for E. coli.

<sup>2</sup> Standards or guidance values were created for surface water bodies and are presented only for comparison. 406 MPN/100mL is the single sample E. coli standard; 126 MPN/100mL is the 30-day geometric mean of  $\geq 5$  samples E. coli standard.

A total of 45 samples at 15 locations – seven at locations with greater than 1000 average daily trips (ADT) and eight at locations with less than 1000 ADT – were collected during three storm events.

The median concentrations of dissolved copper and total phosphorus were at or below the respective guidance values for both traffic categories. However, the 90<sup>th</sup> percentile concentrations for both pollutants in both traffic categories were well above the guidance values.

The median TSS concentration in the < 1000 ADT category was below the guidance value of 20 mg/L, while it is above the guidance value in the > 1000 ADT category. The geometric mean of the E. coli concentrations in both traffic categories was above the standard of 126 MPN/100 mL.

Three of the four highest E. coli concentrations in the < 1000 ADT traffic category were found near a recycling facility that probably attracts a variety of animals, including rodents and birds. This location also had the highest TSS and total phosphorus concentrations. Other high E. coli concentrations only occurred once at a given location and can possibly be attributed to the numerous cats present in the area or to a nearby dog kennel. Additional investigations will be required to determine the source of the high E. coli concentrations.

***Portland Water Quality Index (PWQI) Scores – Summary***

Analyte	< 1000 ADT	> 1000 ADT
Copper, dissolved	37	21
Dissolved Oxygen	83	80
E. coli	10	10
Mercury, total <sup>1</sup>	NA	NA
Nitrogen, ammonia	59	85
Phosphorus, total	10	26
Solids, total suspended	10	10
Temperature	100	100
<b>PWQI</b>	<b>19</b>	<b>22</b>

ADT = Average Daily Trips

<sup>1</sup> Total mercury was not analyzed

The PWQI was developed for surface water bodies and is calculated using stormwater data for comparison with surface water PWQI scores provided in Section 4.1 of this report.

With few exceptions, the PWQI scores for both traffic categories were much lower than the scores reported for surface water bodies (see PWQI tables on pages IV-5 and IV-6). The lower traffic category had the lower PWQI because of very low scores for total phosphorus. The high traffic category had higher scores for ammonia and total phosphorus, but a lower score for dissolved copper.

**4.4. STORMWATER MONITORING – PESTICIDES**

**Purpose**

Pesticides monitoring refers to the monitoring of pesticides in stormwater during defined storm events. Stormwater monitoring for pesticides contributes to monitoring objectives ii, iii, and v identified in Schedule B.1 of the MS4 permit. More specifically, the monitoring is designed to help identify activities and practices that discharge pesticides at concentrations above DEQ water quality criteria (or, in the absence of water quality criteria, EPA aquatic health benchmarks) and to focus BMPs on those activities and practices.

**Background**

Although the City has monitored extensively for legacy pesticides in all media, including stormwater, surface water, sediment, and fish tissue in multiple water bodies, it has not monitored as extensively for current-use pesticides. The City’s UIC WPCF permit requires monitoring of a select number of pesticides (mainly herbicides) in stormwater, including the two pesticides (2,4-D and pentachlorophenol) the MS4 permit requires the City to monitor. These are the only two pesticides that have been detected in more than 10 percent of the samples taken

in stormwater draining to UICs. All other current-use pesticides monitored to date have either never been detected or have had less than 10 percent detects.

The City submitted a pesticide monitoring plan to DEQ on June 28, 2012. That plan provides a list of pesticides to be monitored and describes the monitoring protocol. The first sample that follows the protocol of the pesticide monitoring plan is expected to be collected in October 2012. The following results are from the UIC WPCF pesticides monitoring.

## Results

### *Pesticide Monitoring – Summary*

Statistic	2,4-D		Pentachlorophenol	
	Panel 2	Panel 6	Panel 2	Panel 6
Number of Samples	56	45	56	45
Detection [%]	7	31	95	91
< 1000 ADT Median [ $\mu\text{g/L}$ ] <sup>1</sup>	<0.02	<0.02	0.133	0.110
> 1000 ADT Median [ $\mu\text{g/L}$ ] <sup>1</sup>	<0.02	<0.02	0.550	0.421
Maximum [ $\mu\text{g/L}$ ]	1.6	0.515	3.19	1.77
EPA Aquatic Life Benchmark [ $\mu\text{g/L}$ ] <sup>2</sup>	12,075	12,075	25	25
Table 20 Criterion [ $\mu\text{g/L}$ ] <sup>3</sup>	NA	NA	20	20

<sup>1</sup> ADT = Average Daily Trips

<sup>2</sup> Lowest EPA aquatic life benchmark (invertebrate or fish)

<sup>3</sup> Acute freshwater criterion (OAR 340-041, Table 20)

Under the UIC WPCF permit, Panels 2 and 6 were monitored for pesticides during FY 11-12. Of the 12 pesticides analyzed, only four were detected, two of which (picloram and bentazon) were each only detected once in 101 samples. 2,4-D was detected in 18 of 101 samples at a maximum concentration of 1.6  $\mu\text{g/L}$ , which is over three orders of magnitude below the lowest EPA aquatic life benchmark. It is unclear why the detection rates between Panel 2 and Panel 6 were substantially different, but both rates are in line with the long-term detection rate.

Pentachlorophenol (PCP) was detected in over 90 percent of the samples at a maximum concentration of 3.19  $\mu\text{g/L}$ , which is well below the EPA aquatic life benchmark and the OAR acute freshwater criterion. It is noteworthy that the median pentachlorophenol concentration in locations with an average daily trips (ADT) count of more than 1000 trips is about four times greater than in locations with less than 1000 trips. Recent studies have indicated that PCP wash-off from power poles is greater in locations where power poles are surrounded by impervious surfaces, as is the case along higher-traffic streets.

## 4.5. STORMWATER MONITORING - MERCURY

### Purpose

Stormwater monitoring of mercury refers to the monitoring of low-level total recoverable and dissolved mercury and total recoverable and dissolved methyl mercury in stormwater during defined storm events. Stormwater monitoring of mercury contributes to monitoring objectives i, iii, iv, and v identified in Schedule B.1 of the MS4 permit. An additional objective is to make a connection between the total and dissolved mercury data the City has collected in stormwater since 2005, which used a different analytical method than that prescribed in a recent DEQ mercury memo (see Background section, below) and the mercury data that will be collected as part of the MS4 permit. Making such a connection would allow the City to use a much larger dataset, which would help DEQ create the most scientifically sound mercury TMDL and WLAs.

### Background

In 2006, DEQ established the first phase of a mercury TMDL as part of the Willamette Basin TMDL process. A mercury budget was created, and a target concentration was calculated based on fish tissue concentrations and estimated mercury methylation rates. However, no load or wasteload allocations were assigned to potential sources. DEQ initiated the second phase of the mercury TMDL process by issuing a memorandum (referred to as the “mercury memo”) requiring Willamette Basin point sources to implement mercury monitoring (DEQ, December 23, 2010). The minimum monitoring requirements from that memo were incorporated into Table B-1 of the MS4 permit. The MS4 permit requirements and an updated version of the mercury memo (February 23, 2011) form the basis of the mercury monitoring described in this section.

The City has a large dataset of total and dissolved mercury in stormwater dating back to 2005, but no data on methyl mercury. Although the likelihood of methylation of mercury in stormwater is small, it is important to evaluate methyl mercury levels in stormwater because methyl mercury is the most bioavailable form of mercury. A rainfall study conducted in 2005 and the available stormwater data indicate that mercury concentrations within the City do not vary significantly by land use or geographic location. Comparing total mercury in stormwater and in rainfall indicates that almost all of the mercury in stormwater originates from atmospheric wet deposition.

### Results

The City conducted the first of the required mercury monitoring events on March 14, 2012. In addition to the permit-required mercury species, supplemental parameters were analyzed that may have an impact on the methylation of inorganic mercury.

Two large outfall basins that had been monitored during previous permit cycles were monitored during one wet-weather storm on March 14, 2012. The antecedent dry period with less than 0.1 inch of precipitation for this event was about 24 hours. The amount of rainfall prior to collection of the grab samples was 0.21 inch at outfall S45U and 0.14 inch at outfall M1.

**Mercury Monitoring at MS4 Outfalls – Wet Season – March 14, 2012**

Analyte	Method	Units	M1 – Columbia Slough	S45U – Johnson Creek
Carbon - dissolved organic	SM 5310B	mg/L	1.54	6.14
Carbon - total organic	SM 5310B	mg/L	2.31	6.11
Conductivity - specific	FO SOP 1.03a	µmhos/cm	79	166
pH	FO SOP 1.01a	std units	6.9	6.6
Solids - total suspended	SM 2540D	mg/L	16	12
Sulfate (SO4)	EPA 300.0	mg/L	4.5	7.6
Temperature	FO SOP 1.05a	°C	7.8	10.1
Mercury, total	EPA 1631E LL	ng/L	2.9	3.1
Mercury, dissolved	EPA 1631E LL	ng/L	0.87	0.72
Methyl-mercury, total	EPA 1630	ng/L	0.13	0.10
Methyl-mercury, dissolved	EPA 1630	ng/L	0.082	0.041 J <sup>1</sup>

<sup>1</sup> J = Estimated value below method reporting limit but above method detection limit

The concentrations of all mercury species are not substantially different between the two outfall samples, even though the ancillary analytes (total and dissolved organic carbon, conductivity, and sulfate) show substantial differences. Dissolved mercury is less than 30 percent of total mercury in both outfall samples. Total methyl mercury is less than 5 percent of total mercury, while dissolved methyl mercury is less than 10 percent of dissolved mercury. Based on these two samples, it does not appear that stormwater is a significant source of methyl mercury.

**Mercury Monitoring UIC Stormwater – Summary**

Statistic	Total Mercury		Dissolved Mercury	
	FY 11-12 <sup>1</sup>	2005 - 2012	FY 11-12	2005 - 2012
Number of Samples		118	200	1172
Detection [%]		68	74	80
< 1000 ADT Median [ng/L] <sup>1</sup>		5.8	1.5	1.9
> 1000 ADT Median [ng/L] <sup>1</sup>		7.8	1.4	1.9
Maximum [ng/L]		99.6	9.6	27

<sup>1</sup> Total mercury was not analyzed in the samples collected in FY 11-12.

Compared to most other metals and some pesticides, total mercury showed a smaller difference between the two average daily trip categories, and dissolved mercury did not show any difference. Overall, dissolved mercury is less than 30 percent of total mercury in the stormwater samples draining to UICs, which is very similar to what was observed for both outfalls during one storm event.

## 4.6. MACROINVERTEBRATE MONITORING

### Purpose

Macroinvertebrate monitoring refers to the annual monitoring of benthic macroinvertebrates in late summer from the same rotating sampling locations where instream monitoring occurs. Macroinvertebrate monitoring contributes to monitoring objectives ii, iv, v, and vi identified in Schedule B.1 of the City's MS4 Permit. Macroinvertebrate monitoring is intended to track the status and trends of biological communities within water bodies that receive MS4 discharges. It is designed to evaluate whether and to what degree the biological conditions of streams are changing relative to the three other main goals (besides biological communities) of the 2005 *Portland Watershed Management Plan* (PWMP): habitat, hydrology, and water quality. Macroinvertebrate monitoring is timed to coincide with the first instream monitoring of the fiscal year so biological information is collected at the same time that summer water quality samples are collected.

### Background

Macroinvertebrates are a useful tool to evaluate water quality and habitat condition because they are present in diverse habitat types; represent local conditions because they have limited dispersal ability; are an important food source for fish and other wildlife; and are sensitive to changes in physical habitat and water chemistry.

### Results – Macroinvertebrate Monitoring

#### *Macroinvertebrate Monitoring – Summary by Watershed*

Watershed	FY 10-11	FY 11-12	
	Median O / E Ratio	Min / Max O/E Ratio	
Columbia Slough	0.28	0.24	0.15 / 0.29
Fanno Creek	0.37	0.54	0.41 / 0.66
Johnson Creek	0.47	0.53	0.44 / 0.59
Tryon Creek	0.72	0.52	0.42 / 0.60
Tualatin Tributaries	0.47	0.41	0.38 / 0.44
Willamette River Tributaries	0.34	0.64	0.54 / 0.82

Macroinvertebrate samples were collected in summer and early fall of 2011. The sampling protocol is described in the 2011 City of Portland *Quality Assurance Monitoring Plan*. The PREDATOR score (observed macroinvertebrate communities over modeled expected macroinvertebrate communities, based on reference conditions [O/E] ratio), one of a number of options to summarize macroinvertebrate data, was calculated and compared to the benchmark of 0.85 established by DEQ.

- The highest values were found in an unnamed tributary to the Willamette River and in one of the two Balch Creek locations (tributary to the Willamette River), but neither of them met the DEQ benchmark.

- One tributary to Fanno Creek and one tributary to Tryon Creek had O/E ratios of 0.60 or greater.
- The consistently lowest values were found in the five Columbia Slough monitoring locations. However, the modeled expected macroinvertebrate communities are based on reference conditions which are very different from the Columbia Slough which is not a pool-riffle stream system, but rather an extremely slow-flowing system with a very silty bottom.
- FY 11-12 median O/E ratios were comparable to FY 10-11 ratios for the Columbia Slough, Johnson Creek, and Tualatin tributaries. The Fanno Creek and Willamette tributaries median scores were substantially higher in FY11-12, whereas the median score in Tryon Creek was substantially lower. These differences are because of the small number of sampling locations and the locations within the watershed.
- In general, the most highly urbanized monitoring locations have the lowest O/E scores.

## 5. ILLICIT DISCHARGES MONITORING

### Purpose

The purpose of the City's Illicit Discharge Elimination Program (IDEP) (described under BMP ILL-1 in the *Stormwater Management Plan*) is to identify illicit discharges to the MS4 system, investigate citizen complaints, and evaluate the potential impact of permitted non-stormwater discharges to the MS4 system.

### Background

IDEP has been conducting the following monitoring activities since 1995 to identify and eliminate illicit discharges.

- **Dry-Weather Monitoring.** The City inspects City-owned outfalls every summer to locate illicit discharges from cross-connections, spills, non-residential vehicle washing, illegal dumping, etc. Inspections consist of field observations and testing with meters, kits, and grab samples. The field screening was expanded this year to analytes (e.g., ammonia and potassium) in addition to field parameters and chlorine that may help in detecting illicit discharges. The majority of dry-weather discharges from major outfalls is from groundwater infiltrating into stormwater pipes and is not of concern. Historically, about four illicit discharges, ranging from cross connection and truck washing operations to minor spills, have been detected each month.
- **Spill Response.** The City received and responded to approximately 1,950 complaint calls that were made to the City's spill hotline during FY11-12. Staff members conduct visual observation and some monitoring to identify and track reported spills or other illicit discharges. The vast majority of identified materials are sediment, washwater, or discharges related to dye tests.

## Results

During the four dry month in FY11-12 (August – October 2011 and June 2012), 121 major outfalls were inspected; three of these outfalls were inspected twice for a total of 124 inspections. The following table summarizes illicit discharge inspection activities.

### *Illicit Discharge Inspection – Summary of Activities*

<b>Inspection Date</b>	<b>Inspection Locations</b>	<b>Follow-up Investigations</b>
<b>August 2011</b>	43 – Total 24 – Columbia Slough 17 – Willamette River 2 – Johnson Creek	17 had discharges at the time of inspection, but most discharges were too small to collect any sample for analysis of field parameters. No potential concerns were found, and no follow-up investigations were initiated.
<b>September 2011</b>	74 – Total 44 – Columbia Slough 23 – Willamette River 3 – Columbia River 4 – Johnson Creek	32 had discharges at the time of the inspection, 17 of which did not have sufficient flow to collect any sample. No follow-up investigations were initiated.
<b>October 2011</b>	1 – Total 1 – Willamette River	The inspected outfall had a discharge at the time of the inspection. The discharge was most likely groundwater.
<b>June 2012</b>	6 – Total 5 – Johnson Creek 1 – Columbia River	4 had discharges at the time of inspection. No potential concerns were found, and no follow-up investigation was conducted.

## 6. STORMWATER MANAGEMENT FACILITY MONITORING

### **Purpose**

The purpose of this monitoring task is to evaluate the effectiveness of existing and new stormwater management facilities (SMFs) in reducing pollutants in discharges and managing stormwater.

### **Background**

In the past, little information about the effectiveness of structural stormwater management facilities was available. In 1995, the City began to monitor various types of structural BMPs that were installed as public and private facilities within the City boundaries (as reported in the MS4 annual compliance reports). Since then, many types of structural BMPs have been well characterized by various other jurisdictions and organizations nationwide. Although it is not a permit requirement, the City continues to monitor the effectiveness of ecoroofs, stormwater curb extensions and street planters for retention and detention of various sizes of storm events, as well as to collect data from stormwater flow-through planters for various storm events. Only ecoroofs are monitored for water quality because green streets (curb extensions, street planters, etc.) are designed to infiltrate the water quality storm. Ongoing collection of soil samples in infiltration facilities is conducted to evaluate whether the pollutant concentration in these facilities is changing compared to a control or background soil sample.

## Results—Water Quality Monitoring

### Ecoroofs

Ecoroofs are vegetated facilities that replace a standard roof, mostly on buildings with a low roof pitch. They consist of soil media and vegetation atop a waterproof membrane. They are designed to reduce peak flows and total runoff volume.

### *Ecoroof Effluent Water Quality – Summary*

Parameter	Units	Portland Building Mean of 14 samples	Hamilton West Roof Mean of 23 samples
	Dissolved Copper	µg/L	10.1
Dissolved Lead	µg/L	0.66	0.10
Dissolved Zinc	µg/L	15.6	17.8
Total Dissolved Solids	mg/L	139	110
Nitrate-N	mg/L	0.41	0.31
Total Phosphorus	mg/L	0.64	0.41
Ortho Phosphate	mg/L	0.56	0.31

Two winter storm events were sampled at the Portland Building ecoroof and the Hamilton west roof.

The ecoroof on the Portland Building was installed in 2006, and effluent has been sampled 14 times since June 2007. As expected for disturbed soil, nitrate-nitrogen and total and dissolved phosphorus concentrations were high initially, with the phosphorus concentrations similar to those on the Hamilton west ecoroof right after it was installed, but have declined substantially since then. All of the analytes monitored in FY11-12, except total and dissolved lead and total oil and grease, were well below the long-term average and appear to continue on a downward trend.

For the Hamilton west roof, the total oil and grease concentrations for the January 19, 2012 event were the highest seen to date, while the concentrations of all other monitored analytes were below their respective long-term averages. Total phosphorus concentrations from both monitoring events were among the lowest seen to date and were substantially below the TMDL concentrations in the Columbia Slough and Fanno Creek of 0.155 and 0.13 mg/L, respectively.

## Results—Soil Quality Monitoring

Typically, soil sampling events occur about every three to five years, since changes in the soil composition and pollutant accumulations are expected to be very small. Once three to four sampling events have been conducted for a given facility, an initial data comparison can be conducted to evaluate if there is a substantial change that could potentially be attributed to the accumulation of stormwater pollutants.

In 2010, control samples were taken for the first time. The control samples are from locations adjacent to the stormwater facilities, from areas that do not manage stormwater runoff. The control samples are more likely to be composed of native soil than the samples in the infiltration facilities, which more likely contain a mix of imported soil and compost. The control samples therefore are not necessarily directly comparable to the facility samples, but can be used to evaluate pollutants that are present or introduced through processes unrelated to stormwater infiltration.

In FY 11-12, soil samples were collected from 33 facilities that had not previously been monitored. The facilities were selected to be geographically representative of facilities built by the City over the past few years. In addition to soil samples, a variety of mulch samples were collected to assess the potential introduction of pollutants with the mulch. Only two facilities, the Glencoe rain garden and the Tryon headwaters rain garden, had been sampled previously. Results from the Tryon headwater rain garden are shown below.

**TRYON HEADWATERS RAIN GARDEN - SOIL SAMPLING SUMMARY (0 - 6 INCH)**

<b>Pollutant</b>	<b>Units</b>	<b>2008 mean</b>	<b>2012 mean</b>	<b>Control 2012</b>
motor oil / lube oil / heavy oil	mg/kg	987	977	610
copper	mg/kg	26.7	44.0	25.9
lead	mg/kg	32.4	49.1	30.0
mercury	mg/kg	0.072	0.072	0.055
zinc	mg/kg	112	356	105
benzo(a)pyrene	µg/kg	380	477	2900
benzo(g,h,i)perylene	µg/kg	313	677	3100
chrysene	µg/kg	273	263	2400
fluoranthene	µg/kg	337	490	8100
pyrene	µg/kg	420	700	8900

Based on two sampling events and one control sample, the following general observations can be made:

- Most 2012 analyte concentrations in the facility are higher than they were in 2008.
- The 2012 control sample has lower metals and motor oil concentrations than either sample from the facility, but has much higher PAH concentrations.
- Mercury and motor oil concentrations are virtually identical in the 2008 and 2012 samples.