



Oak Lodge Water Services District

**Willamette Basin
TMDL Implementation Plan**

**May 2014
(Updated February 2019)**

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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 temperature, bacteria, and mercury. These standards assure 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 determines the quantity of constituent pollutants that can be added to the river without exceeding water quality standards.

DEQ issued a pollution reduction plan for temperature, bacteria, and mercury in the Willamette Basin in September 2006. The pollution reduction plan came as a department order called a Total Maximum Daily Load (TMDL). DEQ required several entities with land and water management responsibilities to submit plans for reducing their nonpoint source pollutant inputs within 18 months. These plans are TMDL Implementation Plans. Reporting requirements for those entities, called Designated Management Agencies (DMAs), included an annual progress report and a comprehensive assessment of activities after five years.

As part of the Willamette TMDL, DEQ developed a Water Quality Management Plan (WQMP) to describe the overall framework for implementing the Willamette Basin TMDL. The WQMP includes a description of activities, programs, legal authorities, and other measures for which Oregon DEQ and other designated management agencies (DMAs) have regulatory responsibility. The Oak Lodge Water Services District (OLWSD) will implement TMDL requirements under the auspices of NPDES wastewater discharge permit 101063 and MS4 permit 108016.

The Willamette River TMDL requires preparation of TMDL implementation plans. Along with other cities and agencies in the Willamette Basin, OLWSD will develop a TMDL Implementation Plan because it manages both point source and non-point source stormwater discharges to the Willamette River from its jurisdictional area. The District serves an estimated population of 30,000 in unincorporated Clackamas County, which includes small portions of the cities of Gladstone and Milwaukie.

TMDLs, the WQMP, and associated Implementation Plans and activities 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 Plan will in most cases not be realized in the short term, may take several decades to be measurable, or may be unattainable.

It should be noted that the Willamette River and Kellogg Creek originate outside the jurisdictional area of OLWSD and therefore already contain levels of TMDL pollutants resulting from natural causes, and various land uses and activities before they reach the District's jurisdictional area. In this Implementation Plan, the District recognizes that it is

only responsible for mitigating or improving the water quality that results from activities within the District's jurisdiction. These mitigation and improvement measures may not be sufficient to improve the water quality of the listed water bodies so that standards are met.

In January 2019, the District began a Watershed Protection Master Plan. As a part of this process, the first effort will be to gauge the public's understanding of the Watershed Protection Program and to gauge their interest in taking on responsibilities currently held by Clackamas County. It is unknown at this point how this process will change the District's Stormwater efforts; however, there is potential that changes to this document may be proposed before the next 5-year review.

2. Water Quality Assessment

TMDLs have been developed for the Lower Willamette River for temperature, bacteria, and mercury. Previous sampling and study work indicate that the OLWSD generally does not significantly contribute to the temperature, bacteria and Mercury conditions in the mainstem Willamette.

OLWSD has stormwater discharges that flow overland and enter receiving waters directly without first entering a stormwater conveyance system or MS4 point source. While these discharges should be considered nonpoint sources, they have been included and covered under the District's NPDES permit for ease in management; therefore, the management strategies summarized in the following sections for bacteria and mercury are broken out into both point and non-point sources.

Concerns Associated with Pollutants

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.

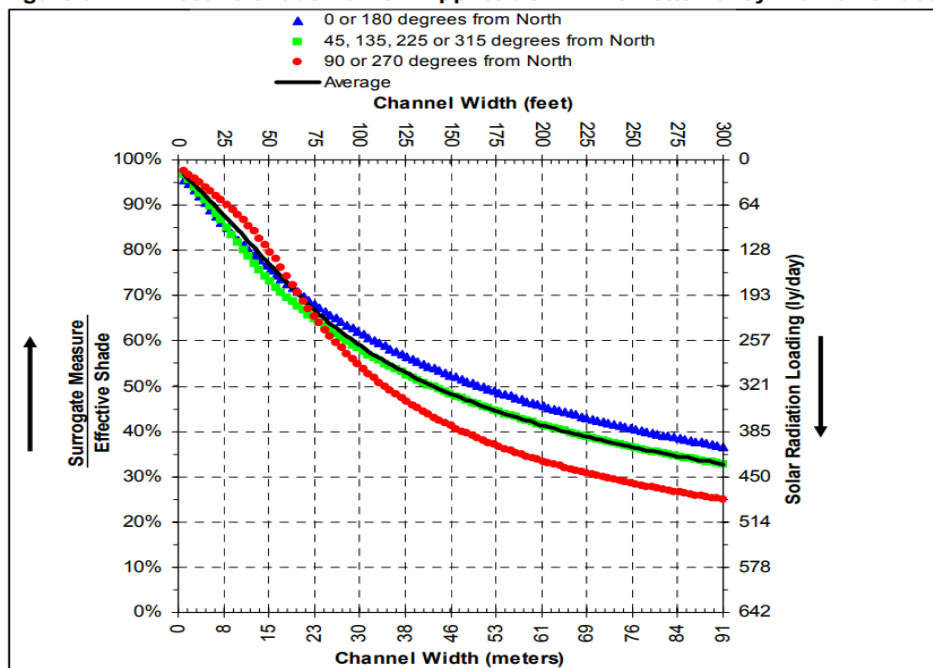
Due to tidal effects, channel morphology, flow characteristics, and other factors the Willamette River along the District boundary is considered a fish transitory area. The District's contribution to the temperature concerns and ability to influence these concerns is extremely limited, but because of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

For areas within the Lower Willamette Subbasin, shade curves were created based on ecoregions, which describe regions with relative likeness of ecological systems and are

identified through patterns of soil composition, vegetation, climate, and topography (DEQ 2006). Potential vegetation type, height, canopy overhang, and canopy density were estimated for each identified ecoregion within the Lower Willamette Subbasin, and subsequently used to develop the shade curves. The selected shade curves are meant to act as a guideline, since site specific conditions could inhibit the vegetation from reaching the height and overhang values used to generate the curves (DEQ 2006).

The District boundaries of OLWSD lay within the Willamette Valley Prairie Terraces, based on the Lower Willamette Subbasin TMDL. Based the Effective Shade Curve from that document, along with what the District knows about our streams, we estimate an average stream width of 25 feet and an average cardinal direction orientation of District streams (see Figure 5.71).

Figure 5.71. Effective Shade Curve - Applicable in Willamette Valley Prairie Terraces



Estimating that OLWSD's streams are 25' in width, the average (black line) effective shade would equate to about 87% based on riparian trees growing to their site potential (based on species of trees, height, density). That % shade(s) becomes the DMA's surrogate target to meet the temperature TMDL. Generally, the wider the stream the less effective shade.

Since the last OLWS Implementation Plan Annual Report, the local watershed council NCWC conducted a Watershed Action Plan which produced several informational documents mapping OLWSD stream characteristics (see Attachments D – NCWC Stream Reach Prioritization and E – NCWC Stream Reach Break). These documents were produced for NCWC in order to help them prioritize restoration and enhancement actions within the watershed council's area. OLWSD benefits from our partnership with NCWC because these maps can also help the District focus resources for both NCWC and other potential partners.

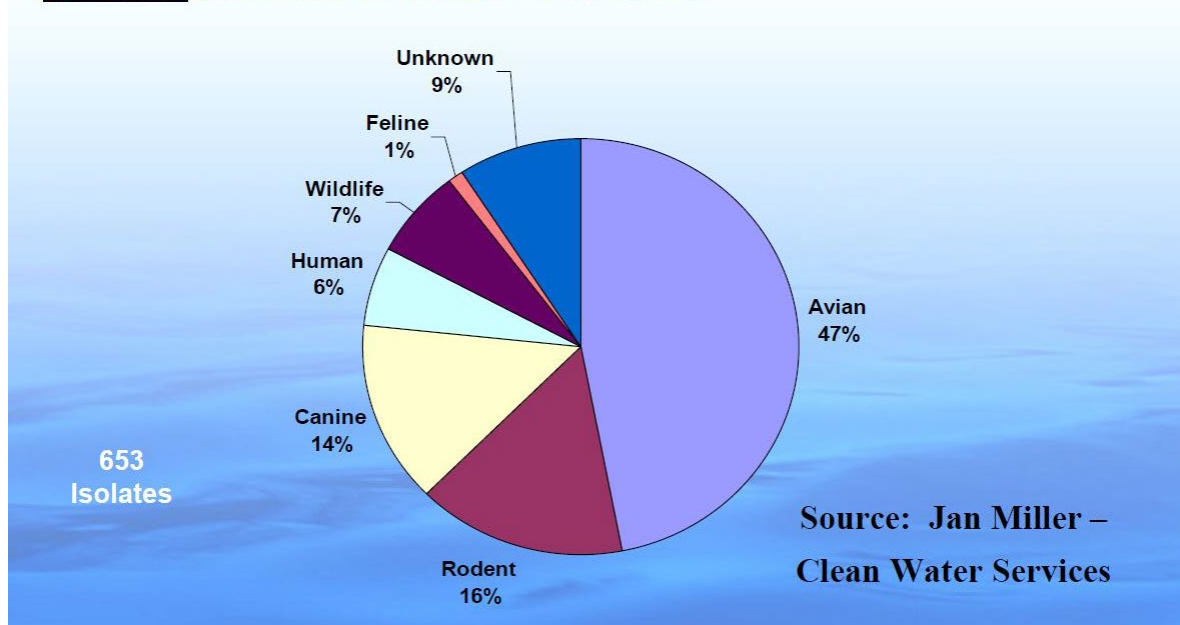
Based on what we know, our opportunities and potential resources, the measures OLWSD is currently taking to address the temperature TMDL are sufficient.

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 DNA Source Tracking Study – Stream Bacteria Sources pie chart). As described below in the BMPs, the District’s TMDL Implementation Plan limits its concern to anthropogenic sources of bacteria and addresses reduction specifically through a pet waste outreach program focused on behavior change.

DNA Source Tracking Study - Stream Bacteria Sources – All Sites



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. As discussed in the TMDL document, the sources and impacts of Mercury are not well

understood and require further study. DEQ intends to further define the management of Mercury concerns in a separate order.

3. Management Strategies

The matrix of activities included as Appendix A includes a summary of activities implemented or planned by OLWSD. For each activity the corresponding management strategies, progress to date, future planned activities, and the pollutant affected by the activity are listed.

The matrix includes the following categories of activities:

SURFACE WATER MANAGEMENT PROGRAM

As required by the MS4 permit, OLWSD has an approved Stormwater Management Plan dated May 2013 (see Appendix B). The Willamette Basin TMDL provides that a TMDL implementation plan should complement, not duplicate, a stormwater management plan. In maintaining that approach, OLWSD is referencing the 2013 SWMP for the TMDL Implementation Plan update for 2019.

In the event that the SWMP is updated during the term of the 2019 TMDL Implementation Plan time span, the updated SWMP shall continue to complement the District's TMDL Implementation Plan. The TMDL Implementation Plans that have been approved by DEQ remain effective until an updated plan is approved.

The SWMP describes the best management practices used to reduce urban stormwater pollution into the Willamette River. The OLWSD implementation of TMDL surface water requirements will be in response to the MS4 permit requirements, including the stormwater management plan authority through the District's MS4 program. The MS4 Permit addresses Bacteria allocations (and will address Mercury), which for ease of management will be applied to the TMDL Implementation Plan (see Attachment C).

A summary of the best management practices used in relation to TMDL pollutants is as follows:

Temperature

The water quality temperature criterion for the Lower Willamette is 20 degrees Celsius. The Lower Willamette exceeds this standard during the summer months. OLWSD MS4 waters do not reasonably cause or contribute to the degradation for the rationales listed below:

1. The Willamette River exceeds the water quality criteria prior to reaching the OLWSD boundary.
2. OLWSD encompasses only 3349 acres, which is a minute fraction of the Willamette River watershed.

3. The Willamette River ambient temperatures generally exceed measured local creek temperatures. OLWSD stormwater discharges provide cooling to the main river.
4. The District monitors temperature through quarterly sampling. Data shows that creek (Willamette River tributary) temperatures generally do not exceed the 18 degrees Celsius standard.
5. The District, through its development ordinances, requires conservation of the riparian areas and the associated shade canopy.

The current BMPs, especially the sensitive lands requirement, combined with the lack of significant impact described above, can be considered effective in meeting the water quality temperature standard.

BMP Measures for Temperature

As noted above, OLWSD stormwater discharges do not generate significant thermal loads on the river. The main mechanism for warming stormwater involves the heating of exposed surfaces due to solar radiation. BMPs include creating new shade or maintaining existing shade, educating the public about shading, and preventing the illicit discharge of hot water to improve the temperature of the receiving waters.

Since the Willamette Basin TMDL uses shade as the surrogate for thermal load allocations, OLWSD sets restoration, enhancement, and preservation of shade through riparian vegetation as a target goal. In order to uphold or increase vegetation along the streams in the District, which are primarily in private ownership, OLWSD works with our local watershed council in a partnership program prioritizing streambank owners.

The following OLWSD BMPs address warming of receiving waters:

Development Review Measures

- OLWSD 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

Public Education/Outreach includes non-point (TMDL) and point (MS4) source pollution reduction outreach messaging through Non-Profit Partnerships /Sponsorships, including:

- Streamside Stewards Program – North Clackamas Watersheds Council (NWWC)
- Ecology in Classrooms and the Outdoors
- Backyard Habitat Certification Program – Audubon and Columbia Land Trust
- Watershed Health Education Program with Rex Putnam High School
- Clean Rivers Coalition (statewide)
- Regional Coalition for Clean rivers and Streams (metro regional)

OLWSD Newsletters

Educational Brochures

OLWSD Website

OLWSD Participation in Regional Educational Activities, including:

- Children's Clean Water Festival
- Clackamas County's Celebrating Water Forum
- Oak Grove Trolley Trail Festival
- Support of regional watershed council outreach at The Big Float

Private Property Tree Planting program with local watershed council:

Streamside Stewards Program through NCWC

Surrogate Shade

During the previous TMDL Implementation Plan term, the District completed a GIS analysis to determine the stream shading potential as a surrogate for effective shade to address the water temperature TMDL. The GIS analysis is scheduled to be updated with current data during the 2014-2015 permit year. OLWSD incorporated the surrogate shade analysis in the form of the "Stream Shading Rating" map as Attachment B.

Mercury

Mercury has been identified as exceeding the water quality standards. Recent DEQ work on Mercury in the Willamette Basin indicates a need for further study of both the sources of and the formation of methyl 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*). The OLWSD MS4 waters do not reasonably cause or contribute to the degradation for these rationales:

1. The Willamette River exceeds the water quality criteria prior to reaching the OLWSD boundary.
2. OLWSD encompasses only 3349 acres, which is a minute fraction of the Willamette River watershed.
3. Major industrial users with Mercury processes do not exist in the District.
4. The Willamette River TMDL does not identify MS4 discharges as a significant source of Mercury.
5. Stream sediments seem to be a major source of Mercury, not stormwater outfalls.
6. Mercury is not a significant component of municipal stormwater discharges in the Portland Metro area. Mercury sampling is currently required in the 2012 MS4 permit. OLWSD completed the initial sampling for mercury during spring, 2014. Mercury was detected in very low concentrations at the sampling location. Considering the lack of a significant source of Mercury in the District and a definite need for understanding of the Mercury physical processes in the environment, the current BMPs are considered effective.

BMP Measures for Mercury:

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. Barring any major source of Mercury, the only available BMPs involve sediment/erosion control and illicit discharge measures.

The OLWSD TMDL (non-point source) programming that address Mercury are:

- Hg outreach and education programming in partnership with non-profit partners
- Riparian Ordinances
- Development buffers for riparian protection
- BMPs to reduce sediment/runoff direct to streams

Development Review Measures

- OLWSD 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

The OLWSD MS4 (point source) BMPs that address Mercury are:

Planning BMP's:

- Trapped Sumps in Catch Basins and Water Quality Manholes
- Erosion Control Measures
- Development Review Measures
- BMP Implementation and Adaptive Management

Structural BMP's:

- Trapped Sumps in Catch Basins and Water Quality Manholes
- Detention and water quality treatment facility Installation Requirements

Operations and Maintenance BMP's:

- Street Sweeping
- Water Quality Sump Cleaning
- Catch Basin/ Area Drain Cleaning and Maintenance
- Detention System Maintenance
- Ditch Cleaning and Maintenance

Illicit Discharge BMP's:

- Visual Inspection of Outfalls
- Water Quality Monitoring
- Industrial Inspections and Inventory
- Pollution Complaint Investigation

Bacteria

A total maximum daily load (TMDL) has been developed for the mainstem of the Willamette River including all tributary reaches listed as water quality limited on the 2002 303(d) list. The TMDL includes load allocations based on analysis of current conditions, loading capacity, excess loading due to anthropogenic sources, and wasteload and load

allocations for controllable sources of bacteria. Load allocations have been developed for nonpoint sources throughout the basin and in the mainstem of the river to ensure water quality standards will be met (From: *Chapter 2 of the Willamette Basin TMDL – Bacteria*).

Fecal coliform bacteria have been 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 now *e. Coli*. In the Willamette mainstem, the TMDL load allocations point to a 78% reduction of E. Coli for tributaries and the Willamette mainstem.

The OLWSD MS4 discharges do not reasonably cause or contribute to the degradation due to the rationales listed below:

1. The Willamette River exceeds the water quality criteria prior to reaching the OLWSD boundary.
2. OLWSD encompasses only 3349 acres, which is a minute fraction of the Willamette River watershed.
3. The District 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. The vast majority of residences, commercial facilities and industrial users in the District are connected to the sanitary sewer system. New septic tanks or other alternate sanitary systems are not allowed. Existing septic systems (2) in OLWSD are not allowed to be reconstructed or repaired, connection to the sanitary sewer system would be required.
5. Recent 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 (See: *DNA Source Tracking Study – Stream Bacteria Sources pie chart above*).
6. Water quality measurements indicate that the Willamette River has seen improvements in bacteria levels over the last 5 years.

With bacteria levels resulting largely from natural sources, and with the lack of a significant impact created by OLWSD, the current BMPs are considered effective.

BMP Measures for Bacteria

As noted above, fecal coliform and *e. Coli* bacteria occur naturally due to wildlife activities. While fecal bacteria can manifest in visible debris, generally the suspended form creates the water quality concern. Filtration and sedimentation do not reduce the amount of bacteria in suspension. Some natural processes, such as sunlight and soil filtration, can reduce bacteria levels, but the performance of these processes is highly variable and difficult to predict.

The best approach to reduce bacteria levels in stormwater involves removing the human sources of bacteria, improving the natural removal processes, and sedimentation (removal of material prior to suspension).

The OLWSD TMDL (non-point source) programming that address Bacteria are:

Outreach and education programming in partnership with non-profit partners
Undisturbed Buffer (riparian) requirements
Post-construction BMPs to reduce untreated surfacewater directed to streams

The OLWSD MS4 (point source) BMPs that address these mechanisms are (See 2013 Stormwater Management Plan for descriptions of the BMPs):

Planning Measure BMP's

Trapped Sumps in Catch Basins and Water Quality Manholes
Erosion Control Measures

Development Review BMP's:

Surface Water Code: water quality treatment facilities, buffer setbacks,
erosion control
Adaptive Management

Public Education/Outreach

OLWSD Newsletters
Catch Basin Stenciling
Educational Brochures
OLWSD Website
OLWSD Participation in Regional Educational Activities
Pet Waste Education Program and Signage along Parks and Regional Trails
SWM Citizens Advisory Committee

Structural Measures

Trapped Sumps in Catch Basins and Water Quality Manholes
Detention and Water Quality Treatment Facility Installation Requirements

O&M Measure

Street Sweeping
Water Quality Sump Cleaning
Catch Basin/ Area Drain Cleaning and Maintenance
Detention System Maintenance
Pipe Cleaning and Maintenance
Ditch Cleaning and Maintenance
Implementation of GIS System and Asset Management Database

Illicit Discharge

Visual Inspection of Outfalls
Water Quality Monitoring
Industrial Inspections and Inventory
Pollution Complaint Investigation (includes dye testing for cross connections
with sanitary sewer system)

4. Performance Monitoring

OLWSD will track TMDL Implementation Plan activities and report to DEQ as required. The District reports performance on a monthly or annual basis depending on permit conditions. In addition, the District will review and revise this Implementation Plan as needed following DEQ reevaluation of the TMDL, or as required by DEQ.

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 and land 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 district (also known as a “service provider”), the OLWSD 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 code which are the typical municipal tools used to demonstrate compliance with land use requirements. Rather, OLWSD’s compliance is generally achieved from its compliance responsibilities with the District’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 District’s practices in this IP and provides for coordination with the District 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 broad policies 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, overarching goals 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 District is a co-permittee with the Clackamas County Phase I MS4 Permit with authority allocated to each separate jurisdiction. Clackamas County recognizes that the District 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 District 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 District and Agency Coordination’s Policy 1 authorizes Clackamas County to:

“Participate in interagency coordination efforts with federal, state, Metro, special purpose districts and cities. The County will maintain an updated list of federal, state and regional

agencies, cities and special districts 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 District for proposals within the District’s jurisdiction to ensure that approval is not granted in the absence of adequate surfacewater 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’s Comp 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.

OLWSD is a sanitary, watershed protection and water district formed and operating under ORS 450. Under the District’s previous name OLSD, OLWSD began enactment of a surface water management program in July 1993 and sanitary system in 1960. The District 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 District’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 District 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 portion of this money is used to support TMDL implementation.

Stormwater Capital Improvements tend to be lesser than what most cities commit to since the public stormwater infrastructure in OLWSD 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 the individual program.

It is estimated that the TMDL expenses come to 10% of the Stormwater Program fees. Currently, the SWM Program fees come to \$2,861,000, with about \$880,000 of that being operational expenses, and just under \$2,000,000 allocated for capital investments. Of the total SWM program budget, the TMDL program support comes to about \$286,100 per year. Over five years that puts support for TMDL program implementation at \$1,430,500.

Two specific programs that fall within the TMDL implementation include support of the North Clackamas Watersheds Council's Streamside Stewards Program, which OLWS sponsors at \$42,000/year, and sponsorship of the North Clackamas Parks and Recreation District's Pet Waste Bags program at \$5,600/year. Over five years those program costs come to \$210,000 and \$28,000, respectively.

As the District continues its programs into the future, the District will use the adaptive management process for implementing changes to the TMDL Implementation Plan.

2. Description of Legal Authority (by District).

The Oak Lodge Water Services District (OLWSD) is a municipal corporation organized and operating under Chapters 198, 264 and Chapter 450 of the Oregon Revised Statutes. The purpose of OLWSD is to supply its users with sanitary sewage conveyance and treatment, watershed protection/surface water quality management, and domestic water supply. As a sanitary district formed under ORS 450, OLWSD 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 District under ORS 450 cannot provide land use regulation. Clackamas County provides local land use regulation through the Clackamas County Zoning and Development Ordinance and Comprehensive Plan. Under State law and the Comprehensive Plan, Oak Lodge Water Services District implements its requirements by participating in Clackamas County's land use process. The District assumed surfacewater 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 OLWSD has limited opportunity to address mainstem cold water refugia. The District's boundary stops at the normal high water elevation. The District 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 river banks negate potential for main stream shading. This steep rocky geology also precludes improving the habitat without major channel disturbances. The deep river channel may provide temperature refuge all along the District 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 District's sensitive land ordinances and participation in County land use regulation.

4. Attachments

Attachment A

TMDL Implementation Plan Matrix

Attachment B

2018-2019 OLWS MS4 Appendix A BMP Table

Attachment C

Stream Shading Rating Map

Attachment D

NCWC Stream Reach Prioritization

Attachment E

NCWC Stream Reach Break Maps

**Oregon DEQ: 5-Year TMDL Reporting Matrix
DMA: Oak Lodge Water Services District
Attachment "A"**

STRATEGY	PROGRAM	ACTIONS	BUDGET	MEASUREABLE OBJECTIVES	TIMELINES	MILESTONES	ADDRESSES			5-YEAR IMPLEMENTATION PLAN STATUS
							Bacteria TMDL	Temp TMDL	Mercury TMDL	
Temperature and Bacteria NPS Strategies	illicit discharge controls		Staff FTE and response materials	None required	These events are dealt with immediately upon notice to the District. Depending on the severity of the event, some are open as long as a few weeks; however, there are no events are currently open.	Ongoing activity with annual report to Oregon DEQ	X		X	Yes, implemented per requirements
	Require that construction and repair of sanitary facilities meet DEQ, OLWSD, and county plumbing codes		Staff FTE and response materials	Summary of activities in annual report	Currently in place and ongoing	Ongoing activity with annual report to Oregon DEQ	X			Yes, implemented per requirements
	Enforce OLWSD and State septic system ban within District		Staff FTE and response materials	None required	Currently in place and ongoing	When each of the two septic systems are abandoned properly and connected to the public system.	X			Implemented per requirements and included in OLWSD code. Currently two functioning septic systems exist in OLWSD that meet State Code for structures distance to public mains.
	Implement Industrial Pretreatment Program		Staff FTE and response materials	Summary of activities in annual report	No current significant users. Program is in place, but not certified by DEQ.	Ongoing activity in compliance with NPDES and MS4 permit	X	X	X	With no current significant users (other than the District's Wastewater Treatment Plant) District Staff is currently working to gain DEQ certification of its program. Quotes have been gained from consultants and Budget is being created for FY20. Once the Budget is approved, Staff will begin on July 1, 2019 to finalize the Program Documents and submit the work to DEQ for approval.
	Dog Waste Bags Installation Behavior Change Program in partnership with North Clackamas Parks & Recreation	NCPRD Staff installs branded dog waste bags in local NCPRD/OLWSD parks with walking trails	\$5,500	Plan was developed and implemented.	OLWSDD will re-implement the existing outreach if needed in the future.	Ongoing activity			X	Notification completed in 2013 to all dentist businesses in OLWSDD
Outreach and Education Partnerships	Clean Rivers Coalition partnership - "One Water" message campaign (includes bacteria)	Messaging campaign	\$3,000	Potential options will be studied, designed and implemented as part of the OLWSDD Capital Improvement Program	Ongoing	Ongoing activity		X		Being continuously implemented. Major Water Reclamation Facility upgrade completed in 2012
	Regional Coalition for Clean Rivers and Streams	Messaging campaign	\$3,000							
	Backyard Habitat Certification Program support in partnership with Audubon Society and the Columbia Land Trust	Private Landowner outreach and behavior change campaign	\$7,500							
	Watershed Health Education Program in partnership with Rex Putnam High School	Experiential Education program, in classroom and field, includes restoration and enhancement planting activities	\$11,000							
	Ecology in Classrooms and the Outdoors partnership	Experiential Education program, in classroom and field, includes restoration and enhancement planting activities	\$18,000							
Technical Programs	Streamside Stewards Program partnership w/ NCWC	Private landowner riparian outreach efforts	\$42,000	Summary of activities in annual report	Currently in place and ongoing	Ongoing activity with annual report to Oregon DEQ	X			Yes, ISI Assessment initiated for certain collection system lines
	Potential stream temperature monitoring partnership w/ NCWC to assess effectiveness of riparian and other projects	Monitoring study or Watershed Action Plan		Summary of activities in annual report	Currently in place and ongoing	Ongoing activity with annual report to Oregon DEQ	X			Yes, Implemented per requirements
	Scoop the Poop campaign partnership w/ North Clackamas Parks & Recreation (bacteria)	Sponsor NCPRD to purchase branded pet waste bags and install in District								
	Cold water refuge-continue to seek opportunities to identify and protect	Watershed Action Plan outcome program implemented by NCWC			Summary of activities in annual report	Currently in place and ongoing	Ongoing activity with annual report to Oregon DEQ	X		
Capital Investments	Boardman Wetland Project			Report progress in annual report	Nearing completion	Comply with NPDES permit requirements		X		Complying with 2012 MS4 permit. WLA submitted 11/1/15.
	Potential WQ project mentioned in annual report (estimated at around \$250K)			Report progress in annual report	Not yet planned	Milestones to be set with project outline	X			Not yet started
	Watershed Protection Master Plan	In January 2019, the District began a Watershed Protection Master Plan. As a part of this process, the first effort will be to gauge the public's understanding of the Watershed Protection Program and to gauge their interest in taking on responsibilities currently held by Clackamas County. It is unknown at this point how this process will change the District's Stormwater efforts; however, there is potential that changes to this document may be proposed before the next 5-year review.		Report progress in annual report	Currently in place and ongoing	Milestones include progress made by consultants, and approval by internal and external stakeholders (Board and public input).	X	X	X	Uncertain - based on receipt of plan and multiple factors effecting how to implement the plan.

Appendix A: BMP Table—OLWS 2018-2019 Summary of BMP Implementation

Best Management Practice	MS4 Permit Schedule A Requirement	BMP Description	Performance Measure	Annual Report 2018-2019
<p>Illicit Discharge Detection and Elimination</p> <p>Enforcement Response Plan and Pollution Parameter Action Levels</p>	<p>4.a.i – iii</p>	<p>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.</p> <p>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 the District’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.</p> <p>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.</p>	<ol style="list-style-type: none"> 1. Documentation of Enforcement Plan 2. Response Procedures 3. Pollutant Parameter Action Levels 	<ol style="list-style-type: none"> 1. Illicit discharges are managed through the Districts documented Illicit Discharge Program. 2. OLWS maintains an SOP (Standard Operation Procedure) for staff to perform enforcement actions with illicit discharges. 3. OLWS has determined pollutant parameter action levels to match Oregon State water quality standards.
<p>Illicit Discharge Detection and Elimination</p> <p>Conduct Annual Dry Weather Field Screening</p>	<p>4.a.iv</p>	<p>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.</p>	<ol style="list-style-type: none"> (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 <p>Measurable Goals:</p> <ul style="list-style-type: none"> • 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. 	<ol style="list-style-type: none"> 1. Five Dry Weather Outfalls were inspected each quarter during the dry season of the 2018/2019 Permit year. 2. No illicit discharges were noted from the outfall inspections. 3. No new requirements were established for the 2016/2017 OLWS Storm Water Monitoring Plan.

Appendix A: BMP Table—OLWS 2018-2019 Summary of BMP Implementation

Best Management Practice	MS4 Permit Schedule A Requirement	BMP Description	Performance Measure	Annual Report 2018-2019
<p>Illicit Discharge Detection and Elimination</p> <p>Implement the Spill Response Program</p>	<p>4.a.v</p>	<p>BMP Description: The District’s Spill Response Program prevents, contains, and responds to spills of dangerous, hazardous and other materials. The District’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, The District’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, Clackamas County’s Road Department (DTD), and Oregon’s Department of Transportation.</p>	<p>(1) Number of reported spills to the MS4 system.</p> <p>(2) Number and type of response to the reported spills.</p> <p>Measurable Goals:</p> <ul style="list-style-type: none"> Implement the spill response program and associated protocols. 	<p>Due to staff turnover and a lack of documentation, it is unknown how many storm water complaints of potential spills occurred during the 2018/2019 reporting period.</p> <p>At least 2 complaints were filed by the Pollution Prevention Specialist to DEQ for action. One of which was an enforceable event.</p>
<p>Respond to reports involving illicit discharges</p>	<p>4.a.v – 4.a.xii</p>	<p>BMP Description: Reports are often received from Oregon’s DEQ, Oregon’s 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 confirm the allegation in a timely manner. If it can be confirmed that an illicit discharge has occurred or is occurring, District staff will cooperate with the property owner and/or business owner to evaluate, and if necessary, control the discharge. Control options that may be applied or recommended by the District include, but are not limited to:</p> <ul style="list-style-type: none"> 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. 	<p>(1) Number of alleged illicit discharges and non-stormwater discharges which were reported each year</p> <p>(2) Number of illicit discharges that were controlled.</p> <p>Measurable Goals:</p> <ul style="list-style-type: none"> Respond to reports involving alleged illicit discharges within two weeks. 	<p>OLWS received at least 2 possible Illicit discharge complaints during the reporting year 2018/2019.</p> <p>At least 1 complaint was found to be reportable Illicit discharges.</p> <ul style="list-style-type: none"> Oak Lodge staff was found to be discharging sediment laden water into a catch basin that drained to Kellogg Creek. DEQ was made aware of the pumping and ultimately fined the District. Since this event, staff have been trained on how to properly dispose of this material and what to do in the event of seeing it happen elsewhere in the District. Staff vehicles have also been equipped with the necessary tools to manage these events quickly.
<p>Screen Existing and New Industrial Facilities</p>	<p>4.b.i – 4.b.iii</p>	<p>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.</p>	<p>(1) Track the number of existing or new industrial facilities subject to a stormwater industrial NPDES permit during the permit term.</p> <p>Measurable Goals:</p> <ul style="list-style-type: none"> Review new industrial development applications once during the permit term to identify additional facilities needing to obtain 1200-Z permits. 	<p>The District currently has 2 1200Z permit holders in its boundaries.</p> <p>No new Industrial user accounts were opened in 2016/2017</p> <p>The District continually reviews all new industrial facilities through its development review process.</p>

Appendix A: BMP Table—OLWS 2018-2019 Summary of BMP Implementation

<i>Best Management Practice</i>	<i>MS4 Permit Schedule A Requirement</i>	<i>BMP Description</i>	<i>Performance Measure</i>	<i>Annual Report 2018-2019</i>
Address Other Industrial Facilities	4.b.i – iii	<p>BMP Description: The facilities that are addressed by the District for this BMP are those that are not required to obtain a 1200Z permit, and/or are anticipated to contribute a substantial load of pollutants to the MS4.</p> <p>Facilities will primarily be inspected on a complaint-driven basis, but it is possible that some inspections will be conducted by the District during source tracking activities if the District’s storm event monitoring work or routine monitoring work shows that excessive levels of one or more pollutants are present. All facilities that are the subject of a complaint will be inspected in a timely manner by District staff. The implementation of control measures for stormwater discharges from these facilities will be deemed necessary by the District if the presence of excess levels of stormwater pollution can be confirmed by the District. For instances where the presence of excess levels of pollution in stormwater has been confirmed by the District, and in the event that the discharger’s initial attempts to improve stormwater quality do not produce the required improvement, then District personnel will continue to provide guidance and technical assistance until the facility’s stormwater quality improves.</p> <p>The presence of excess levels of pollution in stormwater can generally be confirmed by two general methods: visual and analytical. Analytical methodologies include hand-held meters, and those performed by an environmental laboratory. The District will use visual or analytical methods at the District’s discretion.</p> <p>Industrial users permitted under the pretreatment program 40CFR403 have an annual facility inspection which includes a review of storm water facilities.</p>	<ol style="list-style-type: none"> 1. The number of inspections performed, and where applicable, monitoring data collected. 2. The number of letters, enforcement actions, or other contacts made. 3. Number of pretreatment inspections performed <p>Measurable Goals:</p> <ul style="list-style-type: none"> • Notify and work with industries to improve stormwater management if an inspection is conducted that indicates improvement is needed. 	<p>There are 4 commercial or industrial sites that were anticipated to contribute a substantial load of pollutants to the MS4 during 2018/2019.</p> <ol style="list-style-type: none"> 1. 16600 SE Kens Ct. (Blue Sky Filters) 2. 3901 SE Naef Rd. (NW Flex Space) 3. 3810 SE Naef Rd. (Stanley Tools) 4. 3701 SE Naef Rd (Buffalo Welding) <p>There is no storm event monitoring work or routine monitoring work showing excessive levels of pollutants present.</p> <p>There are no industrial users that are permitted under OLWS’s pretreatment program.</p> <p>There was no monitoring performed on stormwater discharged by OLWS’s commercial or industrial accounts.</p>
Construction Site Runoff Control Erosion Control Ordinances	4.c.i – 4.c.vi	<p>BMP Description:</p> <p><i>OLWS Surface Water Management Code</i></p> <p>The District updated the Surface Water Management Code (Rules and Regulations and Design and Construction Standards) in 2018 and 2019 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.</p>	<p>(1) Implement Code</p> <p>Measurable Goals:</p> <ul style="list-style-type: none"> • Update SWMC and implement new code 	<p>The District makes updates the Surface Water Management Code (Rules and Regulations and Design and Construction Standards) annually as needed.</p>

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Best Management Practice	MS4 Permit Schedule A Requirement	BMP Description	Performance Measure	Annual Report 2018-2019
<p>Public Education and Outreach</p> <p>Topic: Reduce Discharges of Pesticides, Herbicides and Fertilizers</p>	<p>4.d.iii</p>	<p>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 the District. Educational information is shared with the public through the use of:</p> <ul style="list-style-type: none"> • 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 <p>Common topics that are addressed by this program include:</p> <ul style="list-style-type: none"> • 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 the District. • Users are reminded that pesticide and herbicide products need to be used in a manner consistent with the product’s label. 	<p>(1) Track programs messages delivered, type of communication piece, and where appropriate, the number of people affected</p> <p>Measurable Goals:</p> <ul style="list-style-type: none"> • 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. 	<p>The following outreach efforts occurred last year: Six newsletters including surface water education topics in each;</p> <p>School Outreach: Administered Watershed Health Education Program (WHEP) with our high school partner, Rex Putnam H.S. OLWS conducted: six group plant tours for 3rd- college aged students; macroinvertebrates workshops for elementary and high school students; native plantings and watershed education for District 5-12th grade students; Rex Putnam WHEP annual report and Board presentation; planting at Rinearson Creek site with WHEP students and elementary school OELP students; partnered with Ecology in Classrooms and Outdoors to conduct water quality lessons; and supported restoration with View Acres Elementary School;</p> <p>Events: OLWS sponsored or participated in four events which contained water quality education, including the Oak Grove Trolley Trail Festival, the Jennings Lodge Community Planning Organization’s Picnic, the CCWET Celebrating Water Forum, the Children’s Clean Water Festival and the North Clackamas Watersheds Council - Watershed Wide Cleanup;</p> <p>Posted brochures include: “<i>Dump Smart:</i>” Proper Disposal for Paint, Power Washing, and Carpet Cleaning; <i>Think Smart About Pesticides</i> by Clackamas River Basin Council, and a pictorial fact sheet on spraying of pesticides and herbicides by the Clackamas River Water Providers;</p> <p>Participated in regional outreach groups, and public involvement campaigns, including: the Clean Rivers Coalition, Clackamas County Water Education Team (CCWET), and the Regional Coalition for Clean Rivers and Streams;</p> <p>Presented streamlined website access to relevant water quality education information for property owners, tenants, and educators including stormwater smart yard and garden maintenance.</p>

Appendix A: BMP Table—OLWS 2018-2019 Summary of BMP Implementation

<i>Best Management Practice</i>	<i>MS4 Permit Schedule A Requirement</i>	<i>BMP Description</i>	<i>Performance Measure</i>	<i>Annual Report 2018-2019</i>
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.	<p>Inspection of 19 out of 115 total, letters sent to owners engaging them in awareness, cleaning, maintenance and functionality of their catchment systems.</p> <p>Participation in the Stormdrain Cleaning Assistance Program (SCAP) with mailers sent to 400+ property owners with private storm drains on their property.</p> <p>Email campaign planned to include all previous participants as well as accounts with email access in order to increase participation.</p>
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	<p>Oak Lodge has four certified erosion control staff members and provides construction site operators notice and training opportunities on an ad hoc basis.</p> <p>Other OLWS erosion control training of staff this reporting year includes:</p> <ul style="list-style-type: none"> • OLWS field supervisor and one water utility worker attended the Erosion and Sediment Control Manager Certification (ODOT) • All Water and Sanitary Utility workers (11 staff members) attended a Stormwater Management Overview Training Video (Safe Personnel through SDAO)
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: <ul style="list-style-type: none"> • Provide/compile information regarding a public education effectiveness evaluation over the permit term. 	During the 2013-2014 permit year, OLWS participated in a regional study about the effectiveness of various stormwater-related public outreach efforts within Oregon. The report was commissioned through Oregon Association of Clean Water Agencies. See Appendix B for a copy of the study.
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.	Track the number of employees receiving training in stormwater management annually. Measurable Goals: <ul style="list-style-type: none"> • Attend relevant stormwater management related training based on need and availability. 	<p>Specific Staff Trainings included:</p> <ul style="list-style-type: none"> • OLWS Pollution Prevention Specialist, Civil Engineer and Outreach / Education Coordinator received certification in the Northwest Environment Training Center’s “Certification in Erosion and Sediment Control Lead” (CESCL). 2 days. • OLWS Pollution Prevention Specialist attended Oregon Water Education Foundation’s Water Environment School at Clackamas Community College. 3 days. • OLWS field supervisor and one water utility worker attended the Erosion and Sediment Control Manager Certification (ODOT). • All Water and Sanitary Utility workers (11 staff members)

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Best Management Practice	MS4 Permit Schedule A Requirement	BMP Description	Performance Measure	Annual Report 2018-2019
				<p>attended a Stormwater Management Overview Training Video (Safe Personnel through SDAO).</p> <ul style="list-style-type: none"> • OLWS General Manager attended the ACWA Stormwater Conference. (3 days)
<p>Public Education and Outreach</p> <p>Topic: Facilitate Public Reporting of Illicit Discharges</p>	4.d.viii	<p>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.</p>	<p>(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.</p> <p>Measurable Goals:</p> <ul style="list-style-type: none"> • Create a page for public complaints on the District’s website and track number of complaints for reporting. 	<p>Potential illicit discharges reported: At least 2</p> <p>Actions taken: 2</p> <p>Educational Events: 1 – Staff Training in Certified Erosion Control Standards and Techniques</p> <p>Educational Publications:</p> <ol style="list-style-type: none"> 1) Dump Smart Campaign – Painting, Carpet Cleaning and Pressure Washing 2) Where to Properly Dispose of unwanted or expired medications 3) EPA – Keep Salmon of Drugs 4) CRWP – Pesticides and Herbicides our of the River (Pictorial) 5) Regional Coalition for Clean Rivers and Streams -- River Starts Here <p>Public submits complaints through the information email on the OLWS website, or calls staff directly. Complaints are coded in Lucity, the district’s Computerized Maintenance Management System.</p>
<p>Public Involvement and Participation</p>	4.e	<p>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.</p> <p>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.</p>	<p>(1) Provide for public participation with the SWMP and pollutant load reduction benchmarks prior to the permit renewal application deadline.</p>	<p>SWM Annual Report Public Notice: completed, announced at North Clackamas Watersheds Council and to OLWS Board Members; SWM Annual Report and Permit on website: completed; the website contains a variety MS4 related material, providing ongoing opportunities for public to comment.</p> <p>SWM Master Planning Advisory Committee: Oak Lodge Water Services District is seeking to complete two studies analyzing the benefits and costs of adding services in the Watershed Protection Program. To achieve this, the District has assembled an advisory committee comprised of residential customers, commercial customers and Board Members. Ultimately, this committee will make recommendations to the Board regarding adding these services or not.</p>

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Best Management Practice	MS4 Permit Schedule A Requirement	BMP Description	Performance Measure	Annual Report 2018-2019
Construction Site Runoff Control	4.f.i - 4.f.iv	<p>BMP Description: <i>OLWS Development Review</i></p> <p>The District reviews all development plans for new construction or redevelopment projects in the District’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.</p>	<p>(2) Annual number of permitted, active construction projects (i.e., those projects disturbing 800 s.f. or more).</p> <p>(3) Annual number of site plan reviews and approved plans.</p> <p>Measurable Goals:</p> <p>6) Review all applicable erosion and sediment control plans submitted as part of the building permit.</p>	<p>Number of development permits issued: 21</p> <p>Acreage of development activity: 14.095 Acres</p> <p>Number of erosion control permits issued: 120</p> <p>Number of erosion control inspections completed: 360</p> <p>Number of enforcements (violations that needed enforcement action): 1</p> <p>Identify any new industrial businesses in OLWS: 0</p> <p>Variance Requests: 1</p> <p>Appeals: 0</p> <p>Estimate of total new and replaced impervious surface area related to development projects: 9 acres</p>
Pollution Prevention for Municipal Operations Street Sweeping	4.g	<p>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.</p>	<p>(1) Number of miles that were swept within OLWS</p> <p>(2) Mass or volume of material removed during sweeping</p> <p>Measurable Goals:</p> <p>7) For DTD roads, see tracking measures in the DTD MS4 NPDES SWMP.</p>	<p>Information Request to CCDTD pending</p> <p>Clackamas DTD Street Sweeping within OLWS Boundary:</p> <p>(1) 226 Curb/ Shoulder Miles</p> <p>(2) 104 Cubic Yards debris removed</p> <p>(3) The district has entered into an agreement with the Clackamas County DTD to have its WRF impervious surface’s swept once a month. This BMP is a result of the Districts 1200Z Permit.</p>
Operations & Maintenance for Public Streets	4.g	<p>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.</p>	<p>Measurable Goals:</p> <ul style="list-style-type: none"> • 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. 	<p>See Clackamas County/DTD’s MS4 Annual Report</p>

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<i>Best Management Practice</i>	<i>MS4 Permit Schedule A Requirement</i>	<i>BMP Description</i>	<i>Performance Measure</i>	<i>Annual Report 2018-2019</i>
Control Infiltration and Cross Connections to the District's Stormwater System	4.g	<p>BMP Description: The District 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.</p> <p>The District 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. The District is able to identify and control the exfiltration of flows from municipal sanitary sewers when it occurs by:</p> <ul style="list-style-type: none"> • 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. 	<p>(1) Number of cross-connections/ sanitary discharges identified.</p> <p>Measurable Goals:</p> <ul style="list-style-type: none"> • Eliminate any identified sanitary discharges to the storm system. 	No Cross-connections were found during the 2018/2019 permit year.
Flood Management Projects and Water Quality	4.g	<p>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.</p> <p><u>CIPs:</u> The District 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.</p>	<p>(1) Number of retrofits constructed that address water quality treatment.</p> <p>(2) Number of flood management projects implemented or constructed and the percentage of those projects that include water quality Components.</p> <p>Measurable Goals:</p> <ul style="list-style-type: none"> • Ensure all planned stormwater CIPs include consideration of water quality. 	Oak Lodge Water Services continues to fund North Clackamas Watersheds Council (NCWC) Streamside Stewards Program which enhances water quality and streamside health. In addition, the District funds the Backyard Habitat Certification Program in partnership with the Columbia Land Trust and the Portland Audubon Society. This program educates and informs the public on yard maintenance options that limit the use of herbicides and pesticides on private property that can get into our streams and reduce water quality.
Maintenance of Conveyance System Components and Structural Controls	4.g	<p>BMP Description: The District 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 the District. 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 the District.</p> <p>The District and DTD are working on the development of an intergovernmental agreement to clarify and coordinate maintenance activities.</p>	<p>(1) Miles of ditches and storm lines maintained</p> <p>(2) Number and type of components inspected and/or cleaned, and</p> <p>(3) Mass or volume of material removed during cleaning</p>	<p>(1) Ditch Cleaning by Clackamas County DTD: 275 ft</p> <p>(2) Culverts Cleaned by Clackamas County DTD: 3 culverts</p> <p>(3) Mass of Debris Removed by Clackamas County DTD: 8.34 cubic yards of material</p>

Appendix A: BMP Table—OLWS 2018-2019 Summary of BMP Implementation

Best Management Practice	MS4 Permit Schedule A Requirement	BMP Description	Performance Measure	Annual Report 2018-2019
Catchbasin 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: <ul style="list-style-type: none"> • Clean OLWS District operated/maintained public catch basins on a 5-year rotational basis. • Schedule repair or replacement of catch basins based on inspection results. 	During this reporting period, OLWS and Clackamas Co. continued a coordinated approach to storm system inspection and maintenance (see updated SWMP Zone Map). (1) Catch basin Inspections: 480 (2) Catch basins and Structures Cleaned: OLWS: 184 (3) Structures Cleaned by CCDTD: 6 (4) Mass of Debris Removed by OLWS: 30 Cubic Yards (5) Mass of Debris Removed by CCDTD: 0.81 Cubic Yards
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.	18 asset inspections were completed in the 2018/2019 permit year. All Facilities that needed cleaning were done. These Facilities were under an agreement with the District for cleaning and inspection. In addition, a letter was sent to 10% of owners of single-family private facilities with OLWS SWM Facility Agreements that explains the requirement to clean and maintain facilities.
Hydromodification Assessment	5.a – 5.d	BMP Description: OLWS anticipates partnering with adjacent co-permittees (CCSD#1, Clackamas County DTD) 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: <ul style="list-style-type: none"> • 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. 	In the OLWS SWMC code documents, stormwater management facility sizing guidelines accept two co-permittee tools; the WES sizing tool and the City of Portland PAC tool. Additionally, in 2019, Oak Lodge implemented a permit review software system (Accela) which tracks impervious surfaces more accurately and precisely than previous systems for future hydromodification assessment and treatment tracking.



Milwaukie

Clackamas County








Gladstone

Lake Oswego

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%)



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	Point Scoring:			Access Score	Avg Channel Confinement	Avg Channel Slope	Geomorph Score	Total Points	Weighted Rank (60% fish, 20% access, 20% geomorph)	FIELD INVESTIGATION?	Rationale
								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								
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.

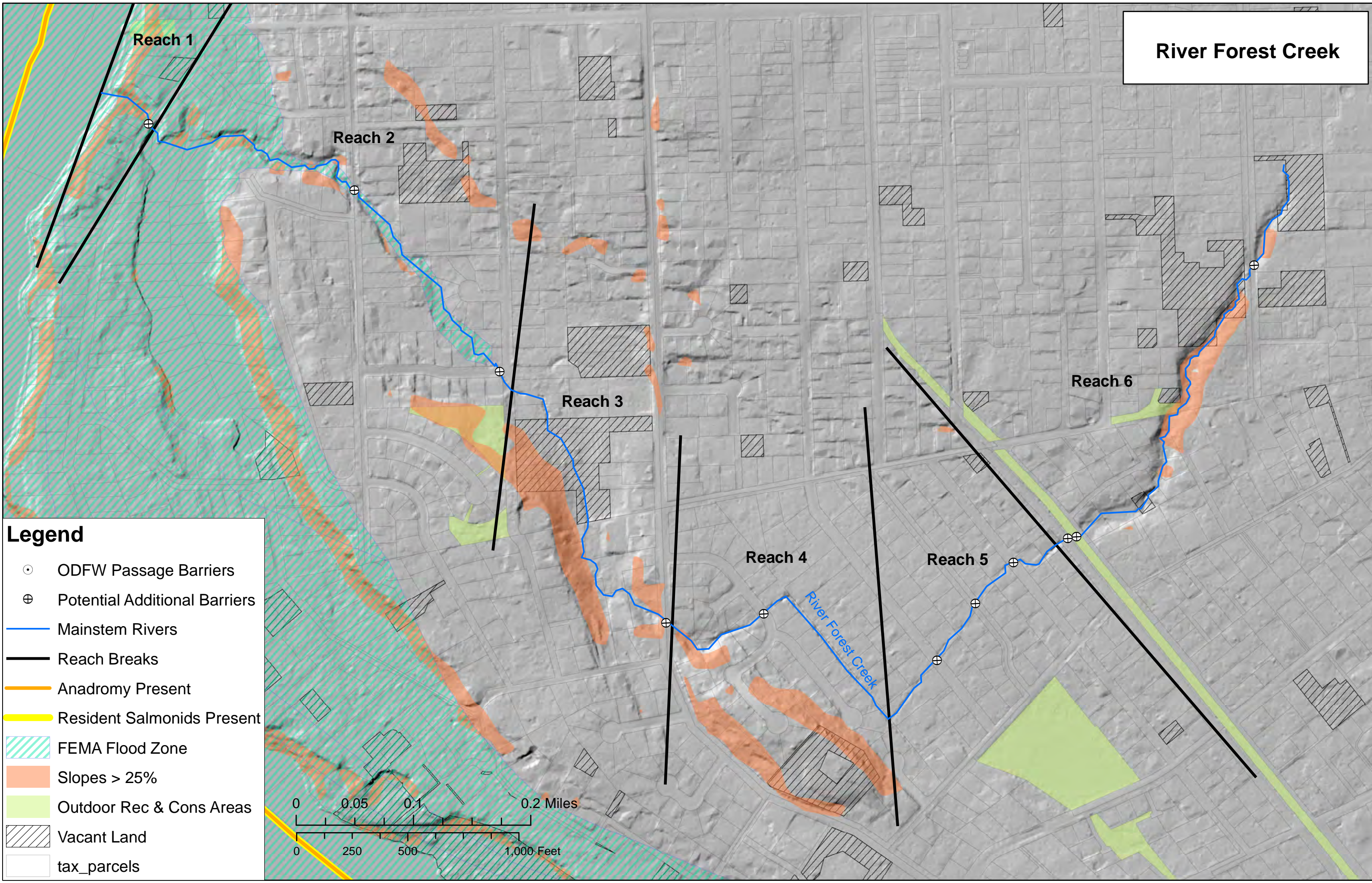
Tinus et al 2003
Neerman & Vogt 2009
Friesen and Zimmerman 1999
(Boardman Creek Reach 1 fish salvage information documenting salmonid presence from Todd Alsbury personal communications)

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://rlisdiscovery.oregonmetro.gov>

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

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

Boardman Creek

Boardman Creek

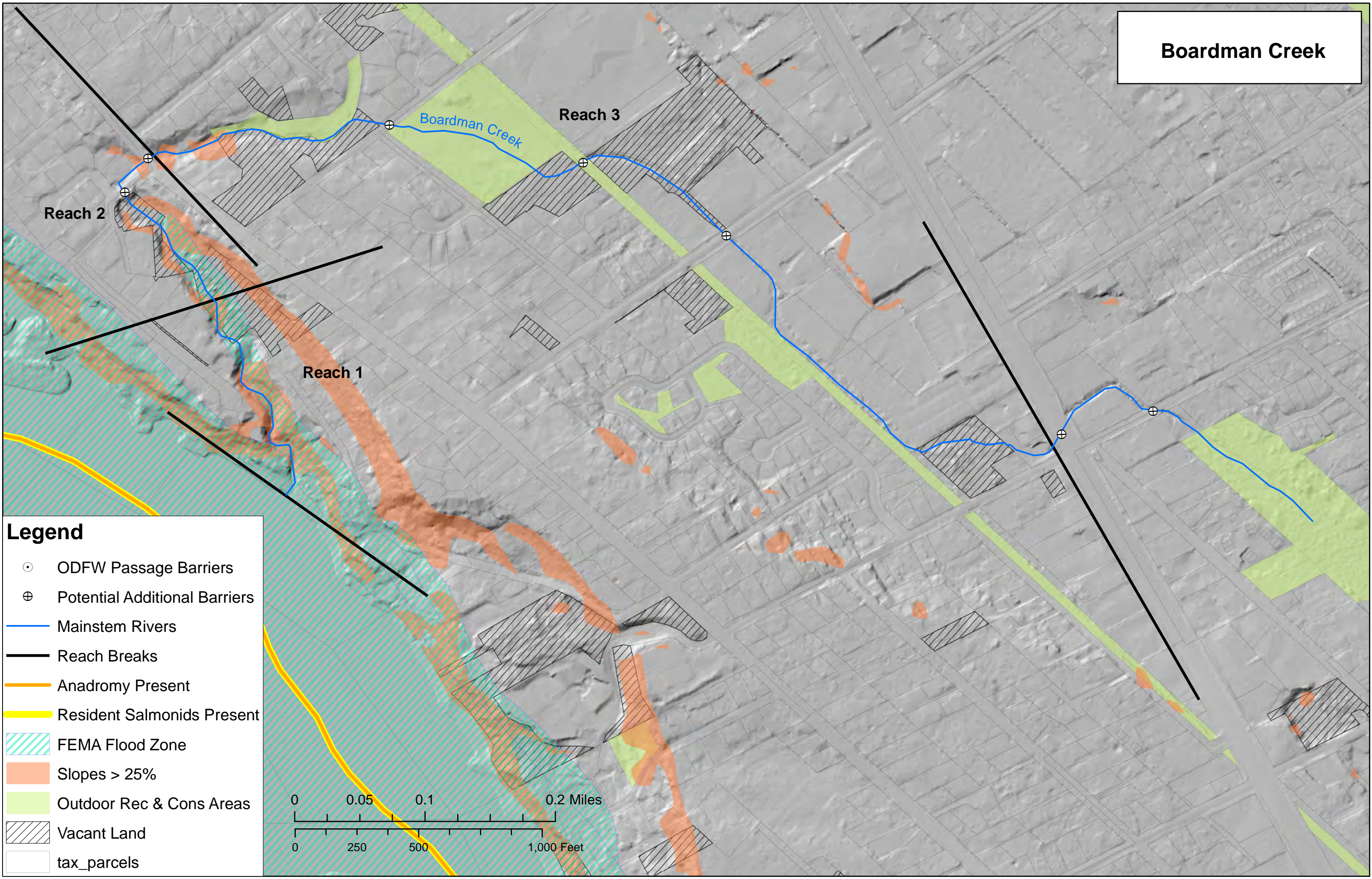
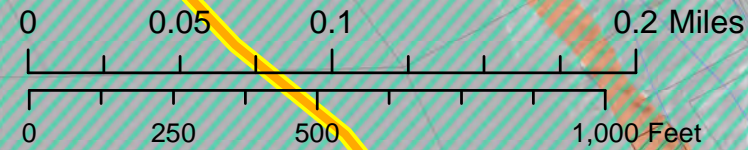
Reach 2

Reach 3

Reach 1

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



Rinearson Creek

Reach 1

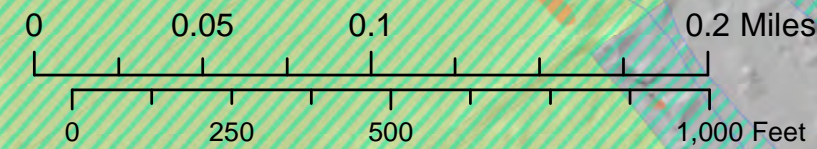
Reach 2

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_parcel

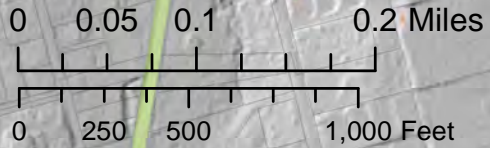


Lower Kellogg Creek

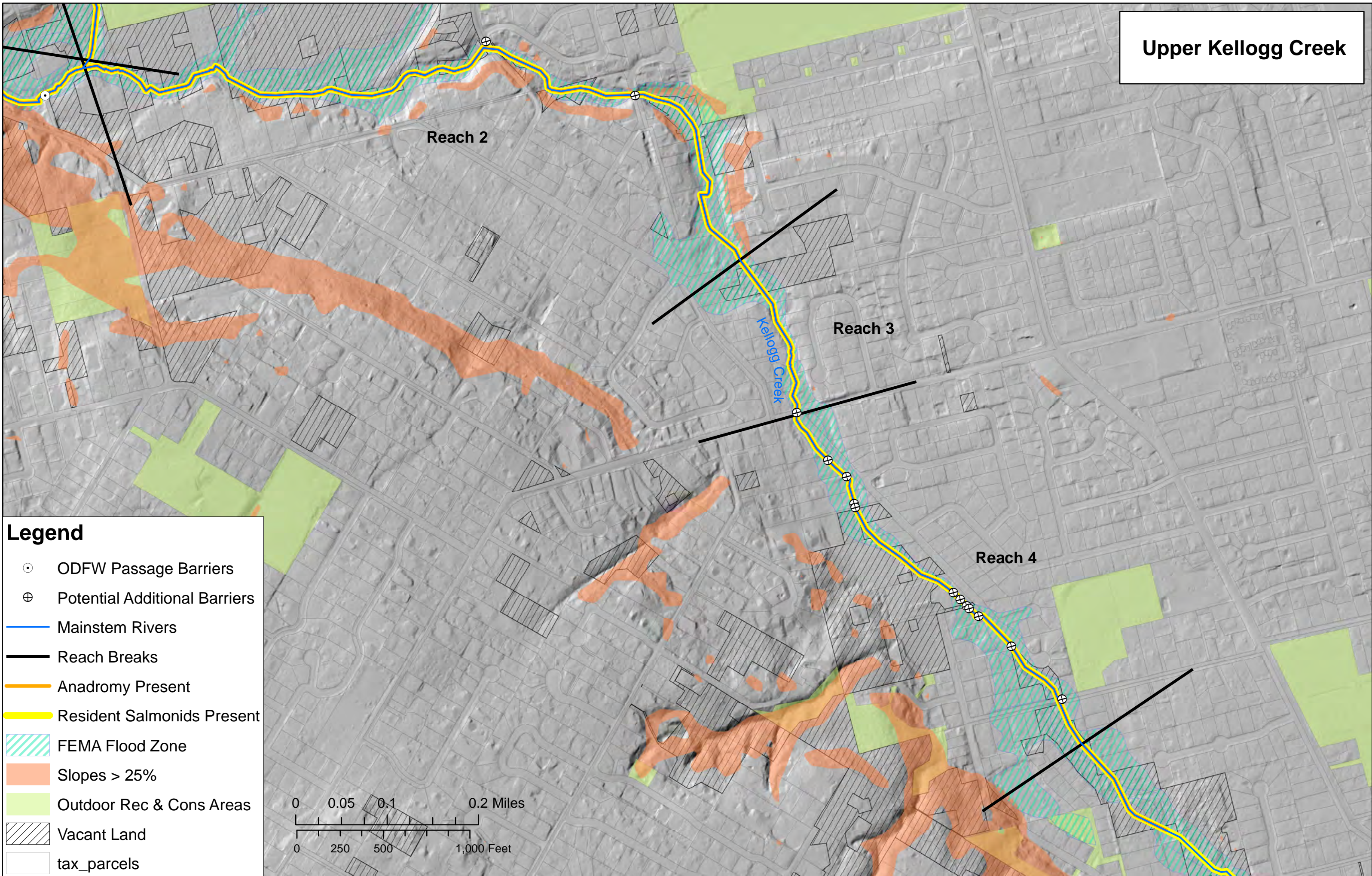


Legend

- 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



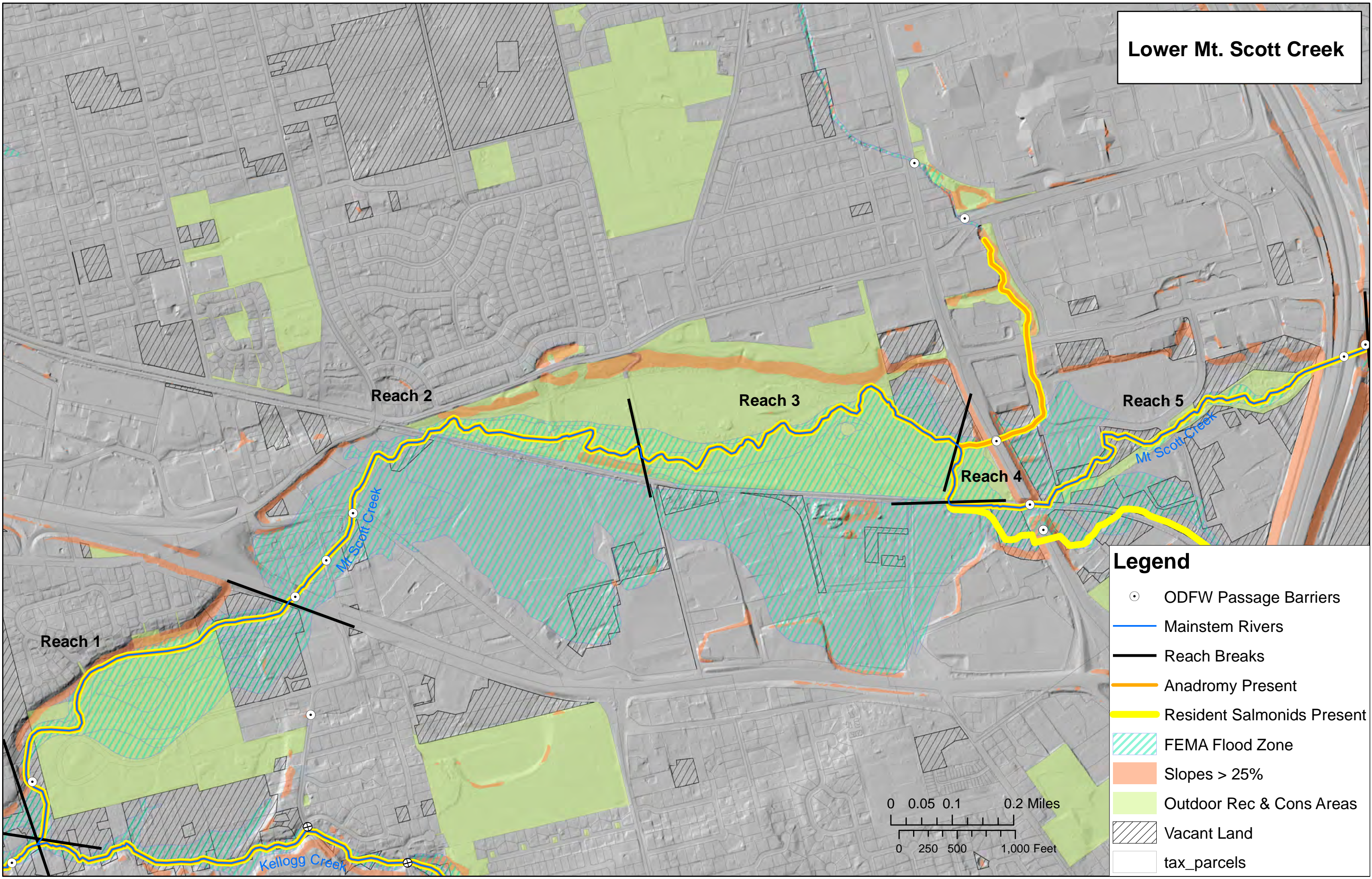
Upper Kellogg Creek



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

Lower Mt. Scott Creek

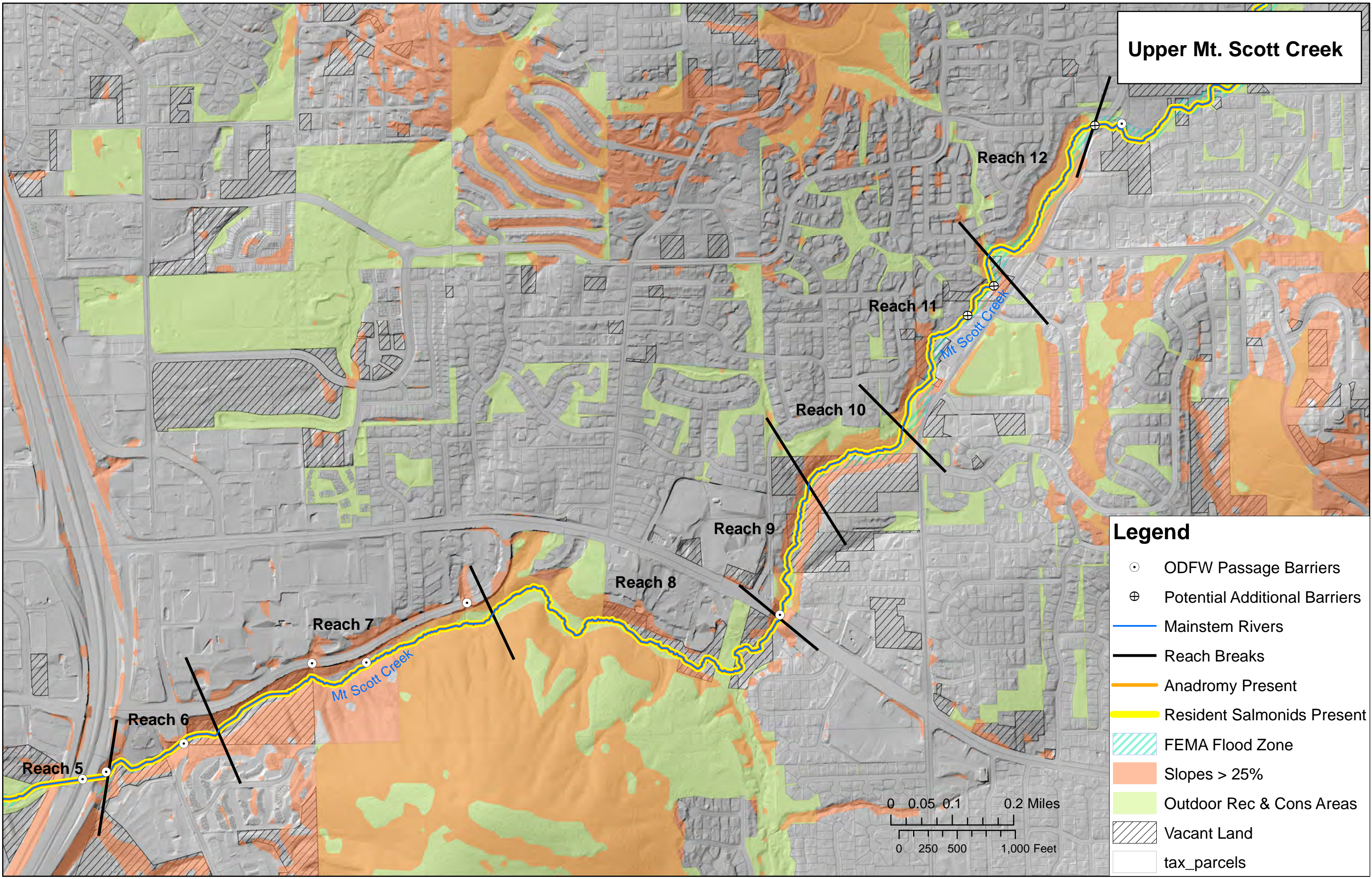


Legend

- 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 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_parcel