

# **Oak Lodge Water Services**

## **Total Maximum Daily Load (TMDL) Implementation Plan**

### **Annual Status Report**

**Fiscal Year 2024**

**(July 1, 2023 - June 30, 2024)**



**Submitted to:**

**Oregon Department of Environmental Quality**

**December 1, 2024**



December 1, 2024

Andrea Matzke, MPH  
Lower Willamette Basin Coordinator  
Northwest Region – Portland  
700 NE Multnomah St. Suite 600  
Portland, OR 97232

RE: Oak Lodge Water Services 2023-2024 Annual TMDL Report

Dear Ms. Matzke:

I am pleased to submit the 2023-2024 Total Maximum Daily Load (TMDL) Annual Report for the Oak Lodge Water Services (OLWS). This report summarizes progress that OLWS has made to address nonpoint source pollutants in the Willamette Basin which are not already addressed under the NPDES permits issued to OLWS for point sources from the MS4 Phase I Permit.

On June 17, 2014, DEQ approved the updated TMDL Overview and Nonpoint Source TMDL Implementation Plans submitted by OLWS under the following condition: *"In subsequent Annual Reports, the report should include appropriate milestones and interim targets related to temperature management strategies."*

The attached report (Attachment A) is based on the previously established matrix, and no modifications to the existing plan are currently being proposed.

If you have any questions regarding this report, please contact me at (503) 353-4202.

Sincerely,

*Brad Albert*

Brad Albert, General Manager  
Oak Lodge Water Services

cc: File

Please find the following notes regarding specific comments made to Oak Lodge Water Services in DEQ's letter dated May 1, 2017.

- (1) *Please note that in DEQ's June 17, 2014 letter conditionally approving the TMDL implementation plan, DEQ indicated that in subsequent annual reports, the reporting matrix should include appropriate milestones and interim targets related to temperature management strategies. OLWS met this requirement by developing new temperature tracking and performance measures in the 2016 revised annual report matrix received on Mar. 24, 2017. DEQ expects to see more specific milestones and interim targets, where possible, developed for next year's annual report as a condition for acceptance. For example, OLWS could reference the stream shade GIS analysis that was completed in 2014 as the basis for targeting riparian shade restoration efforts. [OLWS] could develop milestones based on private landowner outreach efforts or percent of restoration projects completed in these areas. Similarly, OLWS could develop other specific milestones for percent reduction of impervious areas that have been identified within the district boundaries, such as the proposed project to reduce impervious surfaces along McLoughlin Boulevard. DEQ encourages continued collaboration with groups, such as the Audubon Society and the North Clackamas Urban Watershed Council to augment and leverage restoration opportunities on both public and private lands. If you have any questions about developing adequate milestones, please contact me.*

To address stream shading beyond scheduled Capital Improvements, OLWS partners with a number of local non-profits and schools such as North Clackamas Watersheds Council (NCWC), Bird Alliance of Oregon, Columbia Land Trust, Ecology in Classrooms and the Outdoors, and the Pacific Northwest Pollution Prevention Resource Center (PPRC).

### **Examples of projects**

NCWC – OLWS values its strong partnership with the local watershed council, whose Streamside Stewards Program (SSP) continues to educate and support many longstanding partners-stewards to restore properties that are being maintained with the priority of pollution reduction goals. Keeping up maintenance of restored properties is the best way to maximize shade through plant growth, which supports temperature reduction strategies and water filtration through trapping of sediment. In the SSP there remain 66 sites, 20.81, and 6.189.18 linear feet of streambank under revegetation. Of the total number of sites, 32 sites are in the "maintenance mode" while plants grow to maturity.

BHCP – OLWS continues to support the Backyard Habitat Certification Program (BHCP), which is a partnership program of the Bird Alliance of Oregon and Columbia Land Trust. Through partnering with individual landowners on yard plantings, restoration, and enhancement, BHCP adds shade to both streams and household yards. The BHCP also provides technical assistance and incentives to residents on lots less than one acre within the cities of Portland, Lake Oswego, Gresham, Fairview, West Linn, Milwaukie, Oak Grove, and Jennings Lodge to restore native wildlife habitat in backyards. There are five

program elements: removal of aggressive weeds, naturesscaping with native plants, pesticides reduction, stormwater management and wildlife stewardship. This program is a multi-pronged approach to improving not only shade quantity (supporting the temperature TMDL goals), but also educating our public about healthy maintenance of the local environment.

*(2) To measure effectiveness of stream restoration efforts and reduction of impervious surface within the district boundary, DEQ recommends that OLWS monitor stream temperature during critical rearing and migration times for salmon and trout. Typically, this is May through October when many streams throughout the Lower Willamette sub basin exceed the state's water quality criteria for temperature. Additionally, the 2006 Willamette Basin TMDL Water Quality Management Plan (pg. 14-34) required designated management agencies to identify potential cold water refugia from river mile 50 of the mainstem Willamette downstream to the confluence with the Columbia River and provide options for protecting or enhancing such areas. Tributaries to the Willamette River within the District's boundary include, but may not be limited to, Rinearson, Boardman, River Forest, Linden, and Willamette Creeks. These tributaries may provide sources of cold water refugia for salmonids migrating upstream on the Willamette River. DEQ recommends that OLWS explore opportunities to assess potential for cold water refugia (generally, two degrees colder than the mainstem Willamette River) and include these actions in the next annual report. If you have any questions about the cold water refugia requirement, please contact me.*

OLWS continues partnering with NCWC to follow through on restoration and stream shading projects within the boundaries of Oak Lodge. With reference to the recent NCWC Watershed Action Plan, we completed design and worked on funding for the restoration of the Boardman Creek confluence, which will provide increased cold water refugia along our stretch of the lower Willamette. In addition, restoration of the confluence of River Forest Creek was completed. While this currently does not support direct cold-water refuge for salmonoids, it begins the journey toward comprehensive enhancement of that sub watershed. Additional projects like those are being explored with local partners, like the North Clackamas Parks and Recreation District (NCPRD). The goal being enhanced habitat along the headwaters of tributaries and increased cold water refugia along the Willamette River. Along with the “stream shading” map, we have attached the Watershed Action Plan Executive Summary to this annual report to show examples of projects that OLWS will work for to protect our waterways and further shade them (see Attachments B and C).

OLWS and NCWC have partnered to being a comprehensive ongoing water temperature study in these creeks, placing loggers in 28 locations across the North Clackamas Watersheds to identify cold water refugia, threats to cold water, target future restoration and protection activities, and track influences of restoration, climate change, and other influencing factors such as changes in stormwater management, impervious surface, etc. As of this writing, temperature data for spring-fall 2024 has been collected for analysis. OLWS funding for temperature monitoring continues and loggers will be replaced in the same locations in April/May 2025.

Through its partnership with NCWC, OLWS has been referring to its aerial shade surveys of riparian areas along Boardman, River Forest, and Rinearson creeks and their tributaries. This data is being used to 1) target areas for future shade planting when funds become available, based on contiguous shade, aspect, landowner interest, and other factors, and 2) form a baseline of shade for tracking changes in shade over time as plants grow to maturity.

NCWC has also been developing an inland enhancement project that would improve water quality filtration and address pollutants running off Oregon Department of Transportation's (ODOT) maintained major arterial 99E. As the deleterious effects of 6PPD-Q are revealed, OLWS works toward identifying a comprehensive solution to this insidious pollution issue in the lower Willamette River. Pollution reduction from these waterways will directly improve salmonid habitat at the confluences within our sub watersheds, including Boardman Creek (cold water refugia and winter/spring rearing/migratory habitat) and River Forest Creek (winter/spring rearing/migratory habitat). These habitat areas provide direct benefits for the Clackamas Fish Population and the Upper Willamette ESUs using the sub yearling reproductive strategy that results in greater ocean return rates. DEQ (2020) and USGS (2018) studies have identified these confluences as critical habitat in the Oswego stretches of the Lower Willamette. Both projects are in design. The Boardman-Willamette Confluence Project is funded by the Lamb Foundation and the Division of State Lands. The River Forest Confluence Project is funded by Meyer Memorial Trust, Oregon Watershed Enhancement Board via the Clackamas Partnership, and the Spirit Mountain Community Fund. OLWS is a partner on both projects.

*(3) The 2015 TMDL Pollutant Load Reduction Evaluation (PLRE) and Waste Load Allocation Attainment Assessment provided excellent analyses of progress to date in meeting MS4 benchmarks and TMDL waste load allocations for bacteria. The PLRE report showed that [OLWS] is estimated to be achieving the bacteria load removal benchmark that OLWS developed in 2013 through implementation of various structural BMPs. The analysis did not include non-structural BMPs, such as education efforts, to estimate bacteria load reductions, so the analysis is likely conservative. Although non-structural BMPs, such as public education efforts, are difficult to quantify in load reduction analyses, DEQ agrees that these programs contribute to a multi-faceted approach for reducing bacteria loadings to impaired waterbodies. OLWS is not currently estimated to be meeting the TMDL waste load allocation for bacteria established as part of the 2006 Willamette TMDL. According to the report, the PLRE shows a mean pollutant load reduction of 1.5 percent compared with the TMDL waste load allocation of 78 percent. DEQ encourages OLWSD to review and assess bacteria data collected as part of the MS4 permit monitoring requirements. Significant increases in bacteria trends, such as found in Lower Boardman Creek, may lead to more focused efforts in these areas through adaptive management strategies.*

Structural BMPs are the primary line of defense as development occurs within OLWS. OLWS pursues capital improvements to structures affecting TMDL pollutants through its Capital Improvement Plan. In the coming year OLWS plans on investing \$250,000 in a water quality project, the specifics of which are in the design/decision making phases.

OLWS continues to invest in a “Scoop the Poop” program in partnership with the North Clackamas Parks and Recreation District (NCPRD) by sponsoring the placement of dog waste removal bags along the “Trolley Trail” (a walking/biking trail) through the area. Each year the parks district installs thousands of bags in signs which also feature public education about pet waste cleanup.

While the impacts of educational efforts regarding reduction in bacterial loading are harder to quantify, they too continue to be a focus for OLWS. For example, as part of the sponsorship of the watershed council, NCWC continued to offer their hosted online workshops about nonpoint source pollution, watershed function, and individual actions that contribute to watershed health. OLS participated in two other outreach programs that message for clean water and to support actions that can help reduce bacteria: Follow the Water through the Clean Rivers Coalition, and The River Starts Here – a regional coalition to support clean rivers and streams. These messages reach hundreds of thousands of viewers through significant investments in public service announcements, online advertising, and social media.

Stormwater watershed education programming at local elementary and high schools in the OLWS area occur both in person and online. We support teachers and students in learning about the issues as well as participating in experiential education programming outdoors. Messaging around both temperature and bacteria reduction is a significant part of the outreach strategy offered through our outreach and education partnerships.

**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	
<b>Bacteria, Temperature and Mercury NPS Strategies</b>	Illicit Discharge Detection and Elimination (IDDE)	Implement IDDE program-outreach, response, and enforcement	Staff FTE and response materials	Cleanup and documentation	These events are addressed immediately upon notice to OLWS	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 completed certification 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); OLWS has obtained DEQ certification of the program; budget was integrated into annual budget and staff finalized 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	Yes, implemented per requirements
	"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
<b>Outreach and Education Partnerships</b>	Clean Rivers Coalition Partnership and the Regional Coalition for Clean Rivers and Streams	Sponsor and implement statewide messaging of two campaigns: "Follow the Water" and "What's Your Lawn Style"; Implement regional "The River Starts Here" messaging campaign	\$3,000 and \$3,000	Student numbers reached, schools scheduled for classroom and field visits and activities tracked in MS4 Annual Report	Currently in place and ongoing	Ongoing activities	X	X	X	Yes, implemented per requirements
	Clackamas Community College's Environmental Learning Center	Partner with Clackamas Community College's Environmental Learning Center (ELC) to sponsor school-aged experiential education programs in the field at the ELC, which includes restoration and enhancement activities	\$6,000							
	Backyard Habitat Certification Program	Partner with Bird Alliance of Oregon 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 ECO to implement Spanish focused 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							
<b>Technical Programs</b>	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	Yes, implemented per requirements
	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	Currently in place and developing	Ongoing activities with annual report to DEQ		X		Research, evaluation, and design phase
	Watershed Action Plan (WAP)	Support partnership with NCWC to carry out projects from their WAP	Completed and ongoing rollout	Summary of activities in annual report narrative	Currently in place and ongoing	Ongoing activities with annual report to DEQ	X	X	X	Yes, implemented per requirements
<b>Capital Investments</b>	Boardman Wetland Project	Implement infiltration and inflow reduction/control activities	Past investment \$3,000,000	Summary of activities in annual report narrative	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 narrative	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 on several projects	X	X	X	WAC plan adopted; goal to continue seeking funding for projects as outlined in the WAC



NORTH  
CLACKAMAS  
WATERSHEDS  
COUNCIL

# North Clackamas Watersheds Action Plan 2022-2032

## *Executive Summary*

Prepared for North Clackamas Watersheds Council & Partners  
by **Samara Group, LLC & GeoEngineers**  
July 2022

*Supported by:*



*and Customers participating in PGE's Green Future<sup>SM</sup> program through the  
PGE Salmon Habitat Support Fund*





Photo (above): Two hikers enjoying Mt. Talbert Nature Park. Credit: Metro, 2017

Authored by:

Jalene Littlejohn, Melanie Klym, Amanda Temple, Fiona Smeaton, Marie Hepner, and Jason Scott.

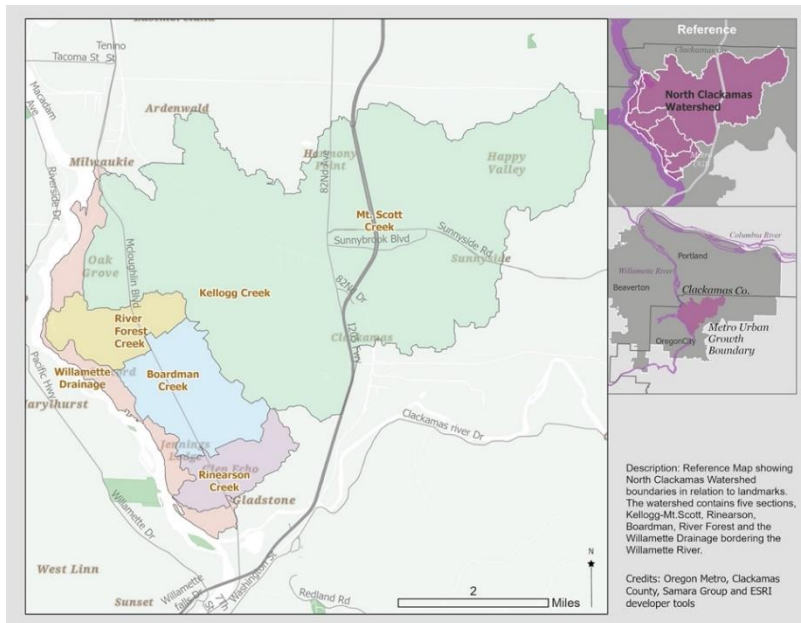
***This action plan was co-developed in partnership with the North Clackamas Watersheds Council and regional partners. Thank you to all who participated in interviews, workshops, and reviews: North Clackamas Watersheds Council Board, Staff and Contractors, Clackamas County (Climate Action, Planning, Disaster Management), Clackamas Water Environment Services, North Clackamas Parks and Recreation District, Oregon Department of Fish & Wildlife, City of Gladstone, City of Milwaukie, City of Happy Valley, Clackamas Soil & Water Conservation District, Altap Restoration, Urban Greenspaces Institute, Oregon Department of Environmental Quality, Oregon Department of Transportation, Metro Parks & Nature, Institute for Natural Resources, Native Fish Society, Willamette Partnership.***

***Your insights are the foundation of this plan.***

# North Clackamas Watersheds hold opportunities for both local and regional benefits

*As Clackamas County continues to grow and the demand for new development increases, the importance of protecting and restoring watershed resources becomes even more pressing.*

Healthy urban watersheds not only support the critical habitat that fish and wildlife need, but they also provide valuable ecosystem services such as buffering against heat island effects, improved water quality, carbon storage, enhanced health outcomes through proximity and access to nature, and reducing utility bills<sup>1</sup>. The services provided by watersheds (or lack thereof) have direct impacts on the local community's lives<sup>1</sup> and the community as direct impact on the health of the watersheds demonstrating that people are a critical piece of the puzzle of watershed management<sup>2</sup>. While it may not be feasible to restore North Clackamas watersheds to pre-colonial conditions, these watersheds remain an important priority and hold opportunities for benefits for fish, wildlife, and people.



The North Clackamas Watersheds are part of the greater Portland metropolitan area, in present day Clackamas County on “the traditional lands and waterways of the Clackamas, Chinook Bands, Kalapuya, Kathlamet, Molalla, Multnomah, Tualatin, Tumwater, Wasco and many other tribes of the Willamette Valley and Western Oregon<sup>3</sup>

<sup>1</sup> [Environmental Protection Agency, Benefits of Watersheds, 2022](#)

<sup>2</sup> Purdue, 2019

<sup>3</sup> Clackamas County Land Acknowledgment

# Planning for Healthy Watersheds

This watershed's action was developed in partnership with and for the many agencies, nonprofit organizations, and other partners who have missions, management responsibilities, policy and funding authority to improve the health of North Clackamas Watersheds. For the Plan to succeed, it must inform the strategies, work plans, and budgets of all the North Clackamas partners.

The plan integrates equity, resilience in the face of climate change, and interjurisdictional collaboration and coordination into all aspects of watershed health. In this summary, you will find an overview of the primary healthy watershed goals and limiting factors considered in the development of North Clackamas Watersheds strategies and actions and an overview of the recommended focal actions. The full plan provides a breadth of assessment information as well as action and opportunity areas that support and expand on the focal actions.

## Healthy Watershed Goals

- Enhance habitat and connectivity for fish, wildlife, and people
- Sustain and enhance cold water in streams
- Improve water quality considering reduction of water quality contaminants and stormwater management
- Conserve and improve flood storage and floodplains
- Integrate watershed health and development needs up and downstream

## Limiting Factors

Factors threatening and limiting the health of the North Clackamas Watersheds and the ecosystems they serve.

- Fish passage barriers
- Lack of stream channel complexity
- Water pollution and warm water temperatures
- Loss of riparian buffers and woodlands that provide shade and habitat
- Loss of connection to floodplains that slow and store water
- Invasive species
- Lack of water availability during low flows



## Anticipating Future Trends

Population and development pressures combined with a variety of climate-related threats are the primary future trends that are anticipated to exacerbate limiting factors for fish and native ecosystems in the North Clackamas Watersheds.

## Recommended Focal Actions for North Clackamas Watersheds

There are a wide variety of participants and actions that may support watershed health. This plan is intended to be flexible. Certain actions rise to the top based on the Watersheds Assessment, stakeholder input, and the consultant team's diverse experience with watershed restoration project implementation, community engagement, and urban ecology. In addition to watershed restoration, an important need that emerged is the mobilization of watershed health advocates to be involved in policy development and collaborative stewardship programs, such as Streamside Stewards. For this to occur, expanded educational and engagement programs are crucial.

When developing programmatic actions and organizational work plans, consider the following actions and review the comprehensive list of actions for additional ideas.

## All Watersheds Focus

This section summarizes the recommended programmatic actions that bridge watershed boundaries. These actions were selected to best address cross-boundary limiting factors for watershed health, particularly regarding habitat connectivity, improving water quality, and integrating watershed health and development needs.

### Implement Diverse Community Engagement & Education

- Install community-based data collection kiosks near 'high-access' community hubs (Action #78)
- Survey community surrounding "gap access" community hubs to better understand needs for access to nature and stewardship opportunities (Action #63) Work with Homeowners' Associations and other community neighborhoods groups, landowners, and managers to collect and interpret regular water quality measurements (Action #80)

- Partner with local schools to adopt restoration sites as outdoor classrooms where students can be involved with full-spectrum restoration activities, have recurrent visits, and long-term stewardship (Action #81)

### Adopt Stronger Watershed Protection Policies and Plans

- Collect and interpret watershed data to inform effective policies, codes, rules, standards, and plans (Actions #11, 12, 57, 70, 75)
- Pass codes and regulations that integrate watershed function into key decisions (zoning, stormwater, floodplain management, development codes, tree codes, etc.) (Action #25)
- Engage in planning updates for stormwater management manuals, master plans and development code to increase green stormwater infrastructure (Action #58)

### Maintain and Expand the Streamside Stewards Program

- Create and distribute handbook on best practices for Streamside Stewards (Action #83)
- Expand “Streamside Stewards” program to include a broader variety of “Watershed Stewards” activities (e.g. Backyard Habitat Certification Program, connectivity projects, data collection, etc.) (Action #87)
- Collaborate with Oak working group, regional corridor group, SWCD, Willamette Partnership, Backyard Habitat program, and other groups to increase planting and maintenance of native oak and associated plant communities in permeable oak corridors (Action #28)
- Partner with native peoples to understand their harvest, cultural, and spiritual needs and incorporate into action efforts (Action #68)

*Restoration Focal Actions*

## Kellogg-Mt. Scott Watersheds

*Watersheds Focus: Reconnect floodplains, enhance wetlands, conserve riparian canopy cover, and provide fish access to cold-water habitats in the Kellogg-Mt. Scott Watershed.*

### In-Stream Focal Actions

<p><b>Fish Passage Barrier Removal</b></p> <p>Remove Kellogg Dam and assess other barriers in the watershed and prioritize by quantity and quality of upstream habitat (Action #41).</p>	<p>The North Clackamas Watersheds Council is currently convening partners to advance planning and design for fish passage and stream restoration at the Kellogg Dam and Impoundment site. The dam removal project will likely be implemented by the Oregon Department of Transportation in coordination with the City of Milwaukie and/or Mitigation Credit firms.</p> <p>The North Clackamas Watersheds Council should lead the fish passage barrier assessment and prioritization with support from the Oregon Department of Fish &amp; Wildlife.</p>
<p><b>In-Line Pond Disconnection</b></p> <p>Restore Kellogg Creek as a discrete channel through the Kellogg Lake impoundment (Action #42). Disconnect in-line pond at Kellogg Creek headwaters. Evaluate other in-line ponds on Kellogg/Mt. Scott Creek for fish passage and heat loading (Action #49).</p>	<p>The North Clackamas Watersheds Council and partners should continue to pursue improvement of Kellogg Creek at the Kellogg Lake impoundment. Clackamas County WES and the City of Happy Valley should evaluate the disconnection of the other in-line ponds as part of their temperature total maximum daily load plans. The North Clackamas Watersheds Council and Clackamas Soil &amp; Water Conservation District could be best-positioned to assist with landowner communication.</p>

### Riparian and Wetland Focal Actions

<p><b>Intact Canopy Conservation on Privately-Owned Lands</b></p>	<p>These organizations manage development and tree code: City of Milwaukie, City of Happy</p>
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<p>Conserve and enhance areas of intact canopy on privately-owned lands at Kellogg Creek and Dean Creek headwaters and along Minthorn Springs Creek (Action #16).</p>	<p>Valley, and Clackamas County.</p> <p>North Clackamas Watersheds Council and the Clackamas Soil and Water Conservation District are organizations most likely to succeed with work on private lands in partnership with the Backyard Habitat Certification Program and the local jurisdictions.</p>
<p><b>Areas with Groundwater near the Surface</b></p> <p>Evaluate floodplain reconnection, wetland enhancement (hydrologic connectivity and native vegetation), and potential willing- seller feasibility in areas of shallow groundwater at Minthorn Springs headwaters, Kellogg Creek, Three Creeks Natural Area, Dean Creek, and Mt. Scott Creek (Action #22).</p>	<p>Clackamas County Disaster Management is best-suited to address flooding risks and floodplain reconnection opportunities. The stormwater management agencies (Clackamas WES, City of Milwaukie, City of Happy Valley) could evaluate wetland enhancement as part of their stormwater management program to address hydromodification. Publicly owned parks are also potential locations for wetland enhancement projects, such as North Clackamas Park.</p> <p>The North Clackamas Watersheds Council could play a role in communicating with landowners.</p>

## Upland Focal Actions

<p><b>Commercial and Industrial Stormwater Management Retrofits</b></p> <p>Evaluate stormwater quality and quantity management retrofits along I-205, Highway 224, and Highway 99E and at Clackamas Town Center (Action #31).</p>	<p>These organizations manage the roadways and/or stormwater management plans: City of Milwaukie, Oregon Department of Transportation, Clackamas Water Environment Services, Clackamas County, and Oak Lodge Water Services.</p> <p>North Clackamas Watersheds Council may be effective at coordinating with partners and writing grants to fund retrofits.</p>
<p><b>Residential Property Downspout Disconnects</b></p> <p>Evaluate stormwater quantity management retrofits on terraces along Kellogg Creek and Dean Creek (Action #18)</p>	<p>These organizations have authority over the stormwater management plans: City of Milwaukie, Clackamas County WES.</p> <p>North Clackamas Watersheds Council may be effective at communicating with private residences in partnership with the Backyard Habitat Certification Program.</p>



*Restoration Focal Actions*

## Boardman Watershed

*Watershed Focus: Sustain and enhance cold-water inputs, restore riparian areas, conserve and restore oak woodlands in the uplands in the Boardman Creek Watershed.*

### In-Stream Focal Actions

<p><b>Confluences and Refugia</b></p> <p>Restore confluence of Boardman Creek with Willamette River (Action #39 underway).</p>	<p>North Clackamas Watersheds Council is leading the development of this project. Implementation will require partnership with private landowners.</p> <p>Project design, implementation, and maintenance require coordination with Oak Lodge Water Services.</p>
<p><b>Fish Passage Barrier Removal</b></p> <p>Evaluate bedrock channel passability; remove the barriers at Walta Vista Drive and River Road (Action #36).</p>	<p>North Clackamas Watersheds Council is leading the assessment of the bedrock channel.</p> <p>The road crossings should be evaluated in cooperation with the Oregon Department of Fish and Wildlife and Clackamas County, and Oak Lodge Water Services.</p>

## Riparian and Wetland Focal Actions

<p><b>Title 13 Habitat Area Buffer Enhancements</b></p> <p>Enroll Class I and Class II riparian habitat areas in Streamside Stewards program (Action #03).</p>	<p>North Clackamas Watersheds Council, Clackamas SWCD, and the Backyard Habitat Certification Program are best positioned to work with private landowners.</p>
<p><b>Areas with Groundwater near the Ground Surface</b></p> <p>Evaluate wetland enhancement potential in the area of shallow groundwater near the intersection of Vineyard Ave. and Vineyard Rd (Action #21).</p>	<p>Clackamas County is best-suited to address flooding risks and floodplain reconnection opportunities. Clackamas County also regulates floodplain land use.</p> <p>Oak Lodge Water Services could evaluate wetland enhancement as part of their stormwater management program to address hydromodification.</p>

## Upland Focal Actions

<p><b>Commercial and Industrial Property Stormwater Management Retrofits</b></p> <p>Evaluate stormwater quality and quantity management retrofits along McLoughlin Blvd (Action #30).</p>	<p>These organizations manage the roadways and/or stormwater management plans: Oak Lodge Water Services, City of Milwaukie, Oregon Department of Transportation.</p> <p>North Clackamas Watersheds Council may be effective at coordinating with commercial and industrial partners and writing grants to fund retrofits.</p>
<p><b>Residential Property Downspout Disconnects</b></p> <p>Evaluate stormwater quantity management retrofits in lower watershed near borders with Rinearson Creek and Willamette Drainage watersheds (Action #17).</p>	<p>Oak Lodge Water Services has authority for stormwater management in this area. Clackamas County administers building codes.</p> <p>North Clackamas Watersheds Council may be effective at building partnerships with private properties.</p>

*Restoration Focal Actions*

# Rinearson Creek Watershed

*Watershed Focus: Sustain and enhance cold-water inputs, enhance wetlands, conserve and restore uplands in the Rinearson Watershed.*

## In-Stream Focal Actions

<p><b>Fish Passage Barrier Removal</b></p> <p>Evaluate passability of steep channel downstream of former dam impoundment and partial barrier at upstream end of Rinearson Natural Area (Action #37); and</p> <p>Remove barrier on Rinearson Creek under McLoughlin Blvd (Action #38).</p>	<p>The project partners (Columbia Restoration Group, City of Gladstone, Private Landowners, NOAA Fisheries) should continue to monitor the Rinearson Natural Area’s performance.</p> <p>North Clackamas Watersheds Council, landowners &amp; Oregon Department of Transportation will need to coordinate assessment and pursuit of removal/improvements of barriers at the upstream end of Rinearson Natural Area and McLoughlin Boulevard.</p>
<p><b>In-Line Pond Disconnection</b></p> <p>Continue monitoring performance of restoration project at Rinearson Creek mouth, especially temperature in former dam impoundment and evaluate disconnection feasibility if elevated temperatures are observed (Action #46).</p>	<p>The project partners (Columbia Restoration Group, City of Gladstone, Private Landowners, NOAA Fisheries) should continue to monitor the Rinearson Natural Area’s performance.</p>

## Riparian and Wetland Focal Actions

<p><b>Title 13 Habitat Area Buffer Enhancements</b></p> <p>Enroll Class I and Class II riparian habitats in Streamside Stewards program (Action #03)</p>	<p>North Clackamas Watersheds Council, Clackamas SWCD, and the Backyard Habitat Certification Program are best positioned to work with private landowners.</p>
<p><b>Oregon Conservation Plan Strategic Habitat Enhancements</b></p> <p>Enhance Glen Echo and Olsen wetlands by improving hydraulic function, managing vegetation, and maximizing stormwater filtration and detention (Action #88).</p>	<p>The City of Gladstone could support wetland enhancement as part of their stormwater management program to address hydromodification.</p> <p>North Clackamas Watersheds Council and the Clackamas Soil and Water Conservation District are organizations most likely to succeed with work on private lands.</p>

## Upland Focal Actions

<p><b>Commercial and Industrial Property Stormwater Management Retrofits</b></p> <p>Evaluate stormwater quality and quantity management retrofits along McLoughlin corridor (Action #32).</p>	<p>These organizations manage the roadways and/or stormwater management plans: City of Gladstone, Oak Lodge Water Services, Oregon Department of Transportation, and Clackamas County.</p> <p>North Clackamas Watersheds Council may be effective at coordinating with commercial and industrial partners and writing grants to fund retrofits.</p>
<p><b>Residential Property Downspout Disconnects</b></p> <p>Evaluate stormwater quantity management retrofits on the terrace above Rinearson Creek adjacent to McLoughlin (Action #19).</p>	<p>Oak Lodge Water Services and the City of Gladstone have authority for the stormwater management in this area.</p> <p>North Clackamas Watersheds Council may be effective at building partnerships with private properties.</p>
<p><b>Title 13 Habitat Area Enhancements and Oregon Conservation Plan Strategic Habitat Enhancements</b></p> <p>Conserve and enhance oak woodlands in the upper watershed (Action #27).</p>	<p>Clackamas County could adopt Development and Non-Development Tree Code to protect Oak woodlands. North Clackamas Watersheds Council, the Clackamas Soil and Water Conservation District, and the Backyard Habitat Certification Program are organizations most likely to succeed with work on private lands.</p>

*Restoration Focal Actions*

## River Forest Creek Watershed

*Watershed Focus: Sustain and enhance cold-water inputs, enhance floodplain connection and wetlands, and provide fish access to cold-water habitats in the River Forest Creek watershed.*

### In-Stream Focal Actions

<p><b>In-Line Pond Disconnection</b></p> <p>Disconnect creek channel from River Forest Lake (Action #47).</p>	<p>North Clackamas Watershed Council should convene partners and landowners for the improvement of River Forest Creek at the River Forest Lake impoundment.</p> <p>It is currently unknown who the project implementation lead will be due to the private ownership of the impoundment area. Clackamas County and Oak Lodge Water Services may be able to implement this project as part of their temperature total maximum daily load reduction water quality plan.</p>
<p><b>Fish Passage Barrier Removal</b></p> <p>Remove passage barrier at River Forest Road (Action #44).</p>	<p>Clackamas County is most suited to implement this project with support from North Clackamas Watersheds Council and Oregon Department of Fish and Wildlife.</p>
<p><b>Confluences and Refugia</b></p> <p>Enhance confluence with large wood (Action #40).</p>	<p>North Clackamas Watersheds Council should lead the development of this project. Implementation will require partnership with private landowners.</p>

### Riparian and Wetland Focal Actions

<p><b>Title 13 Habitat Area Buffer Enhancements</b></p> <p>Enroll Class I and Class II riparian habitats in Streamside Stewards program (Action #03).</p>	<p>North Clackamas Watersheds Council, Clackamas SWCD, and the Backyard Habitat Certification Program are best positioned to work with private landowners.</p>
<p><b>Areas with Groundwater near the Ground Surface</b></p> <p>Evaluate wetland enhancement potential in the area of shallow groundwater upstream of River Forest Lake (Action #13).</p>	<p>Oak Lodge Water Services could evaluate wetland enhancement as part of their stormwater management program to address hydromodification. North Clackamas Watersheds Council may be most effective at coordination with private property owners.</p>

## Upland Focal Actions

<p><b>Commercial and Industrial Property Stormwater Management Retrofits</b></p> <p>Evaluate stormwater quality and quantity management retrofits along McLoughlin corridor (Action #33).</p>	<p>These organizations manage the roadways and/or stormwater management plans: Oak Lodge Water Services, Oregon Department of Transportation, Clackamas County</p> <p>The North Clackamas Watersheds Council and Clackamas SWCD may be effective at building partnerships with private properties.</p>
<p>Conserve and enhance oak woodlands in the lower watershed, especially on privately-owned vacant lands (Action #23).</p>	<p>North Clackamas Watersheds Council, Clackamas SWCD, and the Backyard Habitat Certification Program are best positioned to work with private landowners.</p>

Restoration Focal Actions

# Willamette Drainage

*Watershed Focus: Sustain and enhance cold-water inputs and restore uplands, especially oak woodlands, in the Willamette Drainages.*

## In-Stream Focal Actions

<b>Confluences and Refugia</b>  Ground-truth potential locations of seeps and springs and increase in-channel complexity (by placing large wood, removing bank armoring, etc.) if the locations are accessible (Action #9).	North Clackamas Watersheds Council and the Clackamas Soil and Water Conservation District are organizations most likely to succeed with facilitating work on private lands across multiple partners and jurisdictions.
<b>Confluences, Complexity, Refugia</b>  Enhance and restoration Elk Rock Island and the alcove as refugia habitat (Action #05).	The City of Milwaukie owns Elk Rock Island with North Clackamas Parks and Recreation District management through an Interagency Agreement. Friends of Elk Rock Island is a key partner to mobilize community members in ongoing stewardship activities.
<b>Confluences and Refugia</b>  Increase habitat complexity of Willamette in other publicly owned parks including RiverVilla Park and Milwaukie Bay Park (Action #07).	North Clackamas Watersheds Council, City of Milwaukie, and North Clackamas Parks and Recreation District are best suited to lead the development of these projects.

## Riparian and Wetland Focal Actions

<b>Title 13 Habitat Area Buffer Enhancements</b>  Enroll Class I, Class II and Class III riparian habitats in streamside stewards program (Action #03).	North Clackamas Watersheds Council, Clackamas SWCD, and the Backyard Habitat Certification Program are best positioned to work with private landowners.
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## Upland Focal Actions

<b>Residential Property Downspout Disconnects</b>  Evaluate stormwater quantity management retrofits near the boundary with Boardman Creek and Rinearson Creek watersheds (Action #20).	Oak Lodge Water Services has authority for most stormwater management in this area, with a small area falling in the City of Gladstone. Clackamas County will need to approve Willamette Greenway Projects.
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	North Clackamas Watersheds Council and Clackamas SWCD may be effective at building partnerships with private properties.
Conserve and enhance oak woodlands (Action #24).	Metro is currently in the process of developing tools for oak conservation. Clackamas County is a critical partner to address development impacts and future policy updates. North Clackamas Watersheds Council, Clackamas SWCD, and the Backyard Habitat Certification Program are best positioned to work with private landowners.

## Connecting Communities & Habitat for Long-Term Watershed Health

The intent of this plan is to provide flexibility and resources for those using this plan. In addition to restoration actions, this plan includes a unique opportunity area approach to watershed health planning. In Chapter 3 of the action plan, you will find:

### Connectivity Opportunity Areas

Ease of mobility between riparian or upland environments is critical for wildlife to access required amenities such as food, cover, and mates. In urban watersheds, many potential barriers to wildlife movement exist in the form of roads, size of natural habitat, and fragmentation. Habitat connectivity is an important strategy for wildlife conservation and provides both enhanced resilience to changing climate conditions as well as harnesses potential for greater access to nature for people.

A number of the restoration actions identified in the plan consider connections between stream, riparian/wetland, and upland habitats. However, there are significant knowledge gaps and competing agendas as to where connectivity efforts are most strategic. Opportunity areas identified in the plan provide the ability to narrow geographic areas for further assessment.

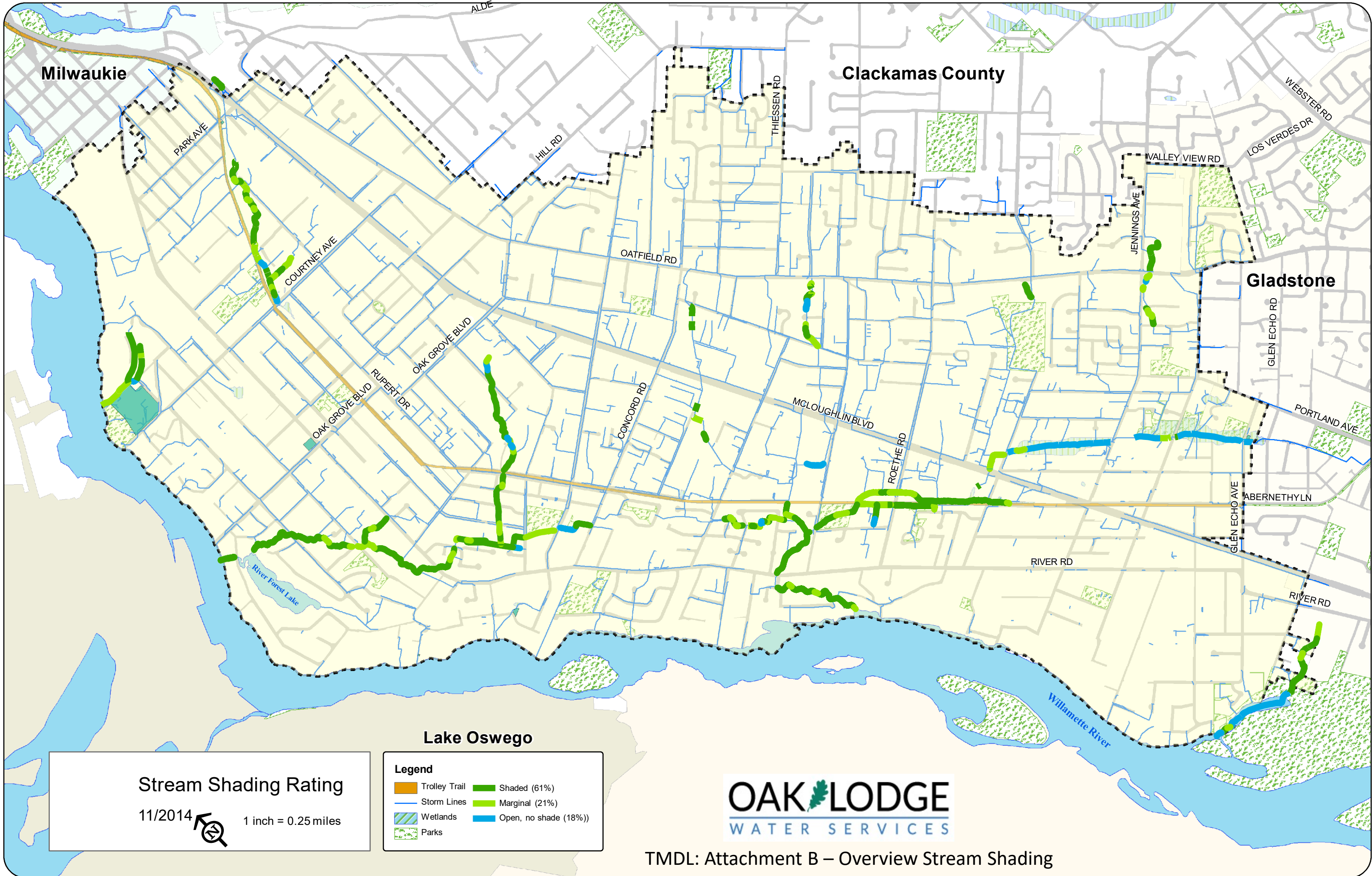
### Community Opportunity Areas

Equitable programming, outreach, and access to nature are complex concepts that require input and participation from a wide variety of stakeholders. A successful community-centered approach is an interactive approach, of which the specifics should not be prioritized by a planning team. Rather, involvement of the community and authentic relationship-building is key. This plan provides a portfolio of community opportunity areas to provide a variety of locations where partnerships can be developed



to explore community needs, advance equity-based activities, and harness community support to meet healthy watershed goals. Community Opportunity Areas are highlighted for each watershed using a combination of approaches including:

- **Identification of a set of community hubs:** schools, affordable housing clusters, public parks and trails, and community centers;
- **Highlighting high-medium-gap access to water resources** and proximity to current and proposed restoration areas using spatial analysis; and
- **Overlay of available data to support equitable investment of resources** including Metro Regional Barometer’s equity focus areas to compare and contrast with Metro’s ongoing equity efforts and narrowed further with recent racial and english learner data from local schools.



### 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%)

