Willamette Basin TMDL Implementation Plan

February 2019

(Updated September 3, 2022)

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1. Background and Implementation Plan Goals

The Willamette River and numerous tributaries do not currently meet several water quality standards including those for temperature, bacteria, and mercury. These water quality standards ensure that beneficial uses of the river and tributaries, such as swimming, fish consumption, and fish rearing, are protected. When water quality standards are not met, the federal Clean Water Act requires states to list these water bodies in a listing (303(d) list), and to develop a Total Maximum Daily Load (TMDL) for the affected water bodies. A TMDL calculates the quantity of constituent pollutants that can be added to the river without exceeding water quality standards.

The Oregon Department of Environmental Quality (DEQ) develops TMDLs for specific water quality parameters affecting water bodies in Oregon, including those in the Willamette River Basin. Any agency or municipality that has legal authority over activities or areas that are sources of TMDL pollutants that impact water quality are known as Designated Management Agencies (DMAs). A DMA that is responsible for areas that discharge to a TMDL water body must develop a TMDL Implementation Plan (TMDL IP) describing management strategies to be undertaken to address TMDL pollutants from nonpoint sources.

This TMDL IP represents an update to Oak Lodge Water Services' (OLWS') 2019 TMDL IP to address the Revised Willamette Basin Mercury TMDL (effective February 2021). This document is arranged in five sections:

- Section 1.0 provides an overview of the TMDL IP and provides background on the Willamette Basin TMDL with respect to OLWS.
- Section 2.0 provides an overview of TMDL pollutants, specifically temperature, bacteria, and mercury.
- Section 3.0 provides a description of management strategies specific to point and nonpoint source areas of OLWS.
- Section 4.0 describes performance monitoring and reporting deadlines.
- Section 5.0 provides evidence of compliance with land use requirements.
- Section 6.0 discusses additional elements required in the Water Quality Management Plan (WQMP) of the Willamette Basin TMDL including: public involvement, fiscal analysis, legal authority, and cold water refugia.

1.1. Willamette Basin TMDL Background

On September 21, 2006, DEQ finalized a TMDL for the Willamette Basin. The TMDL directly addresses water quality impairment of the Lower Willamette River and its tributaries (i.e., Kellogg Creek) and includes wasteload allocations (WLAs) for point source areas of pollutant discharge and load allocations (LAs) for non-point source areas of pollutant discharge. The TMDL also includes loading estimates related to background levels, reserves for future growth, and a margin of safety. **Point sources** are typically defined as those sources that enter surface waters through a pipe or defined conveyance system (i.e., municipal and industrial stormwater and/or wastewater). **Nonpoint sources** are typically defined as those sources that enter surface waters through more diffuse and dispersed overland flow (e.g., surface runoff from agricultural and forested lands).

Applicable TMDL pollutants for OLWS include the following:

- Bacteria
- Mercury
- Temperature

As part of the 2006 Willamette TMDL, DEQ developed a Water Quality Management Plan (WQMP) to describe the overall framework for implementing the Willamette Basin TMDL and developing TMDL IPs. TMDL IPs are a DMA's response to the TMDL, describing management strategies that they will implement and monitor to mitigate excess loading of nonpoint sources of TMDL pollutants (DEQ 2006). Alternatively, point sources of TMDL pollutants are covered through National Pollutant Discharge Elimination System (NPDES) permits (e.g., NPDES permits for Municipal Separate Storm Sewer System [MS4] discharges, NPDES permits for discharges from wastewater treatment plants, and NPDES permits for discharges from industries). The 2006 WQMP included a description of activities, programs, legal authorities, and other measures for which Oregon DEQ and other DMAs have regulatory responsibility.

In November 2019, DEQ issued the Revised Willamette Basin Mercury TMDL following additional monitoring, modeling efforts, and analysis. EPA in turn disapproved the mercury TMDL after determining the newly established WLAs and LAs would not achieve the TMDL targets. The EPA issued the final TMDL on February 4, 2021, which incorporates elements of the November 2019 version with modified WLAs and LAs for select sources of mercury.

Chapter 13 of the Final Revised Willamette Basin Mercury TMDL (November 2019) reflects an updated WQMP. Per Section 13.3.1 and Table 13-11, DEQ refers to six minimum control measures to control mercury from urban runoff from cities/ special Districts with populations of 5,000 or greater (as for OLWS). These six minimum control measures apply to jurisdictions with MS4 permits for areas outside of their MS4 permit coverage area.

In addition, OLWS as a Special District and soon to be an Authority, is also referenced in Section 13.3.1.21 of the WQMP. Section 13.3.1.21 indicates *"OLWS's MS4 permit can serve as the implementation plan for the mercury TMDL for the MS4 permit applicable service area. In addition, OLWS will also implement or continue to implement management strategies to reduce erosion and runoff from OLWS properties that could discharge mercury in stormwater directly to waterbodies."* Discussion of management strategies to specifically address mercury is provided in Section 3.2.

Table 1-1 summarizes applicable WLAs and LAs for OLWS.

Table 1-1. TMDL Summary for OLWS

TMDL water body	TMDL parameters	WLA[1]	LA	TMDL Implementation Plan dates
Lower Willamette River (direct)	• Mercury • Bacteria (*E. Coli*) • Temperature	• Mercury = 97% reduction • Bacteria = 78% reduction	• Mercury = 75% reduction • Bacteria = 78% reduction • Temperature = Shade surrogate 87%	• Original = 2008 • Update = 2014, 2019 • Current = 2022
Kellogg Creek	• Mercury • Bacteria (*E. Coli*) • Temperature	• Mercury = 97% reduction • Bacteria = 78% reduction	• Mercury = 75% reduction • Bacteria = 78% reduction • Temperature = Shade surrogate 87%	• Original = 2008 • Update = 2014, 2019 • Current = 2022

1. The mercury TMDL became effective February 4, 2021. A WLA of 97% for point sources of mercury and 78% for point sources of bacteria are applied for point and non-point source areas in conjunction with TMDL benchmark requirements per the NPDES MS4 permit. This is a conservative assumption, given that the LA for non-point source areas is 75% for mercury.

1.2. Applicability and Sources Covered

OLWS is in the Lower Willamette Basin of the Willamette River and defined in the Willamette Basin TMDL as a "special District", soon to be an "Authority", serving an estimated population of 30,000 in unincorporated Clackamas County, including small portions of the cities of Gladstone and Milwaukie.

The Willamette River is the primary receiving water for stormwater runoff from OLWS. The Willamette River originates outside the jurisdictional area of OLWS and already contain levels of TMDL pollutants resulting from natural causes and various land uses and activities before reaching OLWS' jurisdictional area. This TMDL IP recognizes that OLWS is responsible for mitigating or improving the water quality that results from activities within the jurisdiction. These mitigation and improvement measures would not be sufficient to improve the water quality of the Willamette River so that standards are met.

OLWS has stormwater discharges that enter discrete collection systems and discharge to the Willamette River (i.e., point source areas), as well as flow overland and enter receiving waters without first entering a stormwater conveyance system (non-point source areas). As mentioned, DEQ implements TMDLs for point source areas through inclusion of TMDL-related conditions in NPDES permits. Both point and non-point source areas are addressed by management measures (best management practices or BMPs), documented in OLWS' Stormwater

Management Plan (SWMP), implemented to comply with OLWS' Phase 1 NPDES MS4 permit (Permit #101348). Implementing these management measures across OLWS's jurisdictional area is done for ease in management. In addition, pollutant load reduction evaluations and development of TMDL benchmarks required under the NPDES MS4 permit have been developed for the entire jurisdictional area. Therefore, OLWS's Phase I NPDES MS4 permit SWMP serves as the primary mechanism for addressing the bacteria and mercury TMDLs.

Although point and non-point source areas are included and covered under by management measures implemented under the OLWS's NPDES MS4 permit, there are additional management strategies implemented by OLWS to specifically address bacteria and mercury discharges from non-point source areas, which are detailed in this TMDL IP.

OLWS's NPDES MS4 permit does not address temperature because municipal stormwater runoff is not considered to be a significant contributor of heat or "thermal loading" to surface waters (pp 14-16 Willamette Basin TMDL, 2006). Therefore, DMAs (such as OLWS) that are covered by NPDES MS4 permits are expected to address temperature (and any non-point sources of TMDL pollutants not addressed by management activities required by the NPDES MS4 permit) in a TMDL IP.

2. TMDL Pollutant Overview

TMDLs, the WQMPs, and associated TMDL IPs are designed to restore water quality to comply with water quality standards. In this way designated beneficial uses, such as aquatic life, drinking water supplies, and water contact recreation, will be protected. The improvements in water quality that will result from the implementation of the activities described in this TMDL IP will in most cases not be realized in the short term, may take several decades to be measurable if they are measurable at all.

The following section provides an overview of TMDL pollutants, as well applicable WLAs and LAs.

2.1. Temperature

At times, the Willamette River and its tributaries are too warm to support healthy salmon and trout populations. Some of these cold-water fish, including lower Columbia Coho, spring Chinook, and winter Steelhead, are threatened with extinction and elevated stream temperatures have contributed to their decline. Warm water interferes with adult salmon and trout migration and spawning. Warm water also decreases chances of juvenile survival, affects egg and embryo development, alters juvenile fish growth rates, and decreases their ability to compete with temperature-tolerant fish species for habitat and food. Salmon and trout are also more susceptible to disease when water temperatures are elevated.

Due to tidal effects, channel morphology, flow characteristics, and other factors, the Willamette River along OLWS's boundary is considered a fish transitory area. OLWS's contribution to the temperature concerns and ability to influence these concerns is extremely limited, but because shade is considered a surrogate of temperature for the TMDL, OLWS works to maintain or increase shade where possible.

Per the Willamette Basin TMDL, shade curves were created based on ecoregions, or regions with relative likeness of ecological systems identified through patterns of soil composition, vegetation, climate, and topography for areas within the Lower Willamette Subbasin (DEQ, 2006). Potential vegetation type, height, canopy overhang, and canopy density were estimated for each identified ecoregion and subsequently used to develop the shade curves. The selected shade curves are meant to act as guidelines, since site specific conditions could inhibit the vegetation from reaching the height and overhang values used to generate the curves (DEQ 2006).

OLWS is within the Willamette Valley Prairie Terraces ecoregion. Based the Effective Shade Curve in the Willamette Basin TMDL, along with an understanding of OLWS streams, OLWS staff estimate an average stream width of 25 feet and an average cardinal direction orientation of local streams (see Figure 2-1).

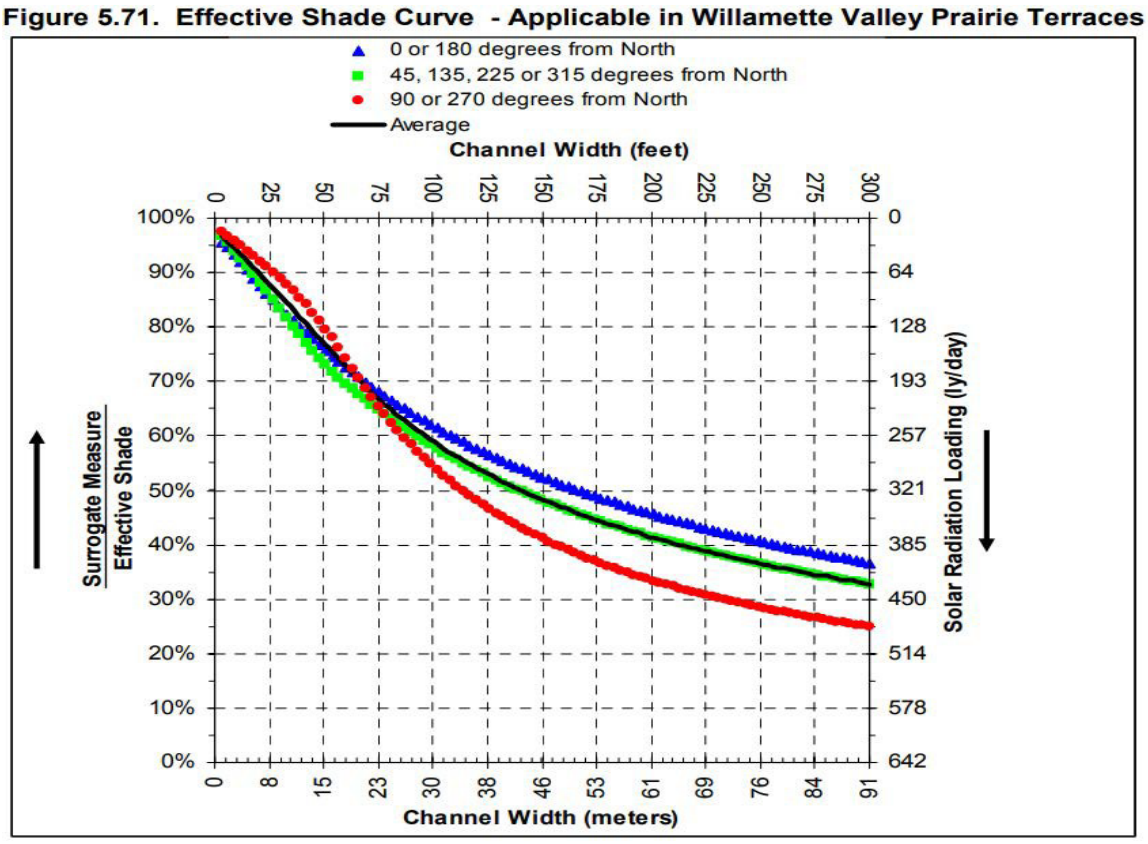

Figure 2-1. Effective Shade Curve for OLWS

Assuming OLWS streams are 25 feet in width, the average (black line per Figure 2-1) effective shade equates to about 87% based on riparian trees growing to their site potential (based on species of trees, height, density). That percentage effective shade is OLWS' surrogate target to meet the temperature TMDL and associated LA. Generally, the wider the stream the less effective shade.

The local North Clackamas Watersheds Council (NCWC) developed a Watershed Action Plan, which produced several informational documents mapping OLWS stream characteristics (see Appendix A–NCWC Stream Shadings Ratings Maps and Appendix B–NCWC Stream Reach Prioritization). These documents were produced to help NCWC prioritize restoration and enhancement actions within the watershed council's area. Partnership activities with NCWC are detailed in Section 3 of this TMDL IP, and these maps help focus resources for both NCWC and other potential partners.

2.2. Bacteria

People can be affected by bacteria present in water when enjoying water contact recreation activities such as swimming, wading, wind surfing, water skiing, boating, or fishing.

Ingestion or contact with water contaminated with bacteria can cause skin and respiratory ailments, gastroenteritis, and other illnesses in humans.

Bacteria in surface waters originates from both human and non-human sources (see Figure 2-2), but primary sources of bacteria loading are associated with wildlife and other non-anthropogenic sources

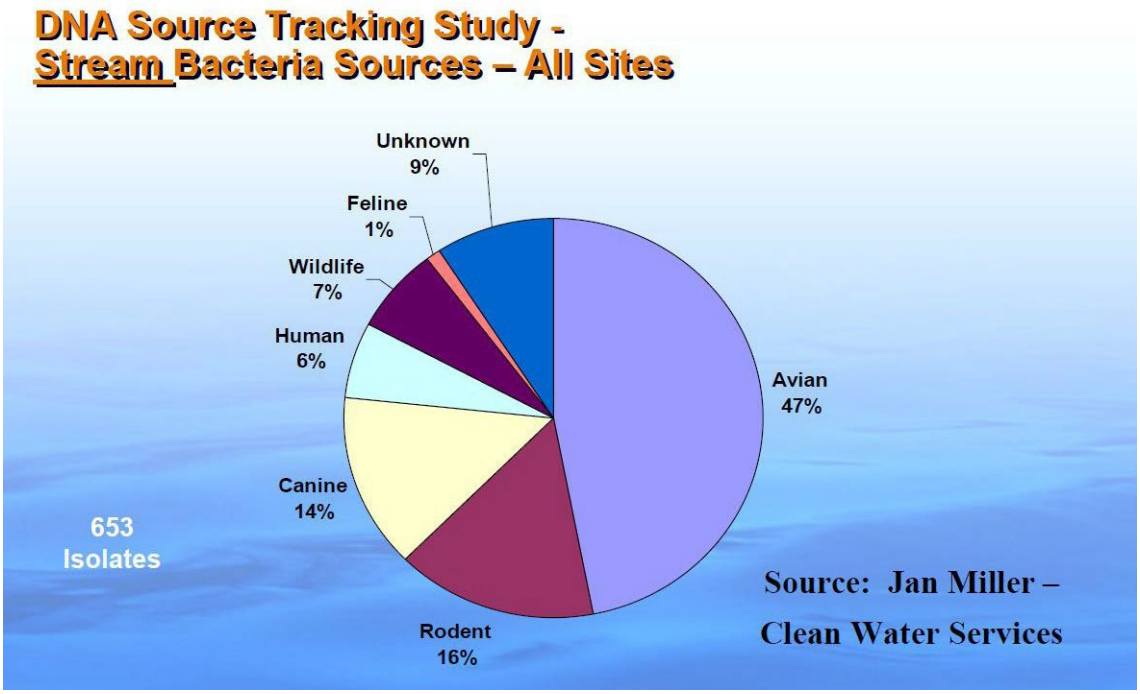

Figure 2-2. Bacteria Source Identification in Stormwater

Per the Willamette Basin TMDL, OLWS is subject to a bacteria WLA and LA of 78% reduction in pollutant load. Management strategies (see Section 3) focus on addressing bacteria sources that are anthropogenic in nature, including activities specific to illicit discharge detection and elimination, public education, and operations and maintenance. Management strategies more specific to non-point source areas include pet waste outreach focused on behavior change.

2.3. Mercury

The accumulation of mercury in fish is a well-recognized environmental problem throughout the United States. Mercury is a potent toxin that can cause damage to the brain and nervous system. Small children and developing fetuses are most sensitive to mercury's toxic effects. The primary pathway through which humans are exposed to mercury is through the consumption of fish or seafood containing elevated levels of mercury. The 2019 revised Willamette Basin Mercury TMDL specifies a WLA of 97% for point sources including all Phase I NPDES MS4 permits. A LA of 75% is applicable for non-point sources. Management strategies (see Section 3) to address mercury target sediment removal as a surrogate pollutant parameter for mercury and include activities related to erosion and sediment control and operations and maintenance of stormwater system components.

3. Management Strategies

The matrix in Appendix C includes a summary of activities implemented or planned by OLWS to address nonpoint source areas of TMDL pollutants. For each activity, Appendix C includes a description of the corresponding management strategy, budget, measurable objectives, timelines, and milestones, as well as identifies the TMDL pollutant affected by the activity.

As described previously, the OLWS NPDES MS4 permit and SWMP includes management strategies for point source areas for bacteria and mercury (see Appendix D). As required by the NPDES MS4 permit, OLWS' approved SWMP, dated May 2013 describes the BMPs used to reduce urban stormwater pollution into the Willamette River. Appendix D details activities per the 2013 SWMP as applicable to bacteria and mercury. As the Willamette Basin TMDL indicates that a TMDL IP should complement, and not duplicate a SWMP, OLWS is referencing BMPs per their 2013 SWMP for this TMDL IP update.

OLWS' NPDES MS4 permit was reissued September 15, 2021, with an effective date of October 1, 2021. OLWS is one of 12 co-permittees on the Clackamas County Phase 1 NPDES MS4 permit. OLWS is currently updating and resubmitted its SWMP for consistency with the reissued permit by December 1, 2022. As such, future updates to this TMDL IP will reflect the updated SWMP and 2021 NPDES MS4 permit requirements. A summary of the management strategies used in relation to TMDL pollutants is provided in the following subsections:

3.1. Temperature

Management strategies associated with temperature and shade management are outlined in Appendix C and include creation of new shade and maintaining existing shade, educating the public about shading, and preventing (via OLWS' Pretreatment Program) the illicit discharge of hot water to maintain the natural temperature of receiving waters. Since the Willamette Basin TMDL uses shade as the surrogate for thermal load allocations, OLWS has set restoration, enhancement, and preservation of shade through riparian vegetation as a target goal.

During the previous TMDL Implementation Plan term, OLWS coordinated with NCWC to complete a GIS analysis to estimate the stream shading potential as a surrogate for effective shade. The GIS analysis was updated with current data during the 2014-2015 permit year. OLWS incorporated the surrogate shade analysis in the form of the "Stream Shading Rating" maps (see Appendix A).

To uphold or increase vegetation along the streams in Oak Lodge, which are primarily in private ownership, OLWS works with our local watershed council (NCWC) in a partnership program prioritizing streambank owners. In 2022, the NCWC completed a Watershed Action Plan (WAP), which prioritizes a series of restoration strategies/projects including riparian revegetation, habitat complexity, water quality, stormwater and impervious surface management, and environmental justice. The WAP incorporated data from many sources, including the shade

analysis of Boardman, River Forest, and Rinearson Creeks. The WAP provides specific opportunities for OLWS to support temperature improvement projects regionally.

In addition to management strategies outlines in Appendix C, the following development review measures also address temperature:

- OLWS Surface Water Management Code (undisturbed buffer requirements) 2.1004.05.05–OLWS Design and Construction Standards and §10.19. Natural Resource Protection of the Rules and Regulations
- Code Enforcement/Mitigation Requirement 2.1004.05.04–OLWS Design and Construction Standards and §10.19. Natural Resource Protection of the Rules and Regulations

3.2. Mercury

Mercury sources occur naturally in the Willamette Basin and municipal sources are considered an extremely small fraction of the overall Mercury mass balance (Source: *Willamette Basin Total Maximum Daily Load Water Quality Management Plan*). Mercury exists naturally in soils and sediments. Small amounts of mercury may be deposited from the atmosphere from wind transport of soil or air pollution. With the 2019 update to the Willamette Basin TMDL to address mercury, updated WLAs and LAs were identified. However, limitations related to addressing these WLAs and LAs include:

1. The Willamette River exceeds the water quality criteria prior to reaching the OLWS boundary.
2. OLWS encompasses only 3,349 acres, which is a minute fraction of the Willamette River watershed.
3. Stream sediments seem to be a major source of mercury, not stormwater outfalls.
4. Mercury sampling was conducted for the 2012 NPDES MS4 permit. OLWS completed their required sampling for mercury during spring 2014. Mercury was detected in very low concentrations at the sampling location. The reissued 2021 NPDES MS4 permit requires expanded mercury monitoring, which will be used to inform current management strategy effectiveness.

Table 3-1 summarizes the six minimum measures outlined in the 2019 Willamette Basin TMDL update for mercury and the associated WQMP. Management strategies applicable to non-point source areas are detailed (as referenced in Appendix C), as well as 2021 NPDES MS4 permit references applicable to both point and non-point source areas. Generally, management strategies targeting sediment/erosion control are applicable to point and nonpoint areas.

Existing management strategies per the City's 2013 SWMP are listed in Appendix D and reference to these minimum control measures.

Management strategies (BMPs) specific to non-point source areas and mercury reduction are listed in Appendices C and D.

Table 3-1. Mercury Management Strategies to address the Six Minimum Stormwater Control Measures

Minimum Stormwater Control Measure	Minimum Stormwater Control Measure Requirements Summary	2021 Phase I NPDES MS4 Permit Reference (applied to point and non-point source areas)[1]	Additional Management Strategies (Appendix C) (non-point source areas)
1) Pollution Prevention and Good Housekeeping for Municipal Operations	• Operate and maintain facilities to reduce the discharge of mercury-related pollutants. • Ensure DMA-owned and operated facilities with industrial activities have coverage under a 1200-Z permit and conduct operations and maintenance activities to protect water quality. • Maintain records.	Schedule A.3.f and Schedule A.3.g	• No additional strategies, see Appendix D.
2) Public Education and Outreach	• Conduct an ongoing education and outreach program to inform the public. • Track implementation of public education and outreach and assess progress including a qualitative evaluation of one activity.	Schedule A.3.a[2]	• Clean Rivers Coalition Partnership • Regional Coalition for Clean Rivers and Streams • Backyard Habitat Certification Program • Ecology in Classrooms and the Outdoors (ECO) • Watershed Health Education Program (WHEP) • Willamette-Laja Twinning Partnership • EcoBiz Partnership • Hg outreach and education programming in partnership with non-profit partners; includes Streamside Stewards Program • See Appendix D
3) Public Involvement and Participation	• Implement a public involvement and participation program to provide the public with opportunities to participate in the development of control measures.	Schedule A.3.b	• No additional strategies, see Appendix D.

[1] The 2021 NPDES MS4 permit is the effective NPDES MS4 permit for OLWS and is listed here for reference. Although management strategies per the OLWS 2013 SWMP (Appendix D) are applicable to the 2012 NPDES MS4 permit, such strategies are anticipated to translate to the 2021 NPDES MS4 permit in accordance with the pending 2022 SWMP update.

[2] A qualitative evaluation is not specifically required by the 2021 NPDES MS4 permit but was required as part of the 2012 NPDES MS4 permit and 2013 SWMP. A qualitative evaluation will be conducted in conjunction with annual reporting to meet the 2021 NPDES MS4 permit requirements.

Table 3-1. Mercury Management Strategies to address the Six Minimum Stormwater Control Measures

Minimum Stormwater Control Measure	Minimum Stormwater Control Measure Requirements Summary	2021 Phase I NPDES MS4 Permit Reference (applied to point and non-point source areas)[1]	Additional Management Strategies (Appendix C) (non-point source areas)
4) Illicit Discharge Detection and Elimination	• Implement and enforce a program to detect and eliminate illicit discharges. • Develop and maintain a current map of the conveyance system. • Prohibit non-stormwater discharges through enforcement of an ordinance or other legal mechanism.	Schedule A.3.c	• Construction and repair sanitary facilities to meet DEQ, OLWS, and county plumbing codes • Industrial Pretreatment Program–illicit connection detection and response • See Appendix D.
5) Construction Site Runoff Control	• Refer project sites to DEQ or agent to obtain 1200-C permit coverage. • Require construction site operators to complete and implement an Erosion and Sediment Control Plan for construction project sites that result in a min. land disturbance of 0.5 acres or more. • Require erosion controls, sediment controls, and waste materials management for qualifying construction projects. • Develop, implement, and maintain escalating enforcement.	Schedule A.3.d	• Implement Streamside Erosion and Sediment Control Program per OL Code sections 2.1004.05.02 and 2.1004.05.04 • OLWS updated the Surface Water Management Code (Rules and Regulations and Design and Construction Standards) in 2020 related to erosion control, tree removal, undisturbed buffers, and flow control and treatment requirements. • Riparian Ordinance: OLWS land disturbance threshold for erosion control is reduced to 250 square feet within undisturbed buffers. • See Appendix D.
6) Post Construction Site Runoff for New and Redevelopment	• Develop, implement, and enforce a program to reduce discharge of pollutants from new and redevelopment project sites (0.25 acres or more). • Target natural or predevelopment hydrologic function to retain rainfall onsite and treat the remainder of runoff.	Schedule A.3.e	• No additional strategies, see Appendix D.

3.3. Bacteria

Like mercury, bacteria (*E. Coli*) are identified as exceeding water quality standards in the Lower Willamette during the fall, winter, and spring timeframes. The indicator organism for Oregon surface waters is *E. Coli*. In the Willamette mainstem, the TMDL WLAs point to a 78% reduction of *E. Coli* for tributaries and the Willamette mainstem. However, limitations related to addressing these WLAs and LAs specific to OLWS and OLWS' influence on the overall Willamette Basin include:

1. The Willamette River exceeds the water quality criteria prior to reaching the OLWS boundary.
2. OLWS encompasses only 3,349 acres, which is a minute fraction of the Willamette River watershed.
3. OLWS monitors *E. Coli* through quarterly sampling. Data shows some sporadic bacteria levels above the standard, but generally bacteria levels meet the water quality standard during the fall/winter/spring flow months.
4. DNA sampling studies show that the sources of bacteria in MS4 discharges consist of mostly natural sources such as birds, mammals, rodents, etc. These DNA studies indicate that natural sources are the primary cause of bacterial pollution, not urbanization or anthropogenic sources, although some anthropogenic activities could promote an increase of natural sources. The vast majority of residences, commercial facilities and industrial users in the OLWS are connected to the sanitary sewer system. New septic tanks or other alternate sanitary systems are not allowed, and existing septic systems in OLWS are not allowed to be reconstructed or repaired, connection to the sanitary sewer system would be required.

The best approach to reducing bacteria levels in stormwater involves removing the human sources of bacteria, improving the natural removal processes, and sedimentation (removal of material prior to suspension). With bacteria levels resulting largely from natural sources, the current management strategies outlined for bacteria in Appendix C and D are considered sufficient.

Management strategies specific to non-point source areas and bacteria reduction are listed in Appendix C and D.

4. Performance Monitoring

OLWS will track TMDL IP activities and report to DEQ as required annually in conjunction with the same timing as the NPDES MS4 annual report.

A summary of pending implementation and compliance dates specific for the TMDL IP and subsequent updates is provided in Table 4-1.

Table 4-1. TMDL IP Compliance Dates

Important Dates	
2019 TIP Implementation	2/1/19–12/31/23
2022 Mercury Update to the TIP	Due 9/3/22
2022 Updated TIP Implementation	9/3/22–12/31/23
TIP 5-year Review	Due 12/31/23
2024 TIP Update	Due 12/31/23
2024 TIP Implementation	1/1/24–12/31/28
Annual Reports	December 1 each year (except 2023)

5. Evidence of Compliance with Land Use Requirements

Oregon Administrative Rule 340-042-0080(3)(a)(D) defines one of the required elements of a TMDL Implementation Plan to be evidence of compliance with applicable statewide land use requirements. Per the TMDL Implementation Plan Guidance Document, this would consist of the following:

1. Identify applicable acknowledged local comprehensive plan provisions andland use regulations, and
2. Explain how the implementation plan is consistent with these local planning requirements or what steps will be taken to make the local planning requirements consistent with the implementation plan.

As a special OLWS (also known as a "service provider"), the OLWS lacks land use authority. Therefore, Oak Lodge can only partially regulate land use and development factors influencing water quality parameters. Oak Lodge does not have an independent Comprehensive Plan (Comp. Plan) that is "acknowledged" or an implementing zoning codewhich are the typical municipal tools used to demonstrate compliance with land use requirements. Rather, OLWS's compliance is generally achieved from its compliance responsibilities with the OLWS's MS4 permit as reviewed by DEQ (as opposed to DLCD for a Comprehensive Plan) and its land use role derived from Clackamas County's Comprehensive Plan (Comp Plan).

The County's Comp Plan does include provisions related to some of the OLWS's practicesin this IP and provides for coordination with the OLWS during land use actions.

Specifically, within the Clackamas County Comprehensive Plan's—Natural Resources and Energy chapter, setback distances from streams/wetland/rivers are addressed with broadpolicies and in specific detail. These broad setback distance policies and details are then repeated and detailed further in Section 704 of the Zoning and Development Ordinance.

While the County's Comp Plan does not specifically mention TMDLs by name, overarchinggoals that are present in the TMDL—including the need to keep in-stream water temperatures down during the summer—are addressed in its Comp Plan.

Regarding its role in land use, the OLWS is a co-permittee with the Clackamas County Phase I MS4 Permit with authority allocated to each separate jurisdiction. Clackamas County recognizes that the OLWS has responsibility for operating, planning, and regulating surface water management systems in the Comp Plan Chapter on Public Facilities and Services Policies 19-26. This section requires all new developments to meet the development standards of the appropriate service provider, which in this case, include Oak Lodge's TMDL measures as described in this report.

The OLWS coordinates with Clackamas County and DEQ on land use and/or development proposals within the County. In the County's Comp Plan–Chapter 11 Policy 1 of City, Special OLWS and Agency Coordination's Policy 1 authorizes Clackamas County to:

> *"Participate in interagency coordination efforts with federal, state, Metro, special purposeOLWSs and cities. The County will maintain an updated list of federal, state and regional agencies, cities and special OLWSs and will invite their participation in plan revisions,ordinance adoptions, and land use actions which affect their jurisdiction or policies."*

The County has a policy to coordinate the review of development applications with the OLWS for proposals within the OLWS's jurisdiction to ensure that approval is not grantedin the absence of adequate surface water management facilities per Oak Lodge's implementing documents, the Rules and Regulations and Design and Construction Standards. In this land use process, Oak Lodge participates in Pre-application conferences, and supplies land use and design review comments, which become part of the land use decision "conditions of approval". Following land use approval, Oak Lodge receives development applications and issues permits for the regulations within its purview.

Oregon's Administrative Rule 340-042-0080(3)(a)(D) states that−to the extent required by ORS 197.180 and OAR chapter 340, Division 18−evidence of this Implementation Plan's compliance with the applicable land use requirements shall be provided. Oak Lodge is currently in compliance with all land use requirements which pertain to this Implementation Plan. This Implementation Plan is consistent with Clackamas County's Comp Plan. The County's Comp Plan has been acknowledged by Oregon's Land Conservation and Development Commission to be in compliance with the Statewide Planning Goals and Metro Titles. This Implementation Plan is consistent with the County'sComp Plan to the extent required by law. Therefore, Oak Lodge's regulations and operations are performed under the County's "acknowledged" Comprehensive Plan, and the proposed Implementation Plan is consistent with applicable land use requirements.

6. Additional Submittals

1. Fiscal Analysis

Oak Lodge Water Services (OLWS) is a sanitary, watershed protection and water Authority formed and operating under ORS 450. Under previous names OLSD or OLWSD, OLWS began enactment of a surfacewater management program in July 1993 and sanitary system in 1960. The OLWS has enacted Sanitary Sewer, Stormwater Management and Water Rules and Regulations Ordinance. These Rules and Regulations and subsequent revisions provide the regulatory framework for developing and implementing a Surface Water Management Plan and program with the OLWS's jurisdictional boundary.

Also included in these ordinances are provisions for the assessment and collection of fees and charges associated with operating the program. Monthly service charges are collected from each developed property within the OLWS as incurred charges for the provision, operation, maintenance, repair and replacement of sanitary and water services, while Watershed Protection Fees are focused on MS4 permit driven initiatives, and a portionof this money is used to support TMDL implementation.

Stormwater Capital Improvements tend to be lesser than what most cities commit to sincethe public stormwater infrastructure in OLWS is either owned by Clackamas County or ODOT. Additional fees are assessed for new and redevelopment plan review, and compliance determination. The revenue generated by these fees and charges is applied to the cost of providing the various services and activities for both the sanitary, water and surface water management programs including capital facility construction. All revenue generated by the fees and charges associated within each program are retained within theindividual program.

It is estimated that the TMDL expenses come to 10% of the Stormwater Program fees. Currently, the SWM Program fees come to $1,585,527, with about $262,886 of that being operational expenses, and just under $2,100,000 allocated for capital investments. Of the total SWM program budget, the TMDL program support comes to about $30,000 per year.Over 5 years that puts support for TMDL program implementation at $150,000.

Three specific programs that fall within the TMDL implementation include support of the North Clackamas Watersheds Council's (NCWC) Streamside Stewards Program, which OLWS sponsors at $42,000/year, the Temperature Monitoring Program run in partnership with NCWC at $13,500/year, and sponsorship of the North Clackamas Parks and Recreation OLWS's "Scoop the Poop" Pet Waste Bags program at $6,500/year. Over 5 years those program costs cometo $210,000, $67,500, and $32,500, respectively.

As the OLWS continues its programs, it will apply adaptive management to implementing changes to the TMDL Implementation Plan.

2. Description of Legal Authority (by OLWS)

OLWS is a municipal corporation organized and operating under Chapters 198, 264, and Chapter 450 of the Oregon Revised Statutes (ORS). The purpose of OLWS is to supply its users with sanitary sewage conveyance and treatment, watershed protection/surface water quality management, and domestic water supply. As asanitary OLWS formed under ORS 450, OLWS believes its Rules and Regulations for sanitary sewer, watershed protection and all amendments thereto, provide adequate legal authority to comply with the TMDL implementation requirements.

The OLWS under ORS 450 cannot provide land use regulation. Clackamas County provides local land use regulation through the Clackamas County Zoning and DevelopmentOrdinance and Comprehensive Plan. Under State law and the Comprehensive Plan, Oak Lodge Water Services implements its requirements by participating in Clackamas County's land use process. OLWS assumed surface water authority in 1993 which included the mandate to implement BMPs and actions to comply with MS4 and associated requirements such as the Willamette River TMDL.

3. Cold Water Refugia

Due to jurisdictional limitations and river morphology, the OLWS has limited opportunity to address mainstem cold water refugia, although it partners with NCWC on restoration and enhancement projects. The OLWS boundary stops at the normal high water elevation point and it lacks land use authority to regulate activities below that elevation.

Because the Willamette River cuts through the Portland West Hills, it narrows in the area of Oak Lodge because of the rock formations. This narrow channel geometry precludes shallows and eddies that provide refugia. Additionally, the steep riverbanks negate potentialfor mainstream shading. This steep rocky geology also precludes improving the habitat without major channel disturbances. The deep river channel may provide temperature refugeall along the OLWS boundary.

The outlets for River Forest, Boardman, and Rinearson Creek provide the most potential for refugia. Any protection or regulation of these outlets would derive from the OLWS's sensitive land ordinances and participation in County land use regulation.

Appendix A: Stream Shade Ratings Maps

Milwaukie

Clackamas County

Gladstone

Lake Oswego

ALDE

PARK AVE

HILL RD

THIESSEN RD

WEBSTER RD

LOS VERDES DR

VALLEY VIEW RD

JENNINGS AVE

COURTNEY AVE

OATFIELD RD

OAK GROVE BLVD

RUPERT DR

CONCORD RD

MCLOUGHLIN BLVD

ROETHE RD

GLEN ECHO RD

PORTLAND AVE

GLEN ECHO AVE

ABERNETHY LN

RIVER RD

River Forest Lake

Willamette River

Stream Shading Rating

11/2014

1 inch = 0.25 miles

Legend

- Trolley Trail
- Storm Lines
- Wetlands
- Parks
- Shaded (61%)
- Marginal (21%)
- Open, no shade (18%))

OAK LODGE WATER SERVICES

TMDL: Attachment B – Overview Stream Shading

Boardman Creek

Boardman Creek

Reach 1

Reach 2

Reach 3

Legend

- ODFW Passage Barriers
- Potential Additional Barriers
- Mainstem Rivers
- Reach Breaks
- Anadromy Present
- Resident Salmonids Present
- FEMA Flood Zone
- Slopes > 25%
- Outdoor Rec & Cons Areas
- Vacant Land
- tax_parcels

0 0.05 0.1 0.2 Miles

0 250 500 1,000 Feet

Rinearson Creek

Reach 1

Reach 2

Reach 3

Rinearson Creek

Legend

- ODFW Passage Barriers
- Potential Additional Barriers
- Mainstem Rivers
- Reach Breaks
- Anadromy Present
- Resident Salmonids Present
- FEMA Flood Zone
- Slopes > 25%
- Outdoor Rec & Cons Areas
- Vacant Land
- tax_parcels

0 0.05 0.1 0.2 Miles

0 250 500 1,000 Feet

River Forest Creek

Reach 1

Reach 2

Reach 3

Reach 4

Reach 5

Reach 6

River Forest Creek

Legend

- ODFW Passage Barriers
- Potential Additional Barriers
- Mainstem Rivers
- Reach Breaks
- Anadromy Present
- Resident Salmonids Present
- FEMA Flood Zone
- Slopes > 25%
- Outdoor Rec & Cons Areas
- Vacant Land
- tax_parcels

0 0.05 0.1 0.2 Miles

0 250 500 1,000 Feet

Upper Mt. Scott Creek

Reach 12

Reach 11

Mt Scott Creek

Reach 10

Reach 9

Reach 8

Reach 7

Mt Scott Creek

Reach 6

Reach 5

0 0.05 0.1 0.2 Miles

0 250 500 1,000 Feet

Legend

- ODFW Passage Barriers
- Potential Additional Barriers
- Mainstem Rivers
- Reach Breaks
- Anadromy Present
- Resident Salmonids Present
- FEMA Flood Zone
- Slopes > 25%
- Outdoor Rec & Cons Areas
- Vacant Land
- tax_parcels

Lower Mt. Scott Creek

Reach 1

Reach 2

Reach 3

Reach 4

Reach 5

Mt Scott Creek

Mt Scott Creek

Kellogg Creek

0 0.05 0.1 0.2 Miles

0 250 500 1,000 Feet

Legend

- ODFW Passage Barriers
- Mainstem Rivers
- Reach Breaks
- Anadromy Present
- Resident Salmonids Present
- FEMA Flood Zone
- Slopes > 25%
- Outdoor Rec & Cons Areas
- Vacant Land
- tax_parcels

Upper Kellogg Creek

Reach 2

Reach 3

Reach 4

Kellogg Creek

Legend

- ODFW Passage Barriers
- Potential Additional Barriers
- Mainstem Rivers
- Reach Breaks
- Anadromy Present
- Resident Salmonids Present
- FEMA Flood Zone
- Slopes > 25%
- Outdoor Rec & Cons Areas
- Vacant Land
- tax_parcels

0 0.05 0.1 0.2 Miles

0 250 500 1,000 Feet

Lower Kellogg Creek

Reach 1

Reach 2

Kellogg Creek

Mt Scott Creek

Legend

- ODFW Passage Barriers
- Potential Additional Barriers
- Mainstem Rivers
- Reach Breaks
- Anadromy Present
- Resident Salmonids Present
- FEMA Flood Zone
- Slopes > 25%
- Outdoor Rec & Cons Areas
- Vacant Land
- tax_parcels

0 0.05 0.1 0.2 Miles

0 250 500 1,000 Feet

Appendix B: Stream Shade Scoring Matrix

Point Scoring:

				Yes = 2 Unk = 1 No = 0	Yes (IBI>75) = 3 Yes (IBI = 51-74) = 2 Unk = 1 No or IBI<50 = 0 +1 for increasing IBI trend	0 - 1 = 2 1 - 5 = 1 >5 = 0		Yes = 2 Partial = 1 No = 0	< 5 = 2 5-15 = 1 >15 = 0	Yes = 2 Partial = 1 No = 0		< 1% = 2 1-3% = 1 > 3% = 0	low = 2 mod = 1 high = 0					
Stream	**Reach**	**Sub-Reach (Habitat or Sub-Reach for Fish Surveys)**	**Length (mi)**	**Fish Presence?**	**IBI Scores (mean) & IBI Trajectory**	**Known or Potential Downstream Fish Barriers? (not incl. barriers w/in reach)**	**Fish Score**	**Public Ownership for Access?**	**# of Private Parcels (non-park, etc.)?**	**Vacant Parcels / Public Land Adjacent?**	**Access Score**	**Avg Channel Confinement**	**Avg Channel Slope**	**Geomorph Score**	**Total Points**	**Weighted Rank** (60% fish, 20% access, 20% geomorph)	**FIELD INVESTIGATION?**	**Rationale**
Kellogg	1	1	1.4	Yes	52.4 (decreasing)	1	6	Partial	73	Partial	2	6.1	0.4%	2	10	4.4	Y	First priority based on ranking. Fewer barriers to fish passage in this reach as compared to upstream reaches. May be challenging to gain access due to number of private landowners. Highest priority area of Reach is upstream: 1000 feet just below confluence w/ MSC
	2	2	0.9	Yes	58.1 (stable)	3	5	Partial	40	Partial	2	7.1	0.5%	4	11	4.2	N	Second priority for field investigation.
		3	0.2	Yes		5	5	No	17	Partial	1	5.6	1.2%	1	7	3.4	N	Not a priority for field investigation.
		4	0.5	Yes		5	5	Partial	15	Partial	3	5.0	0.5%	2	10	4	N	Not a priority for field investigation.
Mt Scott	1	1	0.7	Yes	45.4 (increasing)	3	4	Yes	9	Yes	5	21.8	0.3%	3	12	4	N	Despite lower rank than other reaches, majority of Reach 1 is contained in North Clackamas Park , allowing for easy site access. Second priority for field investigation.
		2	0.8	Yes		4	4	Partial	10	Partial	3	5.8	0.3%	2	9	3.4	N	Not a priority for field investigation.
		3	0.7	Yes		9	3	Yes	1	Yes	6	15.9	0.3%	3	12	3.6	N	Despite lower rank than other reaches, majority of Reach 3 is contained in Three Creeks Natural Area , allowing for easy site access. Second priority for field investigation.
	2	4	0.1	Yes	43.0 (increasing)	9	3	Yes	1	Partial	6	23.1	0.2%	3	12	3.6	N	Not a priority for field investigation.
	3	5	0.8	Yes	54.7 (increasing)	10	5	Partial	7	Yes	4	11.2	0.4%	4	13	4.6	Y	Second highest rank after Reach 8. First priority for field investigation efforts since fewer downstream barriers.
		6	0.2	Yes		13	5	Partial	3	Partial	4	5.8	2.7%	1	10	4	N	Not a priority for field investigation.
		7	0.5	Yes		15	5	Yes	4	Yes	6	3.9	2.3%	1	12	4.4	N	Not a priority for field investigation.
		8	0.7	Yes		16	5	Yes	1	Yes	6	7.7	1.3%	3	14	4.8	N	Ranked highly but number of fish passage barriers or potential barriers (from road crossings) downstream of reach eliminates this reach from the field investigation priority.
	4	9	0.25*	Yes	52.6 (increasing)	16	5	No	6	Yes	3	7.2	2.1%	3	11	4.2	N	Not a priority for field investigation.
		10	0.2*	Yes		17	5	Partial	2	Yes	5	6.8	4.4%	2	12	4.4	N	Not a priority for field investigation.
		11	0.4*	Yes		17	5	Partial	9	Partial	3	4.3	1.9%	1	9	3.8	N	Not a priority for field investigation.
		12	0.3*	Yes		19	5	Yes	1	Yes	6	4.7	2.7%	1	12	4.4	N	Not a priority for field investigation.
Rinearson	1		0.12	Unk	Unk	0	4	Yes	1	Yes	6	28.5	1.8%	2	12	4	Y	Short reach, will be combined with Reach 2 for assessment.
	2		0.24	Unk	Unk	2	3	Yes	0	Yes	6	5.7	0.1%	2	11	3.4	Y	Second priority, will be included in the field investigation since Reach 1 is short.
	3		0.34	Unk	Unk	3	3	Partial	8	Partial	3	4.0	1.9%	1	7	2.6	N	Not included, assuming no fish access to channel above the large ponds and dams based on longitudinal profile.
Boardman	1		0.18	Yes	Unk	0	6	No	10	Yes	3	8.9	3.8%	2	11	4.6	N	Though ranked highest, will not be surveyed since restoration has already occurred here.
	2		0.15	Unk	Unk	0	4	Partial	8	Partial	3	4.2	1.6%	1	8	3.2	Y	Ranked second highest and will be the priority reach for field investigations since restoration has already occurred in Reach 1.
	3		0.83	Unk	Unk	2	3	Partial	11	Partial	3	14.9	0.3%	3	9	3	N	Not a priority for field investigation.
River Forest	1		0.05	Unk	Unk	0	4	No	5	No	1		2.7%	3	8	3.2	Y	Very short reach. To be combined with Reach 3 for site investigation.
	2		0.45	Unk	Unk	1	4	No	22	No	0	8.2	1.1%	3	7	3	N	Tied with Reach 3 for second priority, but will not be investigated due to the lack of public access or vacant parcels adjacent to the channel limiting future restoration potential.
	3		0.3	Unk	Unk	3	3	No	14	Partial	2	10.5	0.9%	4	9	3	Y	Tied with Reach 2 for second priority. Selected as field investigation priority reach due to the suitable geomorphic conditions for future restoration potential.
	4		0.26	Unk	Unk	4	3	No	25	No	0	2.2	0.1%	2	5	2.2	N	Not a priority for field investigation.
	5		0.22	Unk	Unk	5	3	No	12	No	1	1.3	2.6%	1	5	2.2	N	Not a priority for field investigation.
	6		0.45	Unk	Unk	8	2	No	19	Partial	1	7.0	3.5%	2	5	1.8	N	Not a priority for field investigation.

Tinus et al 2003
Neerman & Vogt 2009
Friesen and Zimmerman 1999
(Boardman Creek Reach 1 fish salvage information documenting salmonid presence from Todd Alsbury personal communications)

Bing Aerial Imagery in ArcGIS, digitization of road crossings, & ODFW Fish Passage Barriers shapefile, dated Sept. 2019.
From https://nrimp.dfw.state.or.us/DataClearinghouse/

Outdoor Recreation & Conservation Areas (2019), Taxlots (2019), and Vacant Land shapefiles (2018).
From http://risdiscovery.oregonmetro.gov

Defined based on 2014 LiDAR from Oregon METRO and the National Hydrological Database (NHD) channel alignments.

Appendix C: Management Strategies for Non-Point Source Areas

Appendix C: Management Strategies for Non-Point Source Areas

STRATEGY	PROGRAM	ACTIONS	BUDGET	MEASUREABLE OBJECTIVES	TIMELINES	MILESTONES	ADDRESS			5-YEAR IMPLEMENTATION PLAN STATUS
							Bacteria TMDL	Temp TMDL	Mercury TMDL	
Bacteria, Temperature and Mercury NPS Strategies	Illicit Discharge Detection and Elimination (IDDE)	Implement IDDE program-outreach, response, and enforcement	Staff FTE and response materials	Cleanup and documentation	These events are dealt with immediately upon notice to OLWS and are addressed as soon as possible	Ongoing activities with annual report to DEQ	X	X	X	Yes, implemented per requirements
	Construction and repair of sanitary facilities meet DEQ, OLWS, and county plumbing codes	Require that construction and repair of sanitary facilities meet DEQ, OLWS, and county plumbing codes	Staff FTE and outreach materials	Summary of activities in annual report	Currently in place and ongoing	Ongoing activities	X		X	Through its master planning process, OLWS is investigating monthly rate incentives for usage of pervious materials over traditional impervious materials. OLWS is also looking into incentives for removing current impervious surfaces
	OLWS and State septic system ban within District	Enforce OLWS and State septic system ban within OLWS boundaries	Staff FTE and outreach materials	None required	Currently in place and ongoing	If other septic systems are found, they will be abandoned properly and connected to the public system	X			Implemented per requirements and included in regulatory code; currently two functioning septic systems exist in OLWS that meet State Code for structures distance to public mains
	Industrial Pretreatment Program–illicit connection detection and response	Implement Industrial Pretreatment Program	Staff FTE and outreach materials	Summary of activities in annual report	One current significant user. Program is in the process of being certified by DEQ	Ongoing activities in compliance with NPDES and MS4 permit, included on annual report	X	X	X	There is one potential current significant user (other than the OLWS's WWTP); staff is in the process of gaining DEQ certification of the program; budget was approved FY20 and staff in process of finalizing program documents during summer 2022
	Streamside Erosion and Sediment Control	Implement provisions of Sections 2.1004.05.02 and 2.1004.05.04 including a reduced threshold for construction activities when within the sensitive area buffer	Staff FTE and outreach to contractors	Permits issued and inspections completed	Currently in place and ongoing	Identify number of permits triggered and issued based on program requirement	X	X	X	New program element
	"Scoop the Poop" Dog Waste Bags-Behavior Change Program	Partner with North Clackamas Parks and Recreation District (NCPRD) to provide OLWS-branded Dog Waste Bags in local parks and along walking trails	$6,500	Annual invoice for purchase of branded waste bags	Currently in place and ongoing	Ongoing activities with annual report to DEQ	X			Yes, implemented per requirements
Outreach and Education Partnerships	Clean Rivers Coalition Partnership	Sponsor and implement statewide messaging of two campaigns: "Follow the Water" and "What's Your Lawn Style"	$3,000	Student numbers reached, schools scheduled for classroom and field visits and activities tracked in annual report	Currently in place and ongoing	Ongoing activities	X	X	X	Yes, implemented per requirements
	Regional Coalition for Clean Rivers and Streams	Implement regional messaging campaign	$3,000							
	Backyard Habitat Certification Program	Partner with Audubon Society and Columbia Land Trust to implement private landowner outreach and behavior change campaign to increase restored habitat	$8,000							
	Ecology in Classrooms and the Outdoors (ECO)	Partner with ECO to sponsor elementary school-aged experiential education program in classroom and in the field, which includes restoration and enhancement activities	$8,000							
	Watershed Health Education Program (WHEP)	Partner with ECO to sponsor high school-aged experiential education WHEP program in classroom and field, which includes restoration and enhancement activities	$12,000							
	Willamette-Laja Twinning Partnership	Partner with NCPRD to implement school-aged experiential education program in classroom and field, which includes restoration and enhancement activities	$5,000							
	EcoBiz Partnership	Partner with the Pollution Prevention Resource Center (PPRC) to support behavior change and provide technical assistance to local automotive businesses	$5,500							
Technical Programs	Streamside Stewards Program	Sponsor partnership with North Clackamas Watersheds Council (NCWC) supporting private landowner riparian outreach efforts	Portion of $42,000	Summary of activities in annual report	Currently in place and ongoing	Ongoing activities with annual report to Oregon DEQ		X	X	With one potential significant user (other than the OLWS's WWTP) Staff is working with DEQ to gain certification of the program; budget was approved FY20 and Staff will finalize program documents in summer 2022
	Stream Temperature Monitoring Program	Sponsor partnership with NCWC to monitor and assess effectiveness of riparian shading	$13,500	Summary of activities in annual report	Currently in place and ongoing	Ongoing activities with annual report to DEQ		X		Yes, implemented per requirements
	Cold Water Refugia Restoration Projects	Continue to seek opportunities to identify and protect riparian areas in confluence with the Willamette River	Portion of $42,000	Summary of activities in annual report	TBD	TBD		X		Research, evaluation, and design phase
	Watershed Action Plan (WAP)	Support partnership with NCWC to carry out projects from their WAP	Portion of $42,000	Summary of activities in annual report	Currently in place and ongoing	Ongoing activities with annual report to DEQ	X	X	X	Yes, implemented per requirements
Capital Investments	Boardman Wetland Project	Implement infiltration and inflow reduction/control activities	Past investment $3,000,000	Summary of activities in annual report	Currently in place and ongoing	Completed under NPDES permit requirements	X	X	X	Yes, implemented per plans
	Potential WQ project mentioned in annual report	Research, evaluate, and design WQ projects in Oak Lodge	Capital investment TBD	Summary of activities in annual report	TBD	Milestones to be set with project outline	X	X	X	Research, evaluation, and design phase
	WAP	Support implementation of the WAP developed by NCWC in 2022.	Additional capital TBD	Pursue grant funding for projects in the WAC	Currently in place and ongoing	Milestones include progress made by consultants, and approval by internal and external stakeholders	X	X	X	WAC plan completed; goal to prioritize and seek funding for projects as outlined in the WAC

Appendix D: 2013 SWMP Management Strategies for Point Sources

Appendix D: 2013 SWMP Best Management Practice (BMP) Table (per 2012 NPDES MS4 Permit)

BMP	2012 NPDES MS4 Permit Schedule A Requirement	BMP Description	Performance Measure	Management Strategies to Address:		Annual Report Tracking
				Mercury	Bacteria	
Illicit Discharge Detection and Elimination **Enforcement Response Plan and Pollution Parameter Action Levels**	4.a.i – iii	**BMP Description:** In cases where an illicit discharge has resulted in a discharge that OLWS suspects resulted in a violation of state water quality standards, water quality samples may be collected at the suspected discharge point, as well as upstream and downstream of the discharge point. This is done in an effort to prove the impact on water quality that the illicit discharge has had. The samples will be tested at the laboratory based on field observations of the discharge in an effort to identify any pollutants present in the discharge. Staff will also investigate the source of the discharge by looking in the surface water system upstream of the discharge point; samples may be taken at locations suspected of originating the illicit discharge. In cases of an oily discharge, OLWS will notify DEQ through the OERS (Oregon Emergency Response System), which is in place to address oil spills into waterways and ditches. If the DEQ and/or EPA become involved, OLWS will provide a support role to these agencies. When the source of the illicit discharge is identified, OLWS will determine whether this discharge violated OLWS's Surface Water Management Code, and if so, fines may be levied against the offending party, including all cleanup costs, investigative and sampling costs, and OLWS staff costs, including legal fees. OLWS will rely on State of Oregon water quality standards to determine a pollutant level that violates water quality as a trigger to initiate full enforcement action.	1. Documentation of Enforcement Plan 2. Response Procedures 3. Pollutant Parameter Action Levels	**X**	**X**	
Illicit Discharge Detection and Elimination **Conduct Annual Dry Weather Field Screening**	4.a.iv	**BMP Description:** The purpose of dry-weather outfall inspections is to detect an illicit discharge at the outfall or confirm that they are not present. If flow is detected during dry weather, District staff track it upstream through the storm sewer system to the source, and then address, or if necessary, control the discharge. Illicit discharges are detected during dry-weather inspections through the use of hand-held water quality measuring equipment and through visual inspections by the inspector. When a visual inspection or a pollutant level measured at an outfall indicates that an illicit discharge may be present, an upstream investigation through the storm sewer system is performed. When the discharge's source is located, District staff work with the property owner and/or business owner to evaluate, and if necessary, control the discharge.	1. Number of outfalls inspected during dry weather. 2. Number and type of illicit discharges that were encountered and controlled. 3. Status of updating procedures to address new permit requirements **Measurable Goals:** • Inspect major or priority outfalls for the presence of illicit discharges at least once per year. • Update maps of major outfalls on an annual basis. • Update dry weather field screening program to address new permit requirements by November 1, 2012.			
Illicit Discharge Detection and Elimination **Implement the Spill Response Program**	4.a.v	**BMP Description:** OLWS's Spill Response Program prevents, contains, and responds to spills of dangerous, hazardous and other materials. OLWS's Spill Response Program ensures that the actual or possible release of dangerous/hazardous materials to the MS4 is properly addressed. Except for minor incidents, OLWS's Spill Response Program personnel always coordinate closely with other agencies and departments, including Clackamas County Fire District No. 1 (and for certain incidents involving hazardous materials, the Gresham HazMat Team), DEQ, Oregon State Police, the Clackamas County Department of Transportation and Development (CCDTD), and the Oregon Department of Transportation (ODOT).	1. Number of reported spills to the MS4 system. 2. Number and type of response to the reported spills. **Measurable Goals:** Implement the spill response program and associated protocols.	**X**	**X**	
Respond to reports involving illicit discharges	4.a.V – 4.a.xii	**BMP Description:** Reports are often received from the DEQ, ODOT, Water Districts, Fire Districts, cities, citizens, district employees and others which allege that an illicit discharge has occurred or is occurring. When reports are received which allege that an illicit discharge has occurred or is occurring, OLWS will attempt to verify the allegation in a timely manner. If it can be confirmed that an illicit discharge has occurred or is occurring, OLWS staff will cooperate with the property owner and/or business owner to evaluate, and if necessary, control the discharge. Control options that may be applied or recommended by OLWS include, but are not limited to: • The removal of certain pollutants from the wastewater prior to discharge to the storm sewer system (i.e., cease usage of soap when washing). • Issuance of the proper discharge permit from DEQ. A discharge that has been authorized and controlled by a DEQ water quality permit is not an illicit discharge. • Application of the wastewater to dry land with no discharge to surface waters or storm sewers. This option is inappropriate for certain types of wastewaters, discharge rates, and soil types and may require the issuance of a WPCF permit from DEQ. • Wastewater reuse without any discharge. • Hauling the wastewater off-site for proper disposal. • With the necessary permits, discharge the wastewater to OLWS's sanitary sewer system.	1. Number of alleged illicit discharges and non-stormwater discharges which were reported each year 2. Number of illicit discharges that were controlled. **Measurable Goals:** Respond to reports involving alleged illicit discharges within 2 weeks.	**X**	**X**	
Screen Existing and New Industrial Facilities	4.b.i – 4.b.iii	**BMP Description:** Once during the permit term, OLWS will review new industrial development applications to determine whether any existing or new facilities would be subject to an industrial stormwater NPDES permit. This determination will occur based on a review of the facilities' proposed activities and the applicable SIC codes related to the 1200-series NPDES permit. If a facility is identified that would be subject to an industrial stormwater NPDES permit, the facility and DEQ will be notified within 30 days.	1. Track the number of existing or new industrial facilities subject to a stormwater industrial NPDES permit during the permit term. **Measurable Goals:** Review new industrial development applications once during the permit term to identify additional facilities needing to obtain 1200-Z permits.	**X**	**X**	

Appendix D: 2013 SWMP Best Management Practice (BMP) Table (per 2012 NPDES MS4 Permit)

BMP	2012 NPDES MS4 Permit Schedule A Requirement	BMP Description	Performance Measure	Management Strategies to Address:		Annual Report Tracking
				Mercury	Bacteria	
Address Other Industrial Facilities	4.b.i – iii	**BMP Description:** The facilities that are addressed by OLWS for this BMP are those that are not required to obtain a 1200Z permit, and/or are anticipated to contribute a substantial load of pollutants to the MS4. Facilities will primarily be inspected on a complaint-driven basis, but it is possible that some inspections will be conducted by OLWS during source tracking activities if OLWS's storm event monitoring work or routine monitoring work shows that excessive levels of one or more pollutants are present. All facilities that are the subject of a complaint will be inspected in a timely manner by District staff. The implementation of control measures for stormwater discharges from these facilities will be deemed necessary by OLWS if the presence of excess levels of stormwater pollution can be confirmed by OLWS. For instances where the presence of excess levels of pollution in stormwater has been confirmed by OLWS, and in the event that the discharger's initial attempts to improve stormwater quality do not produce the required improvement, then District personnel will continue to provide guidance and technical assistance until the facility's stormwater quality improves. The presence of excess levels of pollution in stormwater can generally be confirmed by two general methods: visual and analytical. Analytical methodologies include hand-held meters, and those performed by an environmental laboratory. OLWS will use visual or analytical methods at OLWS's discretion. Industrial users permitted under the pretreatment program 40CFR403 have an annual facility inspection which includes a review of storm water facilities.	1. Track the number of inspections performed, and where applicable, monitoring data collected. 2. Track the number of letters, enforcement actions, or other contacts made. 3. Track the number of pretreatment inspections performed. **Measurable Goals:** • Notify and work with industries to improve stormwater management if an inspection is conducted that indicates improvement is needed.	**X**	**X**	
Construction Site Runoff Control **Erosion Control Ordinances**	4.c.i – 4.c.vi	**BMP Description:** *OLWS Surface Water Management Code* OLWS updated the Surface Water Management Code (Rules and Regulations and Design and Construction Standards) in 2018 and 2020 respectively to match updated requirements through the MS4 permit and reconcile the SWWMP. The combined documents address regulatory and review requirements related to erosion control, tree removal, undisturbed buffers, and flow control and treatment requirements. These regulations require submittal of an erosion prevention and sediment control plan containing methods and/or interim facilities to be constructed or used concurrently with land development. Plan submittals are required to provide details of erosion control measures, schedules for construction, and a maintenance schedule for erosion control activities. OLWS administers "small lot" erosion control permits less than one acre and 1200CN permits for sites between 1-5 acres. OLWS has an agreement with Oregon DEQ for administration of the 1200-C sites greater than five acres in size.	1. Implement Code **Measurable Goals:** • Update SWMC and implement new code	**X**	**X**	
Public Education and Outreach **Reduce Discharges of Pesticides, Herbicides and Fertilizers**	4.d.iii	**BMP Description:** OLWS administers a public education program which provides information that attempts to motivate workers and residents to reduce stormwater pollution that is caused by the application of pesticides, herbicides, and fertilizers in OLWS. Educational information is shared with the public using: • Articles in newsletters • District's website • Through local public involvement campaigns. A recent example of a recent relevant public involvement campaign is the Oregon Environmental Literacy Plan (OELP), which is enacted as part of House Bill 2544 and lays out age-appropriate environmental literacy education. • Brochures Common topics that are addressed by this program include: • Less harmful alternatives to the use of pesticides, herbicides, and fertilizers are provided. For example, use of ladybugs to eat insect pests is encouraged as an alternative to pesticide application. • Information about the potential hazards to water quality, public health, and aquatic life associated with the misuse of pesticides, herbicides, and fertilizers in OLWS. • Users are reminded that pesticide and herbicide products need to be used in a manner consistent with the product's label.	1. Track programs messages delivered, type of communication piece, and where appropriate, the number of people affected. **Measurable Goals:** • Continue to maintain relevant public education materials on the district's website. • Prepare a minimum of one relevant article per year for inclusion with customer billing statements.			
Education and Outreach **Privately-Owned SWM Facility Education**	4.d.iv	**BMP Description**: Privately-owned SWM facilities require periodic inspection and maintenance to keep them working correctly. This effort focuses on outreach and education to those private landowners who own these types of facilities	1. Number and Type of Education and Outreach efforts specific to privately owned facility inspection and maintenance.	**X**	**X**	
Education and Outreach **Erosion Control Contractor Training Opportunities**	4.d.v	**BMP Description**: Provide notice to construction site operators concerning where education and training to meet erosion prevention and sediment control requirements can be obtained.	1. Describe efforts to provide this notice	**X**	**X**	

Appendix D: 2013 SWMP Best Management Practice (BMP) Table (per 2012 NPDES MS4 Permit)

BMP	2012 NPDES MS4 Permit Schedule A Requirement	BMP Description	Performance Measure	Management Strategies to Address:		Annual Report Tracking
				Mercury	Bacteria	
Education and Outreach **Effectiveness Evaluation**	4.d.vi	**BMP Description**: Over the permit term, OLWS will provide information related to an effectiveness evaluation. This may be conducted in coordination with other local Phase 1 jurisdictions. The effectiveness evaluation information will focus on assessing changes in targeted behaviors and will allow for additional information that can be used in adaptive management of the OLWS education and outreach strategy.	1. Report on activities annually. **Measurable Goals:** Provide/compile information regarding a public education effectiveness evaluation over the permit term.			
Education and Outreach **Employee Training**	4.d.vii	**BMP Description**: A variety of training is provided to staff associated with surface water management. Training and advisory committee opportunities are made available through local agencies and groups involved with a broad range of water quality issues including stormwater (e.g., Oregon Association of Clean Water Agencies conferences). Such training is provided based on need and availability.	1. Track the number of employees receiving training in stormwater management annually. **Measurable Goals:** Attend relevant stormwater management related training based on need and availability.			
Education and Outreach **Facilitate Public Reporting of Illicit Discharges**	4.d.viii	**BMP Description:** The District implements a program to promote, publicize, and facilitate public reporting of the presence of illicit discharges and other types of improper disposal of materials into the MS4. After District staff have received a report which relates to one of these discharges, they investigate and, if appropriate, apply control measures. See BMP #3.	1. Number illicit discharges reported. 2. Number of illicit discharges requiring action. 3. Number of educational events educating public about illicit discharges and procedures to report. 4. Number of publications educating public about illicit discharges and procedures to report. **Measurable Goals:** Create a page for public complaints on the District's website and track number of complaints for reporting.	**X**	**X**	
Public Involvement and Participation	4.e	**BMP Description:** Schedule A.4.e of the District's MS4 NPDES permit requires OLWS to provide opportunity for public participation in the development, implementation, and modification of the Storm Water Management Plan (SWMP). Prior to submittal of various milestone reports, OLWS will provide the public with an opportunity to comment for a period of 2 weeks prior to submittal dates. Comments on the documents will be collected and considered. Additionally, OLWS has many opportunities for members of the community to participate in various sub committees that provide oversight and guidance to OLWS management related to MS4 implementation.	1. Provide for public participation with the SWMP and pollutant load reduction benchmarks prior to the permit renewal application deadline.			
Post-Construction Site Runoff Control	4.f.i - 4.f.iv	**BMP Description:** *OLWS Development Review* OLWS reviews all development plans for new construction or redevelopment projects in OLWS's service area through the building permit process. All reviews are conducted in accordance with the OLWS Surface Water Management Code (SWMC). These regulations require submittal of a surface water management plan that addresses post-construction pollutant and runoff control measures. The OLWS SWMC was updated during this reporting year, and new, more stringent requirements for surface water management have been adopted.	1. Annual number of permitted, active construction projects (i.e., those projects disturbing 800 SF or more). 2. Annual number of site plan reviews and approved plans. **Measurable Goals:** Review all applicable erosion and sediment control plans submitted as part of the building permit.	**X**	**X**	
Pollution Prevention for Municipal Operations **Street Sweeping**	4.g	**BMP Description:** Major arterial curbed streets within the DTD service area (which includes OLWS) are swept on a regular basis by DTD. The frequency varies depending on a variety of factors (for example, traffic volumes). For information on their street sweeping activities, refer to the DTD MS4 NPDES SWMP.	1. Number of miles that were swept within OLWS 2. Mass or volume of material removed during sweeping **Measurable Goals:** For DTD roads, see tracking measures in the DTD MS4 NPDES SWMP.	**X**	**X**	
Operations & Maintenance for Public Streets	4.g	**BMP Description:** Operations and maintenance of public streets within the DTD service area (which includes OLWS) is the responsibility of DTD. For information on their activities, refer to the DTD MS4 NPDES SWMP.	**Measurable Goals:** • DTD Roads: See DTD's MS4 NPDES SWMP. • Remove illegal solid waste dumps as they are discovered. • Collect sand applied for ice/snow events within 10 days of the end of the event.	**X**	**X**	

Appendix D: 2013 SWMP Best Management Practice (BMP) Table (per 2012 NPDES MS4 Permit)

BMP	2012 NPDES MS4 Permit Schedule A Requirement	BMP Description	Performance Measure	Management Strategies to Address:		Annual Report Tracking
				Mercury	Bacteria	
Control Infiltration and Cross Connections to OLWS's Stormwater System	4.g	**BMP Description:** OLWS prevents exfiltration of flows from municipal sanitary through the presence of a rigorous maintenance program involving routine cleaning and inspection of lines to ensure that there are very few leaks. Lines are inspected with a television camera on a periodic basis. Tree roots, which could cause leakage, are removed whenever identified. OLWS prohibits cross-connections in new/redevelopments through the development and building permit review and issuance process. This system, which features plan review in the office and field inspections by certified plumbing inspectors, ensures that fixtures that need to be plumbed into OLWS's sanitary sewer system or a private septic system are actually plumbed into those systems, preventing hundreds of illicit discharges per year. OLWS is able to identify and control the exfiltration of flows from municipal sanitary sewers when it occurs by: • Performing dry-weather inspections at all major or priority outfalls on an annual basis to detect non-stormwater flows, and Receiving and promptly responding to reports from citizens of unusual colors, odors and solids.	1. Number of cross-connections/sanitary discharges identified. **Measurable Goals:** Eliminate any identified sanitary discharges to the storm system.	**X**	**X**	
Flood Management Projects and Water Quality	4.g	**BMP Description:** There are two Components to this BMP. The first is to ensure that water quality is assessed and addressed when developing capital improvement projects (CIPs) for flooding. The second is to examine the existing system to determine whether water quality retrofits would be beneficial and feasible. **CIPs:** OLWS develops 5- and 10-year Capital Improvement Plans to identify major projects necessary to address water quality concerns. One of the main goals and outcomes of the CIP is to prioritize what stormwater management actions and activities should be conducted in specific sub-basin areas, such as where to assist the operations and maintenance program in targeting specific activities in various locales. Another main goal of the CIP is to build projects to protect, restore, and enhance the health and function of a watershed.	1. Number of retrofits constructed that address water quality treatment. 2. Number of flood management projects implemented or constructed and the percentage of those projects that include water quality Components. **Measurable Goals:** Ensure all planned stormwater CIPs include consideration of water quality.	**X**	**X**	
Maintenance of Conveyance System Components and Structural Controls	4.g	**BMP Description:** OLWS maintains conveyance and treatment components of the storm water system that are located outside the right-of-way of publicly owned roads in maintenance agreement subdivisions or that are owned by OLWS. The conveyance components include, but are not limited to, culverts, storm sewer lines (8" or greater in diameter) and inlets. The stormwater treatment components of the system include, but are not limited to, vegetated aboveground stormwater detention facilities, sedimentation manholes, and various types of underground proprietary pollution control systems. Maintenance records are kept by both DTD and OLWS. OLWS and DTD are working on the development of an intergovernmental agreement to clarify and coordinate maintenance activities.	1. Miles of ditches and storm lines maintained 2. Number and type of components inspected and/or cleaned, and 3. Mass or volume of material removed during cleaning	**X**	**X**	
Catch Basin Cleaning and Maintenance	4.g	**BMP Description:** OLWS cleans all District owned or District operated/maintained catch basins once every five years. Catch basin cleaning activities primarily occur during the dry weather season, but during the fall, certain catch basins may be cleaned more frequently if needed. Utility crews utilize a database to document inspection and maintenance activities for the annual reports. Repair or replacement of public catch basins is scheduled following inspection.	1. Track the number of District owned or District operated/maintained catch basins cleaned per year. 2. Track the mass or volume of debris removed during cleaning activities. **Measurable Goals:** • Clean OLWS operated/maintained public catch basins on a 5-year rotational basis. • Schedule repair or replacement of catch basins based on inspection results.	**X**	**X**	
Private Surface Water Facility Maintenance Program	4.g	**BMP Description:** This BMP includes maintenance agreements for stormwater quality and detention structures in residential areas. There are very few of these facilities in OLWS. This infrastructure varies from subdivision to subdivision but may include any of the following: catch basins, below-ground stormwater detention tanks, above-ground storm water detention and/or water quality ponds, below-ground vortex separators, and swales.	1. Number of structures inspected and cleaned.	**X**	**X**	
Hydro-modification Assessment	5.a – 5.d	**BMP Description:** OLWS anticipates partnering with adjacent co-permittees (CCSD#1, CCDTD) to develop a simplified tool for development engineers to easily size LID BMPs to address the duration of elevated flow levels in addition to addressing flow volumes and peaks. Use of the tool in designing LID BMPS is expected to ultimately address the long-term impacts of increased runoff from development. To address flow durations, a long-term continuous simulation of hydrology is required. As a result, designing and sizing BMPs becomes more complicated than traditional design practices focused on a single design event. In order to make the BMP design process easier for the development community, neighboring states have developed a sizing tool. Currently, there are no BMP design/sizing tools to address the impacts of Hydromodification that are applicable to local conditions such as rainfall patterns and critical channel forming flows. This tool will provide a simple, consistent and defensible methodology for designing/sizing LID throughout Clackamas County and the region to address Hydromodification impacts.	1. Net impervious area treated by LID. 2. Number of applications submitted using tool. 3. Customer Feedback/Community Relations. **Measurable Goals:** The primary goal is to develop, by June 30, 2013, a tool to assist development engineers with the design/sizing of stormwater management facilities in order to reduce target pollutants and stream degradation impacts (i.e., Hydromodification) associated with the development of impervious surfaces.			